




COMBINED HEAT AND POWER (CHP)
EN BANC HEARING
OCTOBER 7, 2014,
UNIVERSITY OF PITTSBURGH

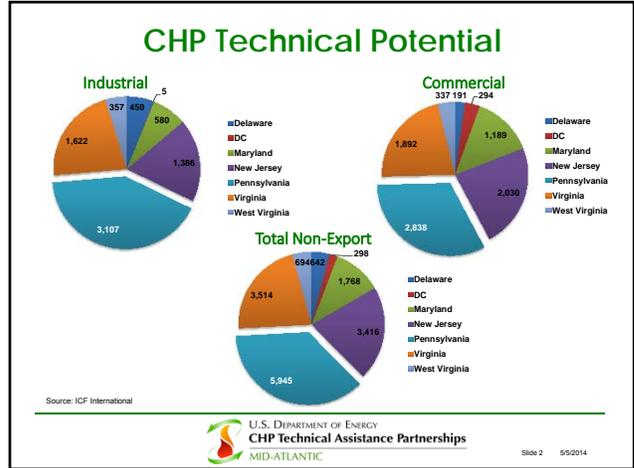
Mid-Atlantic CHP Update and Impact of Wider CHP Adoption in Pennsylvania

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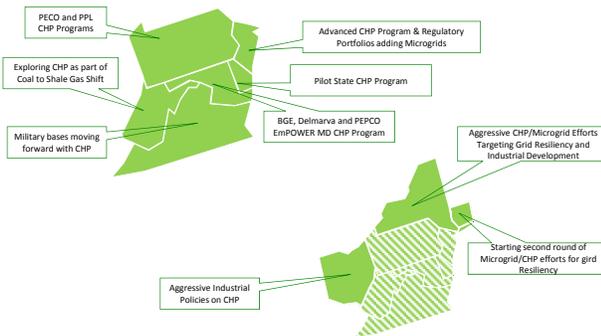




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CHP Mid-Atlantic Update



- PECO and PPL CHP Programs
- Advanced CHP Program & Regulatory Portfolios adding Microgrids
- Exploring CHP as part of Coal to Shale Gas Shift
- Pilot State CHP Program
- Military bases moving forward with CHP
- BGE, Delmarva and PEPSCO EnPOWER MD CHP Program
- Aggressive CHP/Microgrid Efforts Targeting Grid Resiliency and Industrial Development
- Aggressive Industrial Policies on CHP
- Starting second round of Microgrid/CHP efforts for grid Resiliency



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New Jersey Programs and Regulations

- NJ BPU OCE CHP/Fuel Cell Grant Program
- NJ BPU 'REIP' Grant Program for Biofuelled CHP
- No SUT (7% sales tax) on Natural Gas for CHP
- Permit sales of electricity and thermal energy among non-affiliated entities for sale of electricity, the CHP plant must supply thermal to customer
- Air Permit-by-Rule adopted (up to ~ 5 MW)
- Utility Standby Rates currently under review
- NJ HUD Funded 'Energy Resiliency Bank'



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NJ BPU CHP/FC Grant Program

Eligible Technology	Size (Installed Rated Capacity)	Incentive (\$/Watt)	P4P Bonus (\$/Watt) (cap \$250,000)	% of Total Cost Cap per project	\$ Cap per project
Combined Heat & Power					
Powered by non-renewable fuel source	≤500 kW	\$2.00	\$0.25	30-40%	\$2 million
Gas Internal Combustion Engine	>500 kW – 1 MW	\$1.00		30%	\$3 million
Gas Combustion Turbine	>1 MW – 3 MW	\$0.55			
Microturbine	>3 MW	\$0.35			
Fuel Cells	≤1 MW w/ waste heat	\$4.00		60%	\$2 million
Powered by non-renewable fuel source. Incentives available for systems both with and without waste heat recovery.	≤1 MW	\$3.00	45%	\$3 million	
	>1 MW w/ waste heat	\$2.00			
Heat Recovery	>1 MW	\$1.50	30%	\$2 million	
	≤1 MW	\$1.00			
Powered by non-renewable fuel source. Heat recovery or other mechanical recovery from existing equipment utilizing new electric generation equipment (e.g. steam turbine)	>1 MW	\$0.50		30%	\$3 million

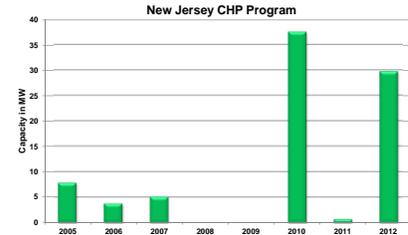
<http://www.njcleanenergy.com/commercial-industrial/programs/combined-heat-power/combined-heat-power-fuel-cells-incentives>



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New Jersey CHP Status

- During this period program consistency was and Issue
- Inconsistent funding
- Economic Turmoil
- Program terminations and restarts



Source: NJ EDA, TRC and BPU



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Maryland CHP Program

- CHP Program
 - Applications run through utilities \$20MM in first round with additional \$20MM approved
 - Provides incentives up to \$2 million
 - Design incentive (\$75/kW)
 - Installation incentive (\$175/kW)
 - Design and Installation capped at \$1 million
 - Production incentive (\$0.07/kWh for 18 months): Three payments subsequent to review of metering data at the end of the 6th, 12th and 18th months. (capped at \$1 million)
- A minimum of 65% efficiency (Higher Heating Value) on an annual basis
- Must not export electricity to the grid
- Projects must be pre-approved by December 31, 2014
- All projects must be commissioned and operational by December 31, 2016

<http://energy.maryland.gov/SENCHP.html>



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BGE Results

- BGE initially received 16 proposals
 - CHP program in April 2012 and received Commission approval in June 2012
 - BGE (\$10.3 million)
 - Proposals were solicited through a RFP process with bids due in December 2012
 - 11 projects initially passed the technical and engineering reviews
 - Gas service upgrades were required on several projects but upgrade costs to customers have been minimum
 - In August 2013 received Commission approval to increase its CHP budget by \$10.7 million and provide incentives for projects approved by BGE by 2014 and completed by 2016
 - Twelve (of 18) CHP proposals making progress towards implementation

<http://www.aesee.org/files/pdf/conferences/m2014C4-W08.pdf>



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Pennsylvania

- PA Act129 – see individual utilities for details
 - Mandates electric utilities reduce demand and throughput on their systems.
 - PECO prescriptive CHP program
 - CHP as custom measure for most other utilities
www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information.aspx
- Commonwealth Financing Authority (CFA)
 - The Alternative and Clean Energy Program (ACE) provides financial assistance in the form of grant and loan funds for the utilization, development and construction of alternative and clean energy projects in the state. The program is administered jointly by the Department of Community and Economic Development (DCED) and the Department of Environmental Protection (DEP), under the direction of the CFA.
www.newpa.com/find-and-apply-for-funding/commonwealth-financing-authority



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Lessons Learned

- Capital Investment Requirements and Load Risk
 - BGE and other experience shows incentives move the market typically require 30% CapX support
 - Smaller size (< 1 MW) CHP plants require higher incentives
 - CFA Grants have been available but not predictable
 - Act 129 EE measures can include CHP but not prescriptive like PV. If 1% of Pennsylvania's electric consumption (1,459,433 MWh) came from CHP this would reduce grid energy use by 1,459,433 MWh and reduce grid peak demand by 196 MW.
 - Long-Term (multi year), Transparent & Consistent metrics
- Poor Recognition of "Externalities" or Societal Benefits and Emissions
 - Cost/Benefit Analysis including Externalities (Societal Cost Test)
 - Better Outreach to all Stakeholders
 - Permit-by-Rule for CHP



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Lessons Learned

- Electric Grid Interconnection, Standby Tariff and No Recognition by PJM as Capacity Resource
 - Expansion of existing Standard Interconnection to greater than 5 MW (Maryland is 10 MW and FERC is 20 MW)
 - Standby Tariff Review and Assessment
 - Need alignment of multiple state constituents on PJM issues
- Lack of CHP Industry Infrastructure
 - Long-term outlook is main industry consideration
 - Requires clear policy signals
 - Owner benefits alone are not sufficient
 - Developers and support industry need to see opportunity



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Lessons Learned

- The PUC can address regulatory hurdles that might exist, via standardized interconnection requirements, timelines, the equity of standby rates and other matters at the utility, on-site generator interface
- The State can review air permitting, and other codes and siting issues, and can encourage CHP in its own capital facilities
- The State can provide Capital Expenditure or procurement incentives that can compensate CHP for the suite of utility system, economic development environmental and societal benefits that the investment provides.



Potential Future

Scenario	Cumulative Net Production (MW)
(A) Low Gas Prices	~400
(B) Permit by Rule	~400
(C) AEC Market	~800
(D) Emission Cap and Cost	~800
Multiple Measures (Permit)	~1000
Multiple Measures (Market)	~1000

This analysis identified the potential for 3,000 to 7,000 new jobs over ten years and retaining between 12,000 and 30,000 jobs. Subsequent to this report the significant development of Marcellus Shale gas adds a potential new and substantial economic development potential from CHP that need to be studied.

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Marcellus Shale Gas Utilization & CHP

- Expanding the PA gas grid to deliver Marcellus Shale gas to the market, particularly PA residents, businesses and industry would benefit from CHP end-use.
- High load factor CHP can help to offset connection costs for low load factor applications such as residences and space conditioning only applications. Furthermore, connecting stranded communities to Marcellus gas could be justified and/or accelerated with CHP end-use. This not only allows local resources to be used but also increases local disposable income through reduction of energy bills.
- Combining low energy prices (Marcellus Shale Gas) with low operating cost (using CHP) will place Pennsylvania in a leading position to attract the next wave of petrochemical development in the US.

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Chemical Industry, MS and CHP

Keeping Pennsylvania Competitive

- "Potential U.S. chemical industry investment linked to plentiful and affordable natural gas has topped \$100 billion. These projects—new factories, expansions, and process changes to increase capacity—could lead to \$81 billion per year in new chemical industry output and 637,000 permanent new jobs across the economy by 2023"
<http://www.americanchemistry.com/Policy/Energy/Shale-Gas>
- "The American Chemistry Council welcomes today's Executive Order that recognizes the important contribution of CHP in improving energy efficiency and easing the major transition underway in America's electricity sector. The President's CHP goal is ambitious, and represents about a 50 percent increase in deployed CHP capacity. Expansion of CHP capacity can make American manufacturers more competitive in the global economy and can stretch our nation's natural gas supplies that benefit a wide variety of industries across the country."
<http://www.americanchemistry.com/Media/PressReleases/Transcripts/ACC-news-releases/ACC-Welcomes-White-House-Executive-Order-to-Boost-Industrial-Energy-Efficiency-and-CHP-Capacity.html>

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