

OTA FOLLOW-UP TRANSCRIPT

RURAL AMERICA AT THE CROSSROADS



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OPENING SESSION

INTRODUCTION

FRESHWATER: I'd like to thank the Foundation for Rural Service for helping us pull this conference off. I really appreciate the work that they put into it and their support. And I particularly want to thank TVA for its support of TVA Rural Studies at the University of Kentucky. Let me tell you what we're going to do. We're going to have three presentations based on the papers that we received, starting with Linda Garcia who was the original leader on the OTA study, and then we'll break into two discussion groups, then we'll have lunch and then come back for the last few questions. We'll try and wrap it early this afternoon. I really would like to get as much discussion as we can. We have microphones throughout the room. They're fairly sensitive so they should pick up all of the discussion. Unless anybody has anything they want to say as a preparatory remark I'd like to ask Linda to come up and give us a bit of a background and her perception of the OTA study.

GARCIA: I'm a little afraid of David's mallet because I have been used to speaking with Congressmen which you had to reduce your comments to like five minutes or 20 minutes at the most and I've been teaching academia and my first class in 20 minutes I finished my lecture, so now I'm up to three hours so I worry a little about that. It's very, very nice for me to be here to talk about the OTA study. I was there for 20 years. I worked with OTA and this perhaps was my favorite study, and I say that not just because over the course of the study we met so many nice people some of whom are here but also we had the pleasure of discovering a solution or what we thought was a solution which is very rare and I guess it's the policy analysts' reward. But there's another reason and that's because I think the rural study is for me proof of what I used to say about OTA which was our process was every bit as important as our product. And when I look back over the elimination of OTA a year and a half ago I realize that this what I think we've lost. We've lost the ability to do that kind of a process and so in my remarks I'm not just going to talk about what it was that we found out but I'd like to emphasize how we came to those conclusions and why I think that an OTA or technology assessment function needs to be performed if we're going to solve these without interdisciplinary problems. And I've said already it was somewhat different and working in academia I can tell here and I can see a lot of the differences and I thought about it a lot subsequently. But what it was that we did that was really quite special and I think for one thing we were very interdisciplinary. We tried to put together teams that had different backgrounds and we tried to use the dialogue and sometimes argument among the teams to come to some higher level or transcend some of the old way of thinking to a higher level of thinking. We also relied tremendously on outside experts because we were generalists. I used to pick people because they knew nothing about the subject rather than because they knew something about the subject because they might get out of the traditional pattern. We also had a public discourse. In some way or another we built into each study a way to reach out to people and to get their input back to us which gave us a very big review. My students are hesitant to turn in their papers early because somebody might find fault with them. Our method was to get it out there. Get it out there to recreate it in the light of what it was people said to us to test our hypothesis over and over again. And as I said we were generalists but I think really what I miss as an academic is that we had a flexible, non-formal process. You could not convince anybody at OTA that we should write down the OTA process. Everybody protected the right to in fact watch classes as it evolved depending on the kind of studies that we did. And I think the rural

study as I'll describe was one of the most innovative in how it reached out to the public and brought broad information in it. David was, of course, the one that inspired this study. He came to OTA and asked us to look at how telecommunications could help to prevent the decline of rural America and how given the cost it might be deployed there, and that was a very exciting topic. We had just finished a major study in telecommunications policy and so we were trying to apply some of the things that we had learned in that. One of the first things you do after you design a project and go back to your requestor and say is this what you want is we put together a panel, and it's a panel of advisors who are there to represent stake holders, they're to be experts, and they're to be part of the general public. Don Dillman was there, Ed Parker was there. Our chairman was George Connick from the University of Maine who I think was a visionary in distance education. But my director at OTA asked me right before I was going on vacation to Washington State where's your person off the street? I mean this is a study about rural economic development. You need a regular person. I said we also have Roger Noll on the panel and I couldn't see a regular person and Roger Noll having a great conversation. So I said how do you get somebody off the street? Do you just go outside and say do you want to be on an OTA panel? Well, fortunately I was backpacking in Washington State and we took a boat across Lake ???????? to go to Purple Pass and on the boat there was a gentleman there and he was doing some work for the state for the summer but his full-time job was a bus driver and ambulance driver and he came from he mentioned a city in the middle of Washington State. We were having a really good conversation and I said how would you like to come to Washington. He'd never been out of Washington State ever and so he agreed, gave us a piece of paper. My husband put it in his pocket, my husband of two days, put it in his pocket and carried it around in our backpack. And when we got back I called him up and said would you like to be on a panel and sure enough he was a fantastic panel member. So that's the kind of innovative—well, let's say the flexibility we had to put things together.

And the second thing is as I said we tried to put together a team of people. Now, I called Columbia for some advice about how to find some bright, not too expensive person to come work on our team and it was when Martin Nelson was there at the time and five minutes later a young woman calls up and said I want to come work on this study. The next day she was down in Washington for an interview and she's very, very, very bright, very, very eager, and I said you just got your business degree at Columbia University, why aren't you going to Wall Street, and she said I want to do something meaningful with my life. I said you're hired. So this is the way we picked people, the way we dealt with people. It's very different from what you do if you're in a bureaucracy or what you'd do I would say in an academic environment. Now, we met with this illustrious panel, and I'm from Patterson, New Jersey. I don't know if you know anything about Patterson but it's a pretty urban city, not very pretty either. And the first thing the panel said to us was how can you from the urban east do anything on rural development? What do you know about rural? I have a summer home in northern New Jersey and we still had a rotary phone but that's about the best I could say. So they said you need to go out there and you need to get on the road. Now, OTA had never financed for three of us and sometimes four, the team of people to go out on the road and spend the taxpayers money talking to people but in fact this is what we did. And I took my program manager on the first trip because we wanted to get him to buy into this new approach or scheme. This was the inside out view. We planned to go to Iowa as well but these are the states we chose to go to and we picked them because they had some different problems. Like we took Washington State because it had an east/west problem. We picked New Mexico because it had some cleavages having to do with ethnicity. We picked Maine because we knew that they were doing some interesting things in education. And we picked Kentucky as none of us had ever been there. And we planned it very, very well. We started with Kentucky in the fall, and when we got cold there we went over here to New Mexico, and then in the spring we went to Washington State, and finally just at the end of the

spring we ended up in Maine which was delightful. I'm going to come back to that slide. But we weren't only innovative I think in terms of the approach we took. We were also innovative in our paradigm.

At the time, and I think even today, regulators in the U.S. are not conscious and they don't really consciously take into account social cost and benefit. They tend to look at individual users and at individual cost benefit analysis, and that has some difficulties when you're talking about economic development. They didn't even had an approach and I think that research should be done, especially in universal service areas. How do you measure social and economic cost and benefit? And that makes sense if you look at U.S. regulatory history. The policy developed at the turn of the century when we were concerned about monopolies and industry structure and we were concerned about individual consumer cost. But the world has changed somewhat and we have some other concerns. So I think it was a big mistake that they looked at it that way because once you say the individual is the user then in fact you can say all the people need is regular plain old telephone service in a rural area and the notion of getting advanced services doesn't come through if you're looking at the individual as the driver of the market. Also you tend to overestimate the cost this way because if you look at the individual user how do you share the cost. But if you look at the community as the user and you look at community development as the purpose, then you can spread your costs widely across the community, and technology is moving in the direction that allows for sharing and allows for this to take place so this was missed. This whole idea was missed because of the focus on the individual.

The second thing that was happening is the government, it was focusing on the industrial area as the backdrop against which one should measure needs. So they were looking at how people had needs in the past and they weren't thinking about what kind of needs they were going to have in the future. And this is a real problem when you see that word I would say at this juncture in our history where the kind of things that drive our needs economically, socially are changing tremendously. So they had no way of thinking about the future and this is the kind of thing that we tried to do. We began by starting with the goal as opposed to starting with the technology. We said, well, let's not look at how to get technology out there. Let's define what we mean by economic development first and I think this is a very good thing. One of the things I teach my students in my classes is to start out by asking what you want to accomplish and then see where telecommunications or information intersects with that. So we started out by looking at what we meant by economic development. As you see we defined our goal of economic development broadly as well in terms of community development, individual ?????????? in a community. And by defining the goal broadly you'll see we also ended up finding some ways—well, these things were all linked together. We also looked at trends instead of what are communities going to need to have in the future. So we looked at how they would be impacted by globalization and the increased competitiveness.

We looked at how difficult it was for rural communities being that they were largely in extraction industries how they were going to deal with the problem of constraints of the environment which were greater and the burden was greater for them than for other urban communities. And also the shift to an information based economy where you have customized mass production and where information plays a much more important role in terms of services and in terms of manufacturing. So I'm thinking about how would we use the technology and began to think about what kind of strategies for development would we use in order to look at where the technology could fit in. We talked about how would you use technology to build individual capacities. How could you use it to enhance entrepreneurship and enterprises in the rural areas. How could you build social community organization capacities and enhance community resources. These are things the FCC is not considering when it's doing its universal service field I think. We also looked at where the technology was going and these were eight trends that we looked at and we had developed these before but we were

trying to figure out how do these trends affect the way in which rural communities might have services delivered. How they might finance them and share costs and we began to evolve an idea in our head about maybe there's other ways of paying for this. If you start out by asking the question what is it that rural communities need and we were beginning to say what they need is advanced services given a global economy, given the problems that they face, given that you look at the community as the user, then you begin to think are there other ways to finance this. You don't start out by thinking if you speak about ?????????? you must mean subsidies because that's the paradigm that Washington people think about. So we looked at this and we began to think, well, we need a new architecture or we need a new way of developing a pricing system and we made a criteria for ourselves. Criteria for the policy options being it had to be market driven. So we tried to eliminate the concerns of regulators that we were talking subsidies or whatever. We said our policy is going to be market driven. Now, as I said, our trips to the rural areas sort of matched our own analytic work at home so we would do some work, go out to a community, come back do some more work, go out to the community and get refreshed and test our hypotheses as we went along.

So in order to tell you the rest of the study I sort of have to tie it into our trips because we didn't—I said that we discovered a solution and that is the truth. We discovered it by virtue of the fact that we kept talking to people out in rural areas and I will tell you exactly where the idea came. We started out, as I said, in Kentucky and we started out in Paducah. Now, we learned a very big lesson about rural communities and that is Kentucky is a very large state and we had planned our time totally wrong. We had no sense of how large it was so we scooted across and we had hoped to get to the east and never made it because we took too long, but we followed this route. We started at Paducah, and then we came along here and we went up to Owensboro which I fell in love with, and down to Glasgow, and then we came up to Lexington. And that was a nice way to do it because we had heard all these complaints, and ideas, and concerns from people along the way, so when we got to Lexington we were educated about what kind of questions to ask. We went to talk to Lou Swanson who was a contractor for our study and contributed a great deal for how thinking about rural areas and we asked some good questions that gave us a sense of what was going on. So we began to think about context because the other thing Kentucky has is 120 counties and when we went from one economic development office to the next nobody knew what anybody was doing. Nobody, and they were very competitive for the state's resources, and we began to think about this is a constraint because we're thinking sharing and in fact they weren't even speaking. So we also began to look at the strategy that they had for development and Kentucky had a strategy of I think import foreign investment and looking at a way to use foreign investment to develop service industry and will develop industry in the state. What we did is we found each state had its own strategy and were very unique. So we began to build into our notion of policy what did it have to be. Well, it had to be flexible so that it could meet the unique needs of each state. We went back home and then we came back out to New Mexico and here we were looking at if Kentucky was divided by counties, New Mexico is divided by ethnicity. You have Spanish people, you have Anglos, and you have native Americans and their view of the world is that it's a zero sum game. So then you have a problem of how to reconcile competing interests within the state. Now, in New Mexico the strategy was let's look to the government and it has a long history of the defense industry, Bureau of Indian Affairs looking to the government for in fact something, and their idea was we're going to build a prison. It was a depressing thought from my point of view and I turned Grant, New Mexico into the most depressing place in the world but they didn't have a vision of getting beyond. They didn't look at how they could use the technology to get beyond where they were. They were trying to find a solution that they could do at hand and they even said to us we don't care about education because we don't need really educated people to run a prison. So it was a really different approach from Kentucky but it was a strategy in itself and I do think they even have more prisons since we were

there. Then we went to Washington State and we were at the point where we were beginning to think about new financing measures, technology changes, what the new options were, and we started out in Spokane and we went up to Newport where there's a crazy librarian who has wonderful, wonderful access to all sorts of technology, and then we came down to Pullman. We met with Don and some people there and we began to talk about an educational institution is an information provider. We began to look at information providers and communications providers as being functional rather than institutional. Well, these universities are providing long distance education. Why couldn't they become the service provider of the future we began to ask ourselves. And one of the ways we determined our conclusions is at nighttime we'd go out for dinner and we'd have this wine and we'd argue about what it was we had heard and this is how we resolved our differences and transcended ourselves. So we were riding along Route 90 having visited these educational institutions in eastern Washington and when we had asked them, well, what's your strategy. We said the Kentucky people are looking to Japan. People in New Mexico are looking to ?????????????????? What are you looking at? And they said, well, we networked, and their concern was that they were left out of all the ?????????? on the west coast and so they were at a disadvantage and the way they got around that disadvantage when they were talking about human networks is they said we network with each other. That little seed, Route 90 on the way to meet our panel member Lloyd Callahan in White Swan which is where he was, we began to think about networks. We began to think about alternative ways of provisioning services. We began to think about universities as players, hospitals as players, and we said, well, there's LANS and I must say the whole notion of metropolitan area networks came to mind. Businesses share costs on the basis of their functional needs. Why couldn't a community share costs on the basis of a geographic need.

So it was on Route 90 that we began to think in terms of what we call, and I thought it was clever, rural area networks, RANS, and so this is why I think going to the states where we discovered and we discovered it as a result of interactivity with people. We went out to Seattle and we found in fact some really interesting ways of especially places like Forks that were heavily dependent upon timber, that there were efforts by the state to try to use information technology to help them shift to other kinds of industries. My husband is an environmentalist and when I told him information technology could save trees he laughed at me and said I was crazy. But in fact we're finding out that these new kinds of industries can in fact help to preserve resources. Now, we get back to Washington and said we have the answer, a rural area network, we have the answer. And they looked at us and said you're crazy, it could never be done. Then we went to Maine and Maine was very important to us because in fact Maine had a rural area network. It was doing just what we had said should be done and it was working. We met with—we started out in Caribou and I can tell you that's when I began to see rural. I'd seen Maine way down the state and we ended up in Bangor. We ended up where we were at a rural telephone conference in which we got a real big ear full that all the things we were doing—the government was doing wrong, and then we went to Augusta to see the university system. Now, how did George do? How did he get a rural area network going? He told us it wasn't easy but he said the benefit was that Maine has very few people who are decision makers and they all go to the same cocktail parties. He said that at one cocktail party he talked to this guy from New England Tel and told him we need to have this fiber laid so we can have a network across Maine, when can we get it, and the guy said 2010, and so he decided they were going to do a satellite network. They were going to bypass the telephone system and pretty soon the guy from New England Tel came along and said maybe we can get it there a little faster. But there was the problem of the up front costs because in fact there's a lot of investment and are people going to use it. Where's the demand? It's the chicken and the egg problem. Well, George was very clever in thinking about communities, thinking about education as a service communications provider. He went to the Department of Education. He didn't look within the telecom institutional framework.

He went to the Department of Education and got a Title I grant to use for telecommunications. He goes back to the state and he says will you match it. Then he went to the telephone company and said, look, if we can up this up for the up front costs can you help us with the rest, and they now have fiber all the way across Maine. So it was unique way of using the community. Using all the resources available if you think about the community and if you think about—if you think about the community and if you think about all the users together as a body of people taking advantage of telecommunications services. And this is what we conceived. This was our idea, that if you brought together institutions and linked them together and aggregated the demand, that in fact you could justify advanced services to rural communities and that there was a way of paying for them. That each area had to look at a very unique—you had to look the unique situation but the communities working together or the institutions working together would be able in fact to do this. Now, I'm a social scientist, not a technologist or an economist, so I was also happy that the rural area network met what I called my social science criteria. We talked about Kentucky and the problems we saw with cooperation. We said rural area networks are really good because they promote development of technology by pooling users and they provide economies of scale. They're also made for shared usage and in order to develop them institutions have to work together. So that's the notion of a rural community supported community networks, not just technology networks. It was said they would overcome some of the technology expertise problems because people could share expertise as well as technology. And they would also induce communication providers to look at rural communities in a different way and to perhaps look at needs in a different way as well as regulators in Washington, DC.

When I think about this five years later I'm very glad our report had a shelf life, but I think that the challenges that we're going to deal with in the future for rural communities are going to be only greater. And I'm not sure that the FCC has kept up with looking at the long-term needs that communities are going to have. Two of my subsequent reports at OTA have led me to think about this. One was a study on electronic commerce and if you look historically you will see that business drove the way the network evolved. It's my opinion that it's going to drive it in the future. None of us has to ask what is a business going to look like. Well, in our electronic commerce studies what we did is we began to look at what are the drivers of electronic commerce and we saw that it's really the ability to reduce transaction costs to work with the networking because here we have a whole process of how you reach a purchase between a buyer and a seller and if you can put them together with a network you really reduce your costs. We see these networks developing more and more between industries, across global boundaries, and you begin to see that networks are what we need access to, not particular technologies. And I guess if I were in that technology group of discussions I would say we need a platform to do business on. We don't need a particular switch or something like that. We need to think about how it's integrated together and I think that's one of the things we have to move towards in the future. And the second thing that really alarms me is I think that the issue of rural areas domestically is going to be really replayed out globally in a real tremendous way and that some places are going to maybe fall off the map. Now, the reason I think this—and this is green because I used this overhead when OTA was going down the tubes and all they had left were green overheads and I couldn't get new ones. In the last scenario that OTA was looking at global trade and whether there were opportunities for trade and we looked at the scenarios for how technology was going to be deployed globally and there were many alarming problems. But one of the things if you look historically at network deployment you see that you have to get a critical mass of a certain point and that point is around 15 percent of teledensity. And if you think about ??????? wonderful paper on network tipping you realize that networks have life cycles. Now, if you look at where some countries are this is their teledensities. They're nowhere near 15 percent. They're nowhere near the takeoff stage and yet in a global economy they have to compete with an unregulated environment in

which they have to find the way to fill that gap, and if they continue to stay regulated they're going to be bypassed by the global economy. So I think this is a really serious question and something that needs to be explored in the future. And I guess I would encourage that as we think about solutions in the U.S. we should think about the rest of the world as well because we could have a world of cities where everything else just falls through and I think that is a really big problem for the future. I hope I've encouraged everybody. I mean there's no OTA anymore. I teach my students technology assessment but I hope that places like the rural centers will in fact use a more open framework for developing policy analysis because I find it really quite fruitful. Thank you.

FRESHWATER: Thank you, Linda. If there are a few brief questions for Linda we'll take those now and if not then I'd like to ask Bruce Egan to come up and give us a background on some of the synopsis of his paper.

EGAN: Thank you, David. Greetings. I'm happy to be here. I actually had a nice presentation with pictures and everything and it's not here. So I'll wave my hands. I did prepare a few overheads but I think that I'll try to be brief so that we can have some more time for interaction at some point because I have a feeling Ed, and myself, and Linda, and Ed will have a lot to say that hopefully will energize some of you. I don't know if you can get energetic this early in the morning but we'll see. Kyna was nice enough to get me some blank transparencies and a marker but the marker doesn't dry. I guess the object is do it the night before or something, I don't know. In fact it was messy because I put another geograph on one I finished and, of course, that just messed it all up. So I have enough college degrees to figure out if I just separated them, with paper, the way you buy them in the store, that doesn't work either because then the paper soaks up the ink. So it's half there. You may benefit from me not having my full talk now because I can more directly go at the questions I was asked to respond to when I was originally asked to participate in this project and which are the questions that you all know about from the old OTA study.

However, I'm not sure I like the framework of the question and I'm going to discuss it in the context of the three angles I think that are going to interact to either bring rural America up to speed on the information super highway or are going to be roadblocks on that highway—technology, economics, and policy. Let's look at the first of these. Investment in technology and the adoption rate of technology, these are these issues, and, in particular, I'm referring to digital services generally speaking however they arrive. Whatever delivery system including wireless telecommunications, digital wireless to be exact. There is no technological roadblock to providing good digital service in rural areas. I've become very much convinced of this. What there is, interestingly enough, is a government roadblock to technology adoption and that's why you don't see neat things happening technology-wise in rural areas. On this I can speak somewhat authoritatively. I don't know if you know this or not, I live in a town myself of 4,000 plus people in Jackson Hole, Wyoming. I'm on a nine-mile long loop. It's very difficult to get service on a nine-mile long loop. I'm north of town. But the fact of the matter is I have decent service. I've got a hell of a lot better service than my friends in New York and this is an experience with many of us who live in rural areas. I don't think there's any big issue there. The large phone companies often fight you when you want decent service anyway and we all know the technology's there. The difference is in New York there's 50 other ways to get a T1 connection to your location in the downtown area. In Wyoming there are zero and so if the phone company won't do it, you don't get it, and you're going to see these interrelationships as we go along.

But let me go back to my original point why do I have great service. Because entrepreneurs come out of the woodwork. Just give them a little opening and they'll be there even in Jackson Hole and I have excellent Internet service now. I was recently at a meeting of my friends, and colleagues,

and my consulting company, we're a virtual organization. I don't think any of us are within 1,000 miles with another. Most of the officers of the company aren't within 1,000 miles of one another and we get along fine. We do great. I'm not sure any of our clients know exactly where we all live. Some of you probably thought I was in New York and my virtual existence is entirely capable at Jackson Hole. No problems. Me and my friends all make lots of money and it's easy and we don't have to be anywhere to do it. And, of course, I'll get to this at the very end, it's an education process that allows all that to happen. If you don't know how to use this technology you're not going to make a lot of money living out in Timbuktu and you have to move to the city. So I don't, some of you may know a guy named Foster Friese who runs the Brandywine Fund. The Brandywine Fund is a major multi-billion dollar investment fund. He's my neighbor and he's usually home. Very interesting. I'm not alone and so the question is what allows that to happen. That's really what this is all about. How can we get away with it. And it's not a technology problem, that's for sure or, my goodness, who needs to know information quicker than a manager of an \$8 billion investment fund. You better be just as good as the next person I'll tell you and being fully electronic, of course, can make it that way. And in fact that's his situation. He runs that fund from Jackson Hole. I'm not kidding. You might say, oh, well, sure, he's got branch offices in New York City. Not true. It's not done from New York City. I was surprised at this guy and I said to myself, wow. Yeah, he's got people all over the world now. You don't manage that much money and not have people all over the world, but every major decision in moving funds around is made in Jackson Hole, and, of course, that has to be done instantaneously. So there's very little to discuss about lack of technology being the problem in rural areas.

TRAINOR: Are you going to explain the government roadblock part of that?

EGAN: Yeah. That comes in the policy part.

TRAINOR: It was an important little thing and I didn't want to lose it.

EGAN: Yeah, I've trifurcated my talk because, by the way, I just finished a book which I want to advertise to you all later. It explains everything including, Brenda, a chapter explaining how technology, economics, and politics, and institutional factors all interact to give you a result in a telecom infrastructure. I discovered it helps to separate things and say, well, it's not a technology problem so let's look at it over here and that's essentially what I've done with my talk today. I'll tell you the business person will always blame economics on government. Government will say we need to jump start it and the business has no control over this. That jump start threshold is not ours to control and so it's a government responsibility. And the government says I don't have enough money and the taxpayer won't accept this and it's just an endless loop—of blame institutions, blame business, blame government, blame technology. And then, of course, ultimately someone will say, oh, the technology's not there. Economics is really an economics of opportunity.

When I moved from New York City to Jackson Hole I was terribly concerned. My god, I'm going to be accused of being out of touch. No one's going to think I can be on top of the world out there and they're not going to hire me anymore. They're going to forget about me so I figure, well, I better hide this fact. I've got a virtual address in New York, still do, New York's my second home. I still have an office there, and I still teach there, and I still do research there but I do it mostly from Jackson Hole. But the point is I risked it all when I moved because, Eli Noam, my friend and colleague in New York, he said, hey, you're crazy. You're not going to be respected anymore in academic circles certainly not in New York or anywhere else. You're just not going to be respected and you're going to be out of touch. He's partly right, we don't get the New York Times in Jackson Hole until

2:00 p.m. That's the first jet that arrives with the newspaper. There is a slight problem there which interestingly lately the Internet has solved for me. But there were those risks which turned out to be not true. So it's ultimately really the economics of opportunity. Can you go to a rural area and be successful because if you do then you quit commuting and wasting your time going to the city office. Is there economies of scale? This used to be an important factor. I'm happy to say, folks, that the answer is now, no, this is not an important factor. This was a revelation to me. As an economist this is truly a revelation. It was always thought that this was the problem. Well, it turns out, Brenda, that's it's the government's fault.

TRAINOR: That's what I thought.

EGAN: And by the way, I'm speaking on behalf of technologists of which I partly am I one because I've hung around with enough eggheads at the engineering labs to get dangerous, and I am an economist and I am now convinced that the economies of scale problem isn't there. In fact I have worked for some of your companies and they tell me, hey, I can get vendor price discounts on my equipment purchases similar to what RBOCs get. As a collective rural holding company I'm not at a disadvantage there. Furthermore, I have done some very careful analysis of rural telephone data lately. You are more efficient operators if you hold constant the distance that people are from the switch, and in fact the proof is in your urban areas. You're more efficient than an RBOC. That's interesting and it's a fact, unless the numbers lie, and I try to look at as many companies as I can with as much data as I can. So what appears to be the economies of scale problem, which as all of you should be aware, it's a declining long-run average cost curve that yields economies of scale. It's not a factor once you reach a density level that most of your companies have in villages and towns. The issue, of course, is the hinterlands, and, guess what, it's not an economies of scale problem. It's not the issue there. Economies of scope, these are not the problem. You have them. You have more economies of scope than large phone companies do. How do I know that? Well, it turns out I found a lot you are sort of sharing your essential buildings with cable TV head ends. That's very efficient. Large companies don't do that. There's a lot of those little economies of scope types of efficiencies that you practice partly because regulation has allowed you to and large companies don't.

TRAINOR: One point for government.

EGAN: No. One point for government, my god, that's my point. That's a government failure. You're just too little and they don't care about you. If they thought you were powerful enough to do anything bad they'd pass rules that would screw your business too. That's what government does. It's a steal from the rich and give to the poor, and get money from both sides to keep it that way and that's what they do. That's why phone companies don't share with cable and cable don't share with phones. Again, just read my stuff. It's monopoly turf allocation. That's what governments do and they do it well. Lobbies represent monopolies, monopolies want turf, and the government's the only way, in an otherwise normal business environment, that can accomplish the clear separation required for that environment. Economies of scope are just as much existing in your business as they are for large phone companies I suspect. I haven't seen any formal statistical analysis that refutes the proposition that your economies of scope exist to the extent that they exist for large providers. A lot of rural company people will say but, it's all done with money. They've got deep pockets and we don't. That's not true. It boils down to profits and profit margins as far as I can tell. Yes, their total profits are high. Your margins are probably high but you never had the opportunity to sell out. If you're not happy with your profits sell out to the big people with the deep pockets or build consortiums. Now, what allows me to say much of what I'm saying about economies of scale—I must admit this and this is a government victory to undo an old government mistake—is open interconnection policy.

This is solely responsible for the observation that I'm making. You don't have decent interconnection, you don't have this.

TRAINOR: The ones that work.

EGAN: No, you're right. If you don't interconnection then this is an issue. If you don't have this you've got an issue because I'm going to tell you right now rural companies can't make it without interconnection and you know that. Your lifeblood has been your interconnection to the rest of the world and there's a fact which allows you to act like a large phone company in terms of the services you offer. It is only but for this fact here. And, of course, the government has done an absolutely abhorrent job of opening up to market interconnection. This is why Internet service changed Jackson Hole. It's why US West won't give us good service where we do not now get good service because US West has been provided by the government with every incentive not to provide interconnection. And you know why? Because interconnection is critical for a new entrant to use new technology and enjoy economies of scale at the go-down. And by the way, some of you are bullish perhaps about future wireless systems in rural America. They are flat out winners if the government will get off their ass and do two things. Give reasonable spectrum allocations to these services in rural areas and quit being stingy and using urban engineering rules as if this is a blueprint for every town in America because that's a problem. You can't get the power requirements and the coverage you need to make it work and secondly you can't get cheap interconnection with the incumbent. Now, it's funny I'm saying this while you run incumbents. Well, hopefully some day you'll be running wireless entrants too and you'll get a real appreciation for how important it is if you interconnect at some type of nondiscriminatory cost based rate with that incumbent. Otherwise you can't reach the scale of operations that you need to make it go. So you can see how important interconnection is and that this all hinges on whether you have it. If you don't have this, you don't have your business. And so the government should get out of the way and say every phone company in America—of course the new law has tried to do this—every phone company in America had better practice good nondiscriminatory interconnection practices, and they mean it, and they're going to enforce it. And you know what that does? Watch the opportunities flow. They will flow like mad and my local Internet provider in Wyoming will be matched ten times over by new entrants including wireless services. But wireless has a special linchpin as well. Remember I said wireless doesn't need just interconnection, it needs the government to understand the rural areas aren't big cities and the powering requirements and the spectrum usage restrictions and assignments to each service provider are what determines whether or not it's a go in that business. Why make a rural carrier be victimized by engineering rules that are straight out of the book for urban areas that some FCC engineer, who's not paid very much and works probably very hard, just follows the rules. That's it. Externalities, jobs, and income is what it all is about and this is the other thing that, of course, I think Linda's report with OTA and others have shown. Ed's has certainly shown and Heather Hudson and others, Don and others, that externalities is where it's at. People don't realize the external benefits you get from a handful of good policies and the jobs and income flow because the opportunities flow. And finally I will address political and policy issues. Regulatory reform is absolutely critical. Here's where your problem is. If you don't have enforced, nondiscriminatory interconnection you will continue to have very slow rates of technology adoption in rural areas—period. If you continue rate of return regulation at broadly average subsidized rates you will stifle technology adoption in rural areas—period. So you might ask, but, you're getting rid of my subsidies and my cost plus operation. Are you crazy? I'm never going to back that. That's not true. You would back to it if you got the right deal and here's the right deal. Free me up, regulator, to do whatever the hell I want in every business I want where I can make a go of it without your jurisdictionally separated revenues, without your subsidies. Then

let's focus on the true problem which is areas where I can't make a go of it, and those are more easily worked out. Besides, I don't have to tell most of you there's parts of your business you have to serve and that RBOCs have to serve parts of your geography that really suck. You and I know that many of your subscribers and others are subsidizing certain people. I'm not opposed to subsidies where the market fails. The problem is we never figured out where the market failed because we just want to subsidize everybody including rich folk's vacation homes. And, of course, that has to stop. It's slowly changing, but the fact is nothing's preventing the government from a wholesale change of this policy structure. You might say, oh, that's coming, Egan, wait till next June. It will be all worked out. Joint Boards stuff will all be approved by then. Wrong. Wrong. Wrong. Triple wrong. But I do have a solution. It's in my book. It's very straightforward. I'll give it to you. This is not rocket science, and I think the government even knows this and that they just have a different agenda.

Item one, get rid of rate of return regulation and put in its place something that gives incentives for opportunities to flourish like elimination of profit regulation and replace it with price regulation on services that matter, and I can think of two. Item two, enforce vigorously open and equal access in interconnection. Watch the benefits flow. Number three, subsidize only those parts of the market that need it, and that requires that the first two get done so that you can discover what parts of the market those are. You may say, oh, my god, but the person who lives in the mountains will lose their phone in the process. Again, that's the easiest problem to fix with the new law that I can think of. Nobody loses their phone. This is not hard either. If you're about to lose your phone, please call—I assume you have a phone—please call and tell us that you're about to lose your phone. We'll look at your situation. It turns out as we've all looked at it everyone out there is not the problem. It's only a handful of areas and people who are the problem in terms of subsidies. So, to recap, eliminate profit regulation and go to price regulation, vigorously enforce open and nondiscriminatory access in interconnection. And the last one I almost forgot but I want to be sure, deregulate everything else—period. And my own opinion is rural areas will do quite well because you don't have all the overhead that big companies have. The implementation of this strategy is, number one, localism. I am absolutely convinced that the Feds can't know what's going on where you are. I am convinced. And Steve Wildman and I wrote a paper awhile back saying that the Feds can implement guidelines all day long. Fine. Don't try to set prices in rural areas. It won't work. Why should it work? Some of you got granite and some got sand. There are big differences. And if you're going to eliminate separations, and I'm sure they're going to, that's a safe prediction, and replace it with something else, let's recognize granite, and sand, and water, and different environmental factors. Only the locals can do that. It's a policy of empowerment. It's a block grant approach to things. You might say, oh, Egan, that ends up being corrupt and we'll get Puerto Rico dipping in and a bunch of Caribbean islands, and who knows, Cable and Wireless will be getting subsidized now, and the Virgin Islands—which I understand that that's happened. I mean, look, everyone tries to game the system, do the best he can. No one's going to eliminate subsidy systems, but if someone's concerned, I've got a Ph.D. student that can, at very low cost, go monitor things. He'd be happy to go to the Virgin Islands. Administration is critical, and by this I mean the administration of the plan has to be local. Has to leverage the non-subsidized parts of the market for the benefit of all and, of course, this occurs by creating the right opportunities at the local level. Administration refers to the local champion that a lot of people talk about. You have to have a local champion. You have to have administration that says this is the policy so there's no confusion about what's going on at the state level or even at the city and county level. And I admire places like Austin and others that are trying to take things into their own hands and promote incentives and opportunities that way. And finally it occurred to me when I was almost ready to give my talk and that's education. If I didn't know about this stuff I wouldn't be getting away with murder the way I am in Jackson Hole and I do view it as getting away with murder living in such a paradise, and I'm sure Ed does, and still being successful in what

you want to do and I had to know about it. And a lot of my friends, including some cowboys, don't know about it. They don't know about this stuff. When I tell them about it their eyes get big. I can do that? Yeah, you can do that. Not everyone's going to need a computer and we know the issues with terminal devices and the expense but that's an urban issue as much as it is a rural issue. The fact is rural people have been beaten down so much they think they're just necessarily out of touch and the New York Times can't possibly get to them as quick as it gets to others and, of course, that's what people don't understand anymore. In fact you can get it roughly as quickly and those types of news services tend to be free these days. Thanks, that's it.

MALECKI: Well, I'm pleased to be here and be among many of the people on whose work I've relied over the years. I also was kind of pleased to hear Linda talking about technology assessment. That's really what I began doing when I got out of graduate school—technology assessments of energy development at the time—and I ran into places that I never saw when I grew up in Columbus, Ohio that were very familiar even from her map. But since that time what I've mostly done is to work on economic development, but typically some people call it futuristically oriented economic development, always related to technology. And so telecommunications is something I really kind of picked up very late and I will not claim to be the expert, but they've made sure that the experts were here so we'll sort of work from that. And my paper review, if you had a look at it gives you a overview of a whole lot of things that you already know and you get from Bruce's and Ed's papers really in much greater detail than I have. There's not really too much to say about where the trends are going, how deregulation is going to change things, and we really need to get kind of past all of that. The different technologies, such as digital wireless, satellite connections, and so on, still need to be put in context.

The point is that we're moving data, and that's sort of what the Internet is even if you're seeing pictures or words—it's still a form of data, but the biggest form of data that's moving around is Bruce's neighbor's sort of commodity, which is money. Money is probably the most important thing that's been moved around and this really brings me to the subtext of this entire presentation, which is something that Linda said earlier. Businesses are the drivers of this technology, not rural farm boys or farm girls, and that's really the key point. The banking industry has been absolutely in the lead of everything to do with information technology since the beginning, because they knew this was how to become global before anybody else was global. Now, some of you are seeing the set of choices that we're dealing with, and we may be going way back to the telegraph too and the new version should really even be bigger than this, but the point is there are more choices out there than Bruce's cowboy friends are able to understand, more than most of us in this room really understand. We tend to be pretty path-dependent in our choices. We learn some things well and other things we don't know so well, and the same thing is true of businesses and their choices. It's true of the RBOCs. No one really knows all this stuff and that's why it's important to be able to focus both on what you know and realize there's always going to be more out there. Now, a big chunk of my paper focuses on the bandwidth issue and that's because, in what I have been able to dip into in the telecommunications technology field, there are kind of two paths here. I might have this completely wrong but it seems that moving in the direction of a lot of the digital and even digital wireless and digital wireless is not really the way to go for efficient, in other words moving money around the globe sort of activities, as opposed to pulling up encyclopedia knowledge that's good for a seventh grader in a classroom.

So I come to the point of in a sense taking off from the idea that, well, we don't need subsidies but maybe we do need subsidies, and it has to do with what level of the service are we going to look at as minimal for rural areas, and this doesn't simply mean Internet access but it means broadband, fast, basically instantaneous Internet access. It basically means the issue of, "Do we need a T1 to

every home, rural or urban, or is something significantly less than that really enough?" And this is a real question and a real problem because what we're talking about as far as business opportunities and so on is something that is a whole lot different from what people are really looking at in rural areas. And I think that having people like Ed (Parker) and Bruce living in rural areas is an example of what can be done, but they're not going to live in places that are less attractive than where they are. And this means that we really need to split rural America into several different bits. The easiest way to do it is there are pretty places where guys like that live, and there are places where they would never live or where many of us would never live. Those are the rural areas about which I'm most concerned and which the OTA study was forced to deal with and did in a very capable way. I think that the solution they came up with is a little different than thinking about the T1 that goes right out past your ranch. So I come up with a few questions that are pretty specific and I don't know that I provide answers to these. But I do think that broadband service is probably more important than it's given credit for. I think that it's going to need to be that sort of capability because Web access is something that kids like my son are growing up with. I mean it's absolutely as normal to them as sitting down and watching television, and they know how to use it and they know it's two-way. It's not so passive. The point is not all kids know this. It's still not part of everybody's environment. It tends to still be a kind of an upper-middle class thing and the extent to which all rural areas are able to kind of tap into that class-based mentality is still something that we don't know enough about.

Much of my paper focuses on business decisions and most of this I've really said before. There are firms, especially the global transnationals, that are working on decision-making, control, computing, sending data, ideas and knowledge. They've bypassed the local networks for years. They have their own private network satellite links in which case they're really pulling the technology in that direction. In fact what they're doing is really being out there on the edge and then everybody is kind of catching up with them, and that's the way it's going to continue to be. The point is that firms are really the ones that are determining what technologies are available. It's not what individuals are trying to do. (I was kind of pleased I brought this map along when Linda had that table). Here I've got an out-of-date but kind of colorful map that tells you who's connected and who isn't. This is data from the Internet Society's Web site which I discovered a few months ago was 18 months out-of-date when I tapped into it, which gives you some clue as to the unreliability of the Internet. (I mean not everything you get is really as good as you might have gotten elsewhere and you really do need to check on some of the backup to that). These big companies want more than just speed and bandwidth. They like their private networks because they're secure and they're able to avoid incompatibilities with the national networks in other countries; this is a real major issue. I saw an ad in one of the magazines I brought along with me on the plane that shows some guy trying to hook up his modem in eastern Europe and these two eastern Europeans are looking at this crazy American trying to plug into the technology and it just simply didn't work. It's still that way, and this is why to a great extent all global firms rely on satellite networks. They keep pushing this. Even so, whenever they're trying to hook into the regular networks, even something like a T1 isn't enough for companies like Rockwell. They've gone beyond it in terms of demand already and this means that, okay, so you provide T1s to rural areas. Their companies are going to be beyond that. The technology is going to be well past that. I think the bottom line is that we're doing what we've always done in talking about rural development and that is, well, if rural areas can catch up to where the urban areas were 10 or 20 years ago they'll be better off. But the point is they're always going to be behind. There's a few exceptions to that and they really tie into places where essentially what you can call the knowledge economy or the advanced services sector, some of which are going to be government-related but they're not really. We're really talking about the group of things in the middle column here, the technical and business service firms. Basically people like Ed and Bruce who are able to live where they want to live. They've been dubbed in *Business Week* and elsewhere as "lone eagles" and I

kind of like that phrase. People who can basically live where they want and they're able to do what they want to do because they've got telecommunications. There's a side line to this, but part of my point is that you're not going to find these sorts of activities in rural areas to any great extent.

What we're relying on, whether from people who are parachuting in from New York or wherever they used to live, or—here's really the key for rural development—the generation of kids with a mind-set to do this sort of work when they're out of school for whom this is the economy. It's not working in an auto plant. It's certainly not working in the chicken processing plant. And those are the sorts of things that we're really talking about as the economy of the future. But what we have is a case where companies like these—you look at the data and it's absolutely incontrovertible—tend to locate in cities, especially large cities, not rural areas. Lone eagles are the exception and it really tends to be the case that companies like that need a labor pool. In other words, if you're going to grow beyond being a small operation or a virtual operation, you're going to need some kind of labor pool and you're going to need airport access. When Bruce mentioned that the jet comes with the New York Times I thought this is the sort of transportation access that not every rural area has. The fact that there are jets that go to Jackson Hole is another thing that makes it absolutely unique. And Frank from Montana told us yesterday about his eight-hour ordeal of getting from Montana to Nashville because there isn't jet service and I know this. In Gainesville we've got a few jets today, but mostly it's little turbo props and it's a slow proposition.

The point is that for big companies, but even for small, one-person outfits, air transportation is as essential as telecommunications, and it has become more that way rather than less. Yes, you're plugged into a network but part of the problem with this is that there's an increasing amount of data from people who are not saying, "Well, what are people doing with telecommunications"? It's, "What are they doing in their whole work activities"? It is absolutely the case that they're using face-to-face contact equally along with telecommunications. It's even been calculated in some work by global companies doing research and development projects internationally that there's a half-life to electronic contacts of six months. In other words, that contact you started with e-mail drops off unless you see these people face-to-face about every six months to be able to kind of re-cement the kind of human interaction that's necessary.

Now, my sociologist colleagues love this conclusion because it's done actually by a guy in a business school without looking for the sociology involved in it, but it's part of human reality. And that means that you need face-to-face contact, meaning you need to be able to fly and most rural places are not going to have that capability. So this all sounds in a sense pretty pessimistic for rural areas and I agree that that's somewhat true. If we look at businesses that might locate in these places they're going to be looking for two things. One is what Bruce's and Ed's papers talk about a lot. I mean what I call here basically technology, but the other things that are just as important is a local infrastructure, which means the technology support and maintenance people being able to be nearby if you need service. And this is something that's going to be needed for the lone eagles as well as for anybody else trying to start telecommunications-based businesses in some other operation. It's possible that you don't have, for example, the multi-vendor coordination because you don't have multi-vendors, and that's as much a constraint in some cases, as Bruce alluded to, to some extent in his talk. Well, I looked at what in earlier work by Ed Parker was called the "rural penalty" or the "three rural penalties" in telecommunications. Low population and density and distance, all of which basically means you've got this longer loop link which typically needs to be subsidized or cross-subsidized in some kind of way. What I focused on here at least equally is the economic specialization in most rural areas outside these knowledge based sectors, which means that you haven't got in most places the demand for telecommunications even if you've got the supply, and that's the issue. I think basically the technology side is saying, "It's available if you'll use it". I know that in talking to Billy last night at dinner, I might be a little wrong about this, but I think we're almost a generation away

from knowing for sure and we'll know when our kids get in their mid-thirties and we see what they do. The bottom line is that we don't have many producer services if we want to call what you guys do in rural areas. But the real gist of it is that in too many places the low levels of education reduce the possibilities. The end of my talk is really also the end of where Bruce ended up: that this lack of awareness hurts rural areas. It's really not only low levels of education but lack of awareness from not having had experiences outside the local area. People who have been somewhere else who bring both network contacts, knowledge, and experience from elsewhere are really the people who are going to bring to rural areas what is going to change that demand side. So you've got a question of efficiency and profitability replacing equity and universal service as priorities, and in this environment what could rural areas do. Well, they probably need to attract or, better, to generate locally (meaning to kind of encourage to spawn) new knowledge-based businesses. These service companies, consultants, and so on within the local areas. You're going to need to attract lone eagles but they're not going to go to the Mississippi Delta in all likelihood.

If there's any hope for a place like that then much of the TVA region is this way in fact. It's going to need to be based on local entrepreneurship, and I think that that's relatively unarguable. Improving education levels is really bottom line, and I didn't just write this as Bruce was talking, you can tell, so my end point here is that improving education levels will allow people to know more of not just what's available now but what will be available in the future so that rural areas are not going to have this 10 to 20 year lag which they've always had. I think that this is improving to some extent but, again, there are very big differences among rural areas and the bottom-of-the-barrel places in America are far behind anything that we've talked about here and I think that that is part of what we're dealing with. I mean that's part of the rural America that's the context for this workshop today and I think that the solutions there are going to be a little harder to come by than they are in other places. Thank you.

FRESHWATER: The last paper is by Ed Parker who's been doing this longer than about everybody and Ed was one of the original contractors for the OTA study.

PARKER: Thank you, David. Where I come from a city of 4,000 people is the big town, the big place. I used to be an academic policy analyst. I taught at Stanford University for 17 years, and gave lectures, and talked about the interaction of technology, and institutions, and economics, and then I figured out all that talking wasn't going to make much difference so I quit being an academic and started a telecommunications company. I thought it might be a good idea to have some competition and competing with the phone companies was a good idea. Nineteen seventy-nine might have been a little early for that but it worked. I grew it up to be about a \$50 million a year business and merged with a phone company and was a telephone executive for a year. That was long enough, at least in the big companies. Now, I'm a consultant. One of my volunteer jobs is as volunteer chair of the Board of Economic Development Alliance of Lincoln County. Trying to do rural development on the ground is kind of fun and my proudest achievement was being named by Oregon Governor Kitzhaber as the local economic development leader of the year in Oregon last year.

One of the key points of my paper is that the information super highway is already under construction. It's happening, but the key difference in the imperfect analogy of highways and information technology is when the interstate highway system was built it really was an inter-urban network and it happened coincidentally to benefit a small few rural places that it happened to pass through. The economics and the technology are such that if only the institutional arrangements were right—I like giving Bruce's talk for him—if only the institutional arrangements were right, the technology and the economics are such that the information super highway can come to every rural community. There's no reason why not except for a few policy barriers in the way.

The Telecommunications Act of '96 has set the framework for getting things changed. The Federal Communications Commission and the state regulatory bodies are going to flounder for a couple of years implementing and putting in place the new rules that are ordered by the Act. But I think the central thing to remember now is the focus of action shifts to the local rural communities. What's going to happen in rural communities is going to happen on the ground in those rural communities. Some places will get it and some places won't, but the successes will be in the communities that have vision, and leadership, and get organized, and get their acts together. There are lots of rural threats and opportunities as we went through in the written paper. The context, of course, is the global information revolution that we're going through. No place is exempt from the global competition and the transformations that that's forcing. What's going to make a difference to economic development in rural areas—as anywhere else in the world—is business productivity gains, that is, producing more output or higher quality output for the same costs of input. It's interesting that in rural areas where government is often more of a presence as a percentage of the economy than it is in urban areas, the government sector is lagging way behind the private sector in applying information technology to get productivity gains on what they do.

That's part of the problem. I always need to put in this slide in my talks to remind people who might get the misconception that telecommunications is going to be a magic silver bullet to make rural development happen. Forget that. It's one little piece of a big puzzle. Probably the most important piece of rural economic development is to invest in human capital, the education point that the other speakers emphasized also.

We also need to invest in the physical infrastructure and there's more physical infrastructure needed in rural communities than fiber optics or digital wireless. Telecommunications is important now because that's what's changing most rapidly but it's not the whole story. Probably the most difficult of all in rural communities is the whole category of things that I group under reforming social infrastructure: providing the role models, providing the incentives, providing the financing, providing the computer technician who can fix your computer when it breaks—all of the support services that people take for granted in urban areas. You need to build that whole social infrastructure. Probably most important of all is to build a culture that understands, and supports, and accepts this taken entrepreneurialism. This is often foreign to the rural cultures where change has been so risky for them that the cultures are risk averse and it's not a good cultural climate for entrepreneurs. So there's a lot that needs to be done and telecommunications is just one small piece.

It's interesting that as we go through the changes in information technologies, the same technology that has brought dramatic reductions in the cost of computers is the same technology that is at the heart of telecommunications switching. Well, why haven't telecommunications prices dropped as fast as computer prices have? The transformations in transmission technology with fiber optics, digital wireless, and other things are not quite as dramatic in cost reductions, but almost. In fact fiber optics can be as dramatic as computers if you get enough volume of use. But it's really institutional barriers that have kept the communications revolution from happening as fast as the information revolution in computing technology.

As we go through this convergence of technologies where everything becomes digital and bits on the network we're very slowly adapting the institutional structures to match the technology conversions. So I think we're going to see the competition, telephone, cable, wireless, electric power utilities, and we need to harness that in rural communities in ways that are very much possible. The information super highway in a sense is becoming almost synonymous with the Internet and it too is potentially affordable everywhere if we get our act together and make it happen.

I've got a section on economic effect studies—the old academic has to go back to data. We've always known that the more developed towns, cities, countries had more telecommunications. Which comes first, the chicken or the egg? Well, we've now got good data that clearly and absolutely definitively answers that question and the answer is both. The richer communities afford more

telecommunications but the places that invest more in telecommunications also become richer and it's a cyclical, positive feedback effect. One of the earliest studies was a time series analysis with 45 countries clearly showed that investing in telecommunications at one time period led to economic development in a later time period. Interestingly, it did find a diminishing return. It found that the more rural, the less densely populated, the greater the payoff. That led to the question in a country like the United States with the most developed telecommunications in the world, does this paradigm still fit. A 1990 study time series analysis of the U.S. economy clearly found that investment in telecommunications in one time period led to increased gross national product in later time periods and the reverse also. Both results were very powerful in the U.S. economy. The same group of researchers also replicated that study using the State of Pennsylvania and in rural counties within Pennsylvania. The results replicate all the way down. One study that Don Dillman and I worked on in rural communities in Oregon and Washington found that, guess what, rural counties, lower incomes, higher unemployment, poorer telephones cluster all goes together. Statistically we separated out, controlled for population density to take out that common population density and rural penalty effect. The residual correlation showed that the places that had electronic switching, as opposed to analog switching, had a better economy. Places that had a higher percentage of single party service also had a better economy as measured in the unemployment rates and in incomes.

The best current data on lone eagles is a study by Don Dillman and his colleagues looking at in-migration into the State of Washington, people turning in their other state driver's licenses to get a Washington State driver's license. Where did they come from? What are they doing? Twenty-six hundred lone eagles moved to Washington in 12 months. A lone eagle is defined as someone using information technology and selling non-locally. Where are they coming to? They're both rural and urban. They're not statistically different. But that's an exciting finding to me that no significant difference. In almost all the other studies you'd find a significantly higher percentage going urban. And if you look at 2,600 jobs, above average paying jobs, that's like recruiting a big electronics factory except it's spread out all over the state. So I think you need at some point in this day to talk to Don Dillman and learn more about that study. So there is lots of evidence that investment in telecommunications infrastructure leads to economic growth and residential and business both contribute. The indirect benefits, the economic payoff to people other than those who invest in the technology substantially outstrip the benefits that go to the people who invest in the technology and that's part of the policy problem. The most remote benefit even more. It's a complement to other development. It's not a single magic silver bullet and the process through which it works is improving business productivity and improving public services. So what are the needs of rural services? The top of my list these days is local Internet access where you get Internet access with a local call. We need line quality on our phones that are at least keeping up with the kind of modems that shift with the computers that you buy these days. We need a number of public sector and private sector applications to make use of them. High on my list for rural needs is lower the long distance rates. I think the current regulated subsidy mechanism, which has the long distance subsidize local, is one of the most perverse subsidy mechanisms we can have. This is the poor people subsidizing the rich. This is the rural folks, who depend on long distance for everything, paying higher long distance rates so the rich urban folks can have lower monthly standard phone bills for local service. It's absurd. It's economically irrational and it's a perverse subsidy. So what rural folks need is to have the cost of intrastate long distance phone calls be at least not more expensive than interstate calls. Why as a matter of state economic development policy would you promote selling and buying out of state? Why would you deliberately send your business out of state rather than try and promote business in the state? I mean it's an absurd economic development policy. Now, there's no reason why the economic development folks in states shouldn't be talking to the public utility regulator folks and start fixing this anomaly.

We need broadband, high capacity trunk lines to all rural communities. It's probably not yet

economic nor a matter of good market business sense to talk about putting broadband to every rural house. There isn't demand in every rural house. What's needed is broadband to every rural community. If you've got broadband on the trunk lines to that community then the businesses, and the schools, and the institutions that need it can pay the local access, but if you don't have the trunk lines to the community you're out of luck. A lot of the optional services that a lot of people need are not available on local telephone switches in rural communities. If you have the high capacity trunk lines they can be remotely served from some switch somewhere else in the network, and if it's too expensive to add those services to the local switch don't add them to the local switch. That's an absurd expense. Provision them remotely from some urban switch or some other rural community that has them so that you pool and aggregate the demand. The policy issues that are going to be most actively debated over the next three years because they're all changing with the Act of '96, the universal service rules, the interconnection rules, and reformulating the access charge rules. I add to that list state procurement, state procurement of telecommunications. Not because state procurement is the big positive driver but because right now in the way things are currently set up state government procurement of telecommunications is one of the most harmful things that's happening to rural communities. State governments, like big businesses, are putting in private networks. It's cheaper. They get the services that aren't available on the public networks. There are good economic reasons for doing that. But in rural communities if you take away that public sector business, put it on a private network, there's not enough business demand left to be able to put in the services for all the rest of us.

The State of Oregon made a good start this past year where they dropped their private government network and said we're going to buy services instead. They negotiated a frame relay contract, distance insensitive available all over the state for state government services so that you can buy the services. The government is buying the services from the providers. They got the frame relay high speed data networking capability and the service providers are free to sell that same technological service to all the rest of us. They only made one mistake in that procurement and it was a serious one. They got a good price because they had the buying power of the state. They got it geographically distributed through the state the way they wanted, but the carriers put in a no resale clause in the contract and the price government got is maybe a third or less the price that the rest of us are going to have to pay which would not be the case if there wasn't that resale provision or banning of resale. Probably the most important thing to do in rural communities, and it's directly out of Linda's OTA study from way back then, is aggregate the business together. Build rural area networks to make it all work together and that rural network sharing means pooling the educational demand as in the State of Maine. Pooling the data communication requirements of the state lottery or whatever data communication requirements there are of the state. Bringing in medical applications for telemedicine. Probably the biggest barrier to telemedicine applications anywhere is not technology. It's the fact that the insurance providers don't reimburse for telemedicine. You can talk to your doctor on the telephone, fat chance, but the reason "fat chance" is because he can't bill your health insurance for that consultation. So you have to travel long distances to go visit him even when you're sick and you'd rather have a teleconference consultation. The problem is not technology. The problem is the institutional arrangements having to do with health insurance. But anyway there are lots of potential applications that can be bundled together if you solve the institutional arrangements, and there's lots of business use, lots of residential use. We need to aggregate that demand to be able to demonstrate that there really is a market for all that stuff in rural areas. There's lots of competition and more coming including competition in rural areas. I'm able in my community thanks to a local telephone co-op in a neighboring community, not even my own, to have direct TV with all the satellite services.

One of our problems is that we don't have a lot of the telecommunications telephone based services and we're trying to work with the local electric utility and use their fiber optic capacity to be

able to make a difference in our community. And our biggest barrier there, again, is not technology. It's the U.S. West and GTE lawyers who are fighting us every step of the way even though they're not providing the rural service. Thank goodness we have electric utilities that are now edging their way into providing an alternative. The rural transition issues are going to be tricky. There is going to be a loss of subsidies but I hope that eventually we'll get past some of the problems that are created. The Telecommunications Act of '96 protects the rural subsidies, protects some of the rural telephone companies from competition for an interim period. I think we'd be better off if we could speed up the transition of rural telephone companies into the competitive environment particularly if we could give rural telephone companies an economic incentive to put in lower cost digital wireless technology instead of continuing under a government subsidized cost plus contracting service. It's hard to get incentives to put in least cost technology when you're working under a cost plus government contract which is what the current regulation setup is. We are going to get higher prices and, in a lot of rural communities, probably poorer service. That will be true at least in those communities that are served by the big RBOCs and GTE because they're going to be putting their investment in the places where they're getting the most competition and that's the urban areas. It's going to be tooth and nail every inch of the way for rural communities that are served by the big phone companies. You're going to hear a lot of arguments from the phone companies about the carriers of last resort issue. My beef is there are still communities in Oregon that don't have any phone service. Whole communities with no phones anywhere in the community. They just happened to be part of the franchised territory of U.S. West so it's hard to get another carrier to come in to serve them and yet U.S. West uses the carrier of last resort argument as a basis why they should get special treatment. I think we really need to throw away the assumptions on carrier of last resort and rethink the process of transition from monopoly to competition in new ways and mostly by changing the incentives.

I already commented on the independents versus the RBOC. The independent telephone companies in rural areas are doing very well in providing the community services. The rural information highways are going to be built by private business, not government. It's going to take in rural areas a lot of regional cooperation. It's going to take local cooperation to aggregate the demand together. I mentioned earlier the state government procurement problem. That's part of the demand aggregation and if it's creamed off that's going to make the job tougher. We need to demonstrate the demand. If you have one single large plant wanting to relocate, the providers understand that and put in the service. When the equivalent demand is 2,600 lone eagles that's not as visible so you have to make that visible in order to get carriers to respond. We need to develop alternatives. You need to have an electric utility alternative, or a satellite alternative, or a wireless provider alternative in order to, in some cases, make it happen. In other cases, just to get leverage on the existing provider to give them an incentive to make it happen because who cares who wins as long as you get the service there. In that case everybody wins. But which communities will benefit and which won't is really going to be the result of which communities have the most determined local leadership. That's going to be the heart of it. Using the information highways once we get them there will be essential for development. Technology is not enough. We need the application software, the information content, the training and the support services, the various distance learning video conference applications, e-mail. Not just access to the Web as consumers to surf the Web but we need the Internet service providers that will help rural businesses put up their rural Web pages. I think part of our assignment today is to try to answer or re-answer these six questions (see slide) and I gave a first preliminary cut of my answers in the paper and I won't go over them again here, but I'm hoping that by the end of this conference we'll have better answers. So we are in a transition from the known to the unknown. Change is inevitable. There are many risks but when there's change there's opportunity and we have lots of opportunities. And we need local action to make the difference in rural communities. Economic growth is possible as we've demonstrated enough times in enough places. And there are win/win solutions available. It's not as a zero sum game where what your community gets the other

doesn't. Everybody can get it and we've got to get out of this zero sum game thinking as we work our way into rural development through telecommunications. Thank you.

FRESHWATER: Thank you, Ed. This is the end of the part where people stand up and talk to you. From here on in you have to do the talking yourselves and we'll try and help facilitate that process. But as Ed showed in his next to last slide we do want to go back to those six original questions. We think they're important. We think that telecommunications is a vital player in economic development and that's why we're interested in it and we're going forward with this study because we see telecom center as infrastructure but it's a different kind. It's an infrastructure that seems to be changing the world, just like the printing press changed the world, and allowing a lot of different things that greatly enhance all forms of communication. But we have no great insights in how this is going to happen, which is why we asked you all here to give us your insights. We'll have a coffee break and then we'll break into two groups. I think the technology track is in the other room and the adoption track will be in here. Thank you.

ADOPTION TRACK

INTRODUCTION

FRESHWATER: This particular section is about adoption—what technologies will be available in rural areas. If you look at the discussion outline, the two adoption questions from the original study concern (1) the expected economic effects of information-age technologies in rural areas (particularly the effects on unemployment including job creation and training, and job displacement, and the investment that will be needed including capital requirements, public infrastructure, etc.); and (2) which rural areas are likely to have the greatest ability to make these new technologies available, so it's taking the technologies and putting them in place.

In looking at these issues, it seemed to us that while there are several new telecommunications services that are already available (in urban areas), as Ed Malecki mentioned this morning, the question we had is "Do you need all of these communications technologies in all rural areas?" Or are there particular technologies that fit the needs of particular rural areas and are there particular rural areas that need certain types of communications technologies for various purposes? One way of thinking about it in my mind is that you might have a farming-dependent community and they may need certain services. You may have a manufacturing-dependent community (and all this builds on the USDA county typology), with communications needs suited for rural manufacturing-dependent communities. While rural areas are diverse, they can and frequently do specialize in specific types of activities once you get the county level. So we thought that one approach would be to develop a matrix of services by type of economic activities, and this would provide an approach as to how each type of rural area should go about obtaining new telecommunications services (which services are needed by which sector, etc.).

Next, we have to deal with the critical questions of how these things would be provided, who will provide it, and so on. Is it going to be an electric power company? Will it be the regional Bell Operating Company? Or would it be a local telephone cooperative association? And then there is the other "big" question about what happens to places that don't get these services.

For example, within the TVA service area there are two regions that have always been behind the curve—the Delta and Appalachia. They're rural, but they're rural with a big problem and that's a poverty problem. Rurality and poverty aren't necessarily synonymous conditions, but there's an interplay between rurality and poverty.

So at this point we were hoping that somebody would leap into the fray and start the discussion about adoption issues. I'm going to sit down and try not to interfere in the discussion any more than I have to.

GARCIA: I have a little problem with your question about technologies—which technologies you need—because in my view what we're going to need are platforms for applications, not technologies, and so we need to be looking at networks independent of the technologies—that's actually what we need. We need networks, and we need to be looking at network architectures rather than types of technologies. And I think the interconnection issue becomes all the more important when we begin to talk about access to networks if we're going to end up with a common platform. The first thing I would look at—and this comes from my work in electronic commerce—is that when you're doing electronic commerce, what you need is a classroom for training and this is one area where I think business is going to be unable to deliver. The second is your categories of different types of communities and their needs. I have only one hesitation about that and that is when you design technology

networks to get on a development trajectory. If you pick your technology to meet the needs you have now, will those needs still be the same ten years from now? Those are my two comments

DILLMAN: Remember 1986, it was only ten years ago, but in a survey that I did for our state, the big issues were party lines. The second big issue was baud rates which were about 600 in some areas and they kept saying how can we get faster connections. We were having the same kind of discussion then that we're having about the Internet now, and some people are saying, "God, do we really need all that stuff?". And then it was 1987 the year the fax became critical and I remember being at a meeting in 1988 with someone from L.L. Bean, a company in Maine, who was talking about they wouldn't buy anything from anybody that didn't have a fax machine because it cut down part of their communication charges. And that was a big revelation saying, my god, rural businesses have to have faxes, and I guess I really think that an Internet and World Wide Web access are just about to become what fax machines became in 1987. And if we don't project ahead and think about, not which communities are going to get it, but how do you get it to every community, then I think maybe we're missing what it's going to take to be part of the economy.

FRESHWATER: So you're suggesting that [advanced] telecommunications are becoming a base-level infrastructure almost like electricity, phone service and potable water. Without these, you have no future.

MALECKI: Yes, but that's maybe going a little too far. I mean what the technologies are setting up is the minimal standards for doing business. If we're setting up that practice, or if we're not part of that practice, or something less than that, that's important. What Don's saying is it's not a basic infrastructure per se because each of these technologies can almost be adopted independently or you can adopt them all bundled together. And I'm not even sure if the Information Superhighway that the Federal Government talks about in a way that realizes what limits is kind of is called path dependency, where if you go down one road you can't come back and go down the other way, and that poses both policy problems and technological choice problems.

STERRS: I'm going to talk about the Internet a little bit. I think that the lesson, at least in my experience as a rural community telephone provider, is that you have a large number of people who want it and don't know what it is. That's the first problem. The second is I think we continue to exacerbate that problem by continuing to talk of it as if it is one thing. We rolled out an Internet access service this past January, and as a rural telecommunications provider we did that because we were getting customers who wanted a toll free access to the Internet. Almost instantly we ran into the problem of connection speed—people were jumping onto the Net and finding out that's it's not as quick as they would like it to be. So we went from the issue of simply providing a needed service to qualitative issues about the speed of the service. And that's when we started moving the discussion away from the application into the technology which I think is a mistake that we as an industry have made. We are forcing our customers to be conversant in technologies rather than applications. So they come to my door and say "give me fiber," "give me ISDN," "give me frame relay" instead of saying "here's my application and this is what I'm going to do" and then letting me provide the technology. I don't know if we can ever go back to that—I don't think we can—but as far as the Internet goes, I know that the Internet's going to take off. I think the visual nature of it is what's making it a success. Talking was great, being able to talk on the phone was terrific, but when you can see things and interact like you can on the Internet, that's the way we need to go. So I'm thinking that in our area, it will make sense to do two things. First of all, segregate each individual unit, particularly e-mail, as one function which may proliferate more quickly than the other Internet ser-

vices because e-mail is much less speed [bandwidth] intensive. (As a user, you're not sitting there waiting as much as you are when you're trying to download something (like a large graphic or movie clip) from the Web.) The second piece is we need to be more proactive in helping businesses understand how to use the Internet to further their business—not just show them how to use the information technology but to show them how their business can benefit economically from it—we need to do that. I think if we're successful with that, then the economic development pieces will fall into place. The small business that had a small clientele, now potentially has a larger one, expanded by telecommunications technology. But applying this concept has been an incredibly difficult thing for us—with our traditional telephone habits—because we've got a pretty wide range of customers. I've got some customers who are saying, "oh, okay, if that's what you've got, I'll take it" and kind of go along. And I have other customers who are saying "give me ISDN," or "I need a video conferencing circuit in my house tomorrow". This full range of customers and services is a real challenge for us.

STREETER: Don mentioned how the Internet in and of itself doesn't equate with being on the same level as water or electricity, but on a sector by sector basis the whole idea of electronic commerce may very well equate to survivability. Banks are under increasing pressure to offer electronic banking and financial EDI products. Non-banks are encroaching into banking territory and new economics of scale are being demanded from the community banker. So on a case by case basis, telecommunications may be that important.

IMORDE: Well, in Tennessee, six out of ten manufacturers do business with the Federal government, and we're not far away from the time when you'll have to do it electronically or you won't continue to do that business. So you've got manufacturers, most of which are in the rural areas, all in jeopardy, especially the small and medium sized ones.

PARKER: Regarding Don's comment about the Internet. It seemed to be a direct answer to the question that Linda posed about looking for a platform on which to build applications. The key thing about networking is "who's connected to whom," and it almost doesn't matter which platform as long as everybody's on the same platform. And lo and behold just now we have emerging this common global platform that everybody is getting on as fast as they can, and it's going to evolve and change over time, but all of a sudden there is an innerconnected platform you can use locally, you can use it as an Intranet in business, you can use it for local community access, and you can let other communities, if you want, look over your shoulder and see what's going on. So I think we have the common application platform (the Internet) and it is a platform on which you can build lots of applications. In one of my side businesses (actually my wife's business), we have an art gallery. I put up a web page, and we just thought it was a way of promoting tourism—to get people into the gallery, but lo and behold earlier this month we sold a piece of art through the Internet from a rural Oregon community, and the customer happened to be in the metropolitan Boston area. It didn't matter where we were or where they were. I mean it's just another Internet transaction. The electronic commerce pieces of the Internet aren't all there yet, but we have an 800 number, so it was easy to communicate through the Internet and then close the transaction by giving a credit card number over a more secure 800 line. That's what's happening and there will be a zillion different applications built on that platform, so I think our technology problem is to provide high speed Internet access to the places where it's needed.

AGHA: The basic issue is one of isolation and when I define isolation, I look at the different characteristics of isolation in many places. If there's a business that has to function "just in time," and there are no four-lane highways to get the product to the customer, the customer won't get the product

"just in time." There are infrastructure problems in terms of being unable to support any type or sector of business. Many rural areas don't have defined street addresses except for a few blacktopped roads where some business set up as a low cost operation back in the '60s or '70s. So it is isolation in terms of physical infrastructure in terms of getting products back and forth, whereas information can travel but the physical goods can't. And, again, which physical goods would be produced and how they would need to be transported has an impact on what level of information transaction needs to be done. If the economic development plan has targeted a particular type of industry for development, the corresponding infrastructure development plan has to be in sync. So a big part of the equation as to what information transactions are going to take place in those rural areas. And that's what I'm struggling with when I look at one of the industries that can be developed given the education, given the isolation, given the sectors' existence, and what will be their economic basis. The other part of it is that on an infrastructure development basis, you have to have sufficient volume in order to reach critical production. From a business point of view if somebody wants to put in a plant in a rural area that is going to potentially employ 1,500 or 2,000 people and they are thinking about setting up in a town with 500 people when the next town is 20 miles away with 800 people, and the next big city with 5,000 people is 40 miles away. Where does the factory get the manpower to go into production? So by definition there's got to be some structural dislocation in order for business development and economic development to take place. When we talk about rural, the word has many different meanings and connotations. It's as if we're talking about the oceans. The one word means many things: there's the Bering Strait and the Atlantic and the Pacific, and there are different interactions and different currents flowing into them. And dare we mention that the Mississippi, or Arkansas or Louisiana Delta, are different from the rural areas of Maine, or the rural areas of Wyoming, or other places, and how do we include those differences.

ODASZ: I just wanted to share briefly that I was in Glasgow, Montana, a week ago presenting a program on the Internet and its capabilities for a vocational consortium that's involved with K through 12. They received local Internet access last week and most of the 400-plus communities with populations under 1,000 will receive local Internet access this year. Dillon received it in June. It's overwhelmingly obvious to me that nobody knows what to do with it other than they want economic opportunity but what do you teach a high school student in order to allow them to remain in Glasgow, Montana, an agricultural community, given local Internet access and given the potential access to the best training in the world through the Internet. It seems to me that it's just not there yet and by the time that type of training does arrive, Glasgow might no longer exist. The other thing is that in Dillon we received a \$97,000 grant from NTIA for eleven Internet terminals. We have local Internet access. The [community's] leadership won't even attend a presentation on economic opportunities available through the Internet because they're basically anti-education, anti-technology, and this is [too often typical of a] rural mind set that is 180 degrees opposite from risk taking entrepreneurship or aggressive use of education and technology. And I just wanted to throw those out as a bit of reality check. Others have mentioned social and organizational capacity building and strong visionary leadership, etc., and all I can say is, good luck. Leaders like that would be shot in Montana.

AGHA: You're talking about [technologies that require at least a] high school [education] while over here in the Delta we are lucky if we see 60 percent of the people having the equivalent of a high school education.

CHILD: It's not just Montana. In the Tennessee Valley we are still well over 50 percent rural, and within TVA's seven state region, the makeup is so unique and different and how you approach one

community is totally different from how you approach another. At TVA, it used to be that we would walk in and attempt to do big government. "We're here from the Federal government, and we're going to tell you how to fix your problem." We don't do that anymore. The only way that we have been successful in our rural communities is through what we call quality community initiative which simply facilitates the communities own leadership development. They identify for themselves their own priorities, and then hopefully we can help assist, match them up with some of the local resources, etc., but it's a very slow process and one where we're still learning how to take the third seat back rather than trying to be the driver in the initiative because we've found it's the only way we can make a difference.

IMORDE: Betsy, in that process do you perceive the communities wanting to know more about how technology can be integrated into their different enterprises?

CHILD: In some places, Joe, but in other places they're still more interested in developing industrial parks.

IMORDE: Waste water treatment plants?

CHILD: Absolutely.

ALLEN: I would like to comment on the question of different community types. I think they're almost irrelevant in the information age. We did a six-state study in the Midwest trying to identify the innovative communities, those that are transitional and those that are traditional—that aren't using telecommunication technology—and we found that some [of the innovative communities] were actually high poverty communities where there has been a crash in the local economy and that was the impetus for them to say "we better get on the ball and do something." We saw retirement destination communities in Minnesota, which I never contemplated anyone would go to Minnesota as a retirement destination, but there are a few Norwegians and Swedes I guess who want to, so we found some of those. We found service sectors like Aurora, Nebraska, which is a small community of 3,000 that's very innovative, doing manufacturing as well as farming. And it's funny, in 1984 Don and I were doing some work in Washington state, and we were looking at the proliferation of technology. Faxes really weren't around yet. PC's were just coming in. The other day in Nebraska I talked to a local country and western station radio station that has a "Drive at Five" program where you can call in and get a song played on the air. Thirty percent of those calls came from cellular phones from farmers from across the state who were cutting corn, and soybeans, and milo. So it's not an issue that will go away, it's a phenomenon that's here to stay. But we found a couple of factors that seemed to influence those innovative communities and one of them was local leadership but the other piece was an aggressive telecommunications provider. So I guess as we think about these issues it may not be necessary to develop a hierarchy of community types, but it may be the types of relationships that exist at the local and regional level. One involves the local community leadership, but I think that another element that we've found is aggressive providers who were willing to take a proactive role in working with local citizens in creating some type of network.

FRESHWATER: When you find aggressive providers, are those aggressive providers aggressive because they face competition or are they aggressive because there's some individual at the company who wants to push these technologies irrespective of the fact there's no competitive pressure to do so?

ALLEN: In our study, it looked as if individuals played a key role. I'm hoping to find some social pattern there. We didn't find it. It was an individual provider who might have a small business and was into this and was driving it.

DAVIS: I want to make a comment as well on the county typologies. Even though that's commonly done, from my work with local communities I think that it is not a helpful way to describe a community as being a farming community even though that may be what they do a lot of. In my experience much of the success of this kind of effort using technology comes from collaboration, building partnerships, getting commitment and involvement. And I'm thinking here of a community where, in economic development terms, the local people themselves look at the community as agriculturally based, but in my work there the drivers behind information technology are light manufacturing and small service providers. This so called agricultural area has some light manufacturing and service providers and includes some recreation-destination places where people come and fish. The issue is 'can the whole community pull together?' and when you pigeon-hole an area with one label then you leave out a bunch of people. They don't feel involved, they won't commit to it. We have to take them for what they are and that's a local community with people who want to survive and help it to grow. Then they get involved and, as Betsy says, they own the process, and they'll make something happen.

DILLMAN: I really think the assumption is legitimate now that without Internet access (without knowing how to use computers that are connected with other computers on a network) one is going to go nowhere in society. And so it becomes a societal goal to bring telecommunications technology to everyone in it, particularly to those in the educational system because without it, people will be unemployable. Let me give just a small example to illustrate that. In a survey of university faculty this spring, 97 percent of our faculty use word processors, 90 percent of them were on electronic mail. Seventy percent said they couldn't function without electronic mail or it is now essential to all their work. We also looked at what they're doing in the classroom, two-thirds of them are using computers in the classroom now. We're just on the verge of the time when a student can't come to the University unless they're computer literate—which I wouldn't have said two or three years ago. But I think now the handwriting is on the wall.

A sense of deprivation is about to set in if one is not on the Network. Faculty like myself can't be on committees around the country and do the work unless they are on electronic mail because everybody else uses list servers now and the truly important stuff is there. I think that's about to come to county government. It's about to come to filing Medicare records every patient needs. It's about to come to all the hospitals. It's going to come to the schools—anything connected to state government. So just if you'll grant me an assumption at the beginning that we're just about there, then I say how do we get in the habit. ?????

And now I want to switch to an adoption framework which is what this session is about. Everett Rogers and I had the same major professor at University, and we started out wearing all those ???????? of hers. And it seems to me that what can be done from a public policy standpoint is to go ahead and bring in high capacity lines to the community. Last night we were talking about the 56 kbs lines that are now in some of the Maine schools, and I thought, my god, the first thing, once you get a line like that in there, is that the availability of the line creates demand for parents to get it into the home so that teachers can communicate with students. It must not be that much distance in the branch of county government and the institutions because each of them need it now then just getting it into the community. ?????? And then, thinking about the adoption concept from there, it seems to me that one can spread things out.

And there's one thing that didn't come out in any of the papers this morning but which I think can really facilitate the adoption process and that is there wasn't a conceptualization of the "mine"???? problem. We have a community where, within in the city limits, there's a high density of businesses, and institutions, and people. It seems to me that these could be wired a lot more cheaply than going out into the rest of the community. And if one can set as a policy goal that every county seat in this country needs high capacity lines, or fiber, or something like that, then from there one can start the diffusion process. Once you have the initial installation, then you can begin to hook in other institutions and eventually, like the party lines, they'll eventually get to people outside the community.

GARCIA: I'm going to break my rule. There are two things that to me are somewhat alarming and one is the idea that we think about the Internet as a static thing. If you look at what's happening to Internet provision in the U.S. today all the large RBOCs and the large long distance companies are now getting into the Internet business. So what started out as a very democratizing, low cost, exciting standardized network is being bought out by a group of industries that have a totally different culture. And if you look at history, you'll see that this will change the nature of the Internet. So I agree that the Internet is a wonderful platform, but we need to take steps now to ensure that it remains a platform in the future, and I'm not quite sure that's happening at the FCC today. With deregulation there's seems to be no thought as to what this platform is going to be.

My second thought is that Bruce talked a lot this morning about economic opportunities and business opportunities, and competition. I was just doing a little work for NTCA on the use of the Internet in rural areas. It was self-selected data because it was from a Web site where respondents themselves supplied the data, but two-thirds of everyone who replied said that their Internet provider was a co-op and not a regional Bell telephone company. Which was an interesting piece of information since there are just as many investor-owned telephone companies as there are co-ops in the NTCA membership.

I got curious about that and called up the first movers, if you look at this diffusion curve, the first movers to provide Internet service were very small companies without any business plan. It makes absolutely no sense for them to provide Internet service. So when I called them up to ask them why, they said "we didn't expect a profit." We're a community service organization and we're providing a community service. Nobody knows what that mentality is. It's only the large companies that get involved where there's a business plan you can study and dissect. So the first movers break all the rules of what we think about business and I don't think we know enough about that.

IMORDE: Linda, do you think that with the larger companies coming in like BellSouth, U.S. West, and so forth, isn't that going to add to the competition?

GARCIA: I'm not sure the competition was the issue. That's my point. If you look at the first company to do this, they aren't doing it for economic reasons. They weren't doing it for competitive reasons. They were doing it because they are part of a community that needed the service. So I only say this because I think we have a power ????? about efficiency, how you're going to get this out there to market it. But if you look early on in that diffusion curve, knowledge, the fact that they could talk to each other.??????? The other thing that comes out is the whole diffusion process starts in Iowa, and then it works its way up to Minnesota, and then it works its way to Michigan, Illinois, etc. All these things came out from the Midwest from various kinds of consortia, and critical to their doing this was education among themselves. This is a great idea—going to meetings to learn about this. And what's interesting is it was low cost in the sense that you already had an infrastructure there. The critical thing was getting information about it and getting excited about, but it wasn't done "to

be competitive." It isn't like, oh my god, the big providers are going to come in and we'd better provide it first. That was not until much later when you reach a critical mass on the Internet that those concerns becomes a factor. So people's attitudes, their incentives are very different depending where they are on that diffusion curve.

IMORDE: But isn't that a natural tendency? First, the entrepreneurs come in, followed by the large companies. The large companies are never the early adapters of something. I mean it seems to be they're always slower to get into something like that.

GARCIA: I think that was true with the rural co-ops originally, and I think you're seeing a similar pattern now. The question is how do you maintain that kind of community involvement and aggressive community leadership that got the thing started after you hit the critical mass and others want to come and provide the service too. What's going to happen when this process becomes competitive? ?????.

TRAINOR: She was saying that it is not the entrepreneurial spirit that's responsible for the initial provision of these services. It's a different kind of spirit that is not business driven as entrepreneurs typically are associated with being. Instead, the initial providers are often community service leaders who were themselves seeking information, not the sale or provision of a service. It's a transformational approach to information sharing in education and libraries through a concept of information sharing, not for the sake of profit.

IMORDE: And yet in Bell South's case, say in Tennessee, which is all I can speak from, we worked very closely with Dent Davis in trying to get these communities together to bring technology to them and the people together and grow them at the same rate and develop the kinds of services....

GARCIA: I'm not trying to call the RBOCs the bad guys, not at all.

IMORDE: I know you're not.

GARCIA: What I'm trying to say is that we shouldn't treat the Internet and all the benefits of it that we see as coming from this platform as a constant. The economics of all this will change as the network gets older and as new players get involved in it, and we need to factor that in when we look at the rules we're creating right now with the new telecom bill. We need to think about that and keep that in mind. That's the only thing.

MALECKI: Let me just bring up another example of what Linda's talking about. The Internet is already changing into the "super Internet," — a super fast mode is that universities, big companies, and government labs are trying to build. I don't know that anybody knows yet exactly, but it's supposed to be 10 to 20 times faster than the normal Web, which is absolutely essential for many of these big firms and for some scientific applications. Well, some of us will not need that, and maybe we'll never be on it—I mean those of us in this room. A few people might be but you can be very sure that the leading uses are going to be on that newer technology, not the old—what is now the only technology. I think that's what really Linda's talking about.

KNEESHAW: I'd like to tell you about an adoption????? I was working on in Washington State. In the State of Washington we have 32 economic development councils—one in every county. Two

years ago, only one was connected to the Internet and that was us. Working in partnership with the state, GTE, U.S. West, a local power company, and several other investors, we put together and launched the State Economic Development network. And we started by realizing that educating people about the uses and possibilities was paramount. Before you bring the technology in you're got to show them how they can use the tools productively. So what we did was to devise a training curriculum, and we trained all the other economic development councils about how we were using the Internet productively. We built a Web site that gave them instant access to a large variety of Internet services that would increase their productivity. We had to provide long distance for some of them. Except in the urban communities, nobody had local access, so we provided six months of long distance access to give each organization the time for their Boards of Directors to evaluate the service. Everyone stayed with it. Now all 32 EDCs are connected, they're all on e-mail, and they're sowing the seeds of Internet connectivity within their communities. They're becoming a focal point of aggregation in their communities. It's a logical point of aggregation because economic development councils are kind of lines to local, state, federal government, court districts, local businesses, education, and all of the interests that are involved in economic development in their communities. So the EDCs are leading the way. We've found that teaching people how to use the tools and teaching them about the possibilities of using the tools are more important—or at least as important—and perhaps has to come first. And what we managed to do is to put a Point of Presence in each community that can reach out to their membership—which is a broad economic development community—and show them how they're using the Internet and World Wide Web productively. Everybody is saying "I didn't know we could do that!" but if you can do that then I can do that in my business.

CROCKETT: Who was the Point of Presence that you're going to? Who's the community leader?

KNEESHAW: The economic development councils.

CROCKETT: Within economic development there's a tendency oftentimes to focus on the provision of resources and not the business know-how and the business networks that go with using the resources. We do a lot of work in the provision of capital and it's very easy to focus on "let's create a pool of capital and make it available to business people" without focusing on what it takes to stimulate demand for that pool of capital. And building on what you were just talking about right now, if you only focus on "here's the technology and here's what you can do," or "here's the Internet," "here's this and that," if you go into a rural community say these things, they'll stop and look at you with this kind of glazed look on their face. The FCA right now is involved in making available on the Internet on a trial basis a wonderful tool that could really impact access to capital for rural businesses, and that's a means for angel investors, individual investors, to be able to review information on start-up companies and existing companies that are looking for access to capital. If you approach that only as a technological issue and you don't approach it as a business issue it could be a disaster. There could be a lot of people who make very foolish mistakes on the Internet. If it's done in conjunction with business know-how and business knowledge, it's a wonderful tool for companies in the Delta region if they're trained in how to do that. If you provide them the business know-how that goes along with the technological know-how.

AGHA: I will give you an example of competitive companies that come to mind. There was a plant slated for shutdown and we worked with them to keep it open. Training was a big problem. Productivity was low as was profitability. Management was so frustrated that after 12 months they took all 300 people, flew them to Georgia to another branch plant, and made them sit there to look at how the workers in the other "good" plant did the work and bring it back. The 12 months that

they put in to training was in the garbage. And very few companies would go to that extent of spending \$6 million to take these people elsewhere and do the training, but that was more on a charitable basis. So it was an individual leader who drove it and brought it there. The school district in Marietta got linked up and got PCs. Two years later, they said "to heck with the Internet" and the PCs are locked up in a warehouse. The teachers don't want them. You've got to help the teachers to be more than just users of a technology. So when we're talking about issues of business we also have to bring in the cultural issues in that region and the educational levels and other things. I don't know how much of this goes on in Kentucky. Over here we don't even know. On different days we get different spins. If I were dealing with somebody close to Memphis I'd get one reaction and a different one in Silicon Valley. In some parts of the Delta, there are counties where there isn't a single manufacturing company in the whole county. Thus there is no culture of manufacturing in that county.

DAVIS: I want to respond and add something to what Tom just said. I think in Tennessee, in the experience that we've had with rural communities that are doing this, it's fundamentally about building, or facilitating, or encouraging what is being talked about today as a learning community. And it's about learning not just the technology but helping people to put in place a system that will help them learn what they need to continue to learn to make use of the technologies—a different kind of effort. Awhile back when we first started it, we thought of a model where you'd go in and actually train somebody to do something but that doesn't do anything but create more problems. It's when the people in the community can learn how they can continue to learn, what they need to learn in order to move forward. When that happens a critical mass develops that can do it. I mean that's part of what you were talking about.

AGHA: It is a question of creating a mindset first. In a way that is what you're doing. If there isn't a mindset—a real want to do it, they won't. Many feel there is no need to be trained or to learn more.

DAVIS: I'm not a technologist, I'm an adult educator and I see telecommunications as fundamental to a learning enterprise. If you say you want to create a different culture, telecommunications is helping people to discover that culture because when they connect then they learn.

JOHNSTON: In this learning culture that Dent talks about, we've centered at this time on the Internet and I guess my question is, number one, what is it that we need the most, is accessibility to the Internet all that we need, or do we need two-way interactive video? What is the right mix of infrastructure: Internet, two-way interactive video, computers? So I guess I'd like to broaden this out to "what is it that we need on a base level?"

STERRS: If I could maybe speak a little bit in terms of this adoption model and maybe talk a little bit about the Maine project that you referenced and how it leads into video because there is an evolution here and I'm going to put the economic development spin on it. What I'm going to tell you has a lot of political and social engineering implications and those of us in the industry cringed a little bit when this School and Library Infrastructure Project (SLIP) happened. But what happened in Maine was that first of all we had some leadership. The governor perceived the benefit of implementation of advanced technology in certain strata of economic development areas, education primarily. The local RBOC there, NYNEX, was in a rate case at the time. It had an earnings problem and when you're in the telecommunications industry sometimes your earnings problem is you have too much as opposed to too little. As that case was proceeding and it became clear that there was going

to be some funds available (traditionally what happens is any funds that are available in overearnings cases are usually applied to reducing some of the existing rates). In the State of Maine it would have been maybe reduced toll rates, or basic service rates, or perhaps some services like touch tone or something would have been made free. In this case, the Maine Public Utilities Commission (MPUC) ordered NYNEX to spend up to \$4 million a year for five years to provide a backbone network to 1,300 schools and libraries across the State of Maine. This backbone network was a 56 kilobit, frame relay circuit to every school in the State and every library in the State. That was the base. The PUC order didn't stop with the implementation of the technology. It also addressed training and maintenance issues. There was a fair amount of training that went along with this. There was a fair amount of policy that needed to be developed in terms of how the schools were going to handle all this and a whole bunch of other stuff like that. But the bottom line was—when it eventually gets done, and before this day's over ten more schools will be hooked up—when this gets done, all of those schools will have that backbone of access. Now, the 56 kilobit circuit gives them high speed access to Internet, but it also gives them high speed access to other networks and databases. It's not focused just on the Internet, it includes some of the Department of Education databases which are available to school administrators to access. Now, the next phase of the project begins in about 1998 where 130 of those locations with this same money will be upgraded to a two-way video system which they'll be using ATM technology for that. So that's one of the ways. Now, this created just a whole bunch of political and social issues there. There are a lot of people that wanted to see the money going towards lowering toll rates. But there were a lot of people who thought putting the money into this network instead was a good idea, and it gave probably a 10 to 15 year jump to the entire educational system in Maine because it broke the chicken/egg cycle of "we don't have any reason to appropriate money on a local school board level for new technology because we can't afford it anyway." So what happened was the pie came for free and the school board in our case started appropriating some money to buy computers and we said, "well, we'll come in and wire and we'll provide the maintenance of the system." So now we've got 11 schools that a year ago could only talk to each other by telephone, now all of them are linked together with the 56 kilobit circuit and using a lot of technology. It's happening right now and it's going to continue and when the thing gets done at the end of 1997 I think we're going to be at a much higher level than we would have been before, but somebody's got to take a risk to do that.

CROCKETT: Isn't there a training and usage process that's also beginning right now to get people familiar with it?

STERRS: Yes, and actually it starts with the teachers because you've got 1,300 schools and you've got the full variety of skills and experience. Some teachers know exactly what's what and have no problem and you have some there that are trying to throw it in the garbage can. But there was an importance placed on making sure that there was some level of education available to the people who are going to be using the system for education—the educators themselves.

IMORDE: I think BellSouth embraced that idea back about five years ago and deployed ISDN throughout the state, virtual switching throughout the state, fiber connectivity throughout the state. Up to \$400 million was spent on that. Now, as of last week 1,560 schools in the State of Tennessee are connected to Internet via ISDN. Now, that's a start and there's a lot of training going on and nobody's throwing anything away that I know of. So what happened five or six years ago in the deployment of this technology is now starting to pay off with the application in schools and with the support of the governor and everybody else.

STERRS: Again, the situation I just described was paid for by rate payer money. The State of Maine also has the dubious honor of having the highest intra-access rates in the country, which are deemed to be anti-competitive, by the way.

DILLMAN: I think sometimes we kind of shoot ourselves in the foot because we argue we've just got to have that education out there or people won't be able to use equipment and then we use the fact that they don't already understand computer technology as the reason for not deploying it, and that really worries me a lot. And because to get the pipeline out there into the communities, somebody outside has to make a decision since an individual can't just decide to adopt something. An individual can buy any kind of computer they want and they can get tremendously powerful computers, but a lot of them can't get the cost-effective access through the telecommunications system, and that's what I want to make a point about. You don't build the darn field of dreams or at least get the 56K line into the community like you have, and so it's gone that far and then it's going to be much more possible for people to make decisions of expanding a little bit here and there. ???????

IMORDE: That's exactly what we've done, just like you.

STERRS: We've already had several schools who are getting together now and saying we'd like to pool our resources and upgrade the 56Ks to higher bandwidth.

FRESHWATER: I just want to try and get us back to Jimmy's original question: "Is the Internet the only thing or are there other things that are complementary or supplementary like two-way video. This is not rural telecommunications or is the Internet so dominant that you've got to fix that before you worry about anything else? ?????"

ALLEN: I think part of it is if you think of this as an adoption and diffusion process. If you look back at agriculture, people adopted processes that fit with what they were already doing. I mean if you already used a tractor then it was much easier to get a practice adopted that required a tractor. And if you think about how people have adopted and utilized PCs, then the Internet is a natural connection. And if you think of the information age as a system of interactions where part of what you're doing is learning how to exchange information very rapidly, but also to add value to that information out there—that that may be the core of the diffusion process of the Internet.

I think we've got a couple of pieces. I want to come back to what Linda said is that one of the pieces I'm running into is that many of the nodes we used to hook into just a very few years ago that were public are now private. Before you'd go into them, you could mess around with them, but now, they cost. If you think of this as a learning curve, maybe we're training people who will not have the financial capability to hook into this information network and that kind of bothers me. So the Internet from my perspective is that core piece and out of that you learn how to do some of these other things and then the T1s come along, et cetera. But the privatization worries me as to whether or not we'll be able to help facilitate that next group who may not have the education, may not currently be on that learning curve, and will they just kind of drop out of the system.

STERRS: I think that's particularly important because as the requirement for speed on the Internet increases, that's where the rural cost is going to come.

TRAINOR: Is this high speed Internet service going to be available soon?

STERRS: Not in my view, not in rural areas. Not to the kind of community we're talking about.

Certainly not to the school it isn't. To high end users, maybe.

TRAINOR: Not to rural schools or not to any schools?

STERRS: Any schools. For cable modems, the prices I'm seeing are \$500. It's at least going to be awhile before schools or individuals are going to be able to afford to have that kind of interface using the cable network just for Internet access. What I was trying to say was that I think cable Internet access—which is quicker—has some technological issues yet to be worked out and I think that schools by and large wouldn't be able to deal with those unless they have funds that I'm not aware of to get that access. But on the other hand if the individual uses that thing we're all going to have to consider whether you want to pay a premium for the speed whether you do it via cable, or wireless, or the telephone company, or whatever. That's where it's at right now.

TRAINOR: What I'm suggesting is a paradigm shift where right now there's a concentration on the telephone company as the network provider when I think there are other network providers also out there that have to be looked at and explored. It was always very aggravating to me to sit and listen to a national policy directive that all schools have to be connected by the year 2000 when in fact since the 70s it's been local government's that have required local connections to the cable network via their local franchise authority and that's also happened in rural areas where there has been franchised cable service available. That's something that's already out there and happening, and I'm not hearing sufficient discussion on it as an alternative source of networking that's using different technologies, not dependent upon ISDN, and may or may not be as dependent on when that critical mass hits becomes affordable. A cable modem at \$500 is far superior to a cable modem of \$2,500 as was talked about two years ago. We cut that cost 80 percent.

STERRS: I think there are two alternative networks. I think the cable network is one. I think the other is the one that's being constructed by the electric companies.

TRAINOR: Yeah.

STERRS: I think those are going to be affordable networks.

TRAINOR: No, those are going to be fiber based, not ISDN. I think the question is still out there as to those platforms are going to be.

MALECKI: We've dealt with some of the standard things in adoption of new technologies. We've dealt with supply: put the pipeline out there near enough so that everybody can have access to it, somehow subsidize or cover the costs so that cost isn't an issue. But we're still having to deal with awareness and it's easier to talk about that at the school level where we can teach the kids. They want to learn, they know more than the teachers anyway, and they can learn very quickly. What I worry about are these small and medium-size manufacturers that Joe mentioned in Tennessee and every state in the country who all of a sudden, even though they haven't been using the Internet, find that they now have to do their communication over the Internet with the Federal government as their customer and they don't know how to do it. And I'm not sure that we have a good system for training; for real hand-holding kinds of service and education at that level for people who don't have a teenage son or daughter who are going to bring them up to speed, to be able to help out these small firms who, let's fact it, are kind of the lifeblood of rural communities.

WALTER: But if you say "either next week you learn how to use a computer and the Internet or you don't have a contract with us anymore," what more incentive do you need to offer a company? I mean the incentives are already out there and Internet training is out there, too.

CROCKETT: I think there is a major difference between the companies that already have those contracts and the companies or the potential companies that could have those contracts and could have those relationships. If you've got it already, you're right, you're going to have the resources to fly someone in and get the thing figured out and to move on from there. But the kind of basic comparative disadvantage that you begin with as a rural location is that you don't have the business in the first place. You need to obtain the business and you don't have the know-how to get the business in the first place, and so it's the case of the potentially successful company or the potential comparative advantage that you haven't addressed yet and that's very nebulous and it's very hard to get your hands around that.

PARKER: But that's what Tom Kneeshaw has been working with the economic development council in rural Washington. I see that as a good role model to follow elsewhere to help people learn to get on.

KNEESHAW: Don, you're talking about a supply driven model. We're putting in connection???????? [demand-based????] models and it worked. When I worked in telecommunications and first heard about it, I was all for supply driven—put the lines in the community and "if you build it, they will come," but that just doesn't happen. But we have found that those economic development councils are stimulating the demand. They're kindling the demand and rural communities are being connected all over the State of Washington, much of the time being led by the actions of the economic development councils. We don't just train the EDCs how to use the Internet and provide them with a connection to the World Wide Web but we are also educating them about different connection models. Before the Telecommunications Act of 1996 there were several models that could be used to connect rural communities and we told people about those and they've been employing them. With the Telecommunications Act of 1996 there's five or six more opportunities that we can see for connecting communities and that's a way I think we need to do things is create the market demand and we're doing it and it's working.

DILLMAN: I agree, Tom.

KNEESHAW: And our smallest rural communities are never going to have local Internet service but we've been pursuing extended area service to larger communities.

DILLMAN: I agree mostly, Tom, but back when you were talking about how you got them to use it and you're talking about it was a long distance-based service at the beginning.

KNEESHAW: Yes, but that was only to 30 organizations. It wasn't to every community in the State, and it wasn't even permanent. We helped them get connected and see the value, then they decided for themselves. That was done a year and a half ago, and now they've decided for themselves they want to keep that service. We were willing to pay for it at first, but we don't want to pay those long distance costs ourselves so we're going to go out and figure out a solution to get local access. And, like I said, there are a number of models to pursue and people are pursuing them, but I think even those economic development organizations needed somebody to show them the way and it's an ongoing role that we're serving. It didn't just stop with the connection. We're continuing to lead the

way and show them how to do things, and then they in turn are showing their local businesses how to compete.

STREETER: I don't know whether it's ever been tried in a telecommunications format, but I've seen where in other industries there is a "mixed model" where a state will charter a private corporation or private organization to deliver a specific service and that corporation as a private corporation would be capitalized from all the industry players. So if it's delivering a telecommunications service to every major city in a given county or every major in the state, having that initially provided through a public/private cooperative kind of a corporation and then let market forces dictate where the lines goes from there.

IMORDE: Is Indiana your model?

STREETER: I was thinking of Kansas.

DILLMAN: It's a very competitive world out there, and maybe it sounds a little Pollyannaish I guess, if I say how to stay ahead of the curve and make the people in your communities potentially more valuable for business activities is the objective. It seems to me that you can help nudge that curve along by public policy, by encouraging development, but I certainly don't want them to go contrary to market forces for I think market forces can push it on. But if somebody shuts off the line from getting in, and whatever helpful????? or large corporations say, these places are too small so two-thirds of the state are not going to have anything going through it that they can get access to. When you're all fiber throughout the state, ????? that won't put points of presence in the rural ????? communities. I want to say you've just about put your state at a huge disadvantage competitively with others. So from public policy standpoint there's a certain investment that can be made to push that curve along a little bit faster and I think that's valuable to us. And also educating kids in the school system so that they come to college a little better prepared and then so they'll be more productive workers.

AGHA: I have something to add to that. One of the biggest factors here is where we're talking about market forces or technologies coming into play. The fact remains that when we're looking at the telecommunications landscape two years from now we'll see wholesale entry of Asian and European telecommunications giants into the international arena. Already Singapore has acquired half of some large American telecommunications company, and they're looking at acquiring other U.S. companies. The European companies are also looking at acquisitions. And when these large giants get in, that will put a whole different spin on the U.S. companies in a free trade market—they're all going to be looking exclusively at their business interests and not at community economic development. That will be their driving force. Think about how competition in the telecommunications market led to the creation of bypass before there was a public policy to establish and guide it. Once it's there, how do you go back and bring them back to the tables since, hey, it's already done. Once these market forces are there those market forces have another interest even if we get nationalistic. But if AT&T gets acquired by some European company, and it's already happened to many U.S. companies already. ???????? Twenty and 30 percent stakes have been taken by foreign companies in them. It's been taken over. The telecommunicaitons industry is going to outstrip the auto industry in not many years—2010-2015. There are as many strategies to address this issue as there are businesses and countries. Japan has an advisory board that recommended \$300 to \$500 billion investment in telecommunications. Singapore has its Infotech 2000 plan. Korea has its Plan 2015. These governments have a strategy. Some of this strategy involves buying US companies. These foreign compa-

nies are not interested in rural development in the US, they are interested market share, profits, etc. They don't have a social agenda.

FRESHWATER: But doesn't that argue for looking at alternative sources of provision like the cable companies, the electricity companies? You don't need a phone company to provide telecommunications.

AGHA: You get into other markets with those technologies. There are two trends going on here. One is that consumer electronics and information technology are going to converge—TV PC. The other is that we are on the verge of a revolutionary change in consumer audio/visual products—in function, usage, interfaces. These two trends mean a couple of things. First, there is going to be shake up in these industries—some will go back to core competencies—for example KODAK gets out of the copier business to concentrate on film. It's a jump ball as to which industry is going to be the "winner." However, the RBOCs have core strengths that the cable companies.

IMORDE: We're further ahead than we think.

AGHA: So looking at that and thinking about it from that perspective, it comes into whether the present cable structure is going to be the structure in the year 2005 or 2010. However, keep in mind that the telecommunications pie is going to be very large. Even the losers will do well.

PARKER: When you don't have access in your community or you don't have the broadband pipeline to your community it's called redlining, and we can't redline our rural communities and still have rural economies. But I think there is a way within the present system where there's a way to change the incentive structure a little bit. For example, if in our universal service policy in the telephone industry, instead of defining universal service to the household as the unit of analysis, which is a task that's largely finished anyway, if you defined it to the community level and allowed universal service funds to flow to building broadband networks to the community you may then have lots of competition in terms of local distribution—the telephone companies compete with the cable company, with the electric utility and have the interconnection—but if you don't have the broadband pipelines connecting the community to the rest of the world you've just redlined that community. And one other implication of that is that a lot of the telephone companies don't put all the advanced services in rural communities because it doesn't make economic sense. It doesn't compute. But if as a matter of public policy we figured out a way to get the broadband pipe to the community then make just one other minor tweak to the regulatory pricing structure process and that is to encourage the telephone companies and the people who interconnect with them to provide what I call "transparent back-haul." If you need a service in the local community and you don't have it on a local switch, provide it off an urban switch somewhere. If you've got broadband and fiber optic cable to the community, price the service as if it's provided locally but service it from somewhere else. That allows you to grow the demand. Once you get a demand level where it is economical to provide that capability locally fine, let the entrepreneurial business decision decide where the tradeoff is. But if you've got the pipe to the community and are pricing the service to the rural area as if it's provided locally, then you'll find that there's a lot of rural demand. Rural people really need this stuff and pretty soon you'll get to the crossover point. You won't provide it locally until it makes economic sense to do so, which is the only way we can operate in a competitive economy.

IMORDE: And at the same time, the community is organizing itself to aggregate that demand—that helps, too. You've got to do both.

PARKER: You've got to do both sides. You've got to aggregate demand and you've got to work on the provision of services.

TRAINOR: You've talked a lot about communities and policies. I guess what I need to hear from this group is what is the best way to define within a community who the policy makers are, to identify them, to educate them, to encourage through their regulatory powers that exist at the local level or the community level, the forcing of the deployment of these kinds of systems overall?

SWANSON: Well, maybe this in on a little bit different tack but we've been skirting about the policy issue, but there are some fundamental trends occurring in national policy. One of them is a shift ????????? of Federal authority to the state and local governments. There is a movement towards placement of community-based policy and away from individual entitlements, or more specific sector entitlements and instead figuring out ways in which you deal with policy at the community level and allow the communities the flexibility to provide the input that fits their particular interest as you fit the diversity issue, not the "one size fits all." ????? Of course, there are a few liabilities in doing that, in that places that are currently being left behind would be further polarized. So how do you develop place ????? policy that includes avenues for information to get to those places that would provide them a more competitive advantage than they would currently have? It also begs the question of something that we've ignored in public policy for a long period of time and that is transition policies. We're in the midst of an enormous transition similar to the transition that occurred in the rural south with the elimination of sharecropping in which a huge portion of those who were on the land as laborers, the sharecroppers and tenants, where there was no concern for what happened to them. We paid a price in the rural south for that, which was not if a similar transition ????? in the north where they had no adjustment at the community level through public education for these people. What kind of transition policies are we considering now in terms of those who are going to be left behind, whether it's in the Delta region, the Appalachian region, the Superior region up in Minnesota, and in Wisconsin, and the upper peninsula of Michigan? We need to begin to consider this now ????? and not start thinking about a transition policy 30 years from now and exactly how we might place ????? policy if that's where we're pushing towards being a mechanism for anticipating those consequences. ????? Which comes back to Don's point of, you need both an infrastructure for the technology and you also need that social infrastructure Ed was talking about earlier in place and this is simultaneous process. It's not one versus the other and in one area of the country it may be the economic development councils. Frankly, I don't think in Kentucky they're going to be the group that does it, but maybe they will be in Wisconsin or in Washington State, which we need to bring the public policy process down to the local level. ????? That's where we're being forced. We need to also anticipate what those consequences would be.

DILLMAN: I guess my response to your question is "why do you push a sled that's already moving"—kind of like the Egyptians. And it seems to me that where it's moving is with younger people and in school systems which is were to reach young people. And then the households that most likely already have computers are the ones that have children, particularly in those grade school/high school years, and so there's an obvious starting ????? point in building a community. Then I think about policies that have held their hand there, and one of them is if there's a special rate that's set in telecommunications regulations for schools, but then it's absolutely specific that the schools cannot resell to parents at that discounted rate. But if you can't resell it, then you lose part of your advantage in being able to move stuff out into your community.

TRAINOR: And is that something that local governments can assist in through their franchising authority and their public benefit services from telecommunication service providers? I mean is this something that you have to look at as a public benefit network?

ALLEN: It may have to be done at a state level with the PUCs and the PSCs. I mean given this evolution of government taking place. A lot of this power is coming down to the states. So I guess one of my suggestions is that as the local communities get organized, they keep good contact with their public service commission and their utility commission as well as their providers.

TRAINOR: Actually I have to disagree. I don't think the public service commissions have any special knowledge about what's going on in local communities.

ALLEN: And I've heard that argument made at the federal level too.

AGHA: The regulatory bodies don't have the knowledge base about the technological developments, R+D, new products on the horizon. They are historically behind the curve. This is real problem for telecommunications because the regulatory bodies 3 to 5 years behind the technology and the technology is being obsoleted in a 3 to 5 year time frame, so by the time the regulations are in place, they are themselves obsolete. The second point is that there are national, state and local regulatory bodies trying to control in their own interest what is happening on an international scale. Right now, 53 nations are engaged in negotiating a global pact on telecommunications. The U.S. negotiates on behalf of the U.S. This is not the same as negotiating on behalf of New England, Northern California, or the Mississippi Delta. At the end of the day, the U.S. has to have one position that represents the U.S. interests as a whole and not necessarily its rural areas. So state governments and local governments will have no say in this.

IMORDE: The only thing I would add to that is the large company is customer driven and your largest customer in every case is state government. You don't ignore state government. At least in our case we do not ignore state government.

TRAINOR: And I don't think local government. . . ?

AGHA: The state may be the main regulatory player right now, but once the U.S. signs this global pact, these policies will change and will to a degree supersede certain state regulations. The states cannot stop free trade. And as the investors in a state's telecommunications system become more global, they will have less interest in what happens in that state's rural areas. You should really start thinking about all of these telecommunications companies as being global—because of all of these mergers and gearing up for the global battle for market share.

IMORDE: And we have some of that, I mean we're doing business in Singapore.

TRAINOR: One of the purposes of the new Telecommunications Act is to retain within local government the power to establish rights-of-way, with appropriate compensation for its use. I think local governments have been unequal in their treatment of different technologies because of the power of states that have treated the different technologies differently such as cable television, which has always been locally controlled versus phone companies which have been more state controlled, and with convergence there is a clash quite frankly of the policy paradigm that gets back to who are the local policy makers who are driving the issues. Local governments have developed institutional

networks within their cable television franchises. The phone companies, no offense intended, simply don't want to provide local government with services. That is not within the telephone paradigm to provide public benefit services to [local] institutions in the same fashion that cable television institutional networks have been deployed [locally]. So there's a real policy clash between locals and states in terms of government regulation and deployment of services within communities. And that's one of the transition policies and areas that I'm trying to figure out. As we have devolved powers to the states, we have also empowered local jurisdictions and required them to treat companies equitably that (within individual states) had not been treated equitably before. How does the state and local model then adapt to that in the end, to achieve equity in a world conversion with historically inverse regulatory powers? ?????

PARKER: I would like to try another answer to your question. I think as we devolve decision making more and more locally, you may need to devolve past some of the local governments also. We talked about local community leadership. The local community leadership may not be the elected government of that rural community. It may be the high school student who somehow got onto the map who can start a business and provide leadership by example and role model. And in many cases a lot of the innovative leadership doesn't come from the existing formal structure of governments. It's going to come from who knows what and it's going to be different everywhere. So I think you've got to think in more entrepreneurial models including entrepreneurial governments but not always governments at the local level. The local leadership is not necessarily local government.

TRAINOR: I agree but getting back to what Linda was saying, I don't know that we can depend upon it ????? as an entrepreneurial spirit that drives that. There's a community sense of information that is not profit driven within communities that I think speaks to the development process.

GARCIA: One of the things I was concerned about we talked about the chicken and egg problem—whether you're service oriented or you're demand oriented—is that if the provider is a local provider—in some sense has roots in a local community—you can bring those two prices together. You literally bring together the demand and the supply. And the second thing is in the future I don't think we're going to be selling bits, I think we're going to be selling applications. And when I look at what Microsoft does when it embeds a certain browser application in its operating system, this is where the competition is going. In the future, when you're going to need electronic commerce services, you're going to buy the services on a platform but every one of the big information companies is looking at how to be the electronic commerce platform, not the telecommunications platform but the business platform. So in some sense we're talking about access at a level that may be meaningless in five or ten years. I don't know how you deal with that, but it's not going to just be the people from Singapore. It's going to be Microsoft that's making decisions about who gets access in a rural community.

KNEESHAW: Donna, we're actually working on one supply model. For the last six months we've been working with a large regional electric power company. We've got them almost on the verge of saying, "yeah, we'll try it as an experiment." We're creating a laboratory out of a community of about 2,500 people. You run fiber from the urban area to that community and wire the entire community down to the block level and either provide information services themselves or at least the infrastructure and access to the information service provider. And we're actually trying to reduce their risk of investment by pairing them up with a large Asian company that has an interest in telecommunications.

DILLMAN: Could I make just a comment on Ed Malecki's paper. I talked to him at breakfast about it this morning and I've really got to mention it because there's sort of an aura of economic inevitability on some things, that rural communities are always going to be worse off. And there was one place and you have in here the Marie Howland paper and you remember talking with her and she said, "well, rural USA has ten years of comparative advantage on certain kinds of industries and then they begin to lose them to the other countries—those things just move out of rural America or cities." And I just sit there and say, "well, maybe so, but is there a way that some of that can be delayed or stopped?" How can you emphasize the comparative advantage that you still have? And one of the comparative advantages this country has is that there are more computers per capita than there are in any other country in the world by a long, long way, and I think that's very important. And the second thing is that—I hope I'm not Pollyannaish here—but I think it's not just having computers but what you add to the computers that enables you to maintain a competitive advantage over others in the work place. And the way you keep some of those low end industries in the United States is that you get people to understand computers sooner. You don't get somebody into major league baseball unless they're in little league or they learned it in grade school. And we're kidding ourselves if we think we're going to have people that can understand computers if we don't acquaint them with them until they're in college. An integral part of that is that a computer can do certain things on its own but its real power comes when it's connected. So it seems to me conceptually that we are so much better off as a nation if we say to ourselves in a policy sense that we have got to get the pipeline to all the communities, then let the adoption process take over, and put it back within people's power to do. And it's this getting it to the community in the first place that I think is outside the control of the local people and maybe that explains why I'm pushing so hard on the getting the lines to the communities and then let things go.

JOHNSTON: I've got a question for you, Don. Is it enough—like in the State of Tennessee—when we have a formal presence in all 95 counties, the public service commission works closely with the provider to get an educational discount but when it gets built it's a closed network. Is that enough for a community?

DILLMAN: No.

JOHNSTON: How do we get past that? We've got a point of presence but no one can use it except for the schools.

DILLMAN: You've got to get past that.

FRESHWATER: Can I just sort of exert my gavel authority. Tim's been trying to keep track of what's going on and so has Linda but why don't we just let Tim walk through what he's heard here today and that may help us come to closure on this process.

WALTER: I was pretty frustrated by the matrix that was presented at the beginning, but after listening to all this, it starts to make a lot more sense. What I was asked to do was to write up what I was hearing, and I added a couple of points that I thought might be interesting. One of the things that I think we spent a lot of time on was that a given rural development strategy may need to be selected to be appropriate for a particular type of county and within the matrix, it is adjusted by the relevance of telecommunications to that strategy. And community capacity building is one of the sort of "hip and happening" rural development strategies. It's the fundamental strategy. It's the learning communities issue. And what I heard the most out of this group, was that telecommunications is hot. It

engages people. It can become a good organizing tool to gather different groups of people together whether it's the business community with the residential community or all sorts of different collaborative efforts. You can actually organize quite a bit around telecommunications. You get those great community conversations happening around telecommunications.

The equity issue was one that came up and it's been reiterated quite a few times as one of the other potential good conversations you can have with people here, kind of average, not very slow but urban centered in the community. ????? The poverty communities There was a lot of talk about education and about distance education. There's a potential for that having an impact on the quality of education and teachers will tell you that the Internet can be fun. So it can be a good learning tool to help keep students engaged but it's not sufficient. Telecommunications won't have a sufficient impact by itself on the community to raise its educational level. We didn't talk much about business recruitment, so it's unclear as to the telecommunications impact on the process of recruiting companies into your area. Not whether they'll come if the community has telecommunications but using telecommunications in the process of recruiting businesses. In the service sector, we touched a little bit on back office operations—the need to have good trunk capabilities into the town as part of a back office facility. That's not necessarily going to go away. But we didn't talk much more about the leading edge services. What I'm thinking of here would be some of those bank tellers who will be linked to you by video conferences and we didn't get into that kind of really high end service provision. Manufacturing: I think it was in Ed's paper that rural areas won't become a Mecca for corporate headquarters because you won't have too many of those outside urban areas, but we didn't seem to sort of get beyond that. So I don't know if it was the sentiment of the group that, "no, he was wrong." Actually you can be a corporate manufacturing headquarters in a rural area. But one of the other manufacturing types we didn't talk about is the flexible manufacturing networks and industry clusters, clusters of services, we heard a little bit about them in this presentation. There was—I heard in other conversations around the room—the notion that groups of entrepreneurs or small companies are grouping together to form sizable industry players. I think there's some real potential here but we didn't get to that yet. The Potomac knowledge ?????? way around northern Virginia and there are some suburban areas looking into this. I don't know how much rural areas are doing out there and whether this is really going to take off or not but it seems like there's great potential. The retirement communities and high amenity communities: we didn't talk a lot about those but telemedicine was mentioned earlier with that fact that rural areas don't have it. You're not going to get any retirees if you can't get decent medical services, so telemedicine is a potential application. The other rural development strategy of linking either a near-urban area to an urban area either by telecommuting or just plugging into that urban economy that's sort of just firing ????? away. There is definitely a proven impact there that's come up in these sessions. It's been proven that you can do telecommuting.

The resource dependent economies: a lot of them are now going into value added strategies. The farming economies are going into value added strategies, too. We hear about teaching entrepreneurialism to the farmer who used to sell to the grain elevator and now he's selling to the sort of funky banker in New York City or you're selling directly your organic whatever. We definitely have talked a lot about teaching entrepreneurialism but can you do that by telecommunications or what impact does telecommunication have on this? Well, maybe it's linked to it. And teaching niche marketing strategies: maybe you can do it on-line, I don't know. You hear about teaching a child about the world by letting them surf the Net? People did talk about sending the rural kids to college and let them get a few years' experience and then bring them back to the rural area. Maybe we can do that on-line a little bit. By surfing the Web we can visit other cultures and lead to more interactive encounters

In the government-dominated counties (either service dominated or from transfer payments), the government is definitely moving towards wanting to do more work and interaction on-line. So to keep your businesses healthy, if you are heavily government dominated, you definitely are going to need high tech.

STERRS: One of the things that we just briefly talked about and I don't think we spent nearly enough time talking about, was the point about transition strategy. If you just look at the new Telecommunications Act, TelAct '96, there's no transition strategy.

WALTER: Transition from what to what?

STERRS: From where we are now to where we think we're going. I mean from my perspective and from the rural economic development perspective I don't think the new telecommunications legislation is the answer for rural communities because it's mainly created for one purpose: to create competition where previously none existed and it does that very well and it does that very quickly. That doesn't mean it's going to benefit everyone, just as the creation of interstate competition did not benefit everyone. There's no transition in TelAct '96 anywhere. There's no transition being contemplated even at the state regulatory level and something's got to be done about that or in addition to being unfair to the rural areas there's going to be total chaos.

FRESHWATER: I think that's a really interesting point. We have this structure that's put in place primarily to create competition and the one thing that we know about rural areas is that in just about every form of economic activity competition is really tough to fight. You have one bank, you have one store, you have one gas station. Why would we think that we're going to have multiple providers for communications in a rural area? So once again we've got the example of a strategy that may work for the 80 percent of the populace that's urban but it's going to be really tough to implement for the rural 20 percent unless you do something really innovative in finding a way around the standard rural penalties of distance and rural population density. Maybe that's the big challenge for the people like you who work with these rural issues. Thank you.

TECHNOLOGY TRACK

INTRODUCTION

EGAN: The first question is more or less an empirical question, and that is, under the main topic, "Will technological advances be made available in a timely manner to rural America?" To answer this we've got to ask "what's the present state?" and "what's the current level of diffusion?" I think a good way to approach this session is to take what the earlier speakers said. Ed Malecki said that rural areas are 10 to 20 years behind and it's going to stay that way. Ed Parker and I and Ed all said that the solutions are going to start with local entrepreneurs. In fact, the quote was from Ed Malecki—Ed Parker was more straightforward, he said businesses—but I like the "local entrepreneurs" as a characterization better. None of us has said that the existing local phone company is going to champion this. I found that to be very interesting. So with that point as a start, I guess the first question is: what is the existing track record and, what's the problem with the track record, before we get into what the future holds. And let me just go around the table.

RAY: To answer the question "Will these be made available in a timely manner in rural America?", left alone, without some kind of outside intervention, no, they're not going to be made available in a timely manner. Telephone companies are not going to do this because they find themselves shackled with the wrong infrastructure. They've got—they've got a heritage narrow-band twisted pair infrastructure that's not worth much for anything except a phone call. Cable companies are not going to do this because they have a heritage infrastructure and a mind set to only do things that make stockholders deliriously happy. They don't want to take risks and build sophisticated, reliable networks capable of delivering these kinds of services. So, that leaves some chaos and some confusion that the electric utilities, who happen to have a heritage of taking a very complicated technology and bundling it in a nice neat package and making it simple for people to use and then using that technology as an economic engine for their communities. If the electric utilities could only come to grips with their heritage and see that this is a job for them to do. Then, the electric utilities could go in and create a system that would reorient the whole decision matrix for the cable companies and phone companies who would then realize they're going to have to do some new infrastructure, retire some old plant—either that or be a complete non-player in this. And most of you will notice that is the same model that drove electricity to reach its prominence in our society. All I'm saying is that the answer to the question is "yes," but it will not be done left alone. Yes, it can be done if we'll just use the same model for information power that we used for electric power.

JAMES: I agree with Billy Ray. The model he speaks of was, in fact, part of TVA's original heritage. If you go back and look at the history of Norris Dam, there were critics who said that TVA would never be able to sell the electric power that Norris Dam would provide. And left alone, that was a true statement. But what happened was that as the dam was being built, TVA went to rural communities and got people in churches and schools and other kinds of groups and taught them about the practical benefits of electricity. TVA taught the people how to set up cooperatives and distribute the electricity and taught them basic things like how to wire light switches in their houses and barns—and very practical uses that would affect their lives like refrigerating milk so they could sell it to outside markets or threshing grain so they could make their own feed. This created such a demand for electricity where there wasn't any demand before. And today, the TVA power service area has the highest per capita use of electricity anywhere in the world. So it can be done. You can take an area—a population that was poverty stricken and extremely low tech and create the demand. Today you can see those TVA 500 KV lines all over the Southeast. You don't really see those in the rest of the

country like you do in the Southeast. Those 500 KV transmission lines are symbolic of what can be done and I think that the same thing can be done with telecommunications. I don't think we have an infrastructure, chicken-egg or any other problems that can't be overcome in the same way that TVA overcame the fact that people in the Southeast did not use electricity, didn't know what it was, didn't know what the benefits were, didn't know how to make money off of it, and until you teach people that, telecommunications won't happen but once you've done that then the suppliers come out of the woodwork, in my opinion.

CANNON: I think it's rather interesting that Billy Ray and Henry and I have all wound up here together because I want to echo their comments. I think that the electric industry is seriously looking into this. Some of the papers that we have seen talk about how the electric power industry already has a lot of the infrastructure in place through rights-of-way easements. In many cases through at least the transmission system, a lot of the fiber is already in place and just has to be harnessed. On the other side, from the big centralized part of it that Henry was addressing, how do you get it into the rural areas and how do you get people using it. I think that's where the unique form of businesses that I represent, being the electric cooperative, really comes into play. As Henry was alluding to with TVA and with electric co-ops in general, it's a community based effort. It's people controlling their own destinies with a little bit of assistance from government, but mostly through their own hard work and diligence of putting things together and making them work and doing them to drive economic development and prosperity in their own areas. We've got tons of local leadership out there. We've got highly knowledgeable boards of directors, highly trained management and staff in all of these rural areas, at least in Kentucky, and I'm sure that's echoed in other states as well. However, the key is, as someone said, breaking the mold—getting these people, our own people, to realize that they can apply what they've done in one area (electricity) years ago to a totally new, but similar type of endeavor.

EGAN: Thank you. You've given me too much to think about. You three threw me a real curve ball. That's very interesting. I wish the other two Eds were in here.

KIMEL: I think the key question is local leadership. I think that across the U.S. and even internationally, that the catalyst for the delivery of this technology—the development as well as the application— will be the local leadership and it'll come from many different areas. And in the experience we've had thus far, that's what's happened. In communities the leadership often arises from different players depending upon the factors on which those players exist within those communities.

DALTON: Just like Dennis said, at TVA we're utilizing our rights-of-way and transmission assets to deploy fiber optics. We have quite an infrastructure of fiber optics in operation right now. To date, its use has been limited primarily to operating the power system and doing internal business, including IAS technologies and video conferencing and things of that nature. We're looking, as Billy Ray said, to the expanded use of that system especially through working with our distributors. And as Dick Crawford I'm sure will tell you next, TVPPA has recently formed a telecommunications committee to look at what they can be doing.

CRAWFORD: Yes, we'll have our initial telecommunications committee meeting next week. A little organizational, but I anticipate seeing that work breaking into two separate areas, one dealing with regulation and legislation, the other piece with technology and business opportunities. Primarily we'll be out trying to educate other distributor managers, of which there are 160. (Actually 159 belong to TVPPA, one is a non-member at this time.) We're trying to educate them on what's going

on, what are the issues, what do they need to be doing, what are the business plans, where are their opportunities, and there's going to be a wide variety of interest, just as there is now. Very few have really jumped in like Bill Ray has, but there are others interested in coming along in a lot of different ways, not only in the rural areas but also in the urban areas, and I think there's a lot to be learned from both. That's where we hope to go with this. TVA history has repeated that and I want to do that again.

EGAN: All right, Tim?

OWENS: I'm somewhat alarmed as a telephone person about hearing from the electric side that the telephone companies aren't going to do this and haven't been doing this and I hope that comes from the perspective of the RBOCs not doing as well. Our members have been very successful and very aggressive in getting new technologies into their communities, and in fact, they're way ahead of their communities. From my perspective, it's not so much a problem of having the technology there, but a problem of the community not having the capacity to benefit from it. So my interest is to bring communities up to capacity so that they can actually take advantage of the technologies that our members are already providing. And as far as who should be doing what and who's responsible for delivering the services to rural America, I think that's going to vary by community, and I think it's somewhat abrupt to say that the electric utilities have the infrastructure and they should be doing it or telephone companies have the infrastructure and they should be doing it. It's going to depend on the community and who's already there and who's serving it and who's successful. So, again, I just want to keep everyone aware that the phone companies, at least our members are doing quite a bit and are very successful at it. In fact, in most cases they're probably much more profitable than the electric companies in rural America.

KNOWLES: I guess I'm one of the "other guys," too. So far I have found it very enlightening and very interesting. At the same time I do disagree with the guys from the electric side. I really think it's going to be a cross section of providers, as Tim mentioned, and it's going to be combination of these currently providing service to—or actually the technology—to the rural areas. We're trying to. But to be honest, it's very difficult to accomplish. We're providing ISDN, Internet service, and long distance. We're bidding on the PCS. I heard you mention earlier about the F-block. We're very active right now in the F-block. We were trying to bid on the C-block licenses, but it was so expensive that we couldn't afford it. We're a very small player in a very large market. We think that a company has to be totally diversified, and I see that as being one problem that the power companies have because they have been in the same business for so long. I'm not sure they can react to a competitive environment quickly enough to take advantage of the window of opportunity. We have our own billing system, so we can bill for the cellular side, we can bill for the long distance side and Internet side. Some of the power companies have a hard time even providing their own billing system. That's a problem. You need the computer capacity and you need the infrastructure. That's part of it, but at the same time you can lease capacity for the infrastructure. That's not a big deal. The main purpose of providing the technology is to harness it and provide it to rural areas, and I think it's going to be that combination.

Right now we already have co-ventured a project with our local power distributor, Caney Fork Electric. We have a joint office, and we're providing all the services out of the same office. Otherwise neither company could justify having an office there. So, we're already partnering with power companies. At the same time we also have another company that's providing a fiber network all across the state of Tennessee—we're trying to lease capacity from TVA. So I see it as a combination of ventures. And I think that your statement was correct, that the entrepreneurial environment

is best—but you need flexibility too. I think the RBOCs are too large and too unwieldy. I think that the small to medium size companies can be the future of rural America.

EGAN: All right, if I may be allowed to respond to the convergence of forces, I'll just make a few comments. Apparently nobody here is particularly enamored with idea that it will be the large-sized companies that will be taking care of rural America's needs for the Information Superhighway. That's actually an important conclusion for the government to understand because that in itself involves huge changes in federal policy. This selling of a local exchange here and there from a large telco to a small telco in hopes that the communities will benefit, that's nothing compared to the flood you would need of that type of transaction occurring in the vision just outlined. That's just one observation I want to make, because the fact of the matter that is most of rural America is still served by large phone companies. Secondly, to follow up on Tim's observation, large and small phone companies are shocked at the prospect that the—and by the way, being academic I assume I get to say whatever I want—that the dinosaur electric power manager is never going to be a leader of cutting edge technology adoption in rural America. I must say, my clients are phone companies, by and large, and some cable companies and some electric companies. There ain't no comparison. So I think it's safe to assume (and I don't know if this offends or not) but the traditional electrical utility managers probably won't be the one to make any of this happen, that's for sure. I've talked to enough of them. If you want some proof of this, five years ago I wrote a paper for OTA for Linda Garcia. I said "I don't know anything about the electric power business, but, I'm going to find out." I interviewed many electric utilities companies and I interviewed TVA and I interviewed EPRI. I interviewed a lot of them. By the way, I have typically consulted on how electric companies can get into the phone business. I assure you that five years ago—and even until today—most electric utilities managers say "huh?, you kidding me? I got problems enough in running the monopoly I've got. I'm not about to start bidding for cellular licenses and getting involved in rather risky ventures."

I just feel I needed to get that out because, incidentally, TVA was one of the few electric companies that was very interested at the time (five years ago). So I don't think we have a representative sample of rural America's electric company's capabilities in this room. But you know what, even five years ago when I interviewed you guys, TVA said, "we'll wait for EPRI to come out with some standards, we'll try to help them. We don't like it right now, we don't think we should be in the phone business, and as far as we're concerned, all we want to do is make money off leasing right-of-way and poles to competitive long distance providers." But TVA was kind of cute in its response. And I said "by the way, a lot of electricians are doing this," and TVA said "yeah, but we don't care, we don't think it's right because they don't give us control. AT&T demands control of those circuits once they're on our grid structure." Your grid structure?, I said. Very interesting. And so TVA said "yeah, I'll let you put your fiber optic cables in, I'll lease you some right-of-way and some structure, but I want some control—I want some circuits. Basically, "What's in it for me?" And apparently AT&T said, "OK then, I'll use gas companies, railroads, and highways instead. I have alternatives, I don't need the electric company." You know, these might be minor war stories of mine, but my number one observation at the time was that rural electric companies can be part of the solution to the problem of the lack of good information services and telecommunications in rural areas, and I am totally happy to see TVA making it a priority. I'm still very bummed out that NTCA doesn't see it the same way. And of course you all will interact, and I'll take notes, because I was asked to report back to the full body of folks when this is over. But when I wrote in my last two reports, including the one I just did for TVA, USTA was furious—United States Telephone Association—absolutely furious. And if they had their way, they'd blackball me from consulting for any of their members. That's how opposed they are to what I heard just now about rural electricians providing phone services. Overcoming that will be a very interesting prospect. And believe me, this is a start because here's

what I think. If TVA convinces local phone companies that are in its service area to be cooperative, we've got a winner here. But if NTCA members in your region don't want to cooperate, we don't have a chance. You know why? Interconnection. Few companies in the world that have the opportunity to legitimately become what we call in this business a facilities-based telecom service provider, because you're in a structure that would allow you ultimately to bypass Tim's constituents. But without interconnection, you're dead. Ain't going to happen, ain't going to happen in our lifetime. Now, I'll make that as a conjecture and then of course, Billy Ray will say well, we wired up the whole community. And of course, I'd throw it right back to you. How many of those situations are there going to be in the year 2005? That's the question, and who's going to pay for it? And by the way, when you "wire up" a community, what happens to the revenue to the incumbents? Do you pay them off or what?

RAY: It's called free market competition—it's the economic model that our society is built on. They only get what is left over after I take their place.

EGAN: See, now you can see why the existing players will oppose this so powerfully.

RAY: This is what the consumer demands. The driving force here is a consumer that is awake and that says "hey, I don't have to pay what I was paying before, now that we've got competition. This is not conjecture, we've proven it in Glasgow. You can buy four megabytes per second access to the Internet unlimited for \$11.45 a month. We've got a NTCA member that we compete with that started off with a unlimited package at 28,800 or whatever that modem speed is, for \$50 a month and now they're down to \$19. That's competition.

OWENS: But is anyone making any money?

RAY: Well, you know, that was where I really raised an eyebrow when you said profitability is the measure of success in the consumer's eyes. I know all my consumers are really clamoring for me to make a lot of money.??????? . . . What they want is services. The vision of the rural electric co-ops—and the telephone co-ops too—was not simply to create some new business where we can take a lot of money. It was to provide needed services and be an economic engine for the rural areas. If we've got rural telephone co-ops and rural electric co-ops that are measuring their success by how much money they make, somebody's missing the target.

OWENS: Well, I didn't say that it has to make a profit, but it does have to be self-sustaining, at least, to continue.

RAY: I thought I heard you say that telephone co-ops are in such great shape because they're making more money than most of the rural electric co-ops?

OWENS: Which allows for greater expansion and diversification if you have the capital to invest.

EGAN: This is sort of what both Eds were saying and what I'm hearing is that you're not agreeing with both of the Eds.

RAY: Well, what they said was a good picture, it was a photograph of the existing situation, but the conclusion that there's no need to build this kind of capacity in a lot of rural because there's no demand. Well, that completely misses the mark of every technological advancement that's ever been

made in our society. Technology creates its own momentum. You know, we did not build TV sets because there was this great clamor in the streets of people saying "I want TV," or the telephone, or any other great technological stride that's been made. We put the technology out there and you couple it with, and anybody can do this, education and you get a market.

EGAN: Do you pay interconnection charges to a local carrier?

RAY: We buy trunks from the local carriers at their tariff.

EGAN: I just wanted to be sure.

HENRY: Bruce, I did not mean to leave the impression that it would only be the electric companies that would be bringing these things to rural areas. If you look at each one of these rural areas, they're all different. Some of them are served by telephone co-ops, some of them are served by RBOCs, some of them have an overlay of cable companies, some of them are getting TV by satellite. As Billy Ray points out, the economic engine demands that rural areas have access to some of these services or they are not going to be viable, and the question becomes who's going to provide those services? And if the current providers aren't, then you have, Darwinistically, an opportunity. If there's no hamburger joint in town, you can put one in. Now, if you've already got a McDonald's here and Wendy's there, you're going to have to think of pizza or something else. I would agree that typically the rural telephone cooperatives are going to play an important role in this. They already are, for example, rural Iowa has a hundred percent local Internet access because it's served by 144 rural telephone cooperatives. But, I don't think there will be as much head to head competition in rural areas as in urban/suburban areas. In rural areas, I see a more Darwinistic model of "niches" where if no one is providing these services and where they are critical to the economic growth of that community, then it behooves one or more of those players to find ways to make those services available on a cost competitive basis. There are going to be a lot of places where the electric power company is not going to be a player in this at all. And on the other hand the current level of telecommunication services needed by an electric power company has not historically been very great. But there are so many things that you can do now with smart appliances and with reading meters electronically that save you so much money and can have positive environmental effects, that electric utilities are going to themselves need more and more telecommunications and information technology. I mean if you can turn off hot water heaters for a few minutes during the peak, then you can shut a particular plant down that's producing most of your sulfur dioxide. If you can shut down air conditioners for five minutes, you can keep from having to use gas turbine power, which is much more expensive. So, I think that the amount of telecommunications that electric utilities will need in the future is going to be substantially greater than it is now and has been in the past. And for their own self-interest, they need to see if those services are going to be provided by the existing companies in those businesses and if they can buy those services competitively. If they can, then there will be less rationale for electric utilities to get into telecommunications services. If McDonald's can buy ground beef at a good price, they won't be raising their own cattle. And I think for electric utilities, if they can buy these services and they're readily available and they're competitive, they're going to buy them because that's going to be the cheapest way to go—and, you don't have to manage anything, you just write a check. For areas that don't have these services (and need them or they're not going to be viable), the electric utilities have too much invested already in that community to just let them go dark. If the rural community needs certain telecommunications services, and if no one else is going to step in, then the electric companies may feel they have to. So, I think that Billy Ray was describing a kind of Darwinistic model of filling unfilled niches and I agree with that, but a Darwinistic model does

mean necessarily that a predator/prey situation. I think you're going to find that you have unfilled niches and you're going to find electric power companies providing some kind of telecommunications services in areas where the RBOC or other traditional provider isn't. That should be an incentive to the traditional providers to make sure that rural areas have the services they need. Either way, the services get provided.

KIMEL: If you look at rural communities, they are not all the same, obviously. We've got rural communities which are at the high end that have a lot of this figured out, and then you've got others which are the majority and which are somewhere at the other end of the continuum. They're all going to progress differently at different rates, and I think what you're saying is there isn't one strategy that's going to work but there are going to be multiple strategies and multiple approaches to this that are going to have to be developed in order to deal with the myriad of problems and issues and challenges that exist out there. I happen to think that this kind of debate is really healthy because I think this is what rural communities need. They need people in there kind of scuffling around, in some cases competing, in some cases forming partnerships. And I probably hasten to say that in some places it's happening now and over the next five years, while some are still debating, someone else may step in and say hey, I've got a better idea how to do this. And again, I think that that makes it better for everybody. It raises the playing field, you know, it raises the stakes. It stimulates innovation and creativity, and I think when there are cases where the partnerships make sense and they say hey, while we're all sitting here talking, there's another guy out here that's going to do this if we don't—maybe we ought to find a way to work together because we've each got something that each other needs and I think that over the long term that's going to be very productive. An analogy of the advent of electricity is certainly instructive as well. There was this educational process to help people to understand what can be done. We need that, because there are lots and lots of places we could go to tomorrow, put in a major investment, and the community would be no better off than it was the day before because people weren't able to make full use of the technology. And just one more quick point. While it is not exactly the same and there are many differences, Henry got me thinking about analogies in a conversation we were having a couple months ago and I also thought about I think there's some interesting comparisons here about what happened with the deregulation of the airlines and what's happened with that. Remember everybody said "In many cases these major carriers won't serve rural areas," and by gosh, that's true, but look at what's happening. There are whole companies basically being created that their entire market is rural areas. They don't want to serve the big markets. You know, ComAir and these others which are finding it very profitable to serve many rural markets. And what's happening to the big carriers? They're getting out of those rural markets completely, leaving the smaller, rural markets to the regional carriers. Of course, they connect with each other and handle each others passengers on routes they don't serve.

JAMES: Like American Eagle or United Express model?

KIMEL: Yeah. And it's kind of interesting—while there are differences—it's interesting just to see that there are some lessons there. We might expect to see certainly among electric co-ops, telephone co-ops, as well as other players, that the rural companies may end up actually providing the services and these big companies may say yeah, we're not going to do this anymore, you do it.

CANNON: I'd like to jump in and echo the thoughts again of these folks that are sitting around me and to offer my clarification on the statements that I made about electric co-ops and others getting into the telephone and communications type business. I agree with Henry that when those services are being provided otherwise and we can achieve them more cost effectively by purchasing from an

existing provider, we will choose to do that. The point that I was trying to make is that the unique form of business that we have, the cooperatively owned business, is a key asset that can be deployed in helping to achieve widespread deployment of this technology. You look back at what happened 40 and 50 years ago when electricity was brought to the hinterlands with the assistance of TVA and others outside of the TVA fence. You got people getting together, identifying a community need, deploying the resources to make it happen, following through with it—granted with a little help from the government—but help that's been paid back and paid back in spades when you look at the development and improvement in the quality of life that's taken place afterwards. And that's where I echo what Billy said. That's the whole purpose: to provide a service to improve the quality of life, not just to make money. And that's where I think we come in to this and we're going to make a good contribution because that's what we're in business for. We're not there just to make money. We're there to identify needs and fill those needs and make the quality of life better for the people that we serve.

EGAN: I'd like to follow up on that, Dennis, because as an economist, I'm confused a little bit, because I'm hearing the group say that there's some virtue to a cooperative model similar to the electric cooperative. Then I heard Billy Ray say the competitive model is best. And then I heard you just say we're not there to make money, and now I want to say as an economist that the law, the telecom law, is clearly based on a competitive model, there is no dispute there. I think everyone agrees with that. And yet if your vision is consistent with the law, somehow the cooperative model, which most business school professors associate with a non-competitive or public sector oriented model is the answer for the future. A co-op is not a competitive model.

CANNON: I disagree with that.

EGAN: Okay, and apparently Billy Ray does too, a co-op is a competitive model. Can there be more than one co-op for...

CANNON: A co-op can compete like hell, you know that.

RAY: Co-operatives and the municipally owned utilities were actually employed as a tool to create competition in the electric utility environment.

CANNON: As a measuring stick.

EGAN: So, the business professors are wrong, a co-op model is not a public sector model. Very interesting because my electrical co-op is clearly a customer owned utility.

CANNON: Right.

EGAN: Which is a public sector effort.

RAY: You're trying to cram a round peg in a square hole. The cooperative model is a competitive tool. It was a mechanism government used during the Great Depression. If the private sector was not going to do it, then by God, we'll just do it ourselves.

EGAN: Oh, I see. Well, okay, the co-op model, I want to pursue this, the co-op model is a model required because "the private sector would not do it." But again, I fundamentally have a problem

with that because I thought a competitive model was a private sector model. This is critical. I think the Federal Act does not say there's to be a transition here. The Federal Act is not ambiguous. It does not say that "until there's private sector competition here's how you should do it." The Act doesn't do that and that's my problem with the model. Let me say the opposite. As my friend Bill Vickery, who just won the Nobel Prize (but he also just died unfortunately three days later), as Bill always said in business classes at Columbia—and he was one of the few who said this—public sector models aren't all bad, there are some good co-ops out there. Bill Vickery was a tremendous champion of the electric co-op idea—but I'm still confused. The Act, the Federal Act on telecom infrastructure didn't say anything about some sort of cooperative model.

OWENS: It's not recognized in the Act.

EGAN: So, am I missing something that when the government passed the Act they meant cooperatives are fine, or did they mean a competitive model, a word that appears constantly. For rural areas too, the Act only refers to the competitive paradigm. It was unambiguous about that.

CANNON: What's to say a co-op can't compete though?

KIMEL: I think that's an interesting question. There is competition here but also due to the changing nature of our economy there is a new paradigm in terms of the relationships between traditional non-profits and for profits and how those entities work. I mean non-profit is a tax classification, not a business strategy, and I think changes are happening. Drucker talks a lot about this, about the increasing role of non-profits in these kinds of ventures and operating more competitively. It's just that a non-profit doesn't mean non-revenue. It's structured differently, but I think there is an interesting transition happening here that is also being driven by the changing nature of the marketplace and the role that these entities play not only independently, but also in conjunction with for profits. Perfect example: we helped create several non-profit companies to manage some of the original Televillage programs. Those companies include the stakeholders from for-profit companies, non-profits, et cetera. It took us 15 to 16 months to get those first for-profit companies through the IRS because of their structure, unique services and the partnerships involved. Now, that's just one particular model and approach, but that was certainly an indication, which I think you've raised an important point actually, Bruce, is how these things are changing, and it really does require kind of a rethinking on the part of a lot of people of how these things can be structured.

OWENS: What I'm hearing from you is that a co-op is an efficient way of doing business and it's expected to be successful by the people that own it.

EGAN: Let me finish. My local electrical co-op is fighting entry by a gas company on the very basis that a competitive gas company wasn't part of the deal. And now I'm wondering, are all of your co-ops perfectly happy to accept that what's good for the goose is good for the gander? Any private power generator who wants to come in here, will you accept them?

CANNON: We may have to accept it whether we want to or not.

RAY: We are willing.

EGAN: Our town council was bought off by the utility and now the competitive gas company can't get in to the area where I live. So anyway, I guess what you're saying is you can't obviously say no as

the president of the co-op. But I suspect that you'd be lobbying the city fathers to keep out the private generators.

JAMES: Well, you can run into cherry picking and other cream-skimming issues, yes. So there are many real "level playing field" issues that are genuine and not anti-competitive. But let me mention one other thing. I stated that the electric utilities are interested in telecommunications because their own telecommunication needs are going to be growing enormously. You're an economist. Economists years ago used to measure how well the economy of a country or region was doing by the consumption of sulfuric acid. That was the standard by which GNP was measured, because the consumption of sulfuric acid had a direct relationship on how well an industrial based economy was doing and you didn't have to worry about the effect of currency exchange rates. To the degree that we are now moving into technologically based economy—information services or whatever you want to call that thing—the per capita usage, I wouldn't say the availability, but the usage of those information services is going to be a strong indicator of how well that economy is doing. Secondly, electric power companies have a huge investment in plant and equipment. They're looking for a long term payoff, and they are concerned with the long-term economic vitality of the areas they serve, which tend to be geographically fixed. The electric companies have their own telecommunications needs and they're also looking at the health of the economy in the area they serve. So, if nobody's going to provide that service and that's the whole basis of the economy we're moving into, then they're going to look at that. But I would also counter argue that it is possible for electric utilities to get into telecommunications for the purpose of economic development of their electric service area and never haul one bit of data, by doing what Kris Kimel was talking about regarding the Televillage—creating users, creating usages, education, bringing people up to speed, etc. In that scenario, it really doesn't matter to if they're not making a profit on telecommunications or not. It matters that people in the area are using those services, even if you are not the one providing it because it has such a great stimulus and effect on the economy of the area. Because unlike a lot of other businesses, no matter what dereg says, an electric utility cannot pick up all of its poles and go move them like a McDonald's that closes one location and opens one up over there if this one's not doing too well. Electric utilities do not have that option. They're kind of stuck with the area they serve.

EGAN: Same with the phone companies.

JAMES: They are stuck for better or for worse with the customer base that they have, so they have to grow that. So, to the degree that telecommunications technology is going to be a driver for the economy as we go forward, you've got to expect electric utilities to be interested in telecommunications. Now, how that interest is manifested, some are going to provide it, some are going to think about providing it, some of them are not going to do anything in there at all because it's going to be done by a traditional provider, and maybe one of TVA's roles is to improve the skill level and the usage of these kinds of services to show people how they can use for information technology for economic benefits, not just for the social good, because that's really how TVA sold electricity, by showing people how they could make money using it, and at that point it really doesn't matter whether you're providing it yourself or not because you're getting the benefit from the economic growth of those services. However, since you do have rights-of-way and poles and bucket trucks and an engineering department, you can, if it is in your interest to do so—work both sides of this equation and use your capabilities to enter the market. Doesn't mean you have to, but you can use your ability to enter that market as leverage to cause say the RBOC to make an investment in your service area that they wouldn't otherwise choose to do. So, I don't think it necessarily means that an electric utility has to get into that business head-on, or even at all, to benefit from participating in telecommunications.

EGAN: All right, well, I view that as actually much more exciting than the question here at hand because after all, the issue is—I think Linda Garcia would argue—the right to profit. It matters a lot. It's just going to be a tremendous job to unscramble how rural America will get any of these advanced telecom services, but is the consensus of the group, getting back to the original question, will the advances be made in a timely manner? Well, obviously timely's in the eyes of the beholder.

JAMES: And how widespread is that going to be?

EGAN: Yes, and the question is do you agree with Ed Malecki that you were 10 or 20 years behind in rural areas in terms of telecom services available to the mass market, and is that going to be the same or are we going to get advanced services in the villages?

JAMES: I think you're going to find it in pockets of places, but I think we're also going to run into definitional problems. For example, you look at a list of rural areas to see if they have ISDN available or not, there's going to be a "yes" on the check mark even though people are not using it—BellSouth ran into that when they were asked to make ISDN available statewide and they did and then nobody used it because ISDN compatible modems and applications weren't available, so I think this question, even though it's oversimplified, is important because it doesn't say "will these technologies be available." It says will these technological advances be made available in a timely manner, and timing is important. Too early and you've made an investment that no one uses and too late and you've hindered economic development. Also, I want to add that I think that these problems are not necessarily so infrastructure dependent as we like to think. Fiber optics is the cheapest infrastructure you can build. Mile for mile, it's cheaper than a four-lane highway, a strip of runway, a pipeline or a railroad spur.

EGAN: Well, then answer the question, "will be available?"—is the answer yes then?

JAMES: I think it's possible if the players in this, the rural telephone cooperatives, the electric companies, and the so-called CBO's, community based organizations like Televillages, push for greater skill level enhancements, education, and most importantly, the usage of those technologies.

CANNON: I would also draw a distinction between hard wire and wireless technologies. I'm sure the telephone co-ops are providing Direct TV just like the electric co-ops are. You know, that's an area where as a matter of fact, the rural people had this service first in a lot of cases before urban people.

JAMES: Satellite television.

CANNON: Exactly. Eighteen inch dishes—they were adopted most readily in the rural areas first. So, in that instance, if information technology is moving more towards a wireless type of framework, then I believe there is the potential for closing the gap, especially when you don't have to depend on running a line over ten mountains and facing two or three times the cost of running a mile of line in a rural area versus an urban area. When you put that bird up in the sky and you nail up an eighteen inch dish to your house, it doesn't matter whether you are rural or urban. The signal reaches both at the same time.

CRAWFORD: I would agree that the 20 year time frame that Ed mentioned is shrinking. But at the same time the threat of bypass is creating the incentive for everybody to rethink their time frames as

well as their game plans. It keeps changing. There are opportunities for bypass. You think you're secure, monopolies sit their comfortably, and all at once that blows away and then something else comes in to replace it, et cetera, et cetera. It's bypass potential that can quickly put you out of business and that's going to drive things to happen a lot faster.

EGAN: What are the time lag lengths?

CRAWFORD: Well, it's the same thing when they're talking about with deregulating the electrical utility industry. I mean it's heresy to talk about retail open access.

JAMES: We're not in California.

CRAWFORD: I know, there are drivers everywhere. You hear about it from Wisconsin and a few of the other places that do those kinds of things first, but we're all hearing it said more and more and people are beginning to devise how they're going to deal with it. It impacts one of the things the power distributors deal with all the time, and that is the long term power contract. There's been a lot of objection to "long term" because they don't have the opportunity to go out and buy power cheaper from other places. All of these question may be bypassed if retail access comes along. You still have your long term supply contract, but you don't have any customers using it, so what the is the contract worth? It's a major change in an old business.

KNOWLES: That's where we are now in our business. We were facing those issues about four or five years earlier than you are. We're concerned and I think there are going to be joint ventures between power companies and telephone companies, telephone companies and cable companies, power companies and cable. I think it's going to be whatever service the customer wants. If we don't supply it, somebody else is going to, and if we don't respond to the customer in a timely fashion, then we're going to miss the window of opportunity. Obviously in Glasgow you did that. You were one of the first in the nation. I've read about it in several papers, and it's commendable, but how many other companies have done that? Very few.

CANNON: Precious few.

KNOWLES: And how many more will?

CRAWFORD: But Bill had some uniqueness there. His system was small and compact, as opposed to some of the rural cooperatives which are not , so they can't build the entire infrastructure in a short period of time at a similar cost.

KNOWLES: That's right. In every decision there is a window of opportunity, and if you pass that window, I feel like you kind of miss the boat.

CRAWFORD: Well, you miss it, but you may lose it too.

KNOWLES: That's true.

CRAWFORD: You may lose everything.

KNOWLES: That's also true.

CRAWFORD: You make the wrong decision, the wrong investment and you're going to be out of business in three or four years. That's what we're looking at right now. We're trying to diversify to get into anything we can to maintain the revenue base, to provide the customers services they want. We're not sure what the future is going to hold five years down the road and you're investing several million dollars a year in infrastructure, but is it the right infrastructure, right technology? The way I see it, if you provide the service the customer wants, that will drive the technology, whichever way it goes, however it changes, but you need to find the right partner. It may be a power company or it could be a cable company or it could be an entrepreneur. We're doing some work with a cable company right now trying to get some broadband. At the same time we're trying to do some work with some entrepreneurs on the Internet side to provide some Web sites.

EGAN: Respond to Ed Parker's contention, which is roughly opposite of what you've been saying, but I want to be sure of the conclusion when I go in and say it's wrong. Ed Parker said in fact, that competition and the new regulatory structure under the new law will worsen the gap, not improve it, and you're saying no, you're running full blast and I think you're saying deregulation and competition will shorten the gap. The models, academics, and people like Ed Parker are saying the opposite, that the rural subsidies are drying up slowing but surely, your gap will worsen like the income gap has worsened.

JAMES: Unfortunately, there are some counties, the poverty counties of the Delta and Appalachia that are probably...

EGAN: Suffering as a result?

JAMES: Which follows the model that Ed Parker talks about.

EGAN: Where do you serve, where is your company?

KNOWLES: Middle Tennessee.

EGAN: Will independent companies shrink the gap with deregulation as opposed to Ed Parker's contention?

KNOWLES: I'm not sure I know the answer to that. What I'm saying is there is going to be a short term cash flow problem and I think it's going to be up to all of these companies to diversify. What we're trying to do by partnering with other industries is to overcome that shortfall of capital and if you can provide the services the customer wants, then you're going to overcome that shortfall. It may be rather than making seven or eight percent on a circuit, maybe making two percent and selling fourteen circuits rather than three. I think there has been an explosion of services, but as far as the question goes, I think there is always going to be a lag in the rural areas because the services are for the most part derived from the need in the urban areas and there's always going to be a delay factor. However, I think there are going to be good telecommunications services in the rural areas, but there's going to be a lag factor. Now, what is that lag factor, I don't know, but I think what you said is right, the factor is getting smaller and smaller.

EGAN: I don't think any expert thinks that certain geographies and certain consumers within them aren't going to be left behind. I mean that's the way markets work, but if you had to strike a big average, does deregulation shrink the gap or does it increase that gap? I mean we're striking a big

average here because I don't think it's good to just look at the Delta area and people of Appalachia.

JAMES: I would say that I think that it would tend to shrink the gap because of what Levoy says. He's got to make an investment to provide this service or he can make a deal with the electric cooperative to haul some fiber for him instead of doing it himself, and so that is the competitive advantage.

EGAN: Aha, interconnection.

JAMES: Interconnection.

EGAN: You're going to use someone else, which moves us into the scale and scope question. Is it important to you now, will it be more important to you going forward or less important to you going forward. I guess Levoy said you need to diversify, in his opinion, so scope is an enabling factor going forward. That's what that says to me. And the electric companies—I mean Billy Ray and Henry, you agree no doubt, Dennis, you've got to start diversifying even in Lexington.

CRAWFORD: I've got one observation to make that I think is going to drive an awful lot of where we go in the future. We get wrapped up in this as if we're the ones controlling what happens, but when you get out there and you look at the consumer—and it's the consumer that drove the 20 year transition period—people buying things for survival. We have transcended that now. We do things because we've got resources much greater we had then, so now we've got more leisure time, more disposable income and all the other things that drive it, and it's amazing what a driving force those excess funds that people have to spend are—how they're going to spend it, and if they're going to spend it in this area. It's going to drive everything we've got going right now.

JAMES: You are exactly right, and if they don't spend it, then all the technology applications we're talking about are not going to happen. And for them to spend it, they're going to have to have a viable economy, they're going to have the skill levels to use it, and there are going to have to be services they're going to want or need to use, but it's all going to be driven by how much people are able and willing to pay for these services.

EGAN: Well, if it's driven by demand, if it's driven by just consumer demand, if that's the driver for going forward, then one would expect the gap to close. They may spend enough to close the gap—I mean their demands are similar to urban people, regarding information.

CRAWFORD: You look at kids in school. It doesn't matter where you go to school, in a rural area or in an urban area. They all talk the same language, they all want the same things.

JAMES: To the degree that there is a demand for those services, again I think somebody will provide them, so the key is creating not just demand as in the entertainment area where people watch seven hours of TV a day, but a demand that is integrated economically into their lives and businesses. Let me give you an example. Fed Ex has this software, you've probably used it, where instead of filling out the Fed Ex form by hand, you do it on your computer and your computer calls Fed Ex and your printer does the bar code. In reality, you're doing Fed Ex's data processing for them. You're printing the shipping label for them. And when you track the package, you're doing their data processing for them. I think as more and more companies go to those kinds of systems, it is going to force people to do more and more of these kinds of things. Now, at some point—Fed Ex has not

done this yet— but Fed Ex will undoubtedly give people a discount for doing the data processing for them, so now you're going to have an economic differential, which is going to behoove you to take advantage of doing those things via information technology. You can buy stocks now at a much lower cost using your computer rather than a broker, you can fiddle with your 401K and do banking. etc. To the degree that you obtain an economic advantage from using those services, I think there's going to be a strong demand for them. If you go back to the example of selling electricity that TVA and the co-ops first did when they went to the farms, they were not taking vibrating Barcaloungers out there. They were showing people how they could increase the value of their lives either in hours or in dollars by using electricity for milking cows or grinding their own feed. And to the degree that we teach people that and they are able to incorporate these information technologies into their lives economically, then I think you'll have demand for those services.

EGAN: Okay, what effect will the new legislation have on scale and scope, it is positive or negative? And I noticed under the section, before we wrap up, are these threshold of use things important? Linda Garcia said unless you get 15 percent of the people using something, it's not going anywhere. What is the effect of telecom law on this issue of scale and scope and is there a threshold that one has to reach. It may not be 15 percent of people using a service to make it work. Actually a lot of people think it's more like 50 percent because it takes two to tango on a phone line, but anyway, is that critical?

RAY: Probably. The new telecom law: is it going to be implemented the way Congress intended, as it was framed or was it going to be implemented with 30 lawsuits filed by the phone companies to try to fight the implementation of the thing?

EGAN: The FCC order has been appealed but, no one has appealed the law, that I know of.

RAY: There have been 30 lawsuits filed by different phone companies trying to delay interconnection provision so others can enter the market.

EGAN: No, those were appeals of the FCC guidelines. To my knowledge, there is no pending appeal of the law, and that's what the question says: the law. I'm not interested in FCC rules and I don't think that that's what that refers to.

RAY: There's a similar effect there. But yes, it's definitely going to improve the competitive level and the services in rural areas if the legislative intent gets all the way to the street, but it doesn't look like it's going to.

CRAWFORD: But as the challenges come to the FCC rules, that gets the attention of the legislators to fix things, if it's apparent that it's not working right, there will probably be some amendments.

EGAN: I think it's the other way around, ain't nothing wrong with the law; there's a lot wrong with the rules.

KNOWLES: You take a 7 page law and make a 760 page rule—I feel that's the problem.

EGAN: Well, anyway, we're generally advised then on the law. What about this threshold thing; is it as critical as it used to be, more critical?

JAMES: I don't know that it's that critical. I think there's actually an advantage to being a little behind the implementation curve. If you have a fax machine and hardly anyone else does, then you've spent something like \$1,000 and you can't really do anything with it, but if you wait and buy a fax machine when they're \$200 at Office Depot and a lot of people already have them, then it's much more useful to you and cheaper too. I think a lot of times when we talk about rural telecommunications, we're talking about rural people communicating with other rural people, and actually I think it's more a question of rural people communicating with the outside, you know, using a toll-free number to buy stuff on Home Shopping, track a package on Fed Ex and all of those kinds of things. So, to the degree that those uses become more common in our economy, I think that the threshold of use effects could be less important in rural areas because they're not dealing with just how many people in your community have fax machines or Internet access, you're dealing with the whole rest of the country, and what businesses like electronic banking and other kinds of things are going on. Since the rest of the economy is using these information technologies, it makes it more important for rural people to have access to them to stay part of the economy, but the fact that everyone else—in urban areas—are using them, it also makes it easier and cheaper for rural people to connect. So, I think the threshold thing is probably less important.

EGAN: I wanted to address Dennis' comment about the criticality of wireless in all of this. I have a feeling that we should answer as a group. Is wireless truly as critical as Dennis characterized it, meaning that's how many of these digital services are going to reach rural areas, or is it just simply another positive factor. A lot of people want to know is rural infrastructure, in the next five or ten years, going to evolve to a heavy reliance on digital wireless, that's the question?

JAMES: I think China's the model for that. I mean one in how many thousand Chinese have a wired line?

EGAN: Yeah, but China is not the model. No, I want to talk about the U.S. because I'm personally convinced that in China it will. The question is in America, in America's rural areas. Are they going to be using wireless as the fixed infrastructure?

JAMES: PCS?

EGAN: I include any wireless loop arrangement, whether it's a satellite provider, PCS provider, wireless cable TV provider, or any other fixed service generally. But not PCS. PCS is still largely characterized as a mobile service. In fact, it's not even legal yet to use it for fixed service except in certain bands. My question is will this become a dominant, or for that matter, critical technology for loops, that is the question. I hate to hang it all on PCS, because don't forget, the government is authorizing non-PCS spectrum all the time for rural wireless systems, not necessarily for mobile service.

JAMES: Well, you've got two systems now for getting television signals coast to coast, satellite and fiber, and they're competitive. You have some specific advantages in wireless over wired for low band with applications, especially for mobility things and especially for area coverage. Wireless has a certain economic advantage.

EGAN: Is your future heavily dependent on wireless for fixed service?

KNOWLES: I think so. We're projecting that anywhere from 15 to 20 percent of our traffic over the next ten years is going to be fixed wireless. Now, whether that prediction's true or not, I have no idea. That's what we're using as a model, and that decreases your need for all the problems at home.

You know, you can provide a lot of services real quick and real cheap.

EGAN: How about your members, Tim, are they bullish for fixed wireless service?

OWENS: No, it's going to be about ten percent, probably. Less in some areas like Tennessee. You'll see more in remote New Mexico or other parts of the Southwest.

EGAN: And that wasn't the nature of my question. These markets to me are not the issue. There's always backwoods subscribers that you can't get to easily with wire.

CANNON: And your territory, Levoy, is pretty much gently rolling Tennessee hills, isn't it?

KNOWLES: Yes.

CANNON: It's not like some of our co-ops over in Eastern Kentucky, where you are scaling huge mountains to run a wire to them.

KNOWLES: Well, we've got some pretty mountainous areas too, but I still think that wireless can get us to the point—if you have pockets of people that need services and you don't want to build wired service to them. The technology is now to the point where you can take your phone in your house and convert all your inside wire to a wireless phone, you take it out and put it in your car and it becomes a cellular phone. It's already there, it's already in existence, and I think that's going to be more widely used in the next 20 years. It's kind of scary because all of a sudden you've got all your inside wire, all your drops, all your network back to the switching point that's now useless basically, so again, diversification I think is the answer for us to stay a viable company. So, I think there's a place for wired. I don't think you can totally replace it, but there's a place for wireless too, it can help you capture a certain part of the market.

EGAN: Ten percent market penetration is not a big deal, but if you have to get up to something like 25 percent, that may be difficult. That's my reaction, because when you think about it you'll always have about 10 or 15 percent above average income type people that would pay a premium just to have a service—cordless phones have proven that, so the question that I was referring to was the loop, not the cordless phone, and I don't know, 10 or 15 percent, that's probably a lot. I guess to a phone company that's a lot.

KNOWLES: That's just over a ten year period, too. Beyond that you're looking a lot higher penetration.

EGAN: We solved everybody's problems.

CLOSING SESSION

FRESHWATER: What I'd like to do first is to ask Linda Garcia and Bruce Egan to give us a synopsis of what happened in their respective sessions and then we'll move into a general session where we'll discuss policy implications. During the adoption track, there were several policy issues that kept creeping into the discussion and I'm sure they crept into the technology session. Actually, I don't know how you separate policy questions from any of this. Following Bruce's argument, policy is the piece that we have to figure out to make all the other pieces fit together. So, Linda, if you could come up and tell us about what happened in the adoption track and then if Bruce would do the same thing with the technology track then we can move on to a general session on policy.

GARCIA: The first question raised was whether we should in fact look at these issues using a community by community approach. Some people suggested that in an information age the notion of looking at different communities as manufacturing communities, as farming communities, and so on was sort of out of date. And while we didn't reach a consensus on that I think there were several people that thought that. Then, when we began to talk about the technologies, we said are there aren't any specific types of technologies that are critical. We talked about the need for a networking platform rather than the need to focus on any particular technology, and most people I think would agree that the Internet was a good place to start. Everyone emphasized the fact that education is critical both in terms of the educational community as users but also as education so that rural users can become acquainted with the value of technology as a vehicle for facilitating other rural activities. There were some questions about how to get the technology into rural areas, and we went back and forth on whether you focus on the demand side of the picture or the supply side. I think we concluded that you need to focus on both the demand side and the supply side, and in fact it's the interaction between them that will actually drive the network. Some interesting questions were also raised, which I hadn't thought about, involving the jurisdictional issues of convergence, such as having cable companies being a provider as well as telephone companies. Where should the jurisdiction rest? Who's going to be tasked with figuring out how to deal with these things on the local level when we're in a global environment where foreign companies are going to be owning large portions of U.S. companies. Will they have the same incentives to be supportive of local communities as some of the companies that are there now? And second of all, should local communities have more of an input than state governments (given the role that cable might play in some of the changing regulatory frameworks that we're seeing)? The emphasis was that it is very important that we don't just look at the telephone companies as the only providers of rural access—we need to look at many different types of providers. I think there was some consensus that we should look at the community as the user in terms of universal service paradigm and that perhaps one of the things we might look as a goal would be to provide broadband services to the community and then let the community sort out how it goes from there to homes, institutions, etc. We also spent a lot of time talking about a transition strategy to get from where we are today to where we're going to be in the future. There was some discussion about what incentives and motivations the providers will need to have at the community level.

EGAN: I'll put our groups results up here. My group was really weird, incidentally, because it totally went off in a direction that has little to do with the questions that were on this outline but, boy, it was interesting. I found out some really interesting stuff, and I guess you've got to hang out with TVA people in central Tennessee to know the real meaning. But I've got to tell the group that it

started out with the unambiguous consensus—phone companies were outnumbered—the electric utilities were just going to save the day. And because our first question was timeliness of the availability of advanced technology (someone has to provide this technology whether it be telcos, cable companies, or cellular, or somebody else) and the consensus was none of the above—it'll be the electric utilities. It seemed that most of the people in the room were from electric companies. And I said that I've always heard, in respect to this question, that electric company managers are dinosaurs. And I prefaced it with, "now don't get offended because I've got to tell you, OTA taught me this. I did my study, and this is all I heard."

Lord knows I've sacrificed a lot of clients over saying stuff like this. However, I told the group that Ed Malecki and Ed Parker said that rural telecommunications is going to be done by entrepreneurs. Then it was pointed out by the electrical faction that the entrepreneurs are cockroaches—they don't eat much, but they sure mess up everything they touch. I loved this. This was great to me. People aren't dealing with the real question. They're always getting embroiled in an endless debate. They represent their private interest—and that's no secret in life. Then we settled down. And it was pointed out by many of the group that technology creates demand and in fact, using the Glasgow example, you've got to have the Information Superhighway before you can expect any services to be used and there's, of course, certainly some logic to that.

And in fact the electric co-op model is the best model for rural America. Even though this was a public sector model to most people, generally it is entirely consistent with the competitive model, and this I found very interesting. You would certainly have to take a business school professor and train him or her to believe this, because a lot of people liken this to a public sector way of running a company, and, of course, it's not. It was pointed out by people in our group that the conventional wisdom is simply not right. That this public sector entity can co-exist entirely happily in a competitive model pursuant to the Act which calls for competition in the telecom market. Very interesting. And incidentally, the small investor-owned telco model is similar in its characteristics. And then we hit on a very important point that a lot of people in here had in private discussion with me—that it looks like we're going down a path of airline deregulation where you're going to sacrifice service to certain areas in order to have robust price competition. Our group disagreed on that and that surprised me too because I potentially could have agreed with that position. But our group disagreed and said, no, no, no. This model, in fact the result of the airline dereg model is fine. It would apply to rural telecom infrastructure because what will happen is the cockroaches (entrepreneurs) will come out of the woodwork to fill those gaps when the incumbents exit, like Comair has filled the regional airline gap when the majors exited. Of course, some communities in Montana might dispute that a Comair type, or Sky West type of operation will take over. But nevertheless I found very interesting that basically the rural infrastructure types said "no, this should not be the concern."

ODASZ: I just wanted to say the Photo Mat guy sold his Photo Mat and became an Internet Service Provider in Dillon, so he came out of the woodwork in our town.

ALLEN: Well, in Nebraska there are three places you can now get on an airplane, Omaha, Lincoln, and Scott's Bluff—if you're coming through Denver. Now it's been some time—and I'm constantly told there's a lag time before these entrepreneurs come out of the woodwork—but they seem to be doing that now and while they're moving to the Omahas, and the Lincolns, and the Denvers, and the Chicagos, we still are not getting transportation connections for a majority of our particular state.

KIMEL: Just to clarify, I don't think the issue was, that airline dereg is a good model for people to follow. But while the analogy is not perfect, there was dissent years ago when deregulation hap-

pened. The rural areas feared that the big airlines were going to give up the rural markets and the rural markets weren't going to be served—therefore the model is not perfect. But what has happened, and what is still evolving, is that there are companies that have started up that do nothing but serve rural markets. Ten years ago nobody thought that was really going to happen and I'm amazed every time I go to the airport I see airlines there that I've never heard of, and I fly a lot. So the idea is valid that there are entrepreneurs who will emerge to serve market niches in rural markets and maybe we'll see some of that in telecommunications—I think we already are.

EGAN: Of course, like with ValuJet, you may land in a swamp. That's an accurate characterization and I view that as significant, but from most rural constituents all you're going to hear is the terrors of the model of airline deregulation.

STERRS: Maybe the model of the airline deregulation isn't as frightful from that respect. You've got some carriers who'll come out and serve the niche market, but the difference I see with telecommunications is we really don't have a very broad base of telecommunications users in rural areas and some of those areas are at risk if we use that model. So, in other words, I think you could have less people using telecommunications than you have using it today if we follow the airline deregulation model.

EGAN: That's a good point.

STERRS: For example, I don't think that there are any subsidization or lifeline type services in the airline industry which help people with low incomes fly. Well, we're still going to have to preserve that in our telecommunications model somehow because nobody's going to stand for going from the high penetration levels we have now down to something less than that at the expense of being able to offer new, competitive services in urban areas.

EGAN: And everyone in our group agreed that in certain geographies and for certain people within those geographies they're going to lose. I mean that's inevitable. No one disagreed with that. I guess what we were saying was that in some sense it's worth it—so be it. We'll have problems here and there. My own experience with rural constituents is largely Washington based. I don't often get to hear Tennessee's view of things is because in Washington it's hard to sort fact from fiction. When you're in Washington all you see from the rural areas are the "all or nothing at all" kind of lobby. They don't care if it's two percent of the people or one percent who won't be served. That's enough to kill any policy reform, and so it's encouraging that real people that represent real world constituents—that aren't getting paid by somebody in Washington—can accept this policy even though they understand that a few people are going to get hurt.

IMORDE: Bruce, isn't the telecom bill at least written in such a way—from a Congressional viewpoint—that you won't have the haves and have nots?

EGAN: Yes.

IMORDE: So what's going to happen between that intent and where we are and where you say we're going in that there are going to be losers?

EGAN: What's going to happen is what Ed Parker said is going to happen. What the policy statement says, what you hear from Washington, will have precious little relevance to what's going to

happen in the real world. So I don't think anyone's confused about that, even the rural lobby. I still hear when I go to Washington the official rural line which was roughly quoted in the Act, bless their hearts—the most effective lobby as far as I'm concerned—that in the entire law "no rural subscriber would be denied service at similar rates to urban subscribers." That's how it's written, but the reality is that the subsidies are going to go away. Just wait for the FCC's implementation rules and you'll see the leaks which are obvious. What the Act says and what rural constituents are going to get are two entirely different things. Believe me, it's going to happen and the de-averaging is a slow process and subsidy erosion itself can be somewhat slowed up by certain policies, but the inevitability—I mean no one should be confused about the inevitability of this. Congress had no intention to do it because they didn't understand the complexity of the issue, the FCC clearly knows what they're doing. They've been doing this a long time and you read their order and it basically says "we interpret the Act to mean that we will reduce subsidies to stimulate competition." Something like that, but it's all there. Those of us who have been working with the FCC staff for a long time know their inner desires for tariff rate rebalancing. How do we know that? In 1980 they tried to implement a policy called "Pure Two" and some of us are old enough to remember "Pure Two." Guess what, "Pure Two" has always been the goal of the FCC every since they played their hand back in 1980 and they simply took advantage of the Act to implement it and it's going to start now. "Pure Two", by the way, meant to shift the revenue requirement to run a small phone company onto the end user by whatever way, shape, or form you can figure out how to do that and quit cross-subsiding it so much. Getting back to our discussion as to why the electric companies are the ones to provide the advanced technology—make it available was their word. It's because telecommunication and cable companies are self interested in profits to make available advanced phone services for everyone.

IMORDE: I've got to tell you from a telco's standpoint, once we started moving into the competitive arena most of us who had been with the telephone company are gone.

EGAN: That's quite true.

IMORDE: And when the electric co-ops do that, the people there now will be gone. They'll be replaced by the people—

EGAN: Well, I did point that out. I pointed out that our management structure changed because at the time I was working in the telephone industry, and I predict just as soundly, that the management structure of the electric companies will change. When the real world takes over surely most of your top managers will come from an entirely different environment. Louisville Gas and Electric was an early example, were they not, in that they hired a telephone executive? So in some sense, I view that as encouraging—if the electrical industry represented here by TVA and their constituents accepts that. Incidentally, this was a revelation to me. When the electric companies are pounding the table for competition, that's a revelation and that was very much a learning experience for me. And, again, I have to preface in deference to Tim and Levoy that the room was largely populated with TVA and electric co-op people. The technology lag is shrinking and competition from the new law will help that process. I want to point out that our experts, Ed and Ed, I think, predicted the opposite. I think Parker indicated and maybe Malecki too, that competition inevitably is going to increase the gap between the haves and the have nots. That's sort of nature's way in a marketing environment and therefore the lags between rural and urban may aggravate it. Our group summarily disagreed with this—not me incidentally, I would never disagree with such wisdom—but the group disagreed and they gave an interesting reason. They said competition is going to shrink those gaps (which in some sense are the counterpoint of income gaps that we're observing in American society) and they're

going to shrink substantially. We can debate that later. Here's an example: rural consumer demand used to be based on some sort of model of subsistence. The way TVA got it's start was to provide something at a level of subsistence, but in fact demand is going to force it to increase the level of service because rural subscribers are not going to tolerate these gaps. I mean they're every bit as self-ish, individually, as the urban subscriber, and they're not going to tolerate increases in gaps. They're going to demand the service. So that's the first observation.

STERRS: Is there a gap now?

EGAN: Ten to 20 years—some sort of gap. And I don't know when the last party line was changed out in New York City but, it probably was a long time ago. But in fact, Larry, I'm glad you brought it up. We were using 10 to 20 years as some sort of average lag for the average availability of a new service in an urban area versus the average rural subscriber having that same service.

DILLMAN: That's not really going to happen with this technology. The whole adoption curve is moving so fast.

PARKER: Five years is more likely than 10 to 20.

EGAN:

But if that's true, then it's not the case that the gap is going to widen. In fact it's going to decrease regardless.

DILLMAN: It will always be there, but it will be a smaller gap.

EGAN: Well, actually that's important because income gaps are growing, not declining, as a result of more market-based policies. Don is totally right, now. I mean everything is collapsing in the sense of the old S curve that you used to look at for the time scale for the adoption of any new technology. But the question was "are there going to be winners and losers?" Will some people end up worse off—on average? And this is the real issue—on average will the gap of service availability be aggravated or not aggravated—if you could image a broad average?

GARCIA: How did you define service?

EGAN: Whatever was available in an urban area at any given point in time. So we didn't define it, really, but whatever it was, would the average rural subscriber have exactly that same capability? That's one way to put it without having to be held to some strict forecast of what universal service is. I don't know. As an economist, I've got to go with the conventional wisdom that the gap is going to get worse. That's my personal view and it's what I've published, and I guess I'm stuck with it. Competition is going to make it worse. I have a feeling that it's just like income gaps.

RAY: How would you deal with the advent of TVA, and the REA, and the rural cooperatives? Given your reasoning, this competition would have meant fewer and fewer people would have electricity and the opposite is what really happened.

EGAN: Yes, and I believe it's the same case with the telephone. Now we're getting back to this threshold effect. I think that in the very early stages things need help and the government needs to be involved. We're now in the very early stages of multi-media. If I misinterpreted your question

repeat it please.

RAY: You're driving the point that the coming competition is going to widen the gap between the haves and have nots.

EGAN: Yes.

RAY: Then how do you explain the coming of competition in the electric power industry in the middle part of this century when we democratized the product and drove it into markets where it would have never happened without competition?

EGAN: But that analogy is no different than telecommunications. Scholars of telecommunications point out that the greatest thing that ever happened to universal service was when there was not just one phone company and that was in a very, very early stage of telecom development. But market forces still led to more discrimination and caused the gaps grow.

PARKER: About the income gap, you were making one point and we were really talking about something else—disposable income. Relatively speaking, the gap may be growing, but each group has more disposable income now. That's going to provide the incentive for somebody to come in and take advantage of that increased disposable income. The people in the rural areas are no different than people in urban areas in what they know about what's going on in the real world. They're going to demand those services. If they've got the money to pay for it, somebody's going to find a way to provide that service.

EGAN: But even if you allow for changes in per capita income. . . for example, I just came from central Europe where I'm doing a considerable amount of work these days and you simply don't tell those people that competition will makes gaps in their society. The alternative to them is socialism, which they tend to hate.

AGHA: I have an issue on the quantitative side. When I take the entire State of Mississippi or Arkansas and look at the population, the realities of the market is that such a large geographic area with such a small population will have trouble creating an economically viable market for these services.

EGAN: And I think that really largely was Ed Malecki and Ed Parker's point. The old saw that the more people you have the more likely business folks are going to go there to satisfy the demand—no doubt about it. The question is "will that become worse under the new law or better?" That's the problem.

AGHA: But if you get new laws, those laws are all going to be subject to change, with international give and take like we faced with deregulation of banking within the European Community. The deregulation of other industries will allow for different lobbies to seek an advantage in different markets. It's not just in telecommunications, it's also the banking industry. It's the auto industry. Those industries are all competing for better markets with the EC. There are going to be acquisitions and mergers too.

EGAN: I'm largely in agreement with you. I do not subscribe to the theory that more market forces versus less leads to lessening of gaps amongst segments of the population. I don't think so and so

I'm on your side.

KNEESHAW: What happens when you implement new technology—looking at 2001 when we can turn on a peripheral satellite network to connect the whole world on the same day?

EGAN: Well, I personally don't subscribe to trickle down economics. I think it's crap and it's been shown over the years and proven as such. Businesses get neat toys to play with all the time that consumers never see. I don't think that's going to change, and I think Teledesic's multimedia system, if and when it arises, will be a lot of fun for rich people to play with. And I have no misconception that it's for everybody and the same goes for all these new technologies. Now, it's easy to say, "oh, but someday everyone will have access to Teledesic—there'll be so many birds flying up there perhaps it will be free." Not so—ask anybody in business. I don't care how long-lived your investment is and how much spare capacity you have, your price is based upon value. It has nothing to do with whether or not there's spare capacity and that's why the old saw that someday there will be—George Gilder's thing—the high speed digital telecom "Ether" is wrong. This optical Ether or this digital, broad-band radio Ether will arise and rest assured, that every human being alive who wishes equal access to that Ether will have it. I don't subscribe to that prediction.

KIMEL: Can we get back to Linda's presentation of this morning? I think these issues are important in the context of the total system. I mean each rural community doesn't operate in a vacuum, no matter what the technology is. I think these things are only important from a systemic point of view. Communities put these things in a context that says that the technologies are a tool.

EGAN: Correct.

KIMEL: And form follows function, thus these things are really comprehensive problems. Ed has been talking about that this morning in terms of how we deal with these confrontations and what the real challenges are for these communities. The technologies will continue to be deployed, et cetera, but your ability to make use of them—of anyone to make sure of them in a constructive way—is dependent on other factors in the community.

EGAN: I agree. If you drop a bunch of casinos into Atlantic City and somehow is that going to trickle down and transform the place? Of course, anyone who's been there knows better. It's a system. And systems have the potential to work or fail. And, Ed, you hit on the income thing that's important. Either you have enough money to afford these advanced telecommunications or you don't, and if income gaps are going to grow, surely the gap in the purchase of information technology will also grow.

KNEESHAW: But theoretically the cost of delivering that service should be the same to anybody around the world. At least you'll have equal opportunity or equal access.

PARKER: Geographically equal but not socio-economically equal.

WALTER: If I could get you to recap this before you go on to the next thing. What I'm hearing from you is that we need to aggregate demand. So I can picture a community saying, "all right, we're going to throw all our business or a huge chunk of our business from our schools or our business sector to a few select providers of telecommunication services. We want that collection of providers to be sort of the "cockroach nest" of entrepreneurs and we will pick and choose from them for the

next two years worth of contracts." So you've got a collection of ten selections between the electric companies, and telephone co-ops, and everybody else is competing for our business. We are selecting from this group, so we are aggregating demand because these people sort of magically appeared. Another way of saying it is that we are selecting the next two years worth of monopoly providers who will have the right to operate in our town. That's the right picture, right?

EGAN: I didn't have the guts to tell some of the people in our session that that's the sort of thing I thought they were saying. Let's go back to the world of bundling everything on to one information super highway. Let's allow competition, say, to change ownership of that infrastructure every once in a while. In fact, for a long time the theoreticians have said, "well, maybe the quickest way to get the information super highway to everyone is to auction off the rights and the megacycles to provide the super pipe to every home." I don't think so and I hope not, or both. How I would respond, I don't know.

AGHA: I have another two things to add to that. One is starting with cost of provision. Even if the service is equally available the cost may not be the same. As such they were never really equal.

EGAN: At the service level, correct.

AGHA: Absolutely. And the next problem that I have is I cannot think of any infrastructure that has ever been created without a government policy forcing it on, whether it be the railroads or trucking or whatever. If you argue that the railroads and the trucking industry will by themselves act to increase competition, that seems at odds with the policy of the government building the road network with tax dollars. If it would work the same on the telecommunications network as it did with the highways instead of with railroads what would be the picture with margins of ????????? over supply. We need to go back to looking at where has any infrastructure ever been created without a government policy and tax dollars directing it? What has the private enterprise done? Has it just piggy-backed on a government policy ?????????? There has never been such a thing in my mind as free competition for infrastructure.

EGAN: That's a good contribution. I mean, after all, infrastructures imply public goods. Let me get back to my group because I'm almost done and I'm sure we can then have a free for all. I thought our group was cohesive in getting to the point after awhile. Scale and scope was the question and these are very, very important issues.

Everyone seemed to agree that distributed processing was how small companies and partnerships achieve scale and scope. And so the rural companies aren't left out for scale and scope reasons. Now, there are a lot of people including Peter Huber, in particular, who completely disagree. They view scale as a humongous advantage and see remonopolizations of sectors of the business. So there are certainly disagreements outside of our group. As I said I think scale and scope are severe problems for you unless you get interconnection. Another thing is that education of the consumer is absolutely critical. This was pointed out by many people in our group. And whose job is it to do the education? Is the private sector going to run around making this a high priority? That's an interesting question.

IMORDE: Is there some way to quickly explain what the co-op model is?

EGAN: The co-op model says there's a partnership between the provider and the customer. In some sense, customers are an equity investor in the partnership (and it is usually considered a monopoly

model, incidentally). I thought our novel contribution to the science was that it's not implied at all that it's a monopoly model. That there could be other co-ops or private interests allowed to attack it. Like the electrical co-op where I live, I'm a shareowner in my electric company. I get dividends from them even though I never asked to be a shareowner nor did I ask for dividends. I mean it's kind of neat, but as I pointed out in my group, my electric co-op was the first one to lobby the city fathers to keep out a new gas company. So you tell me if that model's a good model. It seems to be good, but they seem to work by making the body politic into shareholders. However, I point something out in deference to a good friend of mine who just died, Bill Vickery, who just won a Nobel prize. If you knew Bill, you knew that he would pound on the table in business school, and say "quit bad mouthing government-run things. I know some things that are government run that are good and they happen to be co-ops." He drove that home to me so that this is not a model that a free marketer should necessarily reject out of hand.

GARCIA: How do you explain the fact that the incentive structure for the co-ops or the rural independents is price based, and therefore you would think it wouldn't led to efficiency, but in your work you conclude that productivity among those companies is higher than it is among those that operated in a more market-oriented environment. What's the explanation for that?

EGAN: I guess my explanation is that it's in their interest to minimize their costs, and they don't have the dichotomy between management and owners or customers.

GARCIA: Is it possible we tend to emphasize in the western culture the division between the social sphere and business sphere and what's the differentiation between social roles and economic roles? It seems to me that in rural communities the two will always overlap. You see more social networking as well. This stems from the fact that rural markets are more social to begin with. It might lead to very different ways of providing for business or incentive structures the way it might in let's say Korea or Tehran, or some place like that.

EGAN: I think it does. I actually think it does. As an economist it pains me to agree.

GARCIA: It's only for a short period in history these two spheres were separate.

EGAN: Yes, we've debated this issue at Columbia with other scholars from the New York area and you know what it always boils down to? As far as us "free market" economists are concerned we ought to just re-nationalize the whole thing because this "neither fish nor fowl" is what's causing the problem. Either it is a public infrastructure with "public good" aspects to it or its a free market. We're not claiming it's a pure public good like air or national parks but it has some of those aspects. Then, let's call a spade a spade and move on. One of the few areas where we economists agree on anything, is that if there's a true infrastructure issue here, let's quit forcing a market model on it. Think about that a little.

AGHA: From a business perspective irrespective of how much argument has been made, you can almost see that there are public corporations or state corporations which at times perform better than private organizations or private businesses and private business is often better than public, so the results are often dependent upon the people running them and their policies that make public corporations perform better than private corporations and vice versa.

KIMEL: I think the other thing too is that Bruce was talking earlier about this aggregation of

demand. I think it is important to remember that aggregation of demand is not a "command and control" issue. This is not about some entity owning or controlling all of the assets of the system. It is about a community coming together—more of a persuading and empowering type of environment where there are new deals that will have to be cut, new partnerships, etc., and I think there needs to be a new paradigm between the public and the private sectors about how those things are going to be done. We're still exploring exactly how those partnerships are going to be formed and implemented. But we need to think about these things in terms other than the traditional way as what type of entity owns or manages these "assets." I think new types of cooperative business structures are going to have to be created not only in terms of the ownership of the assets but also legal and financial relationships because ultimately, whether it's public or private, it still comes down to money. So there's going to have to be new ways of figuring out how these things are going to be implemented both in a legal and financial way.

FRESHWATER: Well, we got a little further than the brief discussion about what went on in the two sessions that I thought we would. The next thing we wanted to do in this section was to talk about changes in rural telecommunications since 1991. It's pretty clear that the issues that we focused on most of the time was the Internet and the impact of deregulation. Are there any other changes that people think are significant clearly not of the same order of magnitude but still a significant factor? One of the things that's surprised me so far is the fact that we've never gotten past the Internet. We haven't talked about cellular, or two-way video, or any of the other telecommunications technologies. They seem to be incidental to the Internet, because if you can't do the Internet, the other stuff doesn't make any difference or won't be there. I don't know whether that's a conclusion that we should be drawing from this, or whether we just have not bothered about the other technologies. Jimmy tried to take us that direction a couple of times in our meeting this morning, but it didn't seem to work and that suggests that the game seems to be pretty much the Internet.

DILLMAN: It seems to me that though we aren't talking about those other things directly, what it's about is increasing the capacity of telephone lines sufficient for the Internet, and that's along the way to having the capacity for the Web.

FRESHWATER: So it's the conclusion that if you can do the Internet, you can do everything else but if you can't do the Internet you're not connected, so the other stuff is not sufficient?

MALECKI: What it means is that Internet access is part of the common conception of universal service now. I think that's the tenor of our conversation, whether that's the consensus or not.

GARCIA: And all the other technologies can serve as infrastructure for the Internet because they're not mutually exclusive. We shouldn't have the telco Internet model if it is the whole series of technology that creates a platform for communication.

FRESHWATER: It seems to me that it's a pretty sweeping statement to say that we have gone from a world where universal service meant being able to dial somebody up on the phone and get a reasonably static free connection, to saying that basic service now implies being on the Internet. If this Internet access is now part of the universal service definition, then we've made an incredible leap in a very short period of time and the implications of that for rural areas are really truly sweeping.

TRAINOR: Well, the services that we're looking at for the Internet, even within this room, appear to me to be replacing those things that are still critical. We're looking at the Internet to replace long distance service. We're looking at the Internet to take the place of U.S. Postal Service. We're looking at the Internet to provide a library function. We're looking at the Internet to do video conferencing.

I'm sort of amazed that we've left off a lot of the wireless technologies. I'm not as convinced that the key to the success of rural development is in fact the Internet. If there are advanced other services why aren't post offices those points of presence for Internet availability? ?????? There are models that we're not looking at and I think we may be in a little bit of a rut is what I'm suggesting.

DILLMAN: If you're going to use the Internet we really need to get it to homes. That's where people spend their time, and if you can't operate out of there, we'll never realize the potential of a substitute post office and those other applications.

IMORDE: That's why I say it's universal services.

FRESHWATER: Well, let me suggest a distinction to stimulate discussion. It seems to me that there is segmentation between the Internet as a necessary vehicle for business and the Internet as a form of home information and entertainment. One of those uses may be more important for rural development than the other.

GARCIA: And I would add a third point that the Internet is an interconnected platform for all sorts of services beyond those and that the most important aspect of it isn't the technology nor is it the applications—it's the inter-operability of the platform that everything else can hang on.

ODASZ: There is a great deal beginning to happen regarding the educational potential of the Internet. IBM has announced on-line college courses. The Western Governors Association has announced a virtual university plan both of which could preempt our higher education system. Apple and AT&T have announced on-line teacher mentoring courses just in the last month. The Internet makes possible 28.8 kbs service to the home. Education has been identified numerous times as the most important single service to kick start the rest of these capabilities. You can spend \$89 and get a video camera for your computer, get free software from Cornell and get into the home desktop video conferencing right now. It's a little jerky but it's getting better and it will continue to get better. The emerging potential is that anyone can become an educational multimedia broadcaster from any home, to any home.

STREETER: But the killer application for the Internet is not located at any one specific point. The killer application for the Internet is the Internet itself—its diversity, its ability to serve millions of different uses and because of that, and because when you enhance it through the second generation of Internet to have video and audio interactivity, that exponentially increases its possibilities.

FRESHWATER: But does it make sense to segment questions of business development and access for households?

GARCIA: Not if you're trying to aggregate demand, and the whole point of what we're talking about is it possible to have the flexible, versatile network that allows for sharing.

PARKER: And businesses won't operate effectively if they don't have access to their customers and that's what consumers are.

FRESHWATER: But there's only one segment of customers that are actual end consumers. A lot of business transactions are intra-business transactions.

AGHA: The thing is basically if you look at the infrastructure requirement, neither businesses nor consumers are going to want to locate to any place that does not give them basic infrastructure. I wouldn't want to drag my family to a rural area that doesn't have that infrastructure. So the great problem is that infrastructure availability drives businesses location.

WALTER: And from an adoption standpoint, you see the leading edge Xerox Park-type companies design cool stuff that's not all business—some of it is fun. I worked at GE Information Services and the cutting edge folks there were doing the interactive game playing on line and the rest of the business group could pick up on the potential of this. I think that the way a lot of this stuff has been, and will be, disseminated is through the fun stuff you can do on-line. It starts with entertainment applications and migrates to the more boring business applications using the same technology you've been using for fun. And so there might be some sort of pattern developing that you can see with the access to the home for the fun stuff that leads to business applications

ODASZ: Bill Gates' big book says there are three emerging latest industries—education, entertainment, and social services. If you put those together you get fun, social learning which would be a home-based activity with potentially vast economic potential.

DILLMAN: I have some difficulties when you start the dichotomy with business and then households and then for households you immediately said entertainment. I know that's part of how you get people started using the Internet but it's so darn fundamental I just don't see how that dichotomy can be made. Take life long learning. If anybody wants it, we've got a report we just did on a national survey of people who are being pressured to get additional education. The only way that's going to be delivered is via long distance learning. My university now has 400 students enrolled who are never on any of its campuses. They are literally out in the state somewhere and the Internet is the only connection. And the study that we did on the lone eagles shows that one important business use of the Internet is telecommuting from the home to work, and I just hope that we end this big dichotomy between business and household uses.

TRAINOR: I'd love to end that dichotomy and supplant it with another, a more credible dichotomy. Bruce alluded to it, Tim was talking about it—the difference between applications and the distribution network and the Internet that can run on virtually any of the networks that we've been talking about including wireless, so what we're looking at is essentially a series of a set. I mean packets of applications which is a different set of issues than what we're going to do with this stuff in rural America, or than how we get that set of applications to rural America. And there are different problems, different solutions to getting the system out there. The distribution versus the application question is one that I think we need to make a real important split on. We've been stuck on applications. Getting it there is a different problem.

GARCIA: I really think that it's problematic to look at entertainment as the driving force of the network in the future. First of all if you look back historically, it was business that had the need for an interconnected platform called the telephone system that pressured the government to make sure there was one telephone monopoly because interconnection reduces transaction costs and makes doing business an efficient activity. If you look at where global electronic commerce is going, the

need to reduce transaction costs is the critical variable between competitiveness and non-competitiveness. You can bet your bottom dollar that business is going to demand the exact same thing again and that is an electronic commerce platform. If I were an investor and not an academic I would be trying to develop that platform because that's where the critical standards are going to be.

KIMEL: In the rural communities we work in, the problem isn't distance education for universities, but "are you comfortable using a PC?" In this case the current technology is light years ahead already of where these people are right now, and with all due respect to Bruce, when I think of rural America I don't think of Jackson Hole. I think of some of the communities in many of these states where there's still a problem with plain old telephone penetration. There are still many, many homes that just don't have phones. The education that we're talking about is to bring these people up to speed to take advantage of this new technology and although this is very, very basic, it is also extremely time intensive. But it's critically important because the time that these communities have to take advantage of this is very short. Otherwise, there are other communities, the Jackson Holes and others, that are going to take advantage of the opportunities. I think that education and user capacity are absolutely critical in whether these things have any chance of succeeding because, if not, by the time these technologies are deployed, the writing may already be on the wall for many of these communities.

SWANSON: And it's real easy to get sucked into the technological argument and I think that's where we are headed because I have a hard time understanding how through Internet you can have equal access to any technology if the median family income in your community is \$23,000 as it is parts of rural Kentucky with 150 people per square mile. There may not be that much demand even if everything is in place. And one of the things that I most liked about the report that came out five years ago was its emphasis on non-technological barriers to the use of telecommunications as a rural development tool. We're forgetting the social and economic differences between the suburbs, inner cities and rural America.

FRESHWATER: Let me close by telling you a story about the rural South. You can go back over 100 years and look at educational levels, educational attainment, educational investments and there is a clear line that's called the Ohio River and north of that line you see high levels of investment in education. South of that line you see abysmal levels of investment in education. That's the still the case today. You've got counties in the rural south where more than half the people don't finish high school. I think we need to get back to the point that was raised earlier this morning that if people don't understand these telecommunications technologies like the Internet and they don't have the capacity to use them, then what's the point of putting the pipe into a community? You're asking people to go quantum leaps in their development over night, and I think that is the real problem. The technology may be advancing faster than the capacity of most rural people to catch up with it and use it.

STERRS: Is it possible that part of the reason that this problem exists is because the alternative form of education that might be provided by the Internet isn't being capitalized on? Maybe half those people who don't finish high school don't finish because they're not interested in or they didn't catch onto the current learning systems.

FRESHWATER: All I'm saying is that you've got 100 years of people under investing in every form of education known to mankind. And there's no reason to believe that some new technological solution is going to change that social attitude.

STERRS: But if you don't put in the pipe you don't have a chance.

FRESHWATER: Yes, that's really the other side of the issue.

2:30 SESSION

FRESHWATER: I'd like to deviate a little bit from what we said we were going to do but it's in the spirit of that which I think really are the policy questions. I want to go back and characterize them in terms of a few issues. The first one is, if we believe that Internet access is the new minimum level of telecommunications how do we get it to rural areas? That's the first question. Second, do we have to get it to all rural areas? Third, does everybody have to get it or else universal access is dead. I also want to clarify the prior discussion we had about the rural/urban gap because I think you may no longer be able to characterize it as a rural/urban issue. It's a rich/poor issue in that rich rural areas like Jackson Hole will get Internet access probably as fast as any urban area. Conversely, the middle of Watts is not going to get Internet access any quicker than central Appalachia. I think this distinction is important in discussing who gets access.

TRAINOR: Watts has free local dialing into the rest of Los Angeles.

FRESHWATER: But they don't have the computers.

TRAINOR: As an example of the LA model and what we looked at, there is a 1964 report on broadcasting and the advantages of what broadcasting was going to do. And one of the advantages was that broadcasting was going to provide community services to south central Los Angeles and Watts to provide job information and job training at the community level via over the air, i.e. wireless video services and that was seen as the panacea in the 1964 Presidential Commission report and you can see the exact same language, and the exact same problems, and the exact same proposed panacea solutions using the Internet or local telephone communication competition. It's again looking at the technology as the tool, instead of looking at the problem and what you're trying to solve, and you can see this for 30 years worth of history.

FRESHWATER: And the last question is what does competition do or what does it mean in rural areas when we're busy trying to aggregate enough demand and put together a coalition of suppliers to get in the game? Because essentially what we're looking at in rural areas is probably a monopoly situation because there's just not enough volume to support more than one provider. And I think that leads to some questions about perhaps needing to go back to the '96 Act, which we observed in the morning session was basically to instill competition in the telephone industry. If you've got an area or parts of the country where competition isn't technically feasible to bring about, what you've done is turn the fox loose amongst the chickens by turning loose—deregulating—a natural monopoly. So what do we want for rural areas? Do we want some form of mandated universal service for all rural areas, or in a competitive market do you just let those areas that can afford to pay for it and attract providers get it?

EGAN: I don't mean to be a spoiler but I assume that that use of the word Internet means that you need a PC, and I don't know, have we converged that everyone has to have a PC?

FRESHWATER: I don't know.

EGAN: I don't like that model and I assume it also rubs some other people the wrong way too. Everybody having to have a PC is a tall order. I'm happy to give everyone a phone line, so that if you have a PC, it will work on the network, but do you include having to have a PC or only the lines that it could be hooked to?

GARCIA: As spokesperson for our group, we talked about having Web access to a point of presence in every community, and then encouraging the development from that point of presence to Internet access for everyone, but there may be other ways. When we talked about what universal service requires, if you're going to have people having equal access to economic opportunities in an electronic commerce environment you're going to need to have the same Web access that everybody else does.

EGAN: I'm happy to accept that. Web access doesn't rub me the wrong way. Does that mean a PC?

TRAINOR: Could be a cable set-top. Maybe it's part of your television.

DILLMAN: I kind of split the issues this way: the opportunity is there to buy a computer and make use of a computer, and a person has to decide if they have the economic resources to get one. To do the functional thing you need a connection now, and that's what they don't have the control over—whether they're rich or poor.

EGAN: So you don't throw a PC into item one and therefore I don't have a problem with it. As long as we all agree because the comments before our exchange implied that there was a PC involved.

DILLMAN: Right, that's a separate issue I think.

EGAN: A Web terminal or a PC is a separate issue from what we're dealing with here.

FRESHWATER: Then tell us what universal service is. Is it just a line?

EGAN: Correct. Well, as long as everyone agrees with that—

FRESHWATER: But what's the point in putting a connection into a community that has no money to buy PCs?

TRAINOR: Well, there may be different policy options to deal with the PC issue than there is to do with the connection problem which is probably a scale issue. So you if bundle them together you're going to have a policy option that's not—

MALECKI: And don't forget that we focused on a lot in our group on education and whether the access should be in the schools because the schools are the place, institutionally, for learning and, yes, there's going to be pressure to have parent advisors, machines at home, et cetera. But it is a separate issue as to what the schools do and how they get their money to buy PCs. The point is that even if they have PCs and they don't have Web access there's no advantage.

EGAN: So still let's modify item one to be explicit if we mean a household or like a pay phone model.

ALLEN: Didn't we talk about this as community access? The part that bothers me more than anything about the discussion is it's sectorial. I mean on the one hand we're separating business, education, and health while at the same time we're trying to aggregate demand. If we start splitting up school, and health, law enforcement, government, and business we will never reach a point where we could ever participate in a market economy. So I think what we're talking about here is Internet access.

STREETER: And I think the discussion that we were having during the break is also relevant about the Internet in the sense that using TCP/IP to deliver broadband multi-media is not a functional proposition for rural areas whereas using the Internet broadly defined to mean a different number of technologies that could be delivered is more probable.

EGAN: So you should say narrow band Internet is the correct term?

PARKER: No, we mean broadband access to every community.

EGAN: Okay, then broadband access. Because the word Internet in there could be misleading to a lot of people who think, rightfully so, that TCP/IP does not necessarily mean wide bandwidth.

GARCIA: But I think it's not just a bandwidth issue because I think you want to talk about the issue of access to the World Wide Web as a minimum.

EGAN: If you've got access to the World Wide Web we're okay then. If you've got broadband digital access you've also got access to the Web.

KIMEL: In some cases, in rural areas what's important is the capability. In some cases you're going to have to have intermediaries and organization services to get access to the rural areas. I mean let me give an analogy here. Henry was talking about the time he was giving a talk somewhere and somebody was complaining that farmers in this area didn't have access to the Internet. They didn't use the Internet. He said that's not true because the ag extension agents are on the Internet and the farmers contact the ag extension agents who get the information for them. It may not be the perfect model but it's an example of the use of information intermediaries. For example, if somebody in a rural community wants to start a business says, hey, I understand there's some information that can make it easier to do this, and it's on something that's called the Web and you've got somebody there who can say, fine, I'll get that for you. It's those kinds of bridges that are part of the tool kit that needs to be available in rural areas.

FRESHWATER: Well, let me do a rewind. Just before the coffee break when I tried to say that there was a difference between business access and household access, there was this huge outpouring of emotion. We have to get this service everywhere.

GARCIA: We have to think of it as an aggregated community. It isn't that we have to get it everywhere but we have to think about it not as separate functions.

EGAN: Well, we can say that the rural constituency represented by people in this room don't see it

that way. They see the need for access to the household level, I'm sure. Just ask them. So why are we redefining rural policy here when the law is fairly clear on this point too. Now, I'm happy to go along for the sake of the argument, but I don't think we can say—if we're speaking for rural America—that's the model. I think most of the people want it to the households.

PARKER: But we already have a universal service policy of narrow band to every household, and if you have narrow band to every household and broadband in every community we can let competition and other innovative market functions take hold.

EGAN: You're assuming narrow band digital access? I didn't know we had that to every household.

PARKER: Yes.

EGAN: Well, I am way behind the times.

FRESHWATER: This is more than we have said before. This is a revelation to me too.

JAMES: What he means is dial up Internet access to every household via the phone system.

PARKER: Well, we're basically saying that this stuff can work over a phone line, yes, but you need a local number that you can dial to have connections from those households or you won't get the services.

TRAINOR: But there are various technologies that can bring dial up type service to every household.

EGAN: Who cares whether it's wireless?

TRAINOR: That can be via a cable modem, via electric utilities, via whatever. It could be a telephone.

KNEESHAW: So every household has the capacity to connect to toll free broadband digital access.

EGAN: Not community access. We're back to households. I'm agreeing with you. I don't think it's any great shakes to give every community one and half megabytes. I don't understand that goal, if that's the goal, that's not a very hard job. I think it's safe to say that within a few years at every major aggregation point for telephone traffic in America you'll be able to get Internet access. I just don't think that's a hugely difficult problem, after all Clinton and Gore already guaranteed all schools are going to have it. Isn't that close enough? Doesn't every household have access to a school?

ALLEN: Do you believe that promise?

EGAN: Yes. I feel confident.

ALLEN: So what if we hook it up to the school? There's no resaleability to households tied to that, therefore the only Internet in that community is at the school and that's a policy issue that we haven't dealt with. I mean the FCC is doing the same thing that we talked about earlier which is segmenting this process out among centers in the community.

EGAN: I just don't understand your definition of community, John. Are you telling me every household? If you're saying that? Let's be very explicit. Are you saying every household? When you say community I think of a village. I assumed that was what people are talking about. Go to the village pay phone.

AGHA: I am little confused about the use of the word "market economy." It isn't the market that's driving rural America. That's what worries me because there is no market forces that will make the business decision to go into free competition to service a market that is so remote.

GARCIA: But there's no necessary reliance on market forces in the discussion.

AGHA: If there is no market then there's a question of providing the whole infrastructure and what's the level of infrastructure and how did it get paid for?

GARCIA: That's question number four, it seems to me.

EGAN: That's true. Every household in the community?

PARKER: What I'm suggesting as a policy is really an extension and an addition to the existing universal service policy which is to try to get narrow band to every household so we can run our modems. I think we need to add to that, as part of our universal service policy, of getting broadband capacity to a community aggregation point in every rural community because one of the problems now whether it's Internet access or trying to recruit a business to a community, is that if you don't have the broadband capacity linking that community and the rest of the world you're never going to recruit the new business.

ALLEN: But it has to be resaleable though.

DILLMAN: I guess I was kind of afraid when the telecommunications act came out and people started talking about access and affordability and I saw some people saying, well, everybody ought to have access to a voice phone and they were leaving it right where it was: the voice phone—and if people couldn't pay for it they would still get it and then that's all that would be necessary to put out there. This doesn't get you much beyond Internet, but I don't think it's possible to put out broadband lines to every household. I just don't think it's realistic and so I say "how can you put the system together that keeps changing as technology changes and continue to meet people's needs?" I'm really worried about this because of the World Wide Web. I think more and more information is only going to be put out on the Web and people are going to quit publishing these big volumes of books, and other things because they can so easily be updated electronically and so that there's going to be a clear disadvantage in a few years if you can't reach into the Web and get the information you need for continuing education, or for your kid taking courses in school, or business people seeking information about certain markets. That's the place it's going to have the greatest impact. So down the road, I think we're going to need to get to the household level much higher capacity lines. Right now it seems to be that a way that one can allow this system to build for future demand is to say that at the household we really need being able to get on the Internet and have electronic mail. That's two-way communication and that ought to be a minimum standard. But then, bring the broadband to the community level and into schools and wherever else one can get it, then it's there, so that an innovation diffusion process that's more market driven can begin to take place and push it

into the rest of the community. When it comes to building these lines within the city limits of a community, you can have businesses and households get it pretty fast I think because it doesn't take much to extend the lines. But it's the people that are out on the nine mile loops where it may take a lot longer to get out. So I want to say provide Internet out there and let them have Internet access even though the lines might not be the best yet. Bring a high capacity line into the community and then hopefully the market is going to start filling that first and then eventually move it on out.

STREETER: Don, are you suggesting a public infrastructure model to get the fiber to each county seat? Is that what you suggest or any other way to get it there?

DILLMAN: Bruce knows more about that than I do.

GARCIA: I almost think it's fair to save that question to last so we don't prejudge what you need by notions of how you pay for them.

EGAN: It's surely not too much for public policy to somehow make sure it happens.

PARKER: And as Bruce says, it's not very expensive on the scale of things. It's very small.

FRESHWATER: So where we are is we'd like everybody to have access to a phone if they can afford to pay the monthly connect charge. And we'd like access to the community with some broadband access.

GARCIA: Give every home a narrow band to the Internet and every community should have broadband.

FRESHWATER: Access in the sense that you can pay the connect charge. You can pay your local access number. You don't get it as a matter of right. You still have to pay for it.

GARCIA: Yes.

FRESHWATER: You have to pay whatever the current rate is for phone service.

TRAINOR: But is that higher in rural areas that are 200 miles away from civilization?

FRESHWATER: It is if you have to pay a long distance access charge.

EGAN: No, it is higher anyway. Where I am, I do not have the options nor the monthly fees that I would see in New York. I can't even go with a national provider even in Jackson Hole because they do not offer a local dial up. If I pay a premium I can get an 800 number. So the prices are different in rural areas simply because you don't have the competitors.

JAMES: But the main difference is the cost between the long distance access or a local access number.

EGAN: That is the main difference but not the only one. In my opinion I pay \$8 more a month than my friends pay in the city.

JAMES: Which is small compared to what you would have to pay for long distance access.

FRESHWATER: We seem to be stuck on the universal access model. I realize it's still in legislation but it seems to be that there's at least the potential for some conflict between universal access and competition down here and that there isn't an adequate rate of return and if you eliminate cross subsidies how you can share universal service costs?

TRAINOR: I think again you go back to the difference between application and distribution. Universal access is a distribution question. The competition is really an application issue.

EGAN: I agree. I think the Act is unambiguous and I would say to question number two, that's not only not our call, the Act is clear. It means everybody everywhere gets equal access and I agree with Linda. You can still get that with different levels of services. It's a different animal.

FRESHWATER: So to some extent I think if you say that, then my third question is resolved. If you've agreed that you're going to put it everywhere than it's neither a rural/urban problem nor a rich/poor problem because everybody has an opportunity to get it.

TRAINOR: The question is how big is your highway? Have you got a dirt road or have you got a freeway?

FRESHWATER: You go down to the dirt road and you'll eventually get to the freeway.

TRAINOR: You've got a toll road or you've got a freeway?

EGAN: Three is more of a content issue. I'm suggesting that the relevance of three is the use and use versus access.

MALECKI: A matter of access, but who's going to use them will be people who own PCs who can pay the phone charges, et cetera.

ALLEN: Or who have access to a public library, or a courthouse, or wherever else there may be within that community.

MALECKI: Correct. If it's not at their household then having community facilities becomes the issue and that's going to be more important in televillages that some places have and others don't.

FRESHWATER: So if the last point is—

TRAINOR: Before you go to the last point you've got to go back to the social problems that aren't solved by either applications or distribution mechanisms. It's a totally different order of analysis that's required to figure out how to solve those issues.

FRESHWATER: And it's not a rural/urban problem either.

TRAINOR: Right.

FRESHWATER: But the poor will always be with us and they won't have very good access.

GARCIA: I think there's a bigger social problem here because we talked about the need for a social infrastructure and in that sense you could argue that it's an urban/rural issue if you're not aware of the technology or if you don't have a good institutional base in a local community.

FRESHWATER: And then I guess the last point is something that's come up in various contexts where we've talked about the need for aggregation. We've talked about who does the providing and whether it's for-profits, whether it's co-ops, whether it's a mixture of for-profits and co-ops, whether it's big companies or small companies. But the premise of our public policy seems to be moving more towards market forces and letting competition determine who gets what, at what price, and rural areas have always been suspicious of public policies that go that direction, sometimes justifiably so, sometimes unjustifiably. But how do we see the reliance on competition and changes in the '96 Act altering our ability to get those first three goals?

PARKER: In much of rural America, the telephone company is a co-op and responsive to community needs. There's probably a way to solve this problem in most communities with the telephone company co-op. In other cases it may be the cable company. In yet other communities it may be the electric co-op. Right now, before competition, there is one monopolist locked in place and if that monopolist was not willing to provide all the services that the community needed, you're just stuck. What this does is unstick that sticking point and allow us to negotiate with providers to see who's going to get the business for the next year or so. But because we're in a time of transition and we need new services and we need to unstick and maybe restick, and that's what the '96 Act does for us.

GARCIA: I just want to report on some things that I found from the National Telecommunications Cooperative Association. They had a Web site where they were collecting data. A self selected group of people in rural areas who were providing Internet service were asked to look it over and to see if there were any things that I could make a story about. And one of the most surprising things to me is that if you took their membership, it's half independent telephone companies and the other half are co-ops, but the Internet providers were two-thirds co-ops and not independent telephone companies which, of course, led me to call a whole number of people all over the country asking them why is this the case. And clearly they see it is they are part of the community. "We are the community and we don't have a profit—our bottom line is not profit." Now, that raises the question of whether competition itself or the market is the best solution to provide social infrastructure as well as a technology infrastructure. It might be, for example, in a rural community that you really could get both if you in fact had a community-based kind of cooperative approach. The other thing that was clear is that there wasn't much economy of scale and scope. The very first companies to provide services had extremely small bases of users and were very, very tiny companies. In fact, you don't see the business motives or business plans entering into the provision of the service equation. These people were very small but the critical thing that accounted for them being able to do it was the fact that they worked in consortia and were able to share information about the system. So they could leverage the fact that they had an infrastructure out there to reduce their cost but they needed to leverage expertise across a geographic region and if you look at how it's diffused it's like a spider web. It starts in the Midwest and works it's way out. You can almost see how people had to leverage one another to do it. Those things are not provided for in a competitive model and so I think we need to ask ourselves whether it's really the appropriate model when you have so many problems to solve at one time. The problems can be aggregated as well as the technology.

CRAWFORD: Won't the competitive model decide who are the players who will remain the

providers?

GARCIA: Perhaps.

FRESHWATER: One of the things that I observed when I was in Washington in 1987 was we tried to do rural development legislation and we couldn't get anybody interested. By 1989 rural banks and utilities had changed their attitude toward rural development legislation and had become much more interested in local economic development because they figured out that they had geographically defined service areas and if the people left their service area there wasn't much left. So it seems to me that whether it's a co-op or an investor of a firm, if it's being run by a rational set of individuals they have to figure out that making their service area thrive is in their best interest.

GARCIA: It was a TVA model originally.

TRAINOR: Actually I have to disagree—well, just present a different answer to your question "will a competitive model sort those things out?" I don't think in telecommunications technology that consumers have sufficient education for them to realize the benefits of a competitive market. Consumers don't know. We've seen this already in the long distance market where consumers don't make the cheapest choice. They use brand loyalty. They don't think about it. They don't do price comparisons. They play around with \$25 checks that get mailed to them. They get slammed. The market has not been an effective tool for individual consumer choices but very effective for an industry to deploy new advanced services, different kinds of business creation and partnerships, but for the average consumer, they don't behave competitively because they don't understand the technology. They don't understand the choices that they have and are able to make. Getting information about those choices is difficult for the average consumer. There's a techno-phob block.

CRAWFORD: My point was that the competitive model says nothing's going to occur in your area and you will have to marshal what resources you have to get it there and that may be the rural telephone company, it may be the electric cooperative, or a combinations of those and that's what's going to drive the thing.

AGHA: Businesses use every tactic they can think of to capture the market. And if I'm the high cost supplier I'm not going to tell you I'm the high cost supplier. It doesn't matter whether I've selling communications or I'm selling Cleveland. I'm going to rename my product, create a brand image or do whatever I have to do to get that market share. So I don't know if competitive issues are the issues of the consumer. What it comes back to is saying whether you need a government sponsored or some public agency sponsored consumer agency to come in and protect the consumer from being taken by the telecommunication providers.

TRAINOR: I think that's a very important function that has to be filled. Part of what I'm driving is I don't think we're going to have the solutions from a purely competitive market because there is such a learning curve from the consumer choice side that prevents the competitive market from being realized. If in fact you're trying to keep costs down and get things deployed throughout for reasonable cost, people don't make telecommunications choices based on cost.

For our purposes here, isn't the better question "what does competition and the universal fund do for rural areas?" I keep thinking about those universal fund issues, and there are a lot of them, but they're being worked on every day. We like some of the things and we don't like some others. But if the universal fund issues are resolved, depending on how they're resolved, that will fill the gaps.

Now, is universal service advanced services? We don't know yet. One group says one thing, another group says another thing and it hasn't been resolved. Who pays into that fund, FCC versus local, etc.. I mean all of these things have to be worked out but it's conceivable that the universal fund along with competition will have a tremendous impact on what we're talking about here for the rural areas.

ALLEN: I guess I agree. The FCC and the things that are going on there are going to be important but I think it's going to be at the state level that most of this is handled. And I look back at how Nebraska did it and it's almost a cooperative-capitalistic model. The state said if you, the private sector, will build us an optic fiber loop around the State of Nebraska we will loop our state activity from our dedicated lines to your private sector lines. So in a sense what they did is helped facilitate getting that infrastructure out there so that rural residents could participate in this competitive environment. So it was a cooperation between public/private sectors to get the infrastructure there so that rural residents could participate. And so I agree those FCC decisions are going to be important but I've got a hunch they're going to come down and they're going to say it's going to the public service commission. It's going to be the public utility commissions in each state who are probably going to be coming up with a lot of that money for that group getting universal service.

IMORDE: And yet the congressional decision and the way the law was written says there will not be have and have not. That's where I get confused. Most of your legislatures are rural legislatures. So there's a process for getting this issue resolved but maybe I don't know. Obviously I don't have all the answers.

EGAN: Well, I basically agree with what these two guys said. There is no yes or no answer for the very simple reason that it matters a whole lot how it's done, how competition is introduced, and I couldn't agree more with John. In fact this is also posted on my Web page. Anybody in here who reads that Act, every unsolvable problem is right on this page. When it was an easy decision, the Feds made it. Every sticky wicket it says "we have always known that the states are better equipped to answer that....." So the Act is immensely clear. It is a state responsibility.

IMORDE: Yet the FCC is usurping that.

EGAN: Well, the FCC, again, is telling you how to set the prices but giving you the responsibility to deal with the consequences so I don't understand it either but I just know what the nominal wording of the Act is. So anyway I echo that.

GARCIA: Well, I think a lot depends on what the gap is that you're talking about. If you're talking about the technology gap I think you can come up with certain kinds of competitive ways to make sure the technology gets to rural areas. If we're talking about economic development gaps then I think it is useful to bundle your technology policy with your social policy and in some ways you can get externalities by doing it that way. Now, I think it takes a little bit more creativity in getting outside of the paradigms that we've used before but markets are social networks as much as they are information networks and in rural communities you have kinds of social relationships that you can build on. They might not work or be necessary in a very large scale urban society where nobody knows each other. When Bruce said why the rural operators might be more productive he said because they're accountable to local people, not to the market, and in that sense it's very different.

AGHA: I have a major issue over here. When you said social technology, that's a new term. That's

social policies coming from technology being done by social policies. Throughout history technology has driven social questions. You cannot create policy based on predicting technology because you don't know where technology is heading. Policies were made without even an Internet in existence. So you have government policies being made by people who are not technologists. They're always behind because they can't be ahead.

GARCIA: I guess that's what the purpose of our presentation this morning was to say that we had to look at technology from a multi-dimensional way—holistically.

AGHA: But how can you understand a technology when you don't even know where it's heading. That's the problem. Even the technologists who were in the forefront of development disagree where this is headed five or ten years from now.

GARCIA: Well, I guess I think you still make a stab at it bringing technologists, economists, sociologists together to try to look at the problem in a holistic way. I think you're more likely to predict technology if you look at social and economic factors as well as the technology factors and you're likely to make mistakes if you don't.

TRAINOR: But I don't think you can use the same analysis to determine the dichotomy of the applications versus the tools.

GARCIA: That's why I think your dichotomy is a nice dichotomy actually.

TRAINOR: It has to split up and then come back together again.

STREETER: Well, I don't think we've talked about how that fiber line gets to the county seats yet. Maybe I missed that part of the conversation but it seems to me still kind of a very important part of it at least from a public policy standpoint. My suggestion was a universal service fund. Redefine universal service fund so that you do get broadband to every community.

JAMES: What do you do with fiber that's now sitting inside a manhole cover in the middle of Main Street? What's it for?

PARKER: It's for telephones. It's for Internet access. It's for education for the schools. It's for library access. It's for the medical clinic. It's for the businesses.

TRAINOR: But the universal service fund is only good for the telephone companies. It doesn't apply to those alternative technologies, cable, electric utilities, but it could also be used to provide that fiber loop to city hall.

PARKER: It will if you have the interconnection. The cable could be the broadband service within the community but cable doesn't have the interconnection to the rest of the world except for one way satellite. And if you want a two way broadband using cable as the industry you could employ them in the community, but you'd need interconnection at the central telephone office switching point to get to the rest of the world.

STREETER: We will have to use phone company lines.

FRESHWATER: Well, we've come to a lull. Fortunately that lull is about the time that we're supposed to end so I'll take that as an indication that I can pull the plug. I want to thank you all for coming here. I hope you all got something out of this. It may not be exactly what you expected but I hope it was worthwhile. It was certainly worthwhile for us. We've enjoyed hosting you. I really appreciate you taking the time out of your busy schedules. This is a big issue. I don't know that we've resolved any of it but at least we've beaten it around the edges and we've gone away with more information than we came with, and that's my definition of a successful meeting. Thank you.