

## Summary and Recommendations from the Staff Workshop Entitled Advanced Distributed Generation Research: Current Status and Future Recommendations

### Summary and Recommendations

On November 18, 2015, California Energy Commission staff held a workshop entitled “Advanced Distributed Generation Research: Current Status and Future Recommendations”.<sup>1</sup> The purpose of this workshop was to seek public input regarding the draft recommendations in the “Advanced Distributed Generation Research Roadmap” currently under development. Staff is developing this roadmap to be used as a guide for future research and development activities, including funding solicitations, regarding distributed generation (DG). The workshop was split into two parts, “Part I: Staff Presentation” and “Part II: Panel Discussion.”

In Part I: Staff Presentation, staff presented a summary of the findings and recommendations that are obtained from a survey of stakeholders as well as staff analysis, and proposed to be included in the draft roadmap document. In particular, the staff presentation focused on state energy policy drivers, background on the Electric Program Investment Charge (EPIC) and Natural Gas Research and Development programs, an overview of DG technologies and barriers, current DG research at the Energy Commission, and draft research recommendations. For more detail including slides prepared by the panelists please see the workshop presentation.<sup>2</sup>

In Part II: Panel Discussion, a moderated discussion with expert panelists took place. These panelists were from a variety of professional backgrounds including industry, academia, utilities, and local, state, and federal agencies and are listed below:

Moderator: Rizaldo Aldas, California Energy Commission

Panelists: Al Baez, South Coast Air Quality Management District

Dave Mehl, California Air Resources Board

Jason Harville, California Energy Commission

Neeharika Naik-Dhungel, Environmental Protection Agency CHP Partnership

George Simons, Itron Inc.

Cherif Youssef, Southern California Gas Company

Jim Zoellick, Humboldt State University Schatz Energy Research Center

Panelists provided introductory remarks and slide presentations that are also integrated in the posted workshop presentation. Panelists were given a series of questions in advance meant to spur discussion surrounding the barriers to adoption of DG systems in California and recommended research pathways to address these barriers. Each question and the panelists’ responses are summarized below.

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<sup>1</sup> Please see Appendix A for general workshop information including time and date, location, and list of attendees

<sup>2</sup> Please see Appendix B for links to workshop documents including public notice, agenda, and presentation

*Question 1: How significant of a barrier is emissions compliance to deployment of small DG systems in California? In addition to emissions, what other key technological barriers exist and what research and development activities should be conducted to address these barriers?*

- Comments from Al Baez:
  - On DG background: Participated in the creation of Rule 1110.2 which sets allowable emissions for stationary natural gas and biogas fueled generators in South Coast Air Quality Management District (SCAQMD) territory.
  - On different DG technologies:
    - Fuel cells (FCs) and microturbines (MTs) are viable, available options for customers in SCAQMD territory interested in DG systems.
    - FCs receive an exemption with no permit required (except when thermal energy produced is more than 90,000 therms/yr).
    - MTs over 250 kW have no trouble meeting SCAQMD emission requirements.
    - Many internal combustion (IC) engines are not in compliance with SCAQMD emissions standards. However some, e.g. Tecogen, are able to comply.
  - Emissions compliance is not a large barrier.
  - Future research should focus on emissions controls technology.
- Comments from Dave Mehl:
  - Agreed with Al Baez that emissions compliance is not a large barrier. Systems are able to comply, but cost to comply is too high for potential customers – the real problem is economics.
  - For deploying DG systems it depends on your location. For SCAQMD and San Joaquin Air Pollution Control District territory, look to other technologies rather than IC engines.
- Comments from Cherif Youssef:
  - Emissions compliance is a large challenge but there are technology solutions available. Agreed with Dave Mehl that economics is a larger barrier.
- Comments from George Simons:
  - Agreed with Al Baez that there is not a technology barrier to emissions compliance, however it is perceived as a barrier from customers.
- Comments from Jim Zoellick:
  - For conventional biomass powered systems there are emissions compliance and associated cost barriers. There is still work to be done, especially with regards to gas cleanup.
  - There is a research need to develop reliable and robust packaged, turnkey biomass gasification technologies which can allow emissions compliance and high electrical conversion efficiencies.
- Comments from Neeharika Naik-Dhungel:
  - Often hears from customers that emissions compliance is a barrier. It is important to point out there are 2 aspects: permitting and meeting the emissions limits.

*Question 2: What policies or incentives, new or existing (i.e. expanded SGIP or ITC), would promote deployment of small DG systems in California? How can the State further support the development of an active DG market in California?*

- Comments from Jason Harville:
  - Policy is a very challenging area currently. Utility distribution resource plans are a step in the right direction, but much more is needed to accommodate DG.
- Comments from Dave Mehl:
  - Utility policies often serve as a disincentive. Departing load and standby charges need re-evaluation – if that happens incentives may not be necessary.
  - Policy makers need to look very long term and not policy-by-policy. There needs to be long-term policies in place which can provide certainty to customers considering investing in DG systems.
  - Biogas and renewable natural gas (RNG) with DG can serve as a renewable, flexible resource.
- Comments from George Simons:
  - Grid modernization is taking place and can enable increased adoption of DG systems. Policies are required which can enable this transition. Agreed with Dave Mehl that long-term policies must be put in place.
- Comments from Cherif Youssef:
  - Agreed with Dave Mehl on the role of biogas/RNG.
  - The Self-Generation Incentive Program (SGIP) lowering greenhouse gas thresholds will be a challenge for DG systems moving forward.
- Comments from Al Baez:
  - Streamlining utility interconnection approvals and processes should be prioritized.
- Comments from Jim Zoellick:
  - Uncertainties surrounding the new net energy metering rules give customers pause. While these policies need to work for both the utilities and their customers, the new rules need to be favorable to distributed generation.
  - The interconnection process promotes generator under sizing to avoid high distribution system upgrade costs. The interconnection study process can be time consuming and expensive, and therefore does not allow for an iterative design process and optimal sizing of distributed generators.
- Comments from Neeharika Naik-Dhungel:
  - Air permitting can be slow or sluggish and has been streamlined in Texas, Connecticut, and New Jersey for CHP. California could do something similar.

*Question 3: What specific distributed generation technologies or enabling technologies have significant potential to succeed in the California market and why? What further research and development are needed, if any, to accelerate the market adoption of these technologies or strategies?*

- Comments from Cherif Youssef:
  - On DG technology development background: SoCalGas devotes \$1.5 to \$2.5 million annually to DG and CHP research, leveraged heavily with funds from the Energy Commission, Department of Energy, and technology manufacturers. A list of projects was provided.
  - On promising technologies: Integration of systems with renewables is key. Micro-scale CHP systems are promising but will struggle with electric utility charges such as unfavorable rate structures, departing load and standby charges.
- Comments from George Simons:
  - Agreed with Cherif Youssef that integration with renewables is important. Noted that the “real battle” is at the distribution level where clouds and other weather variability can significantly interrupt solar photovoltaic systems. A low-cost, distribution level generator is needed.
  - Emphasized control technologies which enable integration with renewables as a major area for possible future research.
- Comments from Jim Zoellick
  - Microgrid technologies will be critical for integrating renewables with DG systems
  - Hydrogen and fuel cells have a very high potential for future integration of renewables and DG systems.
  - Special focus should be placed on microgrid systems that can enhance large penetrations of renewable generation.

*Question 4: What specific sectors, if any, have significant potential for DG deployment in California and why? Are there relatively untapped markets or new opportunities?*

- Comments from George Simons:
  - Food processing sector has a huge market potential – identified as 24 GW in a soon-to-be-published Itron study.
    - Noted a large potential for co-digestion at existing wastewater treatment plants which could accept abundant food processing waste.
  - Sectors with large electric and thermal loads have high potential including hospitals, restaurants, and multi-family dwellings.
  - Again, long-term policies which provided certainty are needed to get financial institutions to look at these projects as opportunities.
- Comments from Dave Mehl:
  - The entire state has high potential for DG, depending on location. Previously disturbed land can take advantage of solar PV and wind. There are also many biogas opportunities.
- Comments from Jim Zoellick:
  - Reiterated that microgrids are critical moving forward, especially at critical facilities. Hospitals, police and fire stations, emergency shelters, fuel supply facilities, food preparation facilities, water and wastewater treatment, refrigerated food storage and more.

- Biomass powered DG opportunities are predominantly in the state’s agricultural and forested regions. Additionally, biomass for heating only in rural areas should be examined.
- There are also opportunities for DG in greening and electrifying our ports, specifically in Oakland, Los Angeles and Long Beach. This is another area where hydrogen and fuel cells can play a significant role.

*Question 5: What tools and resources are needed to increase private investment in the DG market (i.e. ROI calculator, technical assistance, networking hubs to connect service providers and customers, etc.) and how could research funding help advance the needed tools and resources? What resources exist today that the public should be aware of?*

- Comments from Neeharika Naik-Dhungel:
  - The EPA CHP Partnership has numerous online resources which are updated regularly including the CHP Catalog of technologies.
  - A lot of work has been done by the CEC but the information is hard to find – easier access to reports would help.
  - Investors will wonder how research translates to work on the ground, this link needs to be communicated.
- Comments from Cherif Youssef:
  - The New York State Energy Research and Development Authority (NYSERDA) has a pre-approved CHP systems list which greatly reduces costs for engineering, permitting and installation. This also eases uncertainty from the end user and gives people a place to start. A similar list for California would be very helpful for end users.
- Comments from George Simons:
  - Agreed with Cherif Youssef on providing a prescriptive list of CHP technologies.
  - Utilities could provide locations where DG systems could be deployed with minimal grid upgrades. This may happen in future distribution resource plans.
- Comments from Jim Zoellick:
  - Technical assistance and networking hubs are a good idea.
  - DOE currently supports the CHP Technical Assistance Partnerships (CHP TAP). The Pacific Region CHP TAP is run by the Center for Sustainable Energy in San Diego.
  - Successful demonstration projects should be well publicized and well documented to attract interest from potential adopters.
  - Potential adopters should be directed to available technical assistance services such as feasibility assessment, project development, financing, permitting assistance, and utility interconnection assistance.

Following the panel discussion, a public question and answer session was held.

## Appendix A: General Workshop Information

Workshop date and time, location, and list of attendees are provided below.

### Date and Time:

Wednesday, November 18, 2015  
9:00 a.m. – 1:00 p.m.

### Location:

Warren-Alquist State Energy Building  
1st Floor, Charles Imbrecht Hearing Room  
1516 Ninth Street  
Sacramento, CA, 95814

### Attendees:

In Person:<sup>3</sup>

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<sup>3</sup> Based on sign-in sheet, may not represent all in person attendees

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## Appendix B: Associated Documents

Associated documents are available online at:

<http://www.energy.ca.gov/research/notices/index.html#11182015>

### Documents:

Public Notice: [http://www.energy.ca.gov/research/notices/2015-11-18\\_workshop/2015-11-18\\_Notice\\_Adv\\_Dist\\_Gen\\_Research\\_Workshop.pdf](http://www.energy.ca.gov/research/notices/2015-11-18_workshop/2015-11-18_Notice_Adv_Dist_Gen_Research_Workshop.pdf)

Agenda: [http://www.energy.ca.gov/research/notices/2015-11-18\\_workshop/2015-11-18\\_Agenda\\_Adv\\_Dist\\_Gen\\_Research\\_Workshop.pdf](http://www.energy.ca.gov/research/notices/2015-11-18_workshop/2015-11-18_Agenda_Adv_Dist_Gen_Research_Workshop.pdf)

Presentation: [http://www.energy.ca.gov/research/notices/2015-11-18\\_workshop/2015-11-18\\_Presentation\\_Adv\\_Dist\\_Gen\\_Research\\_Workshop.pdf](http://www.energy.ca.gov/research/notices/2015-11-18_workshop/2015-11-18_Presentation_Adv_Dist_Gen_Research_Workshop.pdf)