

The Clean Energy Landscape- Linking Cyberspace with Real World Impact

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ABSTRACT

NREL has launched a new open platform (<http://openei.org/cee>) that will help us to understand and engage the clean energy marketplace. We have designed an open source interface called the Clean Energy Economy Gateway that solicits registration from participants in the clean energy economy. We then use that organizational information to help map activity in this growing economic infrastructure. The purpose of my presentation will be to introduce the concept of “Clean Energy Community Organizing” where clean economic stakeholders use virtual media to design and implement regional clean economic development strategies. The Gateway currently tracks activity with regards to clean energy companies, investments, public policies, networking organizations and research & development institutions. We have pre-populated seven regions of the United States that are viewed as “Clean Energy Hotspots” we have also mapped “Clean Energy Generation Facilities” across the US, representing utility scale renewable generation from across all sectors. We also are utilizing third parties to populate our database, including DSIRE for policy and incentive information and New Energy Finance for investment activity. Most exciting is the social networking overlay that we are building in conjunction with these market visualization maps. In other words, not only do participants have access to members of the Clean Energy Economy, they are also empowered to communicate directly with one another in an organized fashion to help facilitate cooperation and learning on the one hand, and to inspire healthy competition on the other. This new resource for the clean energy community may have a tangible impact on real world outcomes. For example, a campaign called IBOG (One Block Off the Grid) is a cyberspace activity where a website drives participants to find one another to aggregate the purchasing ability of solar installations. Another example is called “Project Porchlight” where an online interface engages participants to distribute CFL’s within their communities. These examples represent a grassroots approach; we are attempting to engage an “upstream” community of leaders and decision-makers in the private and public sector. This presentation will discuss what implementation strategies might look like for the 21st century, recognizing the qualities that have evolved in terms of both our citizenry and our technologies.

Keywords: renewable communities, social media, regional clean economic development

1 OPPORTUNITY FOR INNOVATION IN REGIONAL DEPLOYMENT

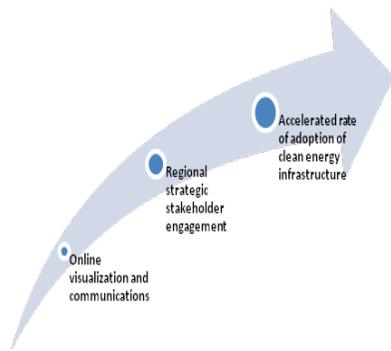
We have an opportunity to use the best of new information communications technology to accelerate the country’s transformation to a clean energy economy. “Consumers” today are online, interactive, and networked; decision-makers are also part of virtual communities and used to engaging in a much more dynamic way than those of past generations. We think of this as a pathway for using the communication tools and technologies of the 21st century such as social media, online visualization tools like GoogleEarth, open platforms, and others to accelerate the development of regional clean economies. Networks of people can learn from online networks of information and insight to aggregate the right tools/stakeholder engagements for strategic implementation of energy efficiency programs and business development, municipal level policies like Property Assessed Clean Energy (PACE) that can help accelerate the uptake of already commercially viable distributed renewable energy technologies, and other shifts in our economy towards energy security, reliability and environmental sustainability. Conversely, these same online resources can help tell the story of job creation, investments, and other econometrics in an iterative and dynamic way that could give insights in “real time” as opposed to historic data as we build a network of clean economic regions nationally.

The opportunity here is to strategically engage regional stakeholders for clean energy development, recognizing the synergy that needs to happen between technology, market & finance, and policy in order to create the right conditions for transformation. This complexity can be coordinated by leveraging cyberspace for real world implementation. NREL/DOE have created an inaugural version of an interactive web-based resource for clean energy economic development called the Clean Energy Economy Gateway, housed on the OpenEI platform (<http://openei.org/cee>). This virtual resource has been designed with the deployment of clean energy technologies and services in mind. The resource is in a very early stage of development, both in terms of its design and also in terms of awareness externally about the resource itself. Those that have been introduced to the Gateway have seen the potential of this new approach to economic development; our challenge is to partner with other public sector interests to help move both

its technical design development and public awareness of this resource forward.

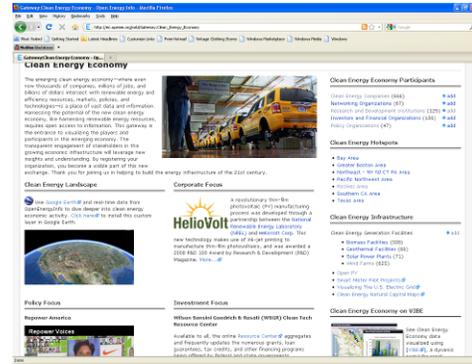
2 OBJECTIVES FOR THE CEE GATEWAY AND STAKEHOLDER ENGAGEMENT

Our objective is to successfully demonstrate the value that our approach has to accelerating economic development on a regional level for clean energy development. Through third party qualitative and quantitative research, we have currently identified seven regions of the U.S. that are experiencing more economic activity in clean energy than the rest of the country. In order to build on that base of activity, we propose that these already identified regions be prioritized for rolling out a coordinated effort to leverage this online resource for stakeholder engagements and the creation of coordinated conversations in both the virtual space (social media) and face-to-face engagements (decision-maker forums/workshops). Within this framework, regional stakeholders can build on road-mapping activities already in place or in development for economic development in the clean energy sector.

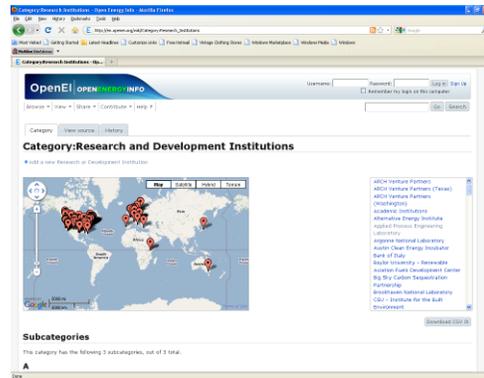


Not unlike Moore's Law and the International Semiconductor Roadmap launched in 1992, the goal is to help all of the parties work off the same sheet of music to maximize the potential for economic development in their region for clean energy infrastructure. This dovetails with conversations being driven on an international level in terms of the context of climate change, whose participants are working on establishing growth rates for clean energy technologies and services on a sector by sector basis necessary to achieve GHG savings by 2020, agreement on the top market barriers to reaching those growth rates (training, regulatory, financing, reports establishing the value of our solutions from government, etc), the top policy barriers, the top ideas for elimination of those barriers, and finally the best way to facilitate stakeholder engagements in achieving objectives. Our objective is to use the robust development of the CEE Gateway as a repository for regional clean energy economic activity as well as a jumping off place for direct stakeholder dialogues to facilitate regional growth of clean energy infrastructure.

3 INTRODUCTION TO THE CEE GATEWAY



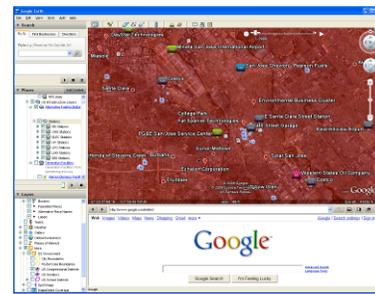
This is the gateway's homepage. Like Wikipedia, users create an account to register their organization (whereas Wikipedia is community driven content for it's own sake, this gives each organization their own wiki page to describe their operations and activities) The categories for organizations were defined by those viewed as necessary for creating "clusters" of economic growth. Go to <http://openei.org/cee>.



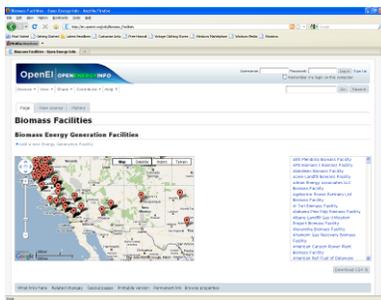
When an organization registers, our platform automatically maps their presence on a static Google map visualization tool. One can view organizations based on type, geography, sector, etc. Each click through on the right goes to that organization's page. Note the "Download as CSV": all information can be exported to Excel to aggregate as the user sees fit.



Here is an example of an organization's wiki page. Note that video, pictures, links can all be uploaded. Also note that the presence of LinkedIn is strategic; when an organization registers the platform pulls information from that social media resource to match participants virtually.



Within the Google Earth visualization tool, they have built in additional layers that a viewer can select to contextualize the organizational and facility information (in addition to other kmz files). So, these economic stories can be told within areas such as congressional districts, etc. We have begun reaching out to Google designers to build in other context like utility service areas.



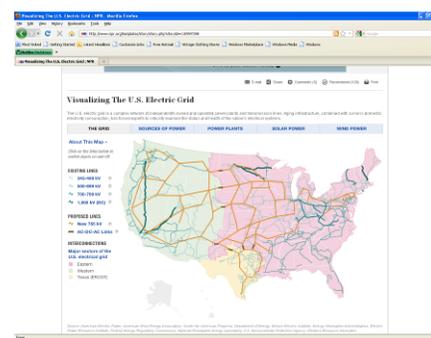
In addition to organizational information, developers can add information on utility-scale clean energy generation facilities. Again, each facility has their own page, is mapped, and able to download as a spreadsheet. For the fields that we request (MW, etc.) please visit the site.



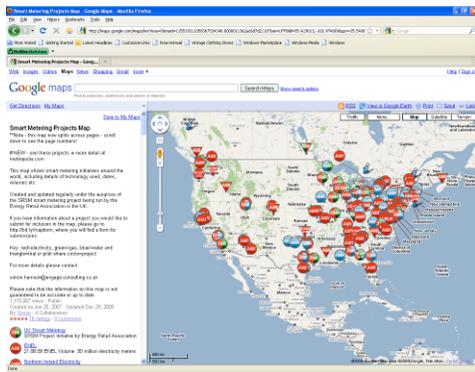
In addition to openly accessed information on the CEE gateway, we also link to other visualization resources. For example, we link to the "Natural Capital" maps pertinent to clean energy, in this case created by NREL.



Information from the CEE gateway as an open platform is migrated to the GoogleEarth platform. Known as "kmz" files, these can be visualized from multiple sources. So, CEE files can be run with other files like Google's Enhanced Geothermal System tool, the EPA's Repowering America tool, etc.



In a similar vein, we link to maps that show existing and planned transmission. This is another layer that could be developed by Google or others as a kmz file per the previous description.



The CEE Gateway links to other more robust maps/visualization tools as well such as this Smart Metering Projects map. Many experts feel that in order for distributed renewable energy to scale up significantly, our grid infrastructure needs an intelligence to be able to handle intermittent sources like wind and solar. OpenEI has a distinct smart grid gateway (the CEE gateway is one of many in development) Go to <http://openei.org> for the OpenEI home page.

In closing, there are many complexities surrounding the engagement between market development, policy frameworks, and technology maturation. The market for renewable electricity generation can be characterized broadly in terms of the tension between **working within existing utility infrastructure** which necessitates addressing agency issues in energy (as well as the need for regulatory frameworks that signal an evolution from prioritization of access to electricity to prioritization of “clean” energy sources and larger scale smart grid development) versus **working outside existing utility infrastructure** (which means focusing on market signals and regulatory frameworks that allow for greater market penetration of distributed renewables, creative energy service companies (ESCOs), and microgrid/off-the-grid strategies). Further, clean transportation solutions that mitigate GHG emissions can be seen in terms of behavioral change that rely on increased usage of public transportation solutions and smart growth planning versus technological advancements in cellulosic biofuels, advanced batteries for electric vehicles, and other technologies that do not rely as heavily on a change in consumer behavior in that these fuels and vehicles function within existing usage patterns. Financing and policy mechanisms that will enhance the market penetration of renewables may be structured in ways that respond to regional factors that take into account the tensions between myriad factors as broadly described above.

4 CONCLUSION

We have an opportunity to use the best of new information communications technology to accelerate the country’s transformation to a clean energy economy. This

kind of "thinking outside the box" has a precedent: The Tennessee Valley Authority (TVA) was envisioned not only as a provider, but also as a regional economic development agency that would use federal experts and electricity to rapidly modernize the region's economy and society. According to the community driven content of Wikipedia, "The TVA was the most revolutionary of all the New Deal programs."

21st Century Stakeholders “Consumers” today are online, interactive, and networked; decision-makers are also part of virtual communities and used to engaging in a much more dynamic way than those post-Great Depression.

21st Century Tools We think of this as a pathway for using the communication tools and technologies of the 21st century such as social media, online visualization tools like GoogleEarth, open platforms, and others to accelerate the development of regional clean economies.

21st Century Strategy Networks of people can learn from online networks of information and insight to aggregate the right tools/stakeholder engagements for strategic implementation of energy efficiency programs and business development, municipal level policies like Property Assessed Clean Energy (PACE) that can help accelerate the uptake of already commercially viable distributed renewable energy technologies, and other shifts in our economy towards energy security, reliability and environmental sustainability. Conversely, these same online resources can help tell the story of job creation, investments, and other econometrics in an iterative and dynamic way that could give insights in "real time" as opposed to historic data as we build a network of clean economic regions nationally.

21st Century Opportunity The opportunity here is to strategically engage regional stakeholders for clean energy development, recognizing the synergy that needs to happen between technology, market & finance, and policy in order to create the right conditions for transformation. This complexity can be coordinated by leveraging cyberspace for real world implementation.

REFERENCES

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- [2] For an example of a regional strategy using online mechanisms for solar development, visit IBOG (1Block Off The Grid) <http://ibog.org/> and Project Porchlight for energy efficiency strategies using cyberspace for regional impact at www.projectporchlight.com