

2005 CHP Action Agenda: Innovating, Advocating, Raising Awareness, and Delivering Solutions

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6th National CHP Roadmap Workshop
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CHP Action Agenda

- Support goal of 92 GW CHP capacity to by 2010
 - CHP Challenge (1998)
 - National CHP Roadmap (2001)
- Need for Situational Analysis as we move forward
 - Progress and accomplishments to date
 - Review status of action items
 - Market conditions between now and 2010
 - Context for the Roadmap workshop process
 - Help identify priorities and additional action items

National Roadmap Priorities: Set the Course to 92 GW

Raising Awareness

National CHP Coordination and Outreach
Federal CHP Coordination and Outreach
Regional/State Coordination and Outreach

Eliminating Regulatory/Institutional Barriers

Output-based Emissions Standards
Streamlined Siting and Permitting
Fair Utility Practices
Equitable Tax Treatment

Developing CHP Markets & Technologies

Commercial Buildings
Industrial, Manufacturing and Process Plants
Federal and State Government Facilities
District Energy, Power Parks, Municipalities

Roadmap – Raising Awareness Action Items

- Implement industry coalitions
 - USCHPA expand outreach activities to states
 - Develop consensus positions on CHP development and deployment
 - Support for industry-government RD&D partnerships
- Implement federal coordination
 - DOE RD&D, CHP education/outreach and FEMP programs
 - EPA CHP Partnership
 - EPA/DOE CHP EnergyStar Awards
- Implement regional and state coordination
 - Regional and state information exchange networks
 - State/federal CHP education and awareness activities
 - Address top priority regulatory and institutional barriers



Roadmap – Regulatory/Institutional Barriers Action Items

- Implement uniform grid interconnection standards
 - Streamlined interconnection procedures in state restructuring
 - Federal legislation for interconnection
 - IEEE uniform interconnection standards that cover CHP
- Implement fair and competitive utility practices
 - Develop standard commercial practices and business terms between utilities and CHP developers
 - Develop model utility principles, tariffs and legislative provisions
 - Develop analysis tools, data and case studies of value of CHP
 - Establish dispute resolution processes and capabilities for CHP
- Implement output-based emissions standards
 - Analyze technical approaches to output-based standards
 - Provide support to EPA to encourage output-based standards
 - Provide technical support to states to develop and use output-based standards
- Implement streamlined siting and permitting
 - CHP permitting guidance and protocols for states
 - National campaign to develop code changes for model code agencies
 - State-specific siting and permitting guidelines and tool kits for designers, developers and installers
 - Pre-certification and permits-by-rule provisions for certain small facilities
- Implement Equitable tax treatment
 - Revise U.S. tax code and define accelerated depreciation schedule



Roadmap – Market and Technology Development Action Items

- **New CHP Capacity Industrial Markets**
 - Demonstrate CHP and energy efficiency best practices
 - Promote output-based emissions standards
 - Industrial CHP RD&D (black liquor/biomass gasification, materials, combustion, power electronics, sensors and controls)
- **New CHP Capacity Buildings Markets**
 - Conduct an outreach campaign (architects, building designers, engineering firms)
 - Support standards development for buildings
 - Cost-shared RD&D (packaged systems, communications/controls, prime movers, TAT)
- **New CHP Capacity District Energy Markets**
 - Launch an outreach campaign
 - Technical assistance to potential CHP users
 - Conduct more demonstrations
- **New CHP Capacity Federal Facilities Markets**
 - New funding sources for CHP
 - Inventory of potential federal CHP sites
 - Requirement for CHP assessment before facility modifications
 - Provide CHP technical assistance to FEMP
 - Develop case studies of CHP at federal facilities



2004 Austin Workshop Action Items

- CHP Utility and Regulatory Issues
 - Identify and promote fair and equitable rate structures for CHP
 - Adopt model approaches to address regulatory and utility barriers
 - Create CHP “Recycled Energy” portfolio standard
 - Incorporate CO₂ benefits into policy position
 - Develop negotiation strategy to bring utilities to the table
- CHP Education and Outreach
 - Integrate CHP into the LEED process
 - Strengthen USCHPA presence
 - Develop quantifiable CHP benefits beyond lower utility bills
 - Develop web-based CHP-specific search engine with frequently asked questions
 - Develop CHP marketing strategy for specific market subgroups
- CHP Technologies
 - Install projects in each target vertical market identified
 - Define best practices for CHP project implementation
 - Develop CHP codes and standards with standard writing organizations
 - Expand packaged IES in both technologies and market applications
- CHP Markets
 - Develop strategy for niche mid-sized industrial markets
 - Create industrial CHP Partners Group
 - Address CHP opportunities in municipal wastewater facilities
 - Monetize utility-related benefits of CHP
 - Establish process for linking to LEED and Green Buildings



Common Themes in 2001 & 2004 Action Items

- Utility and Regulatory Issues/Barriers
 - Same utility barriers need to be addressed
 - Efficiency credit in air quality regulations
 - ***Collaborative analyses and information exchange***
- Education and Outreach/Awareness
 - USCHPA lead organization
 - Regional and state presence needed
 - Specific tools/information for targeted customer segments
 - ***Sharing experiences, information and resources needed for efficient outreach***
- Market Development
 - Regional and state specific issues need to be addressed
 - Targeted market sectors
 - ***Collaborative tools development and information exchange***
- Technology Development
 - Demonstrate performance
 - Broad set of products to address broad base of CHP customers
 - ***Cost-shared RD&D***

Progress and Accomplishments

- 2001-2005 CHP Market Growth Trends
- Accomplishments and completion of action items



CHP Growth Trends

- 2,960 operating sites representing over 82 GW of capacity
- Annual CHP site additions increased from 2001 to 2003 and then decreased in 2004 and 2005
- Decrease in CHP capacity (MW) additions every year since 2001
- While commercial applications make up the majority of new CHP sites, capacity (MW) additions are dominated by industrial applications
- Natural gas has continued to be the dominant fuel for CHP
- Majority of site additions in the 2000-2005 timeframe have been natural gas-fired reciprocating engines less than 1 MW
- Vast majority of recent CHP capacity additions have come from very large projects
- Growth tends to be concentrated in the Northeast, Midwest, Gulf Coast, and West Coast. There has been high project activity in the Midwest, Northeast, and Pacific regions and the large capacity additions due to very large CHP projects in the Gulf Coast

CHP Accomplishments

- Innovating
- Advocating
- Raising Awareness
- Delivering Solutions



Innovating – Technology Development and Commercialization

- Installation, Startup and Operation of DOE Cost-Shared Packaged IES
- Test and Verification of Integrated Energy Systems in Targeted End-Use Markets
- Commercial Availability of Packaged IES
- Transfer of Advanced Prime Mover Technology to Commercial CHP Products



Advocating for CHP

- The Energy Policy Act of 2005
- Federal Energy Regulatory Commission Small Generator Interconnection
- Regional CHP Initiatives
- Air Quality Regulations Recognizing Efficiency Benefits of CHP
- EPA Clean Energy-Environment Guide to Action
- Western Governors Clean and Diversified Energy Program
- Northwest Electric Power and Conservation Plan
- USCHPA Regulatory Toolbox
- Pennsylvania Alternative Energy Portfolio Standard



Raising Awareness – Industry, Government, Regulatory Participants

- CHP Compact
- DOE CHP Regional Application Centers
- Regulatory Education and Regional Power Planning
- EPA/DOE CHP ENERGY STAR® Awards and CHP Certificates
- Ensure LEED Credit for CHP



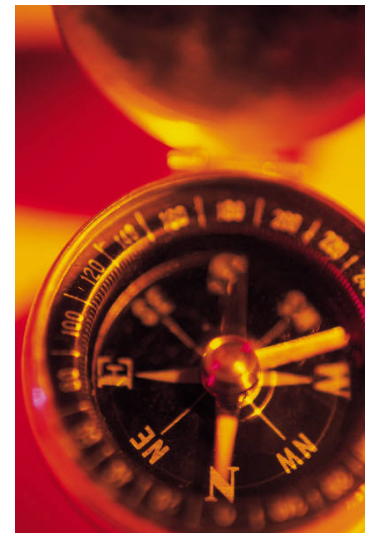
Delivering Solutions – Market Development and Project Implementation

- NYSERDA CHP Demonstration Program
- California Self Generation Incentive Program
- EPA Strategic Markets for CHP: Ethanol
- Targeted Market and Stakeholder Workshops
- DOE Regional Project Development Support and Tool Development
- EPA CHP Outreach and Assistance to Candidate Sites
- Development of Regional Initiative Project Development Tool Kit



Situational Analysis

- Key signposts and indicators show we are well on our way to arriving at the 92 GW
- In 2005, we find the energy industry and CHP market conditions quite different from 2000
- Like so many journeys, the last steps often seem the most challenging



2000 vs. 2005

1998-2000	2005-2010
<ul style="list-style-type: none"> • “Deregulation” inevitable 	<ul style="list-style-type: none"> • California experience slows or stops “deregulation,” and continuation of individual state-by-state regulatory structure distinctions appears inevitable. • FERC’s Standard market design is first attacked by states, then in Congress, and then withdrawn by FERC. May come piecemeal and by different name
<ul style="list-style-type: none"> • Stable, low natural gas prices 	<ul style="list-style-type: none"> • Natural gas prices projected to remain high and supply tight
<ul style="list-style-type: none"> • New generation of generation technology 	<ul style="list-style-type: none"> • Mixed commercialization success and operating experience
<ul style="list-style-type: none"> • Anticipated demand for high reliability power 	<ul style="list-style-type: none"> • Major blackouts illustrate deficiencies of electric grid • Weather events resulting in notable blackouts (ice storms and hurricanes)

2000 vs. 2005 continued

1998-2000	2005-2010
<ul style="list-style-type: none"> Major disruptions due to natural disaster or act of terrorism considered an extremely low probability event 	<ul style="list-style-type: none"> Need for a coordinated national security strategy and disaster response plans increasingly focus on need to sustain electricity grid and reliability September 11 attacks demonstrate that intentional disruptions of grid must be within scope of contingency planning
<ul style="list-style-type: none"> Digital equipment and e-commerce driving projected need for increased power quality 	<ul style="list-style-type: none"> Still the case, but accompanied by growing public awareness of unreliability of grid and desire to preserve value despite potential disruptions, generally leading to installation of back-up generation and UPS (uninterruptible power systems) rather than base-load CHP
<ul style="list-style-type: none"> Projected replacement of major capital-intensive energy equipment 	<ul style="list-style-type: none"> Regulatory uncertainty delaying investment in infrastructure Transmission system needs upgrades but lack of incentives for investment Baseload generation capacity currently sufficient Localized needs for more capacity to meet peak and installed capacity requirements

2000 vs. 2005 continued

1998-2000	2005-2010
<ul style="list-style-type: none">Localized rising energy prices	<ul style="list-style-type: none">Multiple years of energy price volatility and high prices nationwide impacting spark spreads and risk allocation. Regional differences widen. Electricity rate increases lag fuel price increases due to local rate freezes, cost-of-service ratemaking, and influence of relatively unaffected coal, nuclear, and hydro generation, creating poor “spark spread” economic conditions for CHP
<ul style="list-style-type: none">Natural gas fueled combined cycle boom	<ul style="list-style-type: none">Energy supply and capacity adequacy concerns promise to motivate fuel diversity/flexibility, renewable portfolio standards, energy efficiency/conservation and demand response programs; actual responses few and weak in light of excess gas-fired capacity

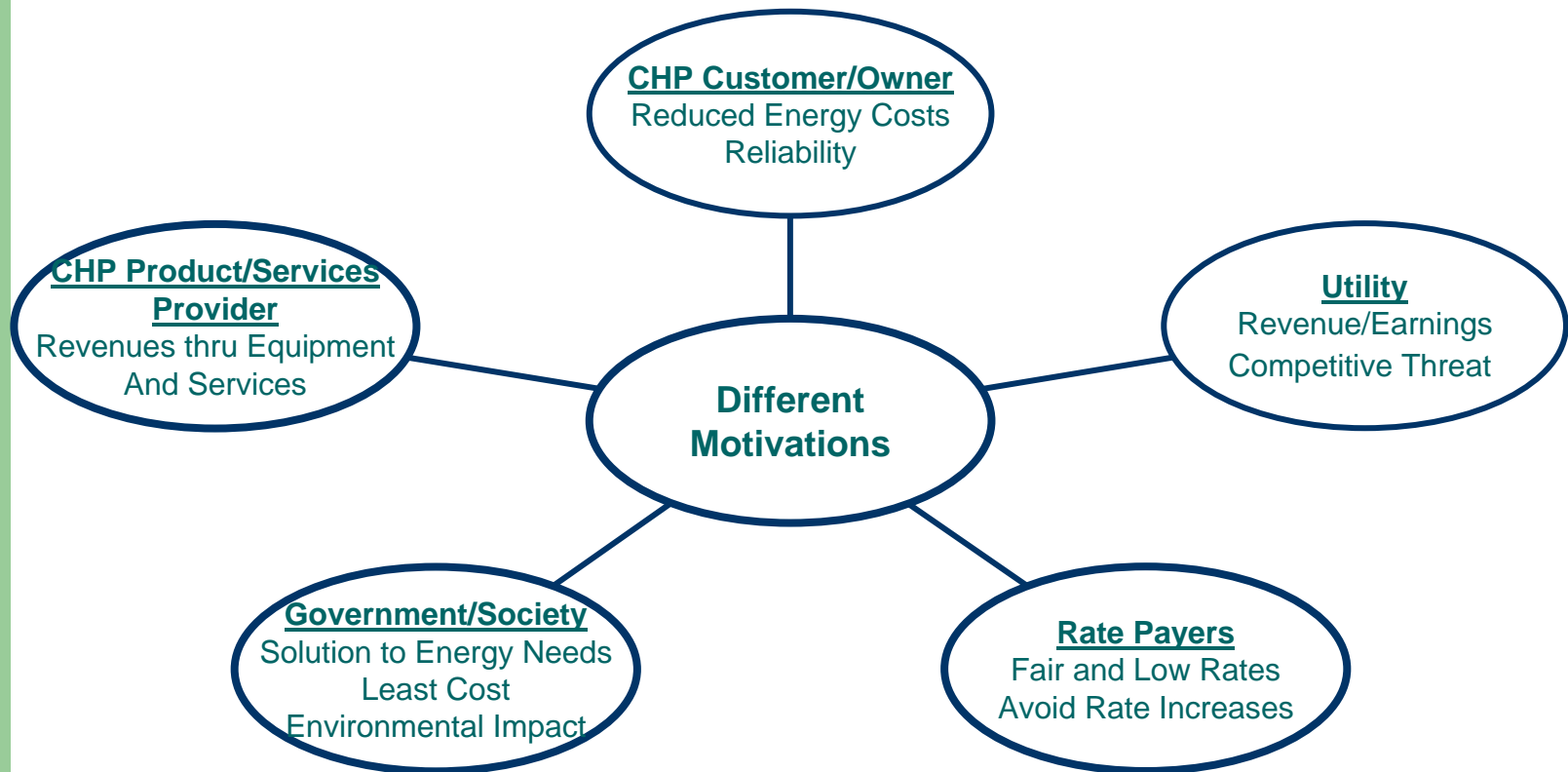
2000 vs. 2005 continued

1998-2000	2005-2010
<ul style="list-style-type: none">• Lower electricity prices due to “deregulation” widely projected	<ul style="list-style-type: none">• Utility tariffs and rates likely to be increased after period of being frozen
<ul style="list-style-type: none">• Air quality concerns	<ul style="list-style-type: none">▪ Still the case▪ Output-based standards adopted in some states
<ul style="list-style-type: none">• Interconnection requirements and open access issues for non-utility entities	<ul style="list-style-type: none">▪ Improved interconnection processes available in numerous states, with promising standardized models emerging for faster procedures.▪ IEEE 1547 passed and being implemented for standardized and authoritative technical guidance.▪ FERC small generator interconnection rules adopted to apply in FERC-jurisdictional areas

Market Conditions

- Volatility and increase in natural gas prices
 - Regional spark spreads affected
 - Tight supply
 - Natural gas still remains the dominant CHP fuel
- Market restructuring
 - Wholesale (ISO/RTO) vs. retail markets (utilities)
- DG and TAT technology development
 - Improved performance, reliability, emissions, and costs required
 - Fuel diversity (e.g., biomass and landfill gas)
- Grid reliability, energy security, and business continuity
 - Events of past few years revealed vulnerability of grid
 - With lack of incentive to invest by grid owners and operators, users will seek out solutions on their own to limit exposure to losses from service disruption
- Air quality and emissions regulations
 - States have or are in the process of modifying air quality regulations applicable to CHP
 - Output-based regulations in some states
- State and regional advocacy
 - State activity on a host issues will continue to be high (interconnection, utility tariffs, RPS, clean energy programs)
 - Rapid response to state utility commissioners needed
- Market activity
 - Price of natural gas viewed as primary contributor to decreased market activity
 - States with CHP incentive programs leading in CHP activity
 - EPACT incentives

CHP Stakeholders



CHP Moving Forward

- Consider the energy market conditions we face as we proceed forward, our accomplishments to date, the lessons learned along the way, and the most compelling value propositions CHP offers in today environment
- What can the CHP community do to ensure our goal is achieved and potential of CHP is fulfilled?
 - Priority issues
 - Needed actions
 - Required resources

CHP: A Valuable Solution

