Molly Lunn: Hello, and welcome to today's webinar from the State and Local Technical Assistance Program. We're focusing today on using cluster roadmapping to determine your strategic clean energy direction. Thank you all for joining us, and a big thank you to NorTech for being our featured speaker today.

Before we dive in, I do want to give just a brief introduction to the Technical Assistance Program and what we do here at DOE. As shown on this graphic, the Technical Assistance provides resources to state, local, and tribal officials to advance successful, high impact, and long lasting clean energy policies, programs, and projects. In doing that, we think of ourselves as supporting one of the department's key missions, which is taking clean energy to scale through high impact efforts.

TAP has been around for about a decade. We've worked with many state and local governments and tribes as well. We've sort of evolved over time, and so this graphic here lays out the framework that we are currently focused on. We have five priority areas that we provide our assistance and resources in, which includes strategic energy planning, program and policy design and implementation, financing strategies, data management, and EM&V, and energy efficiency and renewable energy technologies. These are areas that we consistently hear from state and local officials are of most importance to them as they are looking to take the energy discount in their jurisdiction. Obviously, today's session is really focused on that strategic energy planning area, and sort of processes you can use to inform your strategic energy planning.

For each of these areas, we developed resources and identified resources that we think will be of use to a broad audience, so this includes general education materials, case studies, tools for decision making as well as protocols. In the strategic energy planning areas, we have a number of protocols that I'll mention in a moment, and NorTech's model as well is one that you state and local communities can take advantage of.

A next layer down are our peer exchange and training opportunities, so webinars like today are a way that we provide online training as well as in person trainings and conferences. I'll touch on that in a moment as well. Then our Better Building Project Teams, which are an opportunity for longer term engagement and peer exchange with fellow state and local governments, because we really believe that peer exchange is

one of the best ways for you all to learn about and improve your clean energy programs.

Finally, we do provide one on one direct assistance. The level of effort will vary and we tend to focus on high impact efforts and opportunities for replicability for other state and local communities, and I'll talk a little bit more about that in a moment as well.

On the next slide, just a slightly deeper focus on that priority area, strategic energy planning, first I want to highlight a couple of other peer exchange and training opportunities. In addition to today's webinar, we've been hosting a series over the last few months that are focused on strategic energy planning. Those are all live on the Solution Center now. The Solution Center is our online web portal, and we'll provide the links for these in just a moment, but the Solution Center has a portal focused specifically on strategic energy planning, and you can get to webinars there that include community focused planning as well as state focused.

We also encourage you to join the Better Buildings Alliance and participate in our project team, which is kicking off this month. The project team, as I mentioned before, is an opportunity for longer term peer exchange, and we have one focused specifically on Community Energy Strategic Planning. This is an opportunity for communities who are looking to develop a strategy to engage with their peers who are doing the same, and over a period of several months, we'll sort of walk through those steps as a group and learn from one another.

Finally, we're very excited about an upcoming summit for state and local communities at the end of this month. It's here in Washington, D.C., and there is a track within that focused on strategic energy planning as well. Again, I encourage you to join us for that and the link on the next page will help you find out more.

In terms of our resources, this year we have released a guide for Community Energy Strategic Planning, which sort of paints the big picture of the process of how to develop a strategic energy plan. That's live on our Solution Center as well. One of our partners, the National Association of State Energy Officials, has developed a state level energy plan database, which is available now on their website and we'll be publishing later this year an analysis of state level energy plans as well as, sort of a complement to our community level guide, a state level guide to

energy planning. Again, I hope that you'll check those out in addition to the webinar today.

Finally, we do accept applications for the one on one assistance I mentioned earlier as well as peer matching. On the next slide, you'll see the link to where you can submit an application for that assistance. You also see here the link to our Solution Center, which I've mentioned, and then finally, we encourage you to sign up for our Technical Assistance Program alerts. This is our mailing list and the way to stay up to date on our latest and greatest—future webinars we'll be hosting, events, other events, the new resources when they're available so that those resources from NASEO that will be coming later this year will be announced through those. Please e-mail us and let us know you'd like to be a part of that list; we'll get you added.

Before I hand things off, again, I just want to thank you all for joining us on this really important issue. Linking the clean energy work to economic development, I think, is a place where a lot of state and local communities see as both the biggest opportunities as well as sometimes the most challenging. I think it's great to have NorTech here today to talk a little bit about their methodology for that. Just a few housekeeping notes—if you have any questions, we're gonna hold questions to the end, but if you do have questions as you're going along, on the right side of your screen, you'll see a questions box, so feel free to type in those questions as we're going along here and let us know and we'll get to those at the end.

Without further ado, I'll pass things onto my colleague, David Posner. He's also here with us at DOE. Thanks again for joining us.

David, I think—are you maybe on mute?

David Posner: Can you hear me now?

Molly Lunn: Yeah, we can hear you now.

David Posner: Okay, great. I'm really happy that we have representatives from NorTech here to talk about their cluster roadmapping experience. We've had a few discussions with NorTech over the last couple of months, and their work dovetails nicely with efforts that are now underway at DOE to promote manufacturing as it connects with clean energy. In this regard, I'd like to highlight that the department launched the Clean Energy Manufacturing

Initiative—the acronym for that is CEMI, pronounced "simi." The Clean Energy Manufacturing Initiative is supposed to integrate activities and funding opportunities across the Office of Energy Efficiency and Renewable Energy and had two main objects to increase U.S. competitiveness in the production of clean energy products by strategically investing in certain technologies and secondly, to increase U.S. manufacturing competitiveness across the board by increasing energy productivity through EE measures or the use of combined heat and power or by taking advantage of low cost domestic energy sources.

NorTech and its partners in northeast Ohio have been employing a cluster roadmapping methodology to chart a path for sustainable economic growth in their region and they've been leveraging manufacturing assets to advantage of clean tech opportunities that I think we all have reasonably—will deliver good jobs and prosperity in the future.

I don't want to take away from their time, so I'd like to introduce quickly Dr. Byron C. Clayton. Dr. Clayton is the Vice President of Cluster Acceleration at NorTech, and he leads NorTech's focus on accelerating commercial activity and job creation in three emerging industry clusters in northeast Ohio. The first is advanced energy, the second is flexible electronics, and the third is water technologies.

Dr. Clayton has over 30 years of experience developing and commercializing manufacturing systems and software for a number of industries, including the automotive industry, aerospace, defense, nuclear, space, and windows. For 15 years, he's served as the Senior Executive Manager specializing in strategic management, product commercialization, and business development. He's facilitated the market entry of over 40 high tech products and systems, and he's published in academic and trade journals, and he also holds patents for manufacturing optimization software that's used across North America.

With that, I'll introduce Dr. Clayton who's going to introduce his colleagues from NorTech. Thank you.

Dr. Byron C. Clayton: Thank you, David, and I appreciate that introduction. Thank you all for joining us today. The other speakers on today's webinar include Bill Hagstrand and Nick Bush. A little bit about Bill— Bill is NorTech's Director of Cluster Acceleration. He drives NorTech's engagement with cluster organizations and advanced

energy. In his role, Bill engages value chain members and assists them in identifying and collaborating with potential partners, capturing funding, creating prototypes, and also attracting regional talent.

Nick Bush is the Founder and Principal of Bush Consulting Group. The group is a management consulting firm based here in northeast Ohio. The firm principally services executives who lead product manufacturing and technology businesses, helping them to identify and target areas of growth, address competitiveness and scale business investment. What we have with Bush Consulting is a licensing agreement where the group markets and implements NorTech's InSeven roadmap methodology to other regions and, of course, that's what we're here to talk about today.

In our discussion today, we're going to introduce you to InSeven by NorTech, which is our unique cluster roadmapping approach. We're also going to talk about the situations where the roadmapping methodology is best suited. We will discuss the benefits of this approach and also provide examples using our energy efficiency roadmap, and of course, we'll answer questions that you may have about the roadmapping process. Next slide, please.

A little bit about NorTech—we are a technology based economic development organization based here in northeast Ohio. We focus on 21 counties here, so it's quite a broad region, and our primary focus is to revitalize the region by accelerating the growth of emerging industries. David mentioned the three industries that we focus on; that would be advanced energy, flexible electronics, and water technologies. Next slide, please.

In a nutshell, specifically what we do is, we accelerate the commercialization projects in those three emerging industry clusters. What we do is, we really work with organizations in the region, so we engage with universities and small companies, medium sized companies and even large companies in collaborating together to get their products to market faster. What that involves is not only building strong project teams, but also engaging anchor customers in the region and outside the region, and also helping these firms find project and growth funding. By doing these kinds of services and projects, what we do in the region is create jobs and attract capital, which drives long term economic positive growth, here.

We also position northeast Ohio as a hub of innovation to attract resources and we scan for opportunities in other emerging industries as well. Next slide.

You heard us talk a little bit about clusters, so I'm gonna back up just a second to explain what we mean by an industry cluster. The Brookings Institute has defined clusters as geographic concentrations of interconnected businesses, et cetera, as you can see on this slide, in a particular sector. What that basically means is that, if you look at any type of supply chain or value chain and put it on steroids, that's pretty much what you're talking about with a cluster.

There are multiple levels of deep collaboration within a cluster going anywhere from large companies, small companies, universities—you know, different types of service providers. What results in that is a, you end up really strengthening the industry to a point that you begin to attract other companies within that sector, talent in that sector, and of course, capital. The Holy Grail of clusters, we always point to silicon graphics as the Holy Grail of clusters, but there are many other clusters around the country and around the world. Again, we have the three emerging clusters here that we focus on. Next slide, please.

Just a note on our partner, Bush Consulting Group, we—when we originally went out and decided to do these roadmaps and we were funded to do the roadmaps, we went out and looked at a number of different firms to see who we wanted to work with. We chose Bush because of their unique perspectives on strategy development. What I mean by that is that the firm's roots lie in traditional business and competitive strategy consulting, especially around technology commercialization services for companies. This brings just a little bit of a different approach than most nonprofits may take, and we thought that was really advantageous to what we were trying to accomplish, so Bush has a no nonsense approach to economic development strategy.

They get into the details when necessary, they bring credibility to help foster business community buy in as well. These factors are extremely valuable when it comes to roadmapping work, and they've been a real asset to our process.

With that, I'm gonna hand it over to Bill Hagstrand. Bill?

Bill Hagstrand: Great. Thanks, Byron. As Byron mentioned early on, we're gonna try to do two things today. The primary focus will be to

explain our InSeven roadmapping process, but as we do that, we're going to integrate pieces of our energy efficiency roadmap to show how the process actually works. The majority will be focused on the process.

Again, as Byron mentioned, the InSeven process by NorTech, it's really a consensus driven methodology. It's designed for regional economic development practitioners to position a region to capture significant economic growth within seven years. The InSeven roadmaps attempt to articulate a shared strategic vision for the region. We attempt to prioritize opportunities and guide resource allocations. We try to focus on leveraging existing high value assets within the region.

The important thing to keep in mind is, this is a very repeatable, seven step process. We're gonna be walking through the individual steps here in just a moment. We chose the name InSeven because the outlook is a seven year outlook. It's close enough to be tangible results, but it's not too far out that we can't achieve those results in a reasonable time. It's also a period that lets us factor out any political changes or issues over the short term, but provides a specific opportunity for investment in these technologies and opportunities going forward. Next slide, please.

Because we're all aware of the challenges of driving economic growth, we've tailored our roadmapping approach to meet the particular needs of regions and to learn from the shortcomings of other processes that we've seen. It's crafted around the needs of technology based manufacturing industries. It works well for regions that have already done some thinking about particular areas of focus at the industry level. If not, some additional prework may be necessary to make the process truly beneficial.

There's three keys to the approach in the process. First of all, it achieves an appropriately narrow focus at the industry level, which allows them to develop specific actions. This specifically drives engagement and buy in by the business community. It discerns the region's competitive advantage based on commercial scale, innovative capacity, or other resource endowments. This is really an important issue and we're gonna talk a little bit more about this in a moment, but this regional competitive advantage is certainly a key. Next slide, please.

A very critical component and unique to the process is the formation of a working group. The working group is really tasked with developing the roadmap and, more importantly,

vetting the data that's collected during the process and vetting the conclusions or the actions that are drawn from the data sets. The working group is made up largely of industry players, but it also involves representatives from universities, R&D, other economic development influencers and, very importantly, involvement from government representatives as well. The working group is, as I mentioned, a very unique and key feature of the process, because it brings together these different but interested parties in the same particular area. The uniqueness of the working group provides a great deal of interaction as the process goes forward.

The next portion of the presentation, we're going to show a video clip prepared by Dave Mayewski. Dave is from Rockwell Automation. If you're familiar with Rockwell, this is a multibillion dollar organization. Dave participated in more than one of our roadmaps in the past and will provide some comments about his participation. You can start the video, please.

Dave Mayewski: - creating that atmosphere where you can have a little bit of area to explore some innovative thoughts, but also bring it down to earth and connect the business sides of the discussion and what the market opportunities are. It really creates kind of a balance where there was room to brainstorm, room to discuss some technical and commercial points, but also to bring it down to where the real business opportunities were that had financial gain.

Any time you can get some folks from different companies and businesses together and have them participate in discussions that offer a broad range of experiences really lends itself to a climate of business development and a place where you can gain a lot of insight to look for areas that either your organization or the other organizations might even partner or focus on a specific development.

Bill Hagstrand: Very good. Can we have the next slide, please? As I mentioned, just to wrap up Dave's comments, Dave was a participant in several of our roadmaps, and I think if you were able to question him further, he would confirm the value of the overall process as it relates to companies like his and to other participants in the region.

This next slide gives you a view of exactly how the process moves forward and what the working group is really asked to do during the process. The first step is to take a look at the current state of the region in terms of existing assets, market share and

potential, and regional competitiveness. The regional focus differentiates the InSeven process from other business planning processes which generally have a more product specific focus.

Next, we identify a regional vision, and this vision looks at jobs and gross regional product growth. It's based on capturing a large share of the market by leveraging regional competitive strategies. To get to the vision, we craft very specific regional action plans. We try to develop clear goals with ownership, a specific time frame, and measurable targets. The actions utilize regional economic development tools and the participation by industry, research, and government.

I'd like to turn the rest of the presentation over to Nick Bush, from Bush Consulting, who will provide some more detail.

Nick Bush: Super. Thank you, Bill. I believe I'll take us through some of the more detailed pieces of process and findings specific to our energy efficiency work. Let me just lead off by saying how pleased I am to talk about this particular roadmap, the energy efficiency roadmapping work that we did to facilitate on behalf of NorTech.

The first point I want to make with this page is that we began this effort with energy efficiency called out as a sector in which we wanted to focus, and as you can imagine, that's a pretty broadly defined concept. Really, it's pretty unworkable if you think about it. I mean, what do you do with the idea of developing an energy efficiency strategy? From that, we really relied on the roadmap process to help us provide some boundaries and some definition to it.

First, we determined, with the help of the working group, that energy efficiency is really about the facility, what takes place inside, so again, as part of our work, we started with the meter and we looked inward at the facility. We also decided that power generation was really not the scope or the effort, either.

With that, our first major activity was to define or redefine, in some cases, the actual industries that comprise the sector. We do that by developing what we call, as defined on this page or shown on this page, the technology and service hierarchy. We need to do this so that we have a handle on what's actually part of the product and service mix and the supply chain within energy efficiency. There's not really any mix or industrial classification that's in place to help us do this, so as we do in all

of our roadmaps, we essentially need to start this process from scratch and build our own.

As you can imagine, you might imagine defining these technologies and services for energy efficiency was particularly challenging. In this case, we ended up with 48 distinct technology systems. These are essentially industries that cover three broad categories of building efficiency on the far left hand side of the page, major appliance categories on the far right, and then industrial process efficiency, which is pretty much in the center of this page. We also quantified and identified a series of services, namely those that enable the specification of technologies, services such as building our process optimization that would be provided by architecture and engineering firms or energy services companies and so on.

To our knowledge, energy efficiency as a sector has really not been defined in this way elsewhere, but it was absolutely necessary to support or process of an industry focused growth and development strategy. If you would, please turn to the next page.

As we mentioned, energy efficiency is a pretty big universe. Next, you really have to identify pockets of concentration, or areas where we think we have what we call a critical mass of activity from which to build. Once we define those industries within energy efficiency, we conducted some specialized research, essentially to inventory the region's assets across the value chain, across the commercialization horizon that would incorporate both research and development organizations and activities, all the way through companies and products that were relatively mature.

We focused on those assets that we determined to be core, meaning they lack higher value, they were exportable, and they were assets from which we would expect to identify some sort of regional competitive advantage.

When we talk about these assets, what we're really talking about are the companies, the research organizations that are either private or government or academic in nature, as well as in government and economic development organizations with operations that specifically reside within northeast Ohio. Then we quantify and roll up the employment and revenues associated with these organizations. As you can see, in northeast Ohio, we were able to find 224 unique organizations that represent 4000 or

so employees and nearly $1.1 billion in revenue, that's in 2012—
which, by comparison to the rest of the state, was roughly half of
the entire state's activity. We knew we had a pretty good starting
point from which to begin.

The charts here showed the initial assessment of concentration of
activity in the region. Our initial assessment of critical mass, if
you'll advance the slide to animate the boxes, pointed out, really
lead by our working group, that there are a couple of areas of
focus that were deemed as relevant and attractive for further
evaluation. These include polymer based foam insulation, solid
state lighting, and building optimization services, which really
includes A&E firms and comprehensive energy service company
activities. If you think about it, we started up with a listing of 48
distinct industries, eight or nine different service areas, and we're
able to as a group of regional representatives, narrow that focus
really to four distinct industries, against which we thought we
had an opportunity to competitive. Advance the slide, please.

I'll just take a moment to point out what I think is a particularly
insightful aspect of the work, and it really focuses on
understanding the value added structure within each of the
particular industries that we think we have some critical mass.
We do this to offer a more detailed dynamic of the opportunity
overall. It's really done so that we can identify where value is
created within specific industries, where the assets exist in the
region that contribute to that value, and to help more accurately
calculate what the effect of that value is on head count,
essentially getting a more granular level of FTE understanding,
okay?

This helps us determine where the job revenue growth could
really occur, not just at the system integrator level, but pulling
component suppliers and across the value chain in its entirety. If
we look at the insulation example, not only do we have
companies in the region that make and market the finished foam
product, we also have major players producing specific types of
insulating material, companies making structural components
and so on. That helped to guide some of our strategy thinking.
In general, it allows for a much clearer understanding of the
impact on the region's economy as a whole. If you can advance
to the next page.

As part of the work, we also evaluate the global market, as well
as competing regions for the specific industries of focus. What is
pictured here is a snapshot of the leading competing regions that

the team identified as being players in this insulation space, okay, staying with the insulation example. Again, looking at these competitive regions helps us to stay sober, okay? It forces us to think very hard about the nature and source of any competitive advantage that the region may have, how that advantage may contribute growth and ultimately what can be expected from a strategy development effort of this type.

The three regions of interest that emerged when considering competitiveness in, again, insulation for this example, were Midland, Michigan—this is a directly competitive region that is really focused on polymer based foam development with both R&D and production operations centered around Dow Chemical up there; Philadelphia, we identify as a major market player with IP leadership focused on largely fiberglass insulation products due to the certainty, presence, as well as an insulation technology center there and in addition to that, we recognized that Philadelphia had the presence of a federally funded energy efficient building sub with an emphasis on building envelope technologies as well, which made it an important region to watch; and finally, Columbus, Ohio is also an insulation technology leader, due to the presence of Owens Corning Research and Development operations, as well as a number of other, smaller players. Owens Corning focuses on fiberglass insulation as well. Still, it's an important region to consider, especially given the potential in Ohio for statewide collaboration. It's important to keep it on our radar.

From this analysis, the working group established northeast Ohio as having a distinctive competitive advantage in this foam insulation product, largely based on the production assets in the region and the presence of the market leader and manufacturing assets across the entire supply chain, including service enablers in the installers as well as innovative, bio-based polymer companies as well. Please move to the next page.

These individual pieces of analysis that we just shared come together to inform a vision as it's articulated by our working group. It highlights the areas of emphasis around which the region will invest to grow over seven years, okay? In the case of energy efficiency, you can see the articulated statement that calls out each individual industry focus area—solid state lighting, polymer based foam insulation deployment, and building efficiency services. If you'll animate the page, that vision really was a culmination of the working group's strategy development efforts as informed by the strategic insights we discussed

previously, and in this example, you can see regional strengths and critical barriers coming together to inform and articulate high priority regional goals—four, in the case of energy efficiency, okay?

Goal number two pertains to our foam insulation example, which we'll carry through, and it articulates the desire to take several actions to implement a regional collaboration in deep building retrofits, including development of a clear financing model that will increase the region's deep retrofit rate tenfold by 2018, okay? These deep building retrofits, which simultaneously upgrade multiple aspects of an existing building can leverage not only the region's insulation assets, but its energy efficient window manufacturers, building services providers, and siding manufacturers as well. That was a particularly high leverage action that was called out by the working group. Implementing the collaboration will involve establishing a working consortium as well, beginning with players already identified by the Energy Efficiency Asset Inventory, followed by an assessment of markets, developing an appropriate financing model that would involve private government channels and so on.

One key action item brought up in conjunction with goal number two is also to organize cluster members to support relevant federal state policy objectives for renewal or enactment, such as the Energy Policy Act of 2005 by extending it, the PACE program, on-bill financing, and so on. I just wanted to point out that, given the predominance of building efficiency technologies and services in the region, then the reality that such markets are driven largely by policy, such support would help most of the region's energy efficiency technology and service providers, and it was a major emphasis of the working group in the development of the strategy.

If you'll animate the slide one more time, finally, I'll just make the point that the process enabled robust goal establishment, agreed to by the entire working group vetted throughout the region that allows for pretty robust tracking in terms of growth and market share, employment, and capital attraction. These measures are actually being tracked annually to determine the effectiveness of the regional interventions that were recommended, as well as to enable the region to adjust its course accordingly while moving those goals in 2020. If you'll move to the next slide, please.

I'll just wrap up my portion of the presentation by pointing out Ajay Mahajan. He's the Associate Dean at the University of Akron. He's also been involved in several roadmapping efforts in northeast Ohio, and I think his words sum up the value, at least that he has observed, from this process overall. If you'll please play the video clip.

Dr. Ajay Mahajan: I think the most interesting fact is that it's certainly more than anecdotal, so in some areas where I thought we had lots of expertise in the region, it turned out not to be true, and those areas where I thought there was very little expertise, it turned out that we had a lot of expertise. I think because these are data driven, I would trust these roadmaps much more.

Bill Hagstrand: Good. May we have the next slide, please? Thanks, Nick, for the information, the data you provided. A couple of things that we'd like to provide in summary—first of all, the roadmap document is not a document that is left on the shelf. I can tell you that we refer to the document on a regular basis. Here at NorTech, we're continually revisiting the actions, determining if we are on pace for those actions, determining, in some cases, new actions that come out of those that were established during the roadmap. The important item to leave you with is, we have found this to truly be a working document and truly to be a roadmap as the opportunities move forward for northeast Ohio.

A couple of other items that we hope you took away from the presentation that make it unique: First of all, this is truly an asset based effort. We make a sincere effort to try to find what exists within northeast Ohio and how we can best utilize and grow that asset. We also utilize the working group. I can tell you, having been involved in several roadmaps now—we've done five over the last few years—the commitment from the working group is significant. Over about a four and a half to five month period, the members of the working group put in about 35 hours of their time in meetings and in review of the data to make sure we have vetted things properly and that we are developing a very workable vision.

Finally, the thing that we like to leave you with is, this is a regional competitiveness program, different from a lot of business plans or roadmaps as I mentioned earlier that are very product specific and product strategy driven. This is really regionally driven and regional strategy for the development of job growth, revenue growth, capital investment in the region. Overall, the process has been recognized by a variety of outside

sources, particularly, the Brookings Institute has recognized this as really a best in class effort. Certainly, for NorTech, this effort has helped us to be recognized as certainly a leader in the advanced energy area and the development of advanced energy in the area and against other regions of the country. We're pretty proud of the effort.

As I mentioned, we have done six roadmaps in total, six including energy efficiency, which we referenced here. The other roadmaps include fuel cells, biomass and waste-to-energy, energy storage, smart grid, and transportation electrification. Again, all of those were based on assets that we felt existed here in northeast Ohio. May we have the next slide, please?

Well, I guess at this point—there we are, there's the slide—we'd certainly like to entertain any questions if there are particular details about the roadmap or the roadmap process, we have documents that certainly, we could arrange to get to all of those participating in the webinar today. We went through this in a relatively short period of time. As I mentioned, the process took several months, and all of the documents are multiple pages and there's multiple stacks of data that got us to the conclusion that we did, and we're happy to share as much as we possibly can with you if this is something that you might like to utilize in your own particular area.

With that, you've got my contact information. If there's anything that we can provide, please contact us. Otherwise, we turn it back over to David to field any questions or comments. David?

Nebiat: Thank you. This is Nebiat, I work with David. I do have a couple of questions that have come in. Anybody who has questions, keep typing them in, and we'll read them as they come in.

The question we have right now—when mapping regional company assets, energy efficiency companies, for example, how does NorTech identify what the companies actually do? For instance, the NAICS codes can tell you who's into foam manufacturing, but how do you find out what they're actually doing in their Ohio operations? Are they manufacturing, are they doing R&D, sales, et cetera?

Nick Bush: Sure. This is Nick Bush, I'll take the first stab at answering that, but I'm gonna ask Bill to chime in where necessary. I think the first thing to think about is the approach that we use. As

consultants to private manufacturing companies, we do a lot of work in the area of very specific product and very specific company research that's required in support of merge and acquisition activity or the development of competitive strategies. We have, though our years of existence, I guess, developed a lot of methodology that helps us—and data sources—that help us understand what's going on very much at the location level. It's specific databases, it's a lot of, I guess, knowledgeable searching. Ultimately, we describe it as a big, it's a picture with a central node which is our asset inventory, surrounded by many nodes of disparate pieces of input.

I guess one of those pieces or several of those pieces of input is leveraging regional and local economic development entities. We do a lot of interviewing of folks who are in local chambers of commerce that NorTech can put us in touch with. We interview folks within NorTech who visited or know of these companies fairly extensively, and then we look at thing like patent databases and manufacturing directories and Thomas Registries and so on to get at those.

I think the key is, once we've been able to identify and understand what technology, products and services make up energy efficiency, there's a much more direct line of sight to identifying those operations locally. Well, I don't know if you want me to answer—

Bill Hagstrand: Well, I would just add also that in addition to the database development and the interviewing, the process also gives us an opportunity to contract with and employee specific industry experts who can take us a little bit deeper into specific issues. Since the working group also is quite varied, it gives us an opportunity again to dig into specifics about individual companies in the area and take us beyond just a little data about their basic product and their basic revenues.

I think, in summary, the way we approach this is, we really dig pretty deep, and it's much beyond just what you might find in basic published data.

Nebiat: The next question we have is, do you use location quotients for your initial analysis?

Bill Hagstrand: We really don't use location quotients. Again, I think we have found them to be, from our perspective, biased, because it's very difficult to define an industry like energy efficiency against a

standard classification that can provide the data that we need to accurately calculate it. We pretty much avoid them.

What we do do is, we, from the bottom up, though, we can build up our own, I guess, proxy for the location quotient, which ultimately manifests itself in terms of employment share of an industry or a sector like energy efficiency as a proportion of the total regional employment. That's been a pretty useful proxy.

Nebiat: Then someone wanted to know how this effort was funded.

Bill Hagstrand: The initial funding came from a grant that we received from the Economic Development Association in Washington. There were some other funding pieces, but that was the primary piece. We got the funding based on the development of a concept that was put together utilizing Bush Consulting and utilizing NorTech's ideas of the region. It was with that concept that we went to the EDA and received the majority of the funding for this project.

The funding has since, really, I don't want to say expired, but we were able to continue on and, as I said, we've developed six roadmaps now over the last approximately two and half years, Nick?

Nick Bush: Mm-hmm, that's right, and actually, two roadmaps outside of energy.

Nebiat: We have a question here about how you were able to get the key manufacturing stakeholders to participate in meetings or interviews, since there's people that have been trying to do this and have not succeeded.

Bill Hagstrand: Well, I think that's a very good question and I think that was one of the strengths of the way we did this is because we got very much involved with the people that we wanted to participate in this roadmap. We determined who could be the most important contributors and we spent time with them. We talked to them, we explained to them what we were trying to accomplish and why we felt this was a unique opportunity for the region.

I think the consensus of the folks involved was that this was a unique opportunity and that's what, generally, their interest and their willingness to participate because we were really looking at and getting down really into the weeds with what existed right here in northeast Ohio. I think that's what attracted the industry

leaders in the area to participate because they saw the value for developing this roadmap for the area.

Nick Bush: Yeah, and if I could just add to that, I mean, I think a couple of key ideas to make sure they're clearly articulated is that this is a, it's a targeted selling effort. I mean, I think NorTech, our organization, frankly did spend a fair bit of time thinking carefully about who should be at the table, and then approaching those folks.

A couple of, I guess, tricks or tips that we would share is that we've made it very easy for them to participate. We kept our overall involvement really pretty concise. We get folks together for a couple of hours at a time. It was a very clearly articulated agenda and clearly defined outcomes, and I think they appreciated that. I think the definition of the process also certainly helped to get people interested and bought into their level of participation a well. It had been done before, and they were able to, at this point, talk to peers in the region who had gone through it and hear their endorsements.

Bill Hagstrand: The working group meetings were a very, it was an enjoyable exchange, and I think if you had an opportunity to talk to members of the working group, even those that might have been a little hesitant in being involved in the first place got a lot out of the sessions, because they really had a chance to bring their ideas or their thoughts and hear from other people in a little bit different position whether it was a government position, a nonprofit position, a university position, talk about the issues that they were seeing for this industry opportunity.

I think the results of the working group were very positive, and people truly enjoyed being part of it.

Nebiat: Then the next question we have is, how do you form and rationalize the final goals for the job or investment goals, and can you give a practical example of how and why you came up with specific numbers for this region of Ohio?

Nick Bush: Sure, so I think the actual metrics, the outcomes are really generated, they're calculations and assumptions agreed to by the working group. If I could just give one example, I think if you take a look at the impact that we talked about a minute ago, we talked about increasing the local market share from 4 percent to 6 percent of the relevant solid state lighting market. Well, that was informed by a ton of work that went into identifying and

calculating the fact that we have a 4 percent market share today. It was informed by a lot of data analysis, informed by our working group to understand what the overall market was, and then by looking at competitive regions to get a sense for what the increase in that market share could be.

Ultimately, it was a round table discussion in one of our final sessions in which folks like GE Lighting and other major players around the region, who have a major stake in this play, actually said, "You know what? I think we could improve and increase our market share from X to Y if we could accomplish the achievement of these goals." Ultimately, it was a consensus that was reached by everybody. We then took that input and ultimately calculated the number of jobs that would be reflected by that type of growth.

Bill Hagstrand: One thing that we did also that helped us in defining those particular visions of the actions, after we did it in the working group in a session, Nick and I went back on several occasions to the members of the working group individually, so if there was something that, for some reason, maybe they didn't want to say *[Laughter]* in a larger group, we gave them the opportunity to kind of vent a little bit to Nick and I directly, and we found that to be very positive because then we could take everything that we had learned and do another redraft of the vision and the actions, and we kept working through it 'til we got to this very positive consensus. We felt that everything we had was very real at the time.

It took a little extra effort, but I think the results paid off.

Nebiat: Then the next question I have is—how did you identify the 48 technology systems and the nine service categories? Did you use NAICS to identify the number of companies?

Nick Bush: If I understand the question, it was, "How did we get to sort of the technology hierarchy?" Again—okay. That was a really time consuming and difficult exercise, and yes, we always do start out with NAICS codes as a potential starting point, but usually the NAICS codes don't get nearly in depth enough to provide specificity around technology. Metals manufacturing doesn't tell us whether it's paper clips or whether it's submarine holes or what that is. We need to get a lot more detailed.

Actually, what we did, we're engineers and economists in our organization, but we're not energy efficiency specialists so, as

	Bill suggested earlier, we brought on board to our team, to support the roadmapping effort, a host of energy efficiency subject matter experts. Everybody from people who work at energy services companies to people who actually are employed in the production of certain types of technology to help us round out and flush out that understanding of what those various technologies and thus industries are.

I don't know, Bill, if you had anything to sort of add to that process? |
| *Bill Hagstrand:* | No, I think that captures it, Nick. |
| *Nebiat:* | Then there's a question here about, "Do you have any suggestions on how to carry out the strategy in a rural area?" |
| *Bill Hagstrand:* | That's an interesting question. I think the things that we did would lend themselves to a rural area as well. I think you've got—the key is getting the appropriate working group together and it may take a little more effort in a rural area, but I think I would take the same tactic, because we—again, I hate to keep repeating that point, but we can't stress enough how valuable it was having that group together and having them see the data and give their opinion.

I think it might be a little tougher if you're spread out a little bit more in a rural area, but I think that would have to be where the effort was placed in getting that group together. |
| *Nick Bush:* | I completely agree with that, Bill. I think—keep in mind, we looked at a 21 county region across the northeast Ohio landscape. Many of those counties had populations of under a couple hundred thousand people. Much of that footprint is rural, and there have been other efforts to look at largely rural industrial sectors like agriculture or agriculture bioscience. I think the effort and the challenge is to use telecom to maybe address people more up front in person to get them engaged, but I think the process itself holds pretty much true to form once those steps are taken. |
| *Bill Hagstrand:* | We did have people in the working groups who did travel a long way and what we did to accommodate that is, we tried to give some different options for when the meetings would be held. Did we want to do something later in the day to allow people to travel in the morning, was it better to put it midday or late day? We tried to gather as much consensus as we could, and we tried |

	to accommodate people who may have to travel a long way. We did have some people who traveled between three and four hours to get to the meeting.
Nick Bush:	Mm-hmm.
Nebiat:	There are two questions that are similar, sort of coming at the same thing from different angles. "Were the working group members—did they have to pay a fee to join the cluster group?" The other one was asking if you paid the working group members.
Bill Hagstrand:	No, and no. *[Laughter]* There was—that's the short answer. No, there was no compensation or fees of any type involved. I think, as Nick and I both mentioned earlier, we did spend a great deal of time in selling the concepts to the members of the working group to demonstrating to them what the outcome could be and why their participation would be valuable and appreciated by certainly the community and the state and the industry in general, but there was no charge or participation.
	Looping back a little bit to NorTech for a moment, we are a nonprofit organization. We are funded primarily by the local business community in northeast Ohio, philanthropic organizations representing the business community. We do get some funding, as we did for the roadmaps from some federal agencies, but the majority of our funding comes locally and the services and the efforts that we provide are all at no charge to the members of our cluster and the clients with whom we deal.
Nebiat:	We have a question about the policy recommendations. Can you explain how your policy recommendations played out? For instance, were—if the recommendation was to help finance lighting retrofits, how did that carry out? How was the policy in the state changed to be in alignment with the strategy?
Bill Hagstrand:	Well, a lot of this is still underway. The policy changes aren't easily *[Laughter]* accomplished. One of the things that NorTech tries to provide to our cluster members is, we make an attempt to be a voice for them in both Washington in the federal government, a voice in the state capital in Columbus, Ohio as well.
	We identified some policy issues and we meet, we do what we can to present the opportunities that these particular thoughts might deliver for the state on an overall basis or the country on

	an overall basis, but the policy issues, they take a long time. We're continually looking to make sure we are looking for things that truly we can affect a change, and that change would be valuable. Nick, is there anything you want to add to that?
Nick Bush:	No, just to point out that this is a pretty fresh outcome. I mean, this was actually wrapped up and finalized at the beginning of this year, so I do know this.
Bill Hagstrand:	Yes. A good point, Nick.
Nick Bush:	Many of these activities are still underway without a measurable outcome just yet.
Nebiat:	There's a question about if the cluster group is expanding, will it include other clusters and then how will it be sustained?
Bill Hagstrand:	If you're asking if our cluster membership is expanding—yes, it is. It has been growing regularly over the last few years. I think the roadmapping effort has really helped to grow the folks that are members of our cluster. The clusters tend to be diverse. Certainly they involve large corporations, smaller companies, mid sized, startup organizations—but the cluster activity is clearly growing, and our membership base is growing within that cluster, within all of the clusters.
Nick Bush:	Again, I think, one other aspect to it is, as part of the process, there's a formal update that happens every couple of years. I think that's one additional formal mechanism. There are several to engage and keep the cluster members actively working on recommendations that come from the roadmap, but again, this notion that the world changes every couple of years is an important idea to keep in mind. NorTech has actually undertaken the role of making sure that those roadmaps are refreshed periodically.
Bill Hagstrand:	Yes. No, that's a good addition, Nick, and we are in the process right now of revisiting the first couple roadmaps that we did to make sure our vision, our actions, the activities, the data that we collected, all is still correct and that we're moving in the right direction with that activity.
Nebiat:	The next question is asking how to do granularity analysis and use it in a roadmap.

Nick Bush: You know, I've got to be completely honest, I don't know what that is.

Nebiat: All right, well, that answers the question.

Nick Bush: Yeah, to the extent that we get down to every individual business and understand the head count at every location within a region, revenues at that location and assets associated with it, that's— I'm not sure if that's what the question's getting at or not, but that's pretty darn granular, so.

Bill Hagstrand: Yeah, yeah.

Nebiat: Well, that sums up all the questions we have so far.

Bill Hagstrand: Great. Well, we certainly appreciate the opportunity to provide this information and, as we said, if other things should develop, other questions, I'm sure that members of the audience can get in touch with you folks and you'll pass them onto us, but we're happy to do what we can to continue to answer questions and share the results as much as we can. Thank you.

Nick Bush: Thank you.

David Posner: This is David. Thank you for the great presentation and I'm glad we had so many great questions and for answering those. Nebiat, did you have any closing remarks?

Nebiat: No, I think that's it. Thank you very much for having us and thank you for all the people who called in. We appreciate your attendance and your questions, and all of the slides and everything will be on the Solution Center website probably early next week.

Bill Hagstrand: Thank you.

Nick Bush: Thank you.

Nebiat: Thank you.

[End of Audio]