

Overview of Proposed CHP Incentive Program

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Challenge

- CHP systems are significantly different from other DG and load curtailment options
 - Operate for longer periods of time
 - More fully integrated into the facility HVAC /process systems
 - Typically NG fueled – lower emissions than diesel gen-sets
- CHP provides many public benefits that are not achieved with other DRs – particularly efficiency improvement
- With current local rates, CHP is marginally attractive to users at best, which reduces use of these systems
- Providing a share of public benefits to users should increase use and increase ratepayer benefits

Benefits Provided by CHP

■ **Energy Reliability**

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

■ **Energy Security**

- Reduced system vulnerability
- Disaster mitigation assistance
- Disaster recovery assistance

■ **Energy Efficiency**

- *Improved fuel efficiency (fuel economy)*
- Optimized use of scarce natural gas resources
- Eliminates line losses

■ **Economic Development**

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

■ **Environmental Stewardship**

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



Pilot Program Objectives

- Demonstrate the value of CHP as a distributed resource
- Obtain the data needed to quantify the public benefits of CHP
- Develop a process for improved targeting of CHP and other “lumpy” DRs
- Determine what share of the public benefits provided by CHP must/should be paid to users to maximize ratepayer benefits
 - Benefits payments needed to stimulate CHP additions
 - Program structure that will maximize net public benefit



Proposed Approach

1. Establish a steering committee to develop all of the program details, oversee implementation, and evaluate results.
2. Direct participating utility distribution companies to identify locations where installing CHP would alleviate the need for T&D system expansion or upgrades.
3. Obtain commitment to implement the program from UDC or select a 3rd party provider to implement program.

Proposed Approach ...

4. Determine number/kW of systems to be installed and identify target applications. Possible selection criteria include:
 - Type of system/fuel – biomass, coal or other opportunity fuel, NG
 - Application – want applications that can be replicated easily such as: small industrial site, hospital, campus or city CHP system, hotel, chain restaurant, laundries
 - Size – limit to under 10MW; have at least 1 under 500kW in each area
 - State/region:
 - Delmarva – areas with transmission problems
 - NJ and/or PA – work with state incentive programs
 - MD or DE – include in rate increase relief initiatives



Proposed Approach ...

5. Develop structure & levels for payments to users.

Options include:

- Expedited UDC processing of interconnection agreements
- Waiving stand-by charges
- Capacity payments
- Energy payments – may be tiered:
 - Level 1: Operation during emergency/critical peak periods
 - Level 2: Operation during non-emergency on-peak hours
 - Level 2: Operation during non-emergency baseload & mid-peak hours

6. Recruit participants and install systems

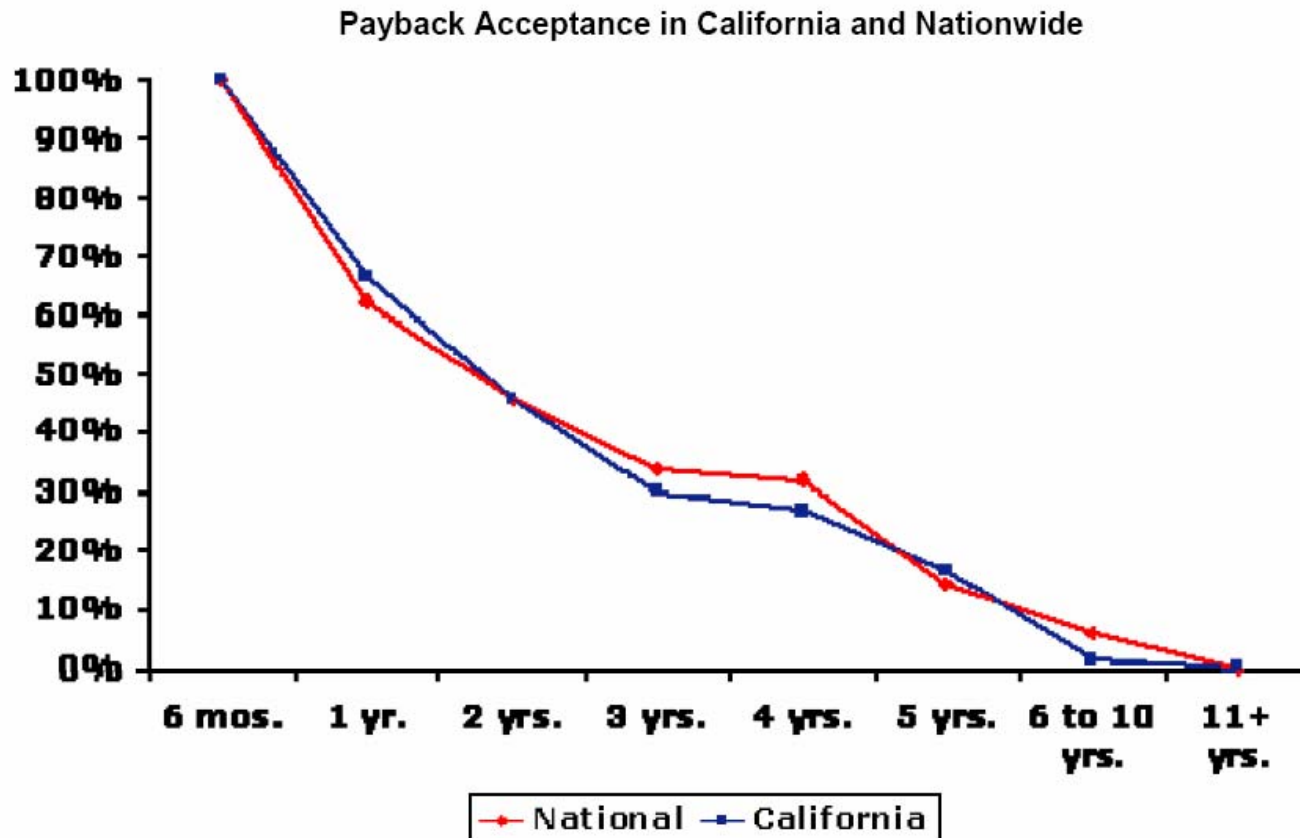
7. Monitor systems & issue period reports



Scoping Economic Analysis

- Conducted scoping analysis for a hospital and a 200 room hotel
 - Based on PSE&G rates
 - Load profiles based on representative buildings
 - CHP systems size based on thermal loads
- Two parts of analysis:
 - Assessment from customers perspective
 - Impact of possible rate increases and payments to user

User Requirements



Source: Assessment of California CHP Market and Policy Options for Increased Penetration, Final Report, July 2005, sponsored by PIER, CEC and EPRI

Net Benefits and Cumulative CHP Penetration for Each Policy Portfolio

	CHP Owner Savings	Total Societal Net Benefits (MM\$)	Cumulative MW	Net Societal Benefit per kW
No New Incentives	\$54	\$306	1,141	\$268
Base Case	\$451	\$620	1,966	\$315
Streamlining	\$571	\$734	2,489	\$295
Hi R&D	\$899	\$1,255	2,764	\$454
Increased Incentives	\$1,285	\$201	2,942	\$68
Moderate Market	\$1,049	\$3,286	4,377	\$751
Aggressive Market	\$1,317	\$4,791	5,348	\$896
High Deployment	\$3,067	\$7,516	7,340	\$1,024

Source: Assessment of California CHP Market and Policy Options for Increased Penetration, Final Report, July 2005, sponsored by: PIER, CEC and EPRI



Hotel Analysis

Simple Payback Period (years)						
Electric Rate Increase	New Rate (ave \$/kWh)	Payment for Service Provided (\$/kW-yr)				
		0	25	50	100	150
0%	\$0.1131	8.8	7.8	6.9	5.7	4.9
25%	\$0.1413	4.2	4.0	3.8	3.4	3.1
50%	\$0.1698	2.8	2.7	2.6	2.4	2.2
75%	\$0.1978	2.1	2.0	2.0	1.8	1.7

Peak demand – 850 kW; 150 kW generator; baseload operation; \$1661/kW capital cost; O&M cost - \$0.015/kWh; 80% thermal recovery; NG cost - \$9.50/MMBtu



Hospital Analysis

Simple Payback Period (years)						
Electric Rate Increase	New Rate (ave \$/kWh)	Payment for Service Provided (\$/kW-yr)				
		0	25	50	100	150
0%	\$0.0908	8.6	7.4	6.5	5.2	4.3
25%	\$0.1135	4.1	3.8	3.5	3.1	2.8
50%	\$0.1362	2.7	2.6	2.4	2.2	2.1
75%	\$0.1589	2.0	1.9	1.9	1.7	1.6

Peak demand – 2.5 MW; 1000 kW generator; baseload operation; \$1324/kW capital cost; O&M cost - \$0.013/kWh; 90% thermal recovery; NG cost - \$8.00/MMBtu



TECHNICAL POTENTIAL FOR CHP IN THE MID-ATLANTIC REGION

	< 1 MW		1 MW to 5 MW		5 MW 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.

Next Steps

- Form committee to develop more plan and structure for pilot.
 - Approach
 - Mechanism for identifying target areas/needs
 - Selecting provider to implement program
- Determine ranges for potential value of public benefits provided by CHP – needed to refine program.
- Recruit UDCs and 3rd party providers to participate
- Present recommendations to MADRI steering committee



CHP Incentive Cases in CA Study

Scenario	Onsite CHP MW	Export CHP MW	Total Market Penetration MW	Description
Base Case	1,966	0	1,966	Expected future conditions with existing incentives
No Incentives	1,141	0	1,141	Remove SGIP, CHP incentive gas price, and CHP CRS exemptions)
Moderate Market Access	1,966	2,410	4,376	Facilitate wholesale generation export
Aggressive Market Access	2,479	2,869	5,348	\$40/kW year T&D capacity payments for projects under 20 MW, global warming incentive, and wholesale export
Increased (Alternative) Incentives	2,942	0	2,942	Extended SGIP (incentives on first 5 MW for projects less than 20 MW, \$0.01/kWh CHP production tax credit
Streamlining	2,489	0	2,489	Customer behavior changes: higher response to payback levels and greater share of market that will consider CHP
High R&D on Base Case	2,764	0	2,764	Rate of technology improvement accelerated 5 years
High Deployment Case	4,471	2,869	7,340	Accelerated technology improvement with aggressive market access and streamlining to improve customer attitudes and response