Proposed CHP Incentive Pilot Program

Summary

Work to date has clearly shown that distributed resources can provide significant net benefits to ratepayers, but the benefits will vary depending on how and where those resources are deployed. It is not possible to develop reliable estimates of those these benefits with the information available today. Hence, the MADRI Business Case Sub-Working Group recommends conducting a series of pilot programs to help accelerate adoption of beneficial distributed resources and determine maximize the benefits these systems provide to ratepayers.

This proposal provides an overview of the CHP incentive program that is recommended. An overview or the rationale for the program, program objectives, program structure options, and a recommended implementation plan are described. This information is intended to serve as background for the MADRI Steering Committee's evaluation of distributed resource opportunities.

1. Introduction

The Mid-Atlantic Distributed Resources Initiative (MADRI) was established to investigate the benefits of distributed resources (DR) and identify ways in which utility commissions, State Governments and other stakeholders should promote use of beneficial DR technologies. The primary focus of these efforts has been technologies and programs that can be employed to shave peak demand such as load curtailment or running emergency generators.

In recent months, the MADRI members have seen a strong resurgence of interest in mitigating the impact of electric rate increases in some the Mid-Atlantic states. The most effective way to mitigate utility cost increases is to reduce total consumption via energy efficiency programs. The technologies and techniques used to shave peak demand normally have little effect on overall efficiency. Hence, the focus of efficiency improvement programs normally is quite different from the focus of demand reduction programs.

Combined heat and power (CHP) is one of the few technologies that can help satisfy both of these needs. CHP systems operate during peak periods which will reduce aggregate demand. By recycling the heat that normally is wasted in a conventional power plant, CHP also increases overall energy use efficiency. Hence, CHP is one of the more promising methods of accomplishing the pressing needs to shave demand peaks and help consumers reduce rapidly rising energy bills.

2. CHP Challenges

Table 1 on the next page is a list of the benefits provided by CHP. However, only 4 of the 20 benefits accrue directly to the user who pays for the system. The others benefits are shared by all ratepayers. Unfortunately, CHP systems are marginally attractive to users in most of this region under the current rate structures, hence few systems are being installed.

Developing a mechanism for accruing a portion of the public benefits provided by CHP to those who install these systems will increase penetration which will increase the net benefit to ratepayers. However, recent changes in energy markets have confused the situation and made it considerably more difficult to determine the best way to encourage use of beneficial CHP systems. A series of pilot programs is needed to obtain the data needed to define CHP programs that will yield the maximum benefit for ratepayers at the minimum cost.

The value of these public benefits is significant, but the values will vary depending on several factors (e.g., where it is located, growth trends and capacity plans for that section of the grid, fuel used). One of the most comprehensive attempts to quantify these benefits was an analysis of Silicon Valley Power

Table I – Benefits Provided by CHP

Energy Reliability

1. *Business continuity during grid outages*
2. *Improved power quality*
3. Reduced grid congestion
4. Can increase end-of-the-wire supply
5. Enables short lead-time, off-the-shelf, modular capacity additions

Energy Security

6. Reduced system vulnerability
7. Disaster mitigation assistance
8. Disaster recovery assistance

Energy Efficiency

9. *Improved fuel efficiency (fuel economy)*
10. Optimized use of scarce natural gas resources
11. Eliminates line losses

Economic Development

12. Lower cost for new electricity than new central generation and T&D
13. *Improved energy cost predictability*
14. No ratepayer investment required (generation or T&D)
15. Creates local jobs for installation, operation and maintenance
16. Creates new high-tech manufacturing sector, domestic and export
17. Supports competitive electricity market structure

Environmental Stewardship

18. Reduced emissions per unit of useful output
19. Reduces land-use impacts and NIMBY objections
20. Reduces fresh water use

Only the italicized items directly benefit CHP system owners/operators – the rest are public benefits shared by all ratepayers

(SVP), a municipal utility serving the City of Santa Clara that was conducted by New Power Technologies.[1] The study identified 382 customer sites where DG would help the grid significantly. The aggregated total of the optimum mix of new generation would be 13.6 MW which equals 3.4% of peak load. If all recommendations were implemented by the utility and the owners, SVP could reduce real power losses by 31% plus reduce reactive power consumption by 30%. The sum of the saved energy was calculated to be approximately three times the system's average loss rate. These numbers are particularly impressive given that SVP was already relatively well designed, maintained, and operated.

Major reductions in energy losses such as those estimated in the SVP study will reduce peak demand and hence reduce peak power prices. In addition, the installation of CHP would defer the need for utility investments to upgrade T&D systems or add generation. The LMP study being sponsored by MADRI will provide valuable quantification of the benefits that DR can provide to the Mid-Atlantic region.

3. CHP Program Objectives

The primary objectives of this pilot program are to quantify the public benefits that CHP can provide in the Mid-Atlantic region and to determine how different program structures and incentive levels will affect adoption of CHP. CHP benefits and customer acceptance are highly dependant on local grid/site conditions and customer attitudes, both of which vary widely across the region. Improper targeting of CHP systems or incentives that are higher than what is required to induce participation will lower the net value of the program.

[1] Summary available at http://www.distributedenergy.com/de_0501_dg.html. Full report available at http://www.energy.ca.gov/2005publications/CEC-500-2005-061/CEC-500-2005-061-D.PDF;

4. Pilot Program Structure

The three key elements that must be determined in developing a CHP incentive program are:

- Target size – what is the goal for MW of capacity to be installed via the program and will there be a cap on participation.
- Incentives to be provided – structure and value of the incentives to be paid to participants.
- Implementation approach – how the program will be implemented and administered.

Each of the state utility commissions participating in the MADRI process must determine how best to address each of these issues in their state. The following discussion is intended to provide perspective and recommendations for these evaluations.

4.1 Capacity Goals

Attachment A summarizes estimates of the technically feasible CHP potential in each state. These numbers represent facilities that have electrical and thermal needs that are conducive to installing CHP. The estimates do not take into account financial feasibility, user interest, or potential impact on the utility grid.

In MADRI sub-working group meetings to date, a target of around 3% of peak demand has been discussed as a reasonable goal for all DR pilot programs. For planning purposes, we recommend establishing a goal for the CHP pilot of 15 - 25% of the DR goal – this equates to 0.5% to 0.8% of peak demand. Specific targets would be established for each participating utility distribution company (UDC) or electricity service provider (ESP) based on their annual peak demand.

In addition to establishing targets for total MW to be implemented in the pilot program, it is appropriate to establish additional criteria for prioritizing or ranking applications if the program is oversubscribed. Criteria that should be considered for prioritizing include:

- Type of system/fuel – systems powered with RPS Tier 1 or Tier 2 fuels should be given priority over those that use natural gas or oil as the primary fuel.
- Type of Application – give priority to applications that can be replicated easily such as: small industrial site, hospital, campus or city CHP system, restaurant (chain store), hotel, laundries
- Size – limit to under 10 MW [2]; there should be at least 1 pilot system under 500 kW in each distribution area; it also may be desirable to limit participation to systems that do not export power from the host site.
- Location – give priority to systems located in congested areas (see step 2 in the implementation plan below) and to systems that will reduce emissions in non-attainment areas.

4.2 Incentives

The incentive structure must take into consideration the need for the project to be financially feasible and attractive to decision makers. In addition, payments need to be tied to performance. For perspective a list of incentives that states in other areas of the country are providing to encourage use of CHP is provided in the attached spreadsheet. For the proposed MADRI-state pilot programs, we recommend the following incentives:

- *Capacity Payment* – A capacity payment is needed to ensure the project can be financed. This incentive would be based on projected output during system peak (i.e., rated equipment output

[2] The PJM Small Generation Interconnection Working Group has established technical standards for interconnection of systems under 10 MW.

adjusted for weather conditions at the time of the expected peak). The capacity payment should be based on the carrying cost for utility investment in comparable conventional utility generation. At present, the utility generation investment that would be deferred by CHP probably would be a natural gas-fired combustion. The carrying cost for such a system is around $75/kW-year. To ensure the project is financially feasible, the payment should be based on operation for a period of several years – a minimum of 10 years would be reasonable for the proposed pilot program. This payment can be structured as a one-time, upfront payment or as an annual capacity payment.

- *Energy Payment* – In addition to the capacity payment, the CHP operator should receive an incentive payment based on electricity produced whenever the PJM Economic Load Response Program is activated. The payment should be equal to the day-ahead or real-time LMP depending on which program is activated.
- *Elimination of standby charges* – Standby charges typically are fully ratcheted charges that are based on the assumption that the CHP systems are unreliable and the utility will be required to provide full capacity to the customer at the time of utility system peak. This assumption appears to be excessively conservative and inappropriate given the improvements in technology and operations that have occurred in recent years. We recommend that standby charges be eliminated for participants in the pilot program. To confirm this change is reasonable, we further recommend evaluating the performance of all systems approximately 5 years after they start operation to confirm that the elimination of standby charges is appropriate and reasonable.
- *Waive interconnection application fees and expedite the application process* – Waiving fees and expediting the application process will facilitate recruiting the participation of private developers and owners. We recommend establishing a requirement that permit applications be processed within 35 days of submitting a completed application and that a dispute resolution procedure be incorporated in the process.

We recommend that the capacity and energy payments for approved pilot program projects be made by utility distribution companies (UDCs) and that the UDCs be permitted to recover these payments plus administrative costs from ratepayers.

4.3 Implementation Approach

There are three basic options for implementation of this pilot program:

- *Include CHP in renewable portfolio standards (RPSs)* – It is appropriate to include CHP in RPSs as these systems recover and recycle energy that otherwise would be wasted. Incorporating CHP into RPSs may require legislative action in some constituencies; in others an expanded definition of renewable resource will suffice. A CHP RPS requirement would eliminate or reduce the need for a ratepayer-funded incentives and the proposed CHP pilot program.
- *Select a 3rd party provider to recruit participants and install system and have the UDC administer the program* – The party to implement the program, which could be a UDC, ESP, or other 3rd party, would be selected through a competitive solicitation. This approach will help ensure they are the most qualified and most cost effective group is implementing the program.
- *Direct UDCs to implement the program* – While the Utility Commission could direct UDCs to implement these pilots, this is not the preferred approach. However, we do recommend that the UDC have the option to implement and administer the program if they can demonstrate that they would perform better than a competitively-selected 3rd party.

5. Implementation Plan

The mandate to implement CHP pilot programs would be established at the state level, hence it may be necessary to develop a separate implementation plan for each state. The major steps in implementing this pilot program are as follows. Note that the program development process would be interactive and several of these steps would be conducted in parallel.

1. *Establish a pilot program steering committee to develop all of the program details, oversee implementation, and evaluate results.*

   This pilot program proposal is intended to lay out the basic concepts, not a detailed structure or implementation plan. The first step in implementing a pilot program would be to form a steering committee that will define the details of how the program would be structured, implemented, and monitored. This committee would present the detailed plan to the appropriate utility commission to obtain approval to proceed. This committee could include utility commissioners or it could be overseen by the MADRI Steering Committee.

2. *Direct participating utility distribution companies to identify locations where installing CHP would alleviate the need for T&D system expansion or upgrades.*

   One of the most common UDC objections to CHP and other DR programs is that systems installed in some locations will not help defer T&D upgrades. This is a valid objection, but it also implies that there are locations where CHP or other types of DR will enable the UDC to defer or cancel planned T&D upgrades. We propose that the UDCs serving the target areas be directed to identify a limited number of locations where CHP or other types of DR program would enable them to defer planned T&D upgrades. Pilot projects in the nominated locations would likely provide the greatest public benefit. However, projects in other locations may particate if they provide sufficient public beneficial to justify inclusion.

3. *Obtain commitment to implement the program from UDC or select a 3rd party provider to implement program.*

   An experienced organization would be selected through a competitive solicitation to promoting and administering this program would be selected. UDCs, ESPs and other 3rd parties would be eligible to submit proposals.

4. *Determine MW of systems to participate in pilot and identify target applications*

   The pilot program steering committee would work with the Utility Commission to determine the specific targets for each state. As noted above, targets would be specified in terms of total MW to participate in the pilot and other criteria which would specify the preferred types of systems.

5. *Establish incentive structure & levels*

   As noted above, it is recommended that both capacity and energy incentives be provided to participants. The exact level of these incentives would be established based on specific cost data for the preferred target locations identified by the UDCs and projections of LMP at that location during periods of high demand. We anticipate that the result of the LMP study being conducted now will provide some guidance for setting energy incentive levels. Incentive level recommendations would be prepared by the CHP pilot steering committee and provided to the Utility Commission for review and approval.

6. *Recruit participants and install systems*

   The technical and financial aspects of installing a CHP system are complex. Focusing recruiting efforts on limited geographic regions will help in recruiting host sites, but considerable effort still will be required to implement projects. We anticipate that the CHP, energy services, and curtailment services industries will be involved in implementing this program.

7. Monitor systems and issue periodic reports on public benefits provided by projects.

Output of the CHP system and total power consumption of the host site will be recorded on an hourly basis. The organization selected for implementation will collect this information periodically, check the data to confirm compliance with program requirements, and issue status reports every 12 months. These status reports will include at a minimum a summary of CHP system performance during the previous 12 months, an estimate of public benefits provided by the system during that period, and an estimate of benefits provided to the user.

After 5 years of operation, an evaluation will be conducted to determine the exact cost of any standby services that were provided by the participating UDCs and determine if it is appropriate to add a standby service charge to the participating projects.

ATTACHMENT A

TECHNICAL POTENTIAL FOR CHP IN THE MID-ATLANTIC REGION *

	< 1 MW		1 to 5 MW		5 to 20 MW		> 20 MW		Total	
	Sites	MW	Sites	MW	Sites	MW	Sites	MW	Sites	MW
Pennsylvania	7,121	774	930	1,034	70	393	5	88	11,059	2,606
New Jersey	6,604	678	620	639	66	305	5	75	7,690	1,844
Maryland	4,956	504	472	500	52	338	3	44	5,483	1,384
District of Columbia	642	70	134	138	34	215	2	50	1,147	511
Delaware	703	82	61	67	6	35	0	0	834	190
Total for Region	20,026	2,108	2,217	2,377	228	1,285	15	256	26,213	6,535

* - Totals include potential in hotels/motels, hospitals, nursing homes, colleges & universities, schools, prisons, apartments, office buildings, and selected other commercial applications.

NET SUMMER GENERATING CAPABILITY **

	Capability (MW)
Pennsylvania	42,368
New Jersey	18,647
Maryland	12,472
District of Columbia	806
Delaware	3,393
Total for Region	77,686

** - From DOE/EIA-0629, 2003 Data, issued April 2006. This information is provided for reference only. Targets should be established for each utility distribution company or electricity service provider based on their annual peak demand and the characteristics of their customer base. We recommend the following targets:

Recommended Target for all DR Pilot Programs (MW): 3% of annual peak demand

Recommended Target for CHP Pilot Program (MW): 0.5% – 0.8% of annual peak demand