CHP Analysis Working Group Meeting Summary
August 1, 2006

The purpose of this meeting was to explore the issues surrounding the market for small CHP, looking specifically at how much there is and how we should measure it. We had two presenters:

Bruce Hedman, Energy and Environmental Analysis, Inc. (EEA, http://www.eea-inc.com), Director, Distributed Generation Markets and Technology
Paul Lemar, Resource Dynamics Corporation (RDC, http://www.rdcnet.com), President

Both presentations are available on the ACEEE website at:
http://aceee.org/chp/analysis.htm

Bruce Hedman's Presentation:
http://www.aceee.org/chp/Hedman%20Presentation,%20Aug%201.pdf
An overview of EEA'a CHP Installation Database [http://www.eea-inc.com/chpdata/index.html], with a focus on small CHP installations captured in the database. Individual CHP installations are broken down in the database by capacity, by sites, by state, by fuel type, and by engine type. The presentation also explores capacity and site additions from 2000-2005. The definition for small CHP here is less than 5 MW.

Bruce Hedman: We have been getting information from developers and manufacturers as well as the RACs and the states. It's not a complete database, but it is better than a couple of years ago, and certainly improving.

Smaller projects are very much affected by utility and policy barriers, so the increase in small systems is likely an indicator of a market that is open to CHP more generally.

It's surprising that VA and Illinois are on that list on Slide 5 (ten states with 70% of the small CHP capacity).

Paul Lemar: Yes, they have pretty bad rates in VA.

Neal Elliott: Actually in the late 90's they had good CHP programs established in VA.

Ed Osann: Maybe it's related to all the military installations in VA?

Neal Elliott: Michigan has also not been friendly to CHP—the same chart for recently installed capacity would be helpful.

Paul Lemar's Presentation:
http://www.aceee.org/chp/Lemar%20Presentation,%20Aug%201.pdf
This presentation provides an overview of various approaches to estimating installation of small DG and CHP units. The definition for small CHP here is 1 MW. Data and

information is lacking for small units and rough estimates of these suggest that by excluding these units, current installations are significantly undercounted. The best approaches for gathering data are to use manufacturer data, interconnection applications data, and permitting/siting data. These approaches were subjected to field tests—PA was the test state utilized.

Secondary data indicates that there is a lot more small CHP out there than the databases are estimating (higher than the EEA database numbers). The numbers here are all per unit, not per site, while the EEA data is all per site.

Bruce Hedman: The numbers are difficult to compare because some may be under 5 MW, versus 1 MW.

Paul Lemar: To get these numbers, we looked at manufacturers' sales, imports/exports, and retirement rates, among other things. There's more noise here in these numbers, but it still looks like the EEA database is underestimating.

Tina Kaarsberg: Does this data go down to residential sizes?

Paul Lemar: Yes, but the applications (e.g., residential, commercial or industrial) are not distinguished in the numbers.

Anna Shipley: How did you estimate the information on emergency generators?

Paul Lemar: We used sales from manufacturers and imports/exports, retirement rates and then there are those projects we knew about. Essentially a stock model.

Neal Elliott: Years ago, Anna and I did some database work and found that sometimes backup units are registered with the fire department (for example, in Houston and Austin), and not the buildings department or with air quality/permitting. This was because these backup power units were regarded as life safety devices. So that might be another place to look.

Kim Crossman: But aren't those all diesel?

Tina Kaarsberg: Is there a way to distinguish between people who are putting in new CHP rather than displacing old boilers, for example?

Paul Lemar: That depends on the data source.
We picked PA for this case study because we wanted to pick a place that fell somewhere in the middle in terms of CHP progress—we didn't want a place like New York or California because we already know a lot about what goes on there, but we didn't want to pick a state with particularly bad rates because nothing would be going on. PA seemed like a good middle ground choice.

Kim Crossman: I wanted to talk a little about the work we are doing at the CHP Partnership. [http://www.epa.gov/chp/]. Our reporting is all voluntary so it can be difficult to get people to report. In 2005, we had 40 reporters. It's interesting to look at who it is that is reporting—industrial equipment manufacturers are generally not good reporters. We generally use them as secondary data sources. We do realize the importance of avoiding double counting because we may have several reporters for the same project. To date, we have 455 projects reported: 90 projects above 10 MW and 60 between 2 and 10 MW. We estimate that 80% reported of what went into the EEA database. We believe we are capturing a large part of the market for small CHP (under 2MW). The information is sorted by the date of start-up, fuel type, % exported to grid, MW, etc. Since we are using this to calculate carbon offsets, our information is to the day.

Increases in reporting may be attributed to the fact that the Partnership publishes a greenhouse gas report every year and gives out carbon reduction certificates which can be used in companies' sustainability reports, in their Press Releases, etc. Those who are better at reporting are generally companies with a corporate sustainability strategy, project developers (we get most of out information from them), and end users. Manufacturers are generally bad at reporting unless they have another stake—for example, they use the reports to sell their project (when a project demonstrates success, they report it). Bigger projects are more likely to be reported which makes things difficult for small CHP.

Bruce Hedman: We believe we have about 2/3 coverage of the small CHP market.

Kim Crossman: It's difficult to get developers to report projects under 50 kW because they have 1000's of small projects. If you look at this from a MW's perspective, it takes a lot of small projects to add up, but information about those projects tells us something about market penetration which is very important. Activity with small projects is a good indicator of the breakdown of the barriers in the marketplace.

Patti Garland: This leads back to my earlier question: how do we know if we are having an effect on market penetration?

Kim Crossman: We count things like conferences and policy work as indirect/ informational effects and direct project assistance is counted as direct effects. Using documented criteria for credit toward program goals, we've counted 3000 MW that count towards the EPA Partnership's work—that's 20% of the total projects that were reported to us by Partners.

Merrill Smith: But how do we capture all of the influences? RACs, policy (discussions with state offices) and others?

Patti Garland: Perhaps we need to categorize these influences: policy, technical assistance, spark spread, etc.

Merrill Smith: Do we take credit, for example, for every site with a Capstone microturbine because we took part in advancing that technology?

Bruce Hedman: Also, how do we account for market development work?

Erin Boedecker: Our numbers are based on data from EIA's 2003 Commercial Buildings Energy Consumption Survey (CBECS): http://www.eia.doe.gov/emeu/cbecs/cbecs2003/public_use_2003/cbecs_pudata2003.html We estimate 149,000 commercial buildings have the ability to generate electricity (including, but not limited to those using CHP). It is important to note that the survey team chose not to include buildings that reported they could generate electricity, but did not know whether generation was for back-up, peak periods, or baseload.

Paul Lemar: More projects will eventually drive costs down. But at what point will we reach market transformation?

Erin Boedecker: High prices will have a lot to do with getting there (spark spread).

Neal Elliott: With the prices of natural gas and the unpredictability/volatility of the costs, people are looking more towards renewables so they can decouple themselves from the energy market.

Rich Sweetser: That may also be due to state and federal subsidies. We have to decouple the idea of natural gas and CHP.

Kim Crossman: Recent reports indicate there is a ton of interest in biomass.

Rich Sweetser: But biomass pretty much translates to biofuels.

Erin Boedecker: And for the most part, if you look at the larger numbers, the big picture is still natural gas.

Kim Crossman: But there are lots of opportunities for small scale projects.

Anna Shipley: And especially small businesses.

Rich Sweetser: There is a ton of pressure on big companies like Wal-Mart to be green—if biomass becomes available for stationary projects, these will start to happen and the uptake will be big.

Erin Boedecker: But the big "if" is whether biomass will become available.

Paul Lemar: It will be available, but the worry is that it may be taken up entirely by transportation.