Vickie Healey: Okay, well, stand by for just a moment to sort out some technical difficulties on this echo. Hello? Hello, Ellen, can you hear me?

Ellen Morris: Yep.

Vickie Healey: Philip, Michael, are you still on the line?

Michael Mendelsohn: I'm on the line, it's just –

Vickie Healey: One thing is if any of our panelists or organizers out there are using their telephone, but have the radio button on the right hand side of the screen clicked, that says mic and speakers, that's what's giving the feedback. So if you're using the phone, make sure you click 'telephone' on that radio button. Okay, testing?

Male: In the control pane, check the audio. Click telephone if you're on the telephone. That should take care of it.

Ellen Morris: Harish, is that you messing up over there?

[Laughter]

Vickie Healey: I think we've clarified the problem, so we can begin again. Mike, would you like to just start over?

Vickie Healey: Yeah, okay. I'll tell you what. I'll just take over and do the introduction slides. Real quick. . So and then Mike Mendelsohn will be moderating the actual presentations of webinars. So again, I just want to introduce myself. I am Vickie Healey with the National Renewable Energy Laboratory. And I'd like to welcome you all to today's webinar, which is hosted by the Clean Energy Solutions Center. Our focus today is going to be on financing clean energy solutions in developing countries, and we have three terrific speakers today, so I'm really excited about this webinar, that you'll be getting a lot of great information.

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Okay, before we begin, I'll just go over some of the housekeeping items, things you need to know before we begin. Two options for audio. You have two options to select on your audio mode. First, you can either listen through your computer, and if you do choose to do that, make sure you have mic and speakers checked off under

the audio pane. That way, we won't be receiving feedback. The other option is you may listen by telephone, and if you choose to listen by telephone, again, just click the telephone option in the right hand display, and the phone number and PIN will display – that will gain you audio access. We also ask that you please mute your audio device, be it your computer or your telephone, so we, again, don't receive the feedback.

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A few other things – We will be opening up during various times during the presentation to the audience to ask questions, and the preferred method for asking a question is on the right hand, again, on the right hand pane. There is an area or a little tab called 'questions'. So select the 'questions' pane on your screen, and then you can type in your question, and then Michael will be going through the questions and then asking and then giving them to the appropriate presenter at the time questions are opened up to the audience. Another option is if you're having trouble viewing the webinar, we do have PDFs of the presentations posted to the www.cleanenergysolutions.org/training, and you can open up those PDFs and follow along as we present the slides. I'd also like to note that a recording of this webinar and the PowerPoint slides – that will be available following the presentation, again, on the www.cleanenergysolutions.org/training site. So you can go back and look and view the slides at a later time.

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So this is just a little bit of the agenda. The welcome and introductory remarks, which I've already done. Right after this overview, I'll be doing actually presenting a little overview of the Clean Energy Solutions Center so you're aware of what the Clean Energy Solutions is, and some of the services that are offered that we believe are very useful to policy makers across the globe on clean energy projects. And then, after that, we will jump into the main course of the presentation. Today, we have three very dynamic speakers that we're very excited to have who will be discussing a range of topics on financing clean energy solutions in developing nations. We have Ellen Morris, who is president and founder of Sustainable Energy Solutions, LLC. Philip LaRocco, who is founder of E+Co. And Harish Hande who is the managing director of SELCO-India. Following that, we'll have a question and answer session, and then discussion and closing remarks.

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So the Clean Energy Solutions Center is actually an initiative and a partnership formed by the Clean Energy Ministerial and the UN Energy Partnership. These two entities are the main support for the Solutions Center. The Clean Energy Solutions Center was launched in April 2011 for major economies. And the Solutions Center is one of eleven Clean Energy Ministerial initiatives. It's led by Australia and the US and other CEM partners. The partnership we developed with UN Energy actually extends the scope to support developing countries, and through this we enhance resources on policies relating to energy access, small to medium enterprises, and financing programs. We also offer expert policy assistance to these countries, and not just to the developing countries, but to all countries. And we also expanded our peer-to-peer learning and training services.

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There are four main goals to what the Clean Energy Solutions Center is striving to accomplish, and one is to serve as a first-stop clearinghouse of energy policy resources, which includes reports, best practices, data, analysis tools, all sorts of tools that policy makers need when they're designing clean energy policies and deploying clean energy projects into their areas. We deliver dynamic services that also enable expert assisted learning and peer-to-peer sharing of experiences. And I'll go over the expert assistance that we provide in just a few moments. We also foster dialogue between nations and policymakers across the globe on emerging policy issues and innovation occurring across the globe. We have two target audiences that we primarily target, and the primary audience is energy policy makers and advisors, and analysts. And then we have a secondary target audience, which includes private sector companies, energy entrepreneurs, and investors, NGOs, civil society, and all others engaged in clean energy.

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Now, onto our Ask an Expert feature, which we have on our Solutions Center. We've assembled over 26 experts in various areas of clean energy policy, and these experts are available to government agencies and institutions supporting those government agencies when trying to develop some sort of clean energy policy, be it on renewables, energy efficiency, energy access, or clean transportation. And these people are experts in their field – they have a vast amount of knowledge on clean energy policy, and we encourage you to, if you have a need to reach out through the Solutions Center Ask an Expert function, and submit a question,

and we will make sure that we get the appropriate expert answering the question that you submit. It is at no cost, so that's very important, and it is provided remotely, but it's a great resource to gain access to these experts when developing your clean energy policy. And I'm pleased to announce that Ellen Morris, who was on – who will be presenting today, is one of our clean energy policy experts on this team, and she specializes under energy access on microfinance and economic development for developing countries.

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As the webinar you're attending today, we conduct monthly webinars on policy topics of interest. And I have a list here of some of the upcoming webinars we have. We actually have another webinar on Wednesday on cool surface and *[inaudible]* policy tool kits, and another one on June 26th about smart grids. So please visit our training website to get more information on those particular webinars. We also partner with some of our – with other agencies in providing training materials and videos and presentations developing curriculum and things of that nature. We also have a policy forum. Again, I encourage you to visit our policy forum, where we have bloggers writing stories on current and new developments occurring all across the globe on clean energy policies. I invite you to visit those blogs, read them, and make any comments that you would like to add to the story.

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And here is another – This slide provides examples of some of the products that we highlight and offer at Clean Energy Solutions Center, including a quarterly report on Bloomberg New Energy Finance who reports quarterly on upcoming and occurrences that have happened during the subsequent quarter, or the previous quarter, excuse me. So again, it's just we have this great resource of support, and up and coming or cutting edge policy efforts occurring around the world.

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And let's see. We'd just like to let you know how you can get involved. Again, feel free to request expert assistance through our Ask an Expert feature. We can do it – We can provide assistance based on a country's specific needs or regional needs, participate in webinars such as you're doing today. We welcome your advice and suggestions on resources we can include in the Solutions Center, and also how you would like to see the Solutions Center

improve. We have a newsletter that you can sign up for, and of course, join conversations on the policy forum that I just mentioned.

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And with that, I think I will turn the presentation over to Michael to moderate, and to our three great speakers today. Give me just a second to bring up their slides.

Michael Mendelsohn: Great, thanks, Vickie. Can you hear me now?

Vickie Healey: Yes.

Michael Mendelsohn: I apologize. That's great. I apologize to our audience for technical difficulties. Always seems to be something with webinars. Our first speaker, Ellen, is going to give us a broad overview of international finance. Please begin whenever you're ready, Ellen.

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Ellen Morris: Thank you, Michael, Vickie, and Scott from the NREL side, and, most important, welcome to Phil and Harish, my two compatriots and friends who are part of this panel. So I would like to first just talk briefly about the sort of context for energy and energy enterprise development, and then Phil will talk about the sort of micro and macro frameworks for examining how finance and access to finance in enterprise development occurs, and then Harish is going to talk about very specific examples in India and the 15 plus years he has about making financing and pro-poor energy products available in India. So with that, I'll go to my first slide.

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So basically, for those of you who are new to this space, and understanding energy and the linkages to development and enterprise creation, the multiple benefits of energy cross over many development sectors. And this just illustrates a few of those interlinkages that we see. Most importantly, I would say, it relates to health and, in terms of indoor air pollution from unvented cooking and cooking with low quality fuels. It's a fourth-leading cause of death for people in developing countries, as well as creating an extreme physical burden for carrying wood, for mainly women and children who are the primary people who take on that task. In addition, lack of electricity limits healthcare services in terms of the nighttime delivery of children and sterilized equipment. And also, the lack of information technologies in many

parts of the world limits the availability to learn about healthcare and disease prevention.

So, health and access to health services is a key aspect of the delivery and the need for clean energy. In terms of education and gender equality, there are several issues around access to education and gender equality. In other words, rural areas tend to have very few schools and find it hard to even attract teachers to get to places with unelectrified areas. It's also difficult for people to study in the evening without lights. If they're working during the day, most of the time out in the fields, and doing other arduous labor, it's – their time for learning and relaxing is in the evening, and without lights, that makes it very difficult.

On the gender side, many girls don't go to school in order to support their family in terms of running the family or taking care of children, processing agriculture products, etcetera, water pumping. So without access to clean energy, many girls are never given any opportunities to improve their lives or be economically productive. In terms of the environment, it's fairly obvious. Cleaner energy services can encourage better management of natural resources, including better water quality and managing the forest resources, as well as climate implications.

In terms of productivity, and that's really probably the most focus of this webinar today, is really thinking about how enterprise creation and economic development and access to finance can really help move forward on creating more productive activities, income-generating activities, jobs creation, trade, etcetera, at many different levels. And I'm happy to have Phil and Harish here who know a lot more about that than me, to help provide some real-world examples about that. But in general, we sort of see direct benefits around access to clean energy, around saving time and improved environment as well as indirect benefits, which include saving time and creating additional productive activities for people.

But I guess what I'd like to sort of start this webinar is with is to think about what we generally know about what's happening in developing countries, and what we think is going on in developing countries, and they're really myths, I would say, that we need to dispel, and we are working to dispel, all of us on this call, and you in the audience. Is the first myth is that energy services are not a priority for poor people, and this is something which is I think a myth because people don't really understand how energy is such a key driver for many development inputs. And what we do find is that when you ask people and when you talk to people about access

to energy, it actually is a very high priority for people living in developing countries and people with no access to energy.

The second myth, which I think we are very much trying to dispel all the time, is that poor people cannot and do not pay for energy. And Harish has the best examples of this in his work – you really do see, if you have access to financing and you have access to products which people are interested in buying and need, that they will actually pay for those products, and in general, they're paying more for low quality energy services at the moment. So the key is sort of how to make that link between affordable products and high quality products and financing to help purchase those.

And then the third myth relates to electricity and thinking that access to electricity is the silver bullet that will help everyone in the world, when, in fact, there is also access to cleaner cooking options, which is a very important side of the equation in terms of especially women and girls who are, as I mentioned, the ones who have the primary burden of cooking in the home and collecting the wood fuel. So we need to understand that the myth of access to electricity is all that we need, but more importantly, we need to look at a balanced solution where access to cleaner cooking options as well as access to electricity are equally important.

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So this is just an illustrative slide to show you the kinds of technologies we're thinking about in the world we're discussing today. And we're thinking of electricity options, cooking options, and mechanical power options. And mechanical power options are things which are for grinding, milling, and husking of agricultural products, as well as water pumping. And more important than these specific energy options are really the quality of the energy options that are available, the reliability of those energy products, and the affordability of those energy products.

And I think also rather than thinking about let's find a solution at the beginning, which is the energy systems column, and look for a problem to solve – more importantly, we need to look at the benefits side, or the end use side, and sort of see what people are looking for in terms of their particular energy needs at the local, micro level, and then match the solution to fit their particular need. So typically, as all of us come from maybe a technology side, we want to have the latest gadget or gizmo, or really excellent product, and then we go, okay, now where can we sell this, where is there a solution that we need to solve with our particular product? But rather, I think what we've seen over the last 20 years of working in

this field, it's more important to listen to that market, listen to what those end users want and the customers want, and then provide the product that fits that particular problem.

So again, we're looking at basic energy needs – we're not looking at new technologies that require a lot of research and development, but we're talking about affordable and reliable energy services, which include basic things like lighting, refrigeration, cooking fuels, water pumping, and mechanical power for low-income people. And we've seen many technology improvements, but those technology improvements over the last five or ten years have been around price, lower prices, and higher quality. And so the key is how do you keep those particular drivers moving in that particular direction? It's not necessarily new technologies, but improvements on the affordability, quality, and access to the energy systems.

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So when we think of access to finance, which is really what this webinar is about, we see in our experience that access to finance is the most frequently cited barrier to reaching more customers and to scaling up energy access programs. And you can see across the value chain, this is just a few of the players that are involved in the value chain in the developing countries where there is no access to clean energy. So starting with the manufacturers, there are capital limitations for both developing not necessarily new products, but products which meet the needs of the poor. There is also a need for working capital across the value chain for manufacturers, wholesalers, dealers, and customers who have tiny businesses.

We typically see credit coming into play for both the wholesalers and the retailers and the last-mile dealers. And, in this case, the last-mile dealers are those vendors, the local vendors, the local entrepreneurs, the local hardware store, anyone who happens to be selling energy products to the local communities. And then the customers, also, have affordability as a major challenge, and they also need financing. So financing comes into play in all of these different ways. And there's financing available through a range of different places, from the micro financing institutions to commercial banks, and there are various challenges with working with those different financial players in terms of demonstrating the value proposition, but also making affordable capital available to those different players.

And, again, it has to do with tailoring the particular financing alternative to the particular person in this value chain, and making sure that the capital can be put into use most effectively, and can

be helped to build a local economy, but most importantly, build the economics of the particular business, whether it's the customer or the wholesale retailers. So next slide.

[Next Slide]

When we think of financial institutions, we think of sort of a black box of financial institutions that are operating in the developing countries, and this is just an illustrative slide to show how very much ambiguity and also range of different options, and how they cross over and intersect with one another – from the very poor on the left hand side, to the less poor or the more economically advantaged going to the right. And then from the less formal financial institutions to the more formal financial institutions. And you see that scale and access to energy and access to financing will be achieved through formalized financial institutions along the lines of the insurance companies, commercial banks, and postal banks, as well as rural banks, microfinance institutions, and community based organizations.

And the point here is that when we say, for instance, microfinance institution, which is what a lot of people focus on, you can see microfinance institution is just one of six or seven options, and there's probably more options for a person or a business at the local level, and microfinance is not necessarily the end-all be-all for solutions at the local level, but more importantly, how to tap into, for instance, savings and credit cooperatives, which are very much thriving in the rural areas of developing countries, and at a super local level, community based organizations who are doing lots of capacity building and access to being the bridge between the community and the more formal financial institutions, and then rotating savings groups, which are very informal and making loans between individuals in a particular group that secures their own financing within their own community.

And banks will, we see, have an increasing role, and microfinance institutions are likely to retain a role in retail service provisions. But, again, microfinance needs some boost to help get them comfortable with making loans for energy, because energy is sort of a foreign, unknown territory, still, even though we've been working on it since 2004 or earlier. And there still will be a continued niche role for non-profits and community based organizations and cooperatives in basically deepening the reach, especially in rural areas, for affordable financing. And the most exciting thing, I think, that all of us on this call agree is that access to technology and innovation around technology will help to reduce transaction costs.

And I think this relates to things around the mobile phone payment systems, access to sort of more standardized products perhaps, the engagement of a more diverse set of players – so it's not only the energy technologies, but there's also the information technology side of the house, as well as other kinds of nonprofit organizations that are seeing the links with energy, for instance health nonprofits are now interested in the access to energy and building up the energy infrastructure to help their particular nonprofit organization. And then, finally, different kinds of models. Certainly Harish and Phil have both been very instrumental in moving this space forward and thinking about new models or how to incubate new models around energy service delivery, and, more importantly, the local entrepreneurs to do that delivery. So with that, I'm going to turn it over to Phil. Is that right?

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Vickie Healey: Yes.

Philip LaRocco: I think so *[laughter]*.

Ellen Morris: So, Phil, if you could jump in now? And one thing I wanted to say—

Philip LaRocco: Hello, everyone.

Ellen Morris: Phil, one thing I wanted to say before I turned it over to you, was we were thinking, just within the webinar, people who are on the phone, if we take sort of a pulse of you in another five minutes, and sort of see what people are thinking and if we're moving in a direction that's interesting to you, or that sort of thing, so we don't do all the talking.

Philip LaRocco: Okay. Hello, everybody. This is Phil LaRocco. I work with Ellen and I worked with Harish over the last two decades. We've probably made, together, as many mistakes as you could possibly imagine, so hopefully we've learned something along the way. Now, given that this is a webinar, and we're supposed to just be using slides, I'm going to ask you to draw a little picture. So find a pencil and paper or use your imagination. But draw a box. And I want you to label the four sides of the box. At the top of that box, I'd like you to write in the words 'corporate or project finance'. On the bottom of that box, the lowest side, I'd ask that you write the word 'microfinance'.

On the extreme left-hand side of that square or rectangle, I'd like you to write 'public purpose/charitable finance'. I paused a little longer because those are a lot of words. On the right, I'd like you

to write ‘private sector fully commercial finance’. The financing conundrum, and that’s what it really is, is the blank space in between. When you look at enterprise finance, whether it’s the retail type of finance and business that Ellen has described serving the poor, or it’s also the project type of finance that builds projects, you’ll see that there’s a missing element to it, that it occupies its own space in developing country, clean energy finance, and frankly it’s not served completely by either of any of the four sides of that box. It doesn’t have its own type of space. And that’s part of the conundrum that needs to be dealt with. Next slide, please.

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There are enormous opportunities in this space, and just to emphasize a point or two off Ellen’s remarks, they come in all different sizes, they come in all different shapes, but they fall into two broad categories. They fall into the categories of retail businesses, such as you see SELCO in the upper left and TecnoSol in the upper right – these are businesses that directly serve customers – doorstep businesses. They also come in the more project oriented or – I don’t even know if there’s a good description for the type of customer, but a single user or a larger user customer. On the lower left is Karat Waste Two Energy (KWTE), which was a methane conversion to replace electricity in Thailand. On the right, is SME-Renewable Energy in Cambodia, which uses biomass gasifiers to replace the husk power, or actually uses husk power to replace diesel fuel.

So one way of looking at them is the type of customer. Another way of looking at them is the basic services, which is what this slide does, which says that you have enterprises that serve the energy impoverished – whether they have, they’re unserved or underserved – and you have energy enterprises that convert the energy waste in our system back as an energy fuel. I’m going to discuss, since Ellen spent some time on the more retail characteristics, and Harish is also going to discuss his business which deals directly with the poor – I want to use an example, next slide please.

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That’s really a project. And it actually sells the majority of its electricity to the national grid. This is La Esperanza in Honduras. It’s an interesting project in a number of ways, but it’s also a typical project in a number of ways.

It's an interesting project because it began very, very small, although it, today, is almost 13 megawatts. It started as a 400-kilowatt project, which is one piece of the financing formula that we need to consider. When you're dealing with remote enterprises, with first of a kind enterprises, with startups in new markets, there's a tendency for us to try and design something that's large and impactful. Esperanza says, no, maybe we shouldn't do that. Because often, if you're new to the market, or the technology is new to the market, or if you're pioneering in a location where something hasn't happened, the problem you encounter is that nobody will finance your project no matter how attractive, no matter how impactful.

What the developers of La Esperanza realized was that they would start at a smaller scale, 400 kilowatts, in which they would limit the size of the financing they would need so they could prove that the water resource would produce electricity, that they could interconnect with the local utility, and that they could generate revenue. That's one of the major insights from La Esperanza, which is if you can break what you're trying to do down into small pieces, please do so, because it actually makes it easier and gives you larger financing potential if you're a newcomer to the space. Now, that can be deemed controversial, because of the great issue of transaction costs that you have think bigger and you have to think larger – but the reality is you can sometimes think around transaction cost by thinking small.

Other elements of this project that made it unusual, and a good example, it was one of the first three small carbon projects that was approved by the CEM under their small projects protocol. That led to realization that carbon markets, especially as they became more regulated, more refined, were in fact very difficult for small projects to access, very expensive for small projects to access, and, frankly, not as impactful – I'm using that word again – as you would really want them to be when you net out the opportunity cost and requirements that you'd go after. Something else that La Esperanza proved, which is in the lower left hand corner, is that you can do a substantial amount of social and environmental good – in this case a large-scale deforestation project and a homegrown nursery project for seedlings for the reforestation.

You can do a whole lot of good and not have a negative impact in any way on the profitability of the project – in fact, it can make it more attractive. There was another project in the area, not in the region I should say, that actually complained that La Esperanza, when it was going into later stages, was getting more attention for its larger financing package than this other project, because it had

features like a nursery and local employment. So how do you look at both the kinds of projects that Ellen described and Harish will describe in greater detail, and the La Esperanza like projects? We've developed three frameworks. Slide, please.

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That are useful, if you would say so, not so much in telling you what to do, but in telling you what mistakes to avoid. We call them, very simply, the macro, the meso, and the micro framework. And this is the highest-level one. And basically what it says is the attractiveness of a market or a project or a group of projects is a function of three things. It's a function of the policies and regulations that are in place. It's a function of the business environment that's in place. And it's a function of the human and institutional capacity to convert that policy and that business environment into predictable, transparent action.

It's this third part of the triangle that regularly gets ignored, if I can use that word. We tend to realize that there are good policy regimes to imitate; there are good business environment characteristics that need to be put in place. But then we don't as policymakers, decision makers, project planners, or program planners, spend the time to make sure that the implementing entities, the local enterprises, the local public enterprises, private enterprises, the local capacity to actually deliver on the promise of policy and regulation is in place in an equal proportion to the outcome we're desiring. A colleague of ours, Jenny Greene, has a good way of describing this.

What she'll say is that if you draw this triangle and the length of the sides and the thickness of the sides will determine how successful you're going to be. So you can imagine having the most perfect policy and regulatory environment, and you have a business environment like Luxembourg or New Zealand, but if you don't have the human and institutional capacity to deliver on this, what happens is you wind up with an incomplete triangle and all of the impact, which is the area inside, leaks away. As basic as this is, it's ignored often. The second slide – Next slide, please.

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The second framework is really when you look at what it takes to convert a macro framework into micro transactions. What do you need? You need information on the market, on the products, on the everything that's taking place. You need to understand the demand characteristics of your clients. You have to understand, as Harish

will refer to it as, their needs and their wants. You have to make sure that you have a capacity building activity in place so that this information or the weaknesses discerned by that information can then be corrected. That market, your market, needs appropriate, affordable products – not unaffordable, inappropriate products. Customers deserve choice. You're going to hear this regularly. And this one-size fits all approach to product development is a formula for very, very limited impact.

Now, you have a delivery enterprise somewhere in this chain. Somebody is bringing a product to a customer. That somebody and that enterprise requires finance. That's enterprise finance. And finally, you have customer finance, which Ellen has described in some of the institutional formats. If you put these five things together as equal, balanced components of a program or a project, you get a reasonably good chance of attaining a reasonable and balanced outcome. The next slide, and then I'll take up the point that Ellen mentioned about taking a pulse and temperature.

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The most important relationship – I'll say that again. The most important relationship is the relationship between the delivery enterprise and the customer. And, over time, you'll see that failures in projects, programs, policies, can normally be traced back to a lack of attention to some of the parts of this slide that are shown here. We call this the spider, which is the EC relationship between the enterprise and the customer, and we define eight characteristics, four on each side. Let's start with the enterprise. Most important characteristic, and I'll say this without any qualification, in an enterprise, is the entrepreneur, the champion, the man or woman who is spending their time adapting to local circumstances and delivering on it.

You can have the best technology in the world, you can have the finest business plan in the world, you can have the greatest business model ever invented – if you don't have the right entrepreneur at the right place at the right time, there is a goodly chance you are going to fail. The second factor for success is the appropriate, affordable, accessible technology shown here with lower case 't'. Now, every enterprise, even someone as accomplished as Harish, and even someone as accomplished as the KWTE project in Thailand which had a 30 plus percent internal rate of return – those enterprises need support services. They cannot do everything.

They're operating in an incomplete value chain, so they need to be bolstered, and it's very important that enterprises have access to those support services. They will tell you what those services need to be. And, finally, enterprises need finance. And if you're going to look at finance, you need to remember two words: working capital. Ellen mentioned it in her remarks. This is the value of death for most enterprises. It's not that they can't be profitable. It's not that they're not financeable. It's that they cannot pay the bills on a day-to-day basis because they have insufficient equity in the company or insufficient working capital to allow for the recovery of their investments via revenue.

On the customer side, I'll keep this brief; the most important characteristic you need to discern is the customer demand. What do customers want? What do customers need as opposed to what you want to sell them? The second thing is does the customer have the knowledge base to work with your technology, with the entrepreneur's technology? If not, that's a deficiency that needs to be corrected. Does the customer require services? This is the most often-repeated maintenance conundrum that works its way into this equation. And finally, the customers need finance, and that finance takes on many, many, many forms. Ellen's chart illustrated the institutions and types of finance. But increased income is another form of finance.

Savings is another form of finance. Etcetera, etcetera. What I tend to say about these eight factors in this thing is if you get these eight factors in reasonable balance, there's a better than 60 percent chance that you won't fail. But if you fail to get these eight factors in balance, I think there's a very, very good chance you're going to fail. So now, let's take that pulse and temperature check that Ellen mentioned and perhaps I guess I can suggest that people type in if they think the seminar or webinar is on a track that's interesting to them, or if we're missing the mark.

Michael Mendelsohn: Yes, that is helpful. This is Mike Mendelsohn. I just wanted to go back to the La Esperanza case study which you were mentioning. Perhaps you can give some insight into the source of financing. You said it started very small, but then grew with experience. And maybe you can take the audience through what type of financiers were at the beginning, and how the sophistication of this financiers grew as the project grew, and sort of how did those expectations change.

Philip LaRocco: Thank you, Mike. In the beginning, when it was a 400-kilowatt project, the only financiers who were available would be small socially oriented entities such as E+CO, the company I founded in

1994, and I was CEO there until 2009. We ran a triple bottom line operation, and we also considered ourselves a catalyst. There's a number of entities that would fit that description around the world. Not a lot of them, but if you work with development finance institutions or you work with nonprofit or social oriented or today is being referred to as impact investors who are willing to seed the initial investment, that was a market segment that was for the first project.

Once it began producing electricity at 400 kilowatts, which is rather small, once it showed that its power purchase agreement with the national utility was in effect, and once it showed that it produced electrons and received payment, then it was first the regional institutions became interested. That would be CABEI – Central American Bank for Economic Integration – and its specialized funds such as the multilateral investment fund, which is managed by the IATB. And, once that process began, there is a herd instinct in financing, so then it became popular to a number of different parties. That's not to be confused with saying it came easy to finance, but it did become more popular, and cast a much wider net, and it was able to then secure a second stage and a third stage round of debt and equity financing.

So once you're revenue producing, no matter how small actually, you then have something to show to someone as a proof of concept, which then allows you to match up what you're doing with their underwriting criteria. In the beginning, it's almost impossible. I doubt La Esperanza could have been financed at its megawatt scale – cause it went from 400 kilowatts to 1 megawatt to 12.xx megawatts. I doubt it ever would have been financed at a megawatt scale because of its location and so many difficulties. So I thank Mike for that comment.

What you have to do is segment your financing need against the universe of possibilities. Just I'll do a small commercial. There's a document called 'How to Prepare and Present Technology Transfer Financing'. It's published by the UNFCCC – full disclosure, I wrote it. But it has in there a chart which is really I think the most significant piece of this 100 and some odd page book. It has in there a chart which tries to match up different financing sources against the different stages of a project, whether it's a planning stage, construction stage, or an operating stage. And that's probably its major contribution to the literature here. There are lots of sources for financing.

When you're at the 400-kilowatt stage, your suppliers are a major source of financing. When you're at the 400-kilowatt stage, your

consulting engineers can be a source of financing, because they know without their services, a project won't be built, and you know without their services, it won't be financed. So you can entice people into working in projects under different bootstrap arrangements. With that, I think I'm out of slides, I hope.

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Michael Mendelsohn: Well, we got a couple of questions in response to your prompts. So maybe we could take a couple of those now, and then continue and try to hit all the issues. One question – Phil said that it's possible to think around transaction costs at a small scale. Can you give an example of that?

Philip LaRocco: Yes. Well, what's interesting about transaction costs is we fall into that box that I asked you to describe at the beginning. We have a view of transaction costs that's very heavily, extraordinarily heavily, reliant on the corporate and project finance model. It says that you do a certain amount of due diligence, you do a certain amount of documentation, you work with people who have a certain amount of track record, you work with people who have a certain amount of security and etcetera, etcetera, etcetera. Well, on small projects, particularly small projects, why is that the only option that's available? The option that can be available is to break the project into pieces and to take the risk.

I tell the story, because it's a true story, that we were once faced with a $250,000.00 project that would have entailed $275,000.00 worth of due diligence. It would have been smarter to just build the project with no due diligence than to do the due diligence. But that's not really a useful, widespread answer. Well, what is a widespread answer is to go back to the entrepreneur and start working with the entrepreneur in a small bet. So you say my transaction cost is going to be $250,000.00. How much will I spend to really build confidence in this entrepreneur, to build confidence in this concept, without embracing that large transaction cost?

And very often, you can do that for $25,000.00. If you have a small, solar entrepreneur who's doing an initial startup as a cash business out of one location, you can finance that business very closely, watch it, and build a confidence in an inexperienced entrepreneur who doesn't have the assets that your due diligence would require, who doesn't have the track record that would be normal from a project finance perspective, and who is doing something new in a new market. So the answer is you can essentially assume additional risks – notice, I said assume, not

mitigate – but you can assume additional risks and learn as you go along rather than limiting the size of the transactions you can look at because of the high transaction cost that you know a minimum size transaction requires. It does actually work. I mean I would leave it at that. There are numerous case studies, numerous studies, or cases, to look at, where you had inexperienced, undercapitalized entrepreneurs, where small bets were made, and those bets grew successfully.

Michael Mendelsohn: And it sounds like operational experience is really the best due diligence available. That will lead to much more access to capital. One other – Yeah. One other question and then we can continue the slide. Are the various investors sharing their experience where credit rating of the various businesses they invest in? Are there a lot of – Is there a lot of information available on the returns available, or the risks that were involved in specific projects? Or is it just mostly qualitative information that's available on the *[inaudible]* side?

Philip LaRocco: Well, if you asked for the very short answer, it would be it's mostly qualitative information that's available and the whole rating formalization, trying to make this space look, smell and feel more like project finance and corporate finance – and even like microfinance institutions, not microfinance operations, microfinance institutions – I mean there's a lot going on in that regard, but it's probably not terribly relevant. I think what's more relevant is going to be to dig into the basics of the business model and the business plan and dig into your entrepreneur as you just suggested a couple minutes ago. Because I don't think you can find out a lot. But I can make one generalization about energy projects and energy enterprises – They are not – What they are not is as important as what they are.

These are not double-digit return, five year, seven-year payback projects. That's the extraordinary exception. These are single digit return projects that tend to be capital intensive over time and require long payback periods. They are not cellphones. They may have certain features of the cellphone business model, but they are not cellphones. So the idea of getting an 80 percent *[inaudible]* year on year is antithetical to what you're actually trying to do here. So there's probably no substitute for digging into the individual entrepreneur and, as Amulya Reddy would say when he was alive, doing the arithmetic.

Michael Mendelsohn: One last question and we'll go on to—Someone asked for a reference to the UNCC booklet that was just mentioned.

Philip LaRocco: It's – We can do it a couple of different ways. It should be on TTClear, which is the UNFCCC website. If it's not, just you can send me an email, anybody. It's – You can send it to PhilipLaRocco1@gmail.com and I will send it to you.

Michael Mendelsohn: Great, and we'll make everybody's email available at the end. Great. Okay, Ellen, if you want to continue? We're running a little late, so go quickly with the slides.

Ellen Morris: Yeah, I had just one minor thing to add in to Phil's point. In this transaction cost discussion, one of the things that I think you'd learn from Harish at one scale of sort of building very tailored solutions towards entrepreneurs, but then at Phil's having 17 plus years investing in small energy entrepreneurs, is that there is a way to reduce the transaction cost by trying to build the capacity of a larger number of entrepreneurs. In other words, casting a much wider net for potential entrepreneurs, and then doing the capacity building through virtual training, and then, more importantly, linking up with mentors who can help create a business.

And in fact Phil and I are working at sort of how to solve that particular problem by creating a web-based portal to basically cast that wide net and reduce the transaction cost or reduce the time with which an individual investment officer has to sit with a potential entrepreneur by creating access to the tools and training that's necessary for a local entrepreneur, and then linking them up with a mentor to sort of guide them through the process of building a business, and trying to get more economies of scale for the creation of more entrepreneurs than we're seeing today.

Michael Mendelsohn: Great, thanks.

Ellen Morris: So should I just – Phil, I mean Harish, did you have anything to add to that?

Harish Hande: No, no, no, that's fine. I – Yeah. No, no, that's fine.

Ellen Morris: Okay. Just quickly then, since we're running late on time, I just wanted to move into more specifically the linkages with end user finance and what's happening with end users in terms of some of the models for how we see people being able to afford—

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—clean energy. First of all, I want to dispel the myth that I raised in the earlier slides, which is just sort of that people are not paying for energy in these countries and markets where we're working, when in fact we see that people are indeed paying for energy, and

they're paying a lot for energy, and typically that energy is of a very low quality. And on this slide which was done by the World Resources Institute and the IFC, you'll see on the left hand slide how much of a household expenditure, in terms of percentage, is dedicated to energy. And then, on the X-axis, where those people are living and the percentage of the people living in rural areas. And on this slide, the size of the bubble corresponds to the number of unelectrified people.

And the pink area really points to some major drivers and points to some priority countries in Africa, mainly, and with of course India and Bangladesh and some of the larger countries where there are still a large number of people who are not having access to clean energy and spending a lot of money on low quality energy. And in these markets, in the pink area mainly, we see a typical household may spend something like $50.00 a year on lighting. $50.00 to $150.00 per year on cooking fuels. And $40.00 to $75.00 per year on battery and mobile phone charging. Those are sort of the three main energy inputs at the household level, and if you add all those up what you see is that the per capita income in some of these countries is $300.00 to $500.00, that chews up a very large part of someone's income at the local level.

And, again, these are not great choices they have, and you can see how those annual expenditures fit well within the cost range of more modern, cleaner energy systems that we're talking about, including improved cook stoves, LPG liquefied petroleum gas, solar lanterns, and solar home systems. And that's sort of the crux of the issue, is sort of not only how do you allocate the amount of money that people are spending to more modern or cleaner energy systems, but also how do you go beyond that? Because people generally say that it's not just what they're spending now on kerosene that will allow them to allocate the same amount of money to a cleaner energy system, but they want to go even beyond that. They have higher aspirations than just displacing a kerosene lamp for one lantern, and Harish will talk a lot about that. And when we think about end user finance.

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We need to think in a very open-minded way about not only microfinance, but more importantly end user finance. What is the local person in that local community, in their house, going to do to be able to afford these systems? And on the left hand side, you see something which is done in Ghana through a company called Toyola. And this entrepreneur, which was financed by E+CO, the company that Philip founded, basically started seeing the need for

people having access to savings to be able to afford cleaner energy products, but not having access to traditional forms of finance either at a rural bank or a microfinance institution. So he, this entrepreneur, Siraj, set up this system where people, every time they went to buy kerosene, would put the money in that box and their alternative was a solar lamp.

So he actually gave them a solar lamp in their house, that they kept, and then every time they went to buy kerosene, they would put the money in the box. Then, he came back in one month's time. They opened the can together. And of course, there was more than enough money to pay for the solar lamp, but then there was additional funds which then they could allocate for not only just a solar lamp but more varied and larger systems. But it allowed them the chance to pay incrementally and to develop a savings pool so they could do things with their disposable income. So that's one example of an entrepreneur who really took it on himself to manage the credit and savings for his own customers and bypassing formal financial channels altogether.

Then, in the lower right hand corner, at the other extreme, is a very successful program in Nepal called the Biogas Support Program – and you'll see that this has many more moving parts, much more complexity, and many more players involved. But equally as important to that end user is that they had access to finance to be able to purchase the household biogas system. And it included government players, which are the AECP and the Biogas Support Program, and they were involved very heavily in the promotion and the engagement and training of entrepreneurs.

The ministries of social and conservation, water, energy, agriculture, livestock – all of those government entities were involved in the conceptualization and the implementation of the Biogas Support Program in Nepal. And what they were able to do is to very effectively combine the technical assistance that was required for the microfinance institutions, which is the MFIs, the biogas companies who were actually building the household biogas systems, and then the clients helping them understand the loan application process, the dispersement process, and the maintenance on how to run these biogas systems in their homes.

So we saw that this biogas program grew from, in the inception, only one biogas company, and now there are more than 75 biogas construction companies. So what I just want you to understand in terms of the end user finance is that it comes in all flavors, shapes, colors. And you can't be so specific when you're thinking how to make this affordable to only working with microfinance

institutions and only working with government programs, but to be very open minded about what will fit with your local communities and your local markets.

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And specifically this leads to really Harish's discussion of things he's doing with SELCO India in Carnottica, and really how to tailor what the financial services are to the needs of the poor customers. And at the center of this slide is really what customers want. And I think this is important for all of us on the enterprise side as well as the financing side, sort of thinking at the center of this slide, really who are the customers, what do they want, what do they need, and what are they aspiring to, more importantly? And it's very simple. It's like anyone in Colorado or New York or Texas. We want all of these things around service.

We want things which are convenient and accessible. We also want respect from the entrepreneur as well as the service provider. We need flexibility in how the loan is structured. In other words, thinking about how to make smaller loans over a longer term. We need to think about having a variety of products, not just one light in my house which, again, is something maybe important but just a stepping-stone into a more holistic look at the energy needs of the household or the business. And thinking about the other types of loans that might be really important to us, whether it's a housing loan, an education loan, business development loan, creating a new business, or also quality of life loans, which relates to clean water and energy.

And then, finally, thinking about some of these other financial products which are always available in Europe and North America, but aren't so widely available in the developing world around savings accounts and insurance products. And those are things which are emerging as very important livelihood and asset building loans for the poor. And finally, thinking about collateral in a more flexible way. Rather than thinking about sort of the formal financial institutions that require very specific collateral requirements and very strict guidelines on their lending, thinking about more flexibility in how collateral for these loans can be offered, because as we all know from the experience of 20 years of microfinance and small loans for the poor, is that they are very reliable borrowers, and the risk profile of these borrowers is very favorable.

So with that, I'm going to turn it over to Harish, who is really going to get you interested in some of the innovations that he's doing at the local level in Carnottica.

Harish Hande: Thanks, Ellen. Can I have the next slide, please? Thanks, Ellen, and thanks, Phil, for the rich information.

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I guess you have covered most of it. I will just – Yes, where do I start? Well, I'll stick to the innovative financing. As you see, as Ellen mentioned in her initial part of her – when she started off her talking, saying that there's a myth. Yes, the myth is that when we talk about sustainable energies like solar or hydro, biogas, some might expel that it's expensive. Yes, it's expensive for people who have choice. It's expensive for people who already enjoy the benefits of subsidies or subsidized electricity, or enjoy the benefits of electricity grids that have been put all over the place. But somebody else has paid for the coal fire plants. And but the dirty fuels, even though they help aspects – as you go deeper into the economic strata of any society, people tend to *[inaudible]* more on energy.

Even let's compare in the US, for example, the inner housing in Chicago spend more on heat bills than people in Manhattan, because people can't afford the extra lining. So these are simple things where we – Let's look at – What happens is when you look at financing, you tend to look at what the monthly incomes are, forgetting the primary variable that poor is not a monolithic structure, and their incomes are not monthly. If you look at a street vendor who plays on a daily basis, a paddy farmer might – A street vendor earns on a daily basis, while a paddy farmer earns on a yearly basis. See, the question is, look at inputs versus outputs.

And normally the EMIs is all considered from an input point of view. Okay, how much are your earnings? So I would decide the loan according to how much you're earning. But if you look at a daily cash flow analysis of a street vendor, you have to look at inputs and outputs. And when you look at inputs as somebody who buys a vegetable and the money that comes in as an input, but what goes out is the working capital for the vegetables. In that, you also have – she makes a payment for the kerosene.

She makes payment for the rental of the cart, etcetera. Now, we'll have to rip that economics apart and say, "How can we create an intervention that in fact leads to a savings in her output, so that the net income that she earns in fact increases rather than creating a

financial model, but only concentrates on the input?" That's not how it should actually work. So I mean if you look at the 4 billion people around the world who don't have access to energy in a reliable way, we need to shift our thinking in terms of financing market linkages with business models completely different. I mean it cannot be based on what the existing 1 billion people already have.

And that's the mistake a lot of us do, is think what the 1 billion people have, and how do we modify and put it for the rest 4.5 billion people. That's not going to work. That's never going to work, because the cash flows are different, the market linkages are different. The way business is carried out is different. The way people use energy, utilize energy, is going to be different. So that makes – If I now – If you have a picture, the four pictures in front of you, I'll concentrate on the one that is in the top right hand side. It's called the Cricket Bat Makers. Now, here was two parts of the economics are played into create a financing model.

One was, yes, in the evenings, these cricket bat makers were based out of one of the slums in Bangalore, were using X amount of kerosene in the evening so that the four hours of extra lighting would help them make X number of cricket bats more. Now, because of obviously the, what you call it, the distance that a kerosene light throws, that makes it harder for them to make good quality, consistent cricket bats. A solar light, which you see on the top right hand corner, actually throws a much wider range of light which actually helps them better quality and more number of bats. And how do they actually calculate the economics of it? Two ways.

One is, okay, how much – How many liters of kerosene that we save on a daily basis, and secondly, how many number of extra cricket bats that we make? And suppose I make five cricket bats. The thing that lights up in a cricket bat maker's mind is, okay, one out of that four is really go towards payment of the solar light; that means the extra four bats are of profit for me. That's where the economics works out. It's not about per kilowatt-hour. I think we need to get away from this whole concept of kilowatt-hour, and question how do you empirically link it to cash flows? On the left hand side, if you see the two street vendors, they really don't care where this electricity comes from, where this lighting comes from. They need four hours of lighting.

Both would have said that we spend 15 rupees on a daily basis for kerosene, and now, there's somebody who delivers a solar light for four hours. He comes and delivers me a battery and a light at 6:00

PM and charges me 10 rupees and he comes and takes it off at 10:00 PM. So not only having created an enterprise which delivers four hours of lighting to these street vendors, and created an enterprise, right? But also we have led to savings of these two street vendors who were earlier spending 15 rupees on a daily basis for lighting and now they are spending 10 rupees. So it's a savings of 5 rupees. The additional benefits obviously being health and the other smoke etcetera etcetera.

Here, as you see, none of these cases are actually talking about the environment. It's sustainable energy linking to better quality of life, increased income. Where else would you have examples? And now, also, talk about subsidies. Where else would you have examples where the environment is an added benefit? So it's a wonderful – sustainable energy is such a wonderful linkage between poverty alleviation and sustainable energy without even talking of the environment. That's the whole beauty of sustained, decentralized, sustainable energy.

Even if you see the handloom workers who were actually losing because of power outages and they require – and especially that handloom worker here requires white light, because he does weaving of sashes where the color of the light is extremely important while he is weaving. And four hours evening light leads to X number of hours of loss of work. Next slide, please.

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So if you see – I mean what happens as Ellen and Phil mentioned when there is no credit evaluation, there is no credit – Well, as in Europe or US. We all know that when if that has to be – For a lot of these people as you see on the right hand side, below and the top right hand corner, even the slum household, for many of these households, solar is a second most expensive after the house itself, and so that's an asset. And we all know that assets like whatever we have, whether it's a house or a car, we do not buy it on a credit card. We need long term financing. And that's exactly what the poor need – long term, five year financing that matches their cash flow, a financial product that matches their cash flow.

It could be a daily, it could be weekly, it could be bi-weekly, it could be once in six months like a peanut farmer, it could be once in one year, like a paddy farmer, or once daily like a street vendor. It's not technology here, it's the question of how do you come up with appropriate technology, yes, that matches the needs of the client. Also, how do you come up with an appropriate financial product that actually manages your end users' cash flow? So it's a

combination of, in this case, finance and technology, and in the previous case, is a question of do they have the markets to sell the cricket bats?

So it's appropriate financing, appropriate utilization of technology, existence of market linkage – that's the holistic ecosystem that needs to be built if one needs to successfully garner social enterprise providing to the rural. And that's what I think sustainability in the future will require, because you – that's how poverty can be alleviated – that's how sustainability can be diffused. It's not about, okay, how do I make the product cheaper? And if you look at the rural household on the right or left urban slum households, many of these people require financing the banks refuse to finance because they did not have appropriate credit.

So what we would have done is we would have negotiated with the financial institutions and said, "Okay, what's your credit risk appetite?" Depending on the household, depending on the area, the bank would say, "Yeah, 15 percent, 20 percent, give me a 20 percent guarantee." So we would actually put up 15 percent or a 20 percent guarantee on behalf of the end user, and after the year, because the users would have paid regularly, we would actually remove the guarantee. And a typical example, when we went and asked the end user after six months, "Are you happy with the light?" many of the users would say, "We are extremely happy with the light."

And especially one slumster, "We're very happy with the light, but more importantly, I have a bank account. So as soon as my solar loan is over, I will actually go and take a sewing machine loan." So that's the beauty of decentralized energy. Had they had the grid, they would never have had a bank account. Having decentralized energy forced them to have a bank account. It actually made them formal, very powerful that they had a bank account, and once they finished their solar loan, they said they would have a sewing machine.

So the social impact of having decentralized energy in a very innovative manner, as more people impact that – it's much beyond health, quality of life, and that's what we're trying to improve. If you see on the right hand side, below rural households, you'll see these lines of grid, but many of these households, because of lack of erection fees, or because of the way the houses are structured, have never had the grid, and that's 500 million people in India. The trick is, how do we innovatively finance using technology that is existing, and that's what we're trying to prove with 150,000 households with 8 to 10 different financing models that we have,

saying that yes, we have to have a paradigm shift in thinking, we have to have a paradigm shift in way financial *[inaudible]*, actually are defined.

We have to have complete shift in how do you look at businesses and look at clients. And we have a shift in the way we actually have clients in the supply chain as well as part of your business. And then there's excitement. And that's why I tell youngsters around the world – is don't take your MBA seriously, because you're taught about case studies which will be of really no use. Don't take your financial *[inaudible]* very seriously, look at the world that's happened with the financial crisis. The four billion people will teach the rest of the world what is the next paradigm shift in financing and technology, and how to actually make this world a better place in a much, much better sustainable manner that will actually leave that we will all survive. That's my two cents to all of you.

Michael Mendelsohn: Thank you, Harish, that was really great. This is Mike again, and we're officially out of time but I was hoping that our panelists could continue discussing the issues for perhaps another 15 to 20 minutes. We have a whole bunch of questions. Would that be okay with everybody?

Philip LaRocco: Fine with me.

Ellen Morris: Sure.

Harish Hande: Sure.

Michael Mendelsohn: Okay, great. So feel free to add your questions, and I thank the audience again , and we apologize for all those technical complications upfront. But perhaps we could start taking some of these questions. One person indicates that small-scale developers can't afford MIGA that was available to cover risks for clean energy in developing countries. Is it viable for a risk management or underwriting facility to attract investment for small-scale entrepreneurs? Does anything like this exist? So are there substitutes for MIGA? Maybe someone could explain what MIGA is quickly and tackle that one.

Philip LaRocco: Hi, this is Phil. MIGA is the World Bank that insures risk, high-level risk, primarily country risk. It serves a similar function as the overseas private investment corporation in the US and other European institutions. I'm not aware of any entity that has actually taken on the challenge of insuring that risk. And I think where it

breaks down is in fact that the MIGAs of the world are created to insure macro-level large-scale project risk.

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Things such as macroeconomic changes, currency – vast currency depreciation, etcetera, etcetera. It doesn't – There is no compatible institution that focuses on small and medium size enterprises, not just energy enterprises, enterprises at all. So it represents a gap in the value chain of financing from alpha to omega, but I'm not sure it's an essential gap at this point in time to fill. It's probably – The problems that a MIGA type facility are established to overcome can also be overcome by having a portfolio approach to small projects. So if I have 25 small projects in my portfolio, I inherently have some risk, and risk management taking place by diversity, and I'm not as subject in small projects to the macroeconomic failures that large project insurance addresses.

So when Harish is describing these different vendors – The relative stability or instability of the rupee at that point in time is not a day-to-day matter of great consequence, because you're dealing, buying, and selling largely in local currency. So by way of an answer, no, I'm not aware of any institution that focuses on this. Two, I'm not sure that that would be the legitimate response from an underwriting perspective. It might be more responsive to simply make sure you have a diverse portfolio.

Ellen Morris: And just to add, I think what you find is that most entrepreneurs, and I think Phil, maybe you can just tell me if I'm wrong, but I think most entrepreneurs at the local level that we're talking about sort of fly below the radar. In other words, those kinds of opportunities and access to the services that someone who is at MIGA generally can't be availed of those services. And I agree with you in terms of scale – probably don't really fit.

Philip LaRocco: Yeah, I think that's true. And that represents a whole phylum of services. Even when you look at things that people very often tout as the next big trend in small scale, cleaner energy, which is carbon financing, the reality is for the small firm and the small entrepreneur, these things are not readily accessible. Until a program works that out that makes it smooth for small entrepreneurs to do it, it's just not really going to work for them.

Michael Mendelsohn: Great, thanks.

Michael Mendelsohn: Next question is banks and financial institutions have been mentioned as one of the major sources of financing clean energy

technologies, however, can you cite examples of programs of building capacity of the officials in such banks? The understanding of various factors Phil mentioned by the banks is crucial to financing clean energy. So how do we actually build capacity? What does that mean, specifically, to build capacity, and how do we do that at the local level?

Ellen Morris: Harish, maybe you could talk about the regional rural banks.

Harish Hande: See, in India, what – there's a structure called the regional rural banks, which is one step below the commercial banks. There are 40,000 banks and branches in rural parts. And initially, when we started this whole concept in 1995, one of the issues was how do you create awareness among the bankers? They needed to know what this technology was about before they wanted to finance. Whether it would break down, people would pay for it, all these questions. So we basically have partnered with a not-for-profit called The Parata of Eekus Trust, which over the years has actually trained 7,000 to 8,000 bankers of what this technology is, what they should look at for financing this technology, what should typically be after sales issues, and those are things.

So the bankers would say, "Yes, I would like to know these issues if I am financing, because I will be held responsible for the non-performing asset." So one is the primary was to train them in what the technology was, how would they finance, how would they look at a supplier, and that further would enhance the 2002-2003 when UNEF created a market – sorry bank incentive program to incentivize banks with a lower interest rate to finance the end users, and they have, again, a mass scale training of 2,000 bankers on what the technology was. I think that's very critical for them to understand what the technology is. So that's one of the largest programs that I know about.

Similarly, in Sri Lanka, when the World Bank started this program in the early 2000-2001, they had something called the participating credit institution, called the PCIs. And there was a good scale of training of many financial managers to what they should look in before they finance, what should be the criteria of the suppliers, how do they put in checks and balances of the guarantee mechanisms. What are the agreements that the bankers should have with the suppliers? Battery maintenance, X years of service, compulsory service. How do you penalize a supplier if the financing was not done. That's pretty mature, those type of *[inaudible]*, especially in rural parts of South India and Carnottica, especially.

Ellen Morris: And just to add, I think in the microfinance sector, it has been really challenging to get that capacity of the staff of the microfinance institution to be willing to take this on, because they have built over 20 years these very strong relationships with communities and people that they work with and they, as Harish said, don't want to take on a risk of something like an energy technology system which might not work, or might not have appropriate service. So a lot of capacity building at the microfinance institution takes place to basically I think manage expectations of what the microfinance institution's role is, but also to make sure that there's a solid partnership with an energy company that they can rely on to provide the products that their customers want and also that the service is in place.

But getting that capacity of the financial side to understand even what questions to ask of their potential energy supplier so that they can have their risk mitigated from the technology side – because they only know financing. And as Harish said, in this business it's important for them to know exactly what they're doing and what that channel is for the product supplier and finding a really good product can be very challenging. But the first step is for them to be educated on how sort of what these products are about and what questions they need to ask of the energy enterprise.

Michael Mendelsohn: Great, thanks. And is there a good resource for individuals in different countries to go to to sort of understand all the available credit enhancements and sort of other sort of support structures that can be used to mitigate risk within some of these smaller scale projects?

Philip LaRocco: I think the short answer is no. There is – If you can – On a country by country basis, though, it doesn't take too much digging to get a good country profile for Tanzania or for Ghana or for a particular state in a larger country. But is there a comprehensive, useful, underwriting guide that says these are the risk mitigation tools? No. I know I'm not aware of one.

Michael Mendelsohn: But if someone in Tanzania wanted to find capacity building or infrastructure supporting policies or mechanisms out there, how would they go about it? Would they just Google it? Or is there an easier, quicker way?

Philip LaRocco: No, I think they would Google to build an inventory of all the institutions that are operating and all the programs that are operating, and then they would have to do email legwork with those institutions. But it wouldn't be very difficult to ask to compile a good cross section of everything that's going on.

Ellen Morris: But that said, Phil, I think there is, for instance on the microfinance side, one of the best resources out there is the World Bank's consultative group to assist the poor. And they do a lot of capacity building on the finance side. It's not geared towards energy, but there are definitely windows within the consultative group – to assist the poor on enterprise development.

Michael Mendelsohn: Okay, great. Maybe we could share that website link with our audience. Just thought that'd be great.

Ellen Morris: All right.

Michael Mendelsohn: Here's another question. Have you had problems getting bankers to understand the need to tailor the payment to the customers' circumstances? Something you were referring to Harish. And how do you get into that payment schedule, needs of the client?

Harish Hande: See, there are two things. One, it was easy initially in terms of the agricultural based products, because many of these rural banks were already very mature for financing, because they've been financing these farmers for many years, from the early 70s, and many of the products were already tailor-made to the cropping cycles, for the peanut and sugar cane working farmers and the paddy farmers, for example. And what we came up – But they had not gone deeper into the economic strata as far as, for example, street vending, or people who earn on a daily basis, or people who earn on a weekly basis.

And that's when we started looking at the combination of both delivery of services, in terms of that have a cash flow generation on a daily or weekly basis, and then tailor-made the financial product and worked with the financial institution to create that particular product. But we got more in the early 2000 but before that we – For the agricultural produce, we – the banks were already very mature to do that. And at the beginning, I think I heard you – was – What did you say about the collection, the performing asset? Or no?

Michael Mendelsohn: It wasn't clear in the question. But I think your answer is helpful. I mean it's a difficult thing to respond to very quickly, but it's nice to know that people are thinking about that sort of payment timeframe within the specifics of the business. Another person asked – They would like the panel to shed some light on the Grameen Shakti model, and what that is, and how it works. Can someone explain that quickly?

Ellen Morris: Should I take a shot at that?

Philip LaRocco: Sure.

Michael Mendelsohn: Sure, go right ahead.

Ellen Morris: Okay. So Grameen Shakti is really a successful and unique example of an energy lending portfolio window under the Grameen Bank structure. It's separate from Grameen Bank. And Grameen Shakti really was responding to the request and needs in their markets for clean energy products. And what we refer to – Grameen Shakti as it's a one-handed model, which is different from, say, the model that SELCO has done with another microfinance institution in India called Self Employment. Self Employed Women's Association. Where it was a two-handed model. And the reason I say that is because the one-handed model that Grameen Shakti has is everything can be considered under one umbrella. So they have the energy supplier, the energy products. They have the energy service.

They have the energy installers. They have the financing. They have the capacity building. They have the social inputs and the lending methodologies all under one umbrella, and it's a really amazing model for that, that reaches a lot of people, and it's a very comprehensive, intense program that's very successful in Bangladesh, and it's very – has the benefit of large capitalization, which allows it to continually reach further and further into the rural areas and create energy lending products for their customers. That's different than, say, the two handed model where you have an energy company like, for instance, SELCO, that Harish is in charge of, and the microfinance institution, in this case, the Self Employed Women's Association, where each have their respective businesses that are separate but linked through an energy lending portfolio.

So SELCO's responsibility is around the energy enterprise operation, the access to product, the design of product, the service of energy products, and the microfinance institution does what it does, which is basically make loans to its customers and assure them that the loans that they're making will allow them to access very high quality and high service through SELCO. So that's a two-handed model where the two organizations existed before the energy-lending portfolio, and will exist after the energy-lending portfolio. But they're linked through their common mission of creating energy and finance together, versus Grameen Shakti, where the energy and finance are all under one organizational umbrella. Harish, did you want to add something?

Harish Hande: Yeah, I mean it's a different – I mean the model that we think – Also, Grameen Shakti piggybacked on the subsidization of the channels that was created by the Grameen Bank, which many of the entrepreneurs around the world might not have access to. And I think this is where the hidden subsidies is what we also need to take into consideration, Ellen. The ecosystem that Grameen Bank had created. So I think that's why I go back to what Phil was kind of hinting to, the kinds of money that – especially when going into a new country, the ecosystem of building – whether it's a financial ecosystem that one needs to piggyback – also needs to be mature enough one way or the other, and that requires lots of soft money to be built.

Michael Mendelsohn: Great, thanks. I'll try to pick just a couple more questions and maybe we'll stop at the hour. I appreciate everybody's extra time. What has SELCO's experience been with delinquency? What have you found to be the primary cause?

Harish Hande: Yeah, see, we have, depending on the area, we've – See, the thing is our non-performing assets are around 8 to 11 percent depending on the area, and when we analyze that, that actually breaks down into three parts – 2 to 3 percent of people are crooks who don't want to pay, and the rest is actually divided between health issues in the family for which people would have to spend their money on, and the failures of the agriculture crops. And that is why people who are not in this – In the latter two cases, if things come to light more quickly onto the table of the bank, there are 70 to 80 percent time the bank does have the ability to restructure the loan. But we also have a back-to-back agreement with the bank that if the bank takes the system, we do buy a credit *[inaudible]* rate, predefined when the financing is.

But I also like to make it clear again is that in this case, 90 percent of our clients are financed by these banks, the credit risk as well as the collection mechanism is the responsibility of the financial institution. It's classically like any other business. You think about car financing in the US where one company sells and the other finances. The credit risk is on the bank, so it's an agreement that we have with the bank for a minimum of five years, but it varies. The financing is not on our balance sheet.

Michael Mendelsohn: Right, but just as far as your experience with delinquency, could you give a range for the small projects that you are working with?

Harish Hande: That's what I said. It's between 8 to 10 percent is what – people who don't pay. And of that, 2 percent are crooks, and the rest is between crop failure and health sickness at home.

Michael Mendelsohn: Right.

Philip LaRocco: There's a—

Michael Mendelsohn: Does it help to restructure?

Harish Hande: What did you just say?

Michael Mendelsohn: I was asking if it helps to restructure with the non-crooks.

Harish Hande: Yes. I mean it—Yes, I mean the restructure is mostly done by the banks. In terms of the saver, the restructuring is done within next to—It's between two weeks because of intense but – In the typical rural bank mechanism, it's restructured, normally takes two months.

Michael Mendelsohn: Yes. Okay. Phil, did you want to add something?

Philip LaRocco: No, that was exactly the point. Restructuring has to be built into the dynamic, and very often, when people look at things such as 30-day, 60-day, 90-day non-performing assets, they are really overestimating the potential damage to the core business, because restructuring can solve a lot of those problems.

Michael Mendelsohn: Right, exactly.

Ellen Morris: I think Harish though, you should come back to the point, which was that you guarantee these loans for the bank to give them an extra cushion of –

Harish Hande: No we don't – Yeah, we guarantee – We don't guarantee the whole, but it depends on the client base. The maximum guarantee we do is 10 to 15 percent equal in to the down payment. For extremely poor clients, where the bank is not willing to take the risk, we would guarantee, yes, 100 percent, but on a five-year basis we actually go back to the bank and say six months down the line when people have paid – if you had this information six months ago, what would you have taken the guarantee from us? They would say 20 percent. Immediately, we would remove 80 percent of the money. And so the question is, we play around with that, making – See, there are two things. One is not only are you *[inaudible]*, it helps people get light, more importantly, you actually make the people bankable. So those are experiments, yes, needs to be done, exactly.

Philip LaRocco: Part of the paradigm that Harish referred to earlier, I referred to a little more obliquely, which is that one of the ways to deal with risk is to take the risk.

Harish Hande: Yes, exactly.

Philip LaRocco: We've really lost that in Western banking and project finance. We think risk is always something we dump on someone else.

Ellen Morris: Exactly.

Michael Mendelsohn: Okay, this has been really, really great. Maybe we'll take one last question. Someone offers – Sorry, I'm just going through and finding the right one here. I want to see the presentations. It's one question for Harish. What happens when the grid comes to SELCO electrified villages? What's the experience been?

Harish Hande: Yeah, see, it's an interesting—I was asked the same question in '94 *[laughter]*. And secondly, 40 percent of our clients already have the grid. And the question is, and as a woman once said, I would rather be in this area when I have solar, because wherever people have – my daughter has the grid, and the reliability is so bad that I would rather have reliable solar which works for 4 to 6 hours rather than have an unreliable grid. But the question is, yes, 40 percent of our clients already have the grid. It's a question of unreliability. So the 40 percent of – this proved further that sustainability is not for the poor. So the question of – I go back to many of the young entrepreneurs who are developing is that.

If you are able to get away from the concept of selling products, but selling services and providing value to the people by making people as part of your organization thinking process, you in fact – you destroy the whole concept of consumerism, and that's when you don't look at comparison whether the grid has come or not, but if you are providing good value, and depending on what the people's problems are -- unreliability – I think that's one. So for people – So out of the 150,000 households, 40 to 45 percent of the households have the grid, but because of unreliability, are going for solar.

Ellen Morris: But also, to add, Harish, in Africa, what we see – and I don't know what the connection fee is for the grid, but the connection fee in some areas of Ghana are on the order of $350.00 to $400.00 per connection. So just to get into the grid costs that much. So if you're thinking of a solar home system which costs $400.00 to $500.00 or $600.00, you can easily see that that might be a choice you make versus thinking about the unreliability of the grid but also the connection fee of the grid.

Philip LaRocco: In –

Harish Hande: But Ellen, I also – Sorry. I just want to bring in a more important point here, Ellen, of decentralized energy, is that if you look at decentralized energy, many of the policy makers would listen to decentralized energy subsidizers that hold financial inclusivity, that people have taken a bank loan because of decentralized energy, now because when you are thinking of decentralized energy you automatically think of efficiency, energy efficiency, so again you don't need to cross subsidize energy efficiency. Just like a typical example, when somebody came and said, "I want ten computers." The first question we ask is, "Do you want ten computers or ten terminals?" Like one computer is enough to run ten terminals. Why do you have to buy ten computers? Had they had the grid, they would have bought ten computers. So decentralized energy automatically forces the thinking of energy efficiency in multiple ways. Makes so much a value for a country or a society much on many different ways.

Ellen Morris: Mm-hmm. Think it gets to asking the right questions.

Harish Hande: Exactly right.

Michael Mendelsohn: Great. Thanks so much. I actually – One last question that I thought is quite valuable. What does it take to scale up the energy entrepreneur framework? So I think that's a great question. How do we get more entrepreneurs and get the financing to them?

Philip LaRocco: Well, I think our experience for now 20 years is that it's lumpy. What we've been doing, and I think my colleagues and I have been as involved as anybody, is we've been doing a lot of one on one interaction. And the reason for that is quite simple, because the experience base was very small. We're going back to a period where Harish had 5,000 customers, or Richard Hanson had 6,000 customers, and it wasn't a large base to draw upon, an experience base. That's no longer the case. Not only do we have a substantial experience base, we also have now improved technologies – and I'm not referring to lower cost solar, I'm referring to the pay as you go technologies that Ellen mentioned.

So what we now have is the capacity to distill not all of the scaling up requirements, but a substantial portion of it. These are my numbers, although Harish I think has a similar concept with different numbers, which is 50 percent of what a new entrepreneur needs can be copied, and 20 percent of what a new entrepreneur needs can be adapted, and 25 percent of it – and the numbers are arbitrary obviously – is local and requires that localization. You can build systems and capacity building and access to capital and access to products and access to means of financing around that

basic paradigm. And Ellen referred to Embark, which is what we're working on, which is a learning platform that could have connectivity to providers of finance and providers of product.

And Harish similarly is working on an innovation center which is trying to distill these experiences so that it can be moved out. Just to comment on scalability and scale in general – People tend to present scale with one of those hockey stick curves. That's not what scale really means in this space. What scale will occur – scaling will occur in this space – is when we have sizable, understandable blocks – 100,000, 50,000, 25,000 – of different business models that work together for different client bases. Not one business model that explodes in hockey stick fashion.

The history of energy – any energy system, not just clean energy, all energy systems – is that it consists of numerous parts moving forward. It is not all like the mobile phone replacing the landline phone. And the reason is the different choices, the different needs that people have. So I think we have the potential to do distance learning, distance mentoring, face to face mentoring, workshops, and experience sharing, and connect that to products and connect that to finance, and that's where a scale or increase in the number of enterprises will come from.

Michael Mendelsohn: Thanks, Phil. Ellen, Harish, do you have any last words?

Harish Hande: I think, yes, I would add to what Phil said, would be also the business models are very specific, that there are processes that can actually be scaled up other than just business models. For example, if there is a financing process that is successful in one part of India, so there is a policy that makes it make sure that, okay, private sector lending that solar can be financed, or something that would be 12 to 13 percent greater interest that paddy farmers get are able to get financing, that will up the market, yes. That ups the scale across the country. So we need to differentiate between process and models and so that rather than – And the Wal-Mart model will not work.

Ellen Morris: And I think what Phil is saying is the two people – I mean Phil building E+CO and Harish building SELCO offer such rich lessons in learning that so many entrepreneurs in the world don't have the benefit of knowing about. So only now, as sort of the IT infrastructure and web based platforms start to emerge as being available to a wider audience, now those will start to be able to be used and, as Harish said, sort of taking pieces of one thing that works in India and moving it to Tanzania is now possible. And so I think that's the exciting part that we're starting to see, and now

why we can move to greater scale and more numbers of these entrepreneurs by just virtue of the fact of how the world has changed in the last 20 years since Phil started his really groundbreaking work with E+CO.

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Michael Mendelsohn: Great. Okay, thanks, everyone. And we hope that the Clean Energy Solutions Center can help be part of that by sharing sort of best practices and successful case studies. So we hope that's helpful to the audience. And we will also send out some of the links that were described here by the panelists, and we look forward to continuing a dialogue offline. So with that, thanks very much. Vickie, did you have any last words?

Male: Hi, this is Scott Gossett for the Solutions Center team. I just wanted to quickly say thanks to Mike and Ellen, Philip and Harish for this great discussion. There will be copies of the slides and recording of this presentation available on the Solutions Center at http://cleanenergysolutions.org/training. And with that, I will say I hope everyone has a great rest of your day.

Ellen Morris: Thank you for organizing it.

Harish Hande: Thanks.

Philip LaRocco: Thank you.

Michael Mendelsohn: Take care.

[End of Audio]