

5th Annual CHP Roadmap Workshop

September 20-21, 2004

BREAKOUT GROUP RESULTS

November 2004

CHP TECHNOLOGIES

SUMMARY

Since 1998, many improvements have been made in the efficiency of CHP technologies and the development of packaged–integrated–combined heat and power systems. Integration of CHP products and systems with renewables, biofuels, and a variety of prime movers has improved the market substantially.

The need to increase emphasis on “bottoming-cycle” systems remains, as well as the use of opportunity fuels in CHP systems. There also continues to be a need to improve the dissemination of information on integrated systems, and the success that various vertical markets are having in introducing CHP technologies into their buildings and industrial and commercial settings. Optimization of packaged systems with packagers and end-users in specific market segments—including office buildings, schools, hotels, and health clubs—is still needed.

Key action items identified during the CHP Technologies Breakout Group address standard methodologies that measure efficiency and emissions; expanded packaged systems design, installation, commissioning, and operations; continual education to end user groups and the design community; integration of CHP systems in additional vertical markets; and development of effective business models on CHP that can be marketed to utilities.

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TABLE 1. CHP TECHNOLOGIES ACTIONS FOR 2005

◆ = HIGHEST PRIORITY

REGULATORY ISSUES	INTEGRATED ENERGY SYSTEMS	EDUCATION	VERTICAL MARKETS	GAS AND ELECTRIC UTILITIES
<ul style="list-style-type: none"> • Continue ASHAE standards work so design A/Es can specify systems ◆◆◆◆◆◆◆◆◆◆ • Develop standard methodologies to measure efficiency and CHP ratings ◆◆◆◆◆ • Find mechanism to work with utilities to develop a fair method to evaluate benefits of and obstacles to installing CHP ◆◆◆◆◆ • Certify prime movers as using "Green Fuels" ◆◆ • Design tariffs as CHP friendly ◆ • Support the U.S. Green Building Council LEED Program • Develop incentive-oriented regulation to encourage utilization of CHP 	<ul style="list-style-type: none"> • Package systems up to 1 MW ◆◆◆◆◆◆◆◆◆◆ • Expand IES program to additional manufacturers and products (including steam) ◆◆◆◆◆◆◆◆◆◆ • Baseline intelligent/packaged systems, highlight new packaged systems, work with DOE to improve them ◆◆◆◆◆◆◆◆◆◆ • Create Best Practices applications, design, installation, commissioning and operation of CHP systems ◆◆◆◆◆◆◆◆◆◆ • Include steam turbines ◆◆◆◆◆◆◆◆◆◆ • Develop CHP control systems for performance improvement ◆◆◆◆◆◆◆◆◆◆ • Look to multi-system applications more than one prime mover type ◆◆◆◆◆◆◆◆◆◆ • Develop expert systems for IES units (i.e., automated T/S guide) • Correlate markets with range of sizes to determine best fit for S/M/L systems • Expand thermal use technologies 	<ul style="list-style-type: none"> • Present IES systems to end user groups to future optimize system patents ◆◆◆◆◆◆◆◆◆◆ • Obtain DOE/state funding to demonstrate CHP systems by industry/commercial application ◆◆◆◆◆ • Support integrated buildings concepts ◆◆◆◆◆ • Evaluate CHP success in other countries: drivers, efficiency use tax incentives, etc. ◆◆◆◆◆ • Carry out more comprehensive engineering – economic analysis ◆◆◆◆◆ • Have more public relations events to make even "common folk" understand benefits of CHP technology in small applications (maybe the elected leaders will follow) ◆◆◆◆◆ • Develop energy opportunity prospects for new system integrators ◆◆◆◆◆ • Develop education and outreach program to spread word on IES success to target markets (utilize RACs) ◆◆◆◆◆ • Produce white paper on future of energy prices and emissions • Conduct case studies 	<ul style="list-style-type: none"> • Get universities involved in IES projects ◆◆◆◆◆◆◆◆◆◆ 	<ul style="list-style-type: none"> • Develop business model for CHP geared toward utilities ◆◆◆◆◆◆◆◆◆◆

TABLE 2. CHP TECHNOLOGIES ACTION PLAN

ACTION	DESCRIPTION	KEY ACTIVITIES	MILESTONES AND DEADLINES	LEAD AND SUPPORT ORGANIZATION	IMMEDIATE NEXT STEPS
Need to Get Projects Installed in Each Vertical Market	<ul style="list-style-type: none"> Reference projects in each vertical market are essential to "jump start" CHP 	<ul style="list-style-type: none"> Benchmark Verification of vertical markets Identify gaps Sell, sell, sell Fill gaps 	<ul style="list-style-type: none"> Benchmark work already done b IDEA, DOE, USCHPA, RACs, and IAC <ul style="list-style-type: none"> 6 months done as soon as possible Verification of vertical markets Technologies Economics Identify gaps +6 months - 1 year Fill gaps – 9 months 	<ul style="list-style-type: none"> USCHPA IDEA DOE EPA All CHP Stakeholders 	<ul style="list-style-type: none"> Sell, sell, sell Case studies
Define Best Practices for Implementing CHP Projects	<ul style="list-style-type: none"> Project analysis Design Installation Commissioning Operations 	<ul style="list-style-type: none"> Assemble team Identify all critical elements Draft, review issue 	<ul style="list-style-type: none"> Assemble Team – 1 month Identify elements – 2 months Draft, review, issue – 6 months 	<ul style="list-style-type: none"> DOE customers Engine Association USCHPA Vendors A&E's 	<ul style="list-style-type: none"> Identify CHP champion Put together Subcommittees Schedule Funding Publicize and distribute practices
CHP Codes and Standards	<ul style="list-style-type: none"> Create an industry-accepted (ASHRAE and LEED) standard for using CHP in buildings 	<ul style="list-style-type: none"> Lobby U.S. Green Buildings Council and ASHRAE Participate in crafting of new standards 	<ul style="list-style-type: none"> Get on agenda – 6 months Initiate activity of standards development – 1 year Approval of standards – 2 years 	<ul style="list-style-type: none"> USCHPA regulatory group (ORNL, DOE, A/E's equipment manufacturers) 	<ul style="list-style-type: none"> Designate representatives Encourage participation Acknowledge success
Expand Modular Integrated and Packaged Systems (IES)	<ul style="list-style-type: none"> Advance from: <ul style="list-style-type: none"> Small microturbine and heat recovery 500 kW recip and chiller 5 MW turbine and chiller To: <ul style="list-style-type: none"> Steam/turbine Other TATs, including desiccants and hydronics Identify missing market units 	<ul style="list-style-type: none"> Develop "missing" module RFP for demonstration Design RFP for broader integrated and 2nd phase demonstration systems Obtain legislative support 	<ul style="list-style-type: none"> Now <ul style="list-style-type: none"> Budget 2005 RFPs 1-3 years – 2008 <ul style="list-style-type: none"> Product development Peer Reviews Long term – 2009-2010 up to 5 years <ul style="list-style-type: none"> Market integration and penetration 	<ul style="list-style-type: none"> DOE ORNL Manufacturers System Integrators 	<ul style="list-style-type: none"> Immediate <ul style="list-style-type: none"> Budget for 2005 Legislative support

ACTION	DESCRIPTION	KEY ACTIVITIES	MILESTONES AND DEADLINES	LEAD AND SUPPORT ORGANIZATION	IMMEDIATE NEXT STEPS
Enhance Utilization of Packaged CHP Systems	<ul style="list-style-type: none"> • Improve system performance • Define baselines • Develop success stories of packaged CHP systems 	<ul style="list-style-type: none"> • Improve: DOE and manufacturing distributor effort underway • Baseline: develop database of packaged CHP systems and capabilities • Baseline: develop energy-use profiles of typical end users • Baseline: develop a program as a decision tool for owner operators in selecting CHP • Case studies: continue to develop and publish 	<ul style="list-style-type: none"> • Database 25 case studies – 1 year • Complete selection tool – 1 year 	<ul style="list-style-type: none"> • USCHPA • DOE 	<ul style="list-style-type: none"> • Contract to develop database and selection tool

CHP MARKETS

SUMMARY

Much of the increase in U.S. CHP capacity since 1998 has been in the following market segments: large industrial plants, merchant power plants, and district energy systems. These projects tend to be large and well financed. Slowdowns in the last several years are largely due to increases in natural gas prices. Progress in addressing institutional and regulatory barriers has benefited smaller-scale CHP, as have efforts to develop and field test packaged CHP systems designed specifically for use in buildings.

Because of the recent slowdowns, and prevailing conditions in natural gas markets, there is a general need to re-double CHP marketing efforts to all market segments and sectors, and to evaluate areas that may not have received enough attention.

These include:

- ◆ Medium and small sized industrial niche markets (3-15MW), including pharmaceutical manufacturing and food processing plants
- ◆ Municipal wastewater treatment plants
- ◆ Farm and rural agricultural facilities
- ◆ “Green” buildings
- ◆ Residential single family dwellings

There is also a need to study trends in manufacturing and sectoral shifts in the economy to identify growth areas and target developers and A&E firms who are constructing facilities with information on the costs and benefits of CHP.

The best strategy for marketing CHP continues to be to focus on markets and applications where project economics result in favorable paybacks for end users. This means continued focus on traditional CHP markets such large industrial plants (e.g., chemical plants, petroleum refining, pulp and paper mills) and district energy systems. However, to address new and emerging markets there are other “drivers” that should be considered and used more extensively. These include:

- ◆ Fears about blackout and the high economic losses that can result
- ◆ Concerns about homeland security and the need to protect assets from terrorist threats
- ◆ Rising public and corporate interest in sustainable and “green” solutions

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TABLE 3. LIST OF ACTIONS, PRODUCTS, AND SERVICES TO EXPAND CHP MARKET APPLICATIONS AND INCREASE CHP INSTALLATIONS

◆ = HIGHEST PRIORITY

CHP TECHNOLOGY AND EQUIPMENT	MARKET INCENTIVES FOR CHP	REGIONAL CHP STRATEGIES	LARGE INDUSTRIAL AND MERCHANT POWER MARKETS	LARGE AND MEDIUM INDUSTRIAL MARKETS	ELECTRIC UTILITY MARKETS FOR GRID SUPPORT
<ul style="list-style-type: none"> • Modular, easy-to-install skid mounted CHP systems for commercial buildings and medium to small industrial facilities ◆◆◆◆◆◆◆◆ – Moveable assets • Low-quality heat devices for cooling ◆◆◆◆◆◆◆◆ – e.g., ORCs, absorption chillers, desiccant humidity control • Fuel processing devices for converting wastes to fuel ◆ • Small-scale coal CHP systems ◆ • Hydrogen-CHP systems ◆ • Large-scale coal CHP systems (lower cost and cleaner) • Modular, limited purpose, easy to install packages that don't need to interconnect • Devices that do both CHP and anaerobic digestion • Cost-effective emissions control systems • Ultra low emission, easy to operate, industrial gas turbines 	<ul style="list-style-type: none"> • Strategy for monetizing emissions reduction credits ◆◆◆◆◆◆◆◆ • More favorable tax/depreciation schedules for CHP ◆◆◆◆◆◆◆◆ • Electricity pricing transparency ◆ • CHP payments for avoided costs • Comprehensive energy resources planning (supply, demand response, renewables, CHP) • Tax benefits for the reduction of agricultural or municipal waste from CHP 	<ul style="list-style-type: none"> • SWAT team approach for key niche markets on regional basis ◆◆ • Rebuilding in Florida following hurricanes ◆ • Targeted regional information about CHP to members of Congress ◆ 	<ul style="list-style-type: none"> • Government financial participation in large scale CHP (risk buy-down like Clean Coal Demo Program) ◆◆ • Work with Clean Coal coalitions to promote coal CHP and tap existing marketing activities 	<ul style="list-style-type: none"> • Niche strategy for medium and light industrial CHP markets (3-15MW) ◆◆◆◆◆◆◆◆ – e.g., pharmaceuticals, food processing • Create industrial “CHP partners” group to push installations, target sustainability, and document best CHP practices ◆◆◆◆◆◆◆◆ • Conduct more industrial energy audits 	<ul style="list-style-type: none"> • Monetize utility and grid-related CHP benefits ◆◆◆◆◆◆◆◆ • Allow distribution companies to own DG/CHP • Assistance to developers with understanding/accomplishing grid interconnection

**TABLE 3. LIST OF ACTIONS, PRODUCTS, AND SERVICES TO
EXPAND CHP MARKET APPLICATIONS AND INCREASE CHP INSTALLATIONS (CONTINUED)**

DISTRICT ENERGY MARKETS	MUNICIPAL WASTE PLANTS	FARM AND RURAL AGRICULTURAL MARKETS	BOTH MUNICIPAL WASTE AND FARM MARKETS	COMMERCIAL AND INSTITUTIONAL BUILDINGS MARKETS	FEDERAL FACILITIES	RESIDENTIAL – SINGLE FAMILY MARKET
<ul style="list-style-type: none"> Assess industrial clustering opportunities for CHP and coordinate with industrial ecology groups 	<ul style="list-style-type: none"> Targeted campaign to establish dialog with key municipal waste associations ◆◆◆◆◆◆◆◆◆◆ – e.g., WEF, WERF, AMSA Strategies for using thermal energy from landfill gas-to-energy projects to nearby industrial facilities ◆◆◆◆ Maintenance services for CHP in municipal waste plants 	<ul style="list-style-type: none"> Collaborate with biomass advocacy groups and seek to capture funding from Farm Bills ◆ Targeted campaign to ethanol plants managers, A&E firms, and interested political leaders ◆ 	<ul style="list-style-type: none"> Develop market models for opportunity fuels ◆◆◆◆ 	<ul style="list-style-type: none"> Implement strategy for linking with LEED and various green buildings councils ◆◆◆◆◆◆◆◆◆◆ Develop business models for mix-use buildings and link to urban planning ◆◆◆◆◆ Target “sweet spots” in hospitals ◆◆ Focus on new buildings where CHP economics can be “credited” with offset capital (e.g. need for upgrade/replace boilers, chillers, standby generators) New business rules for 3rd party CHP owners and operators 	<ul style="list-style-type: none"> Establish partnership with DHS ◆◆◆◆◆◆◆◆◆◆ – Targeted education materials – Market assessment of first responder facilities and level one trauma centers 	<ul style="list-style-type: none"> Design strategy for home CHP systems that can be mass marketed ◆◆◆◆ Investigate use of natural gas vehicles that can be used in CHP mode to provide energy to homes

TABLE 4. CHP MARKETS ACTION PLAN

ACTION	DESCRIPTION	KEY ACTIVITIES	SCHEDULE/MILESTONES	PARTICIPANTS	IMMEDIATE NEXT STEPS
Develop strategy for niche, mid-size industrial markets	<ul style="list-style-type: none"> Focus on High Priority Opportunities <ul style="list-style-type: none"> e.g. pharmaceuticals, food processing 	<ul style="list-style-type: none"> Screen for target applications (feasibility, economics, “desperation” drivers) Strategy for CHP implementation 	<ul style="list-style-type: none"> 3-4 targets by 12/04 Drill down for subsectors by 1Q 2005 Have regional strategies and targeted information to RACs by 4Q 2005 	<ul style="list-style-type: none"> Lead: DOE, EPA, CEC, NYSERDA, ORNL Support: USCHPA, Trade Associations 	<ul style="list-style-type: none"> Identify 3-4 target niches
Create industrial “CHP Partners” Group	<ul style="list-style-type: none"> Boost demand for CHP Among Key Industrial Users <ul style="list-style-type: none"> Sustainability theme, advertise best practices 	<ul style="list-style-type: none"> Identify national organizations with goals served by CHP Examine membership lists of EPA CHP Partners Find key associations in key industries and promote CHP, e.g. ACC, NPRA, Food Processors 	<ul style="list-style-type: none"> Identify target companies and trade groups Develop approach and marketing materials Implement approach Organize for follow up 		<ul style="list-style-type: none"> Organize a subcommittee of USCHPA volunteers
Address CHP opportunities in municipal wastewater facilities	<ul style="list-style-type: none"> Link USCHPA with Key Wastewater Groups 	<ul style="list-style-type: none"> Contact major water engineering associations and engineering companies Conduct case studies of existing CHP installations Conduct targeted outreach and workshops Conduct technology review 	--	<ul style="list-style-type: none"> Lead: EPA, NYSERDA, Cinergy and other developers Support: WEF, AMSA, WERF, ASERTTI, NASEO, National League of Cities, RACs, EPA Revolving Loan Fund, Wisc Focus on Energy 	<ul style="list-style-type: none"> Contact NYSERDA and get CHP question into AMSA study Plug into WERF, etc. Benchmarking study 2-pager on benefits Check retrace econ. eval. for biogas CHP
Monetize utility-related benefits of CHP	<ul style="list-style-type: none"> Collaborations (Win-Win) Between Utilities and CHP/DE 	<ul style="list-style-type: none"> Develop methods/data for cost transparency in utility planning Remove regulatory disincentives to utilities (IOUs) Estimate economic benefits to utilities of using CHP/DE 	<ul style="list-style-type: none"> Multi-year effort Complete summary of existing efforts within one year 	<ul style="list-style-type: none"> Lead: “Open minded” utility such as DTE Support: DOE, RACs, USCHPA 	<ul style="list-style-type: none"> Identify utility models for IRP and LMP that monetize costs of electric delivery on geographically disaggregated basis
Establish process for linking strongly to LEED and various green buildings councils	<ul style="list-style-type: none"> Assess GBC/LEED Adopters for CHP Applications Across Multiple Facilities <ul style="list-style-type: none"> Clarify points value from CHP for LEED 	<ul style="list-style-type: none"> Identify LEED adopters Assess their energy uses/values/needs Propose CHP points calculation methods Targeted CHP materials to certified A&E firms 	<ul style="list-style-type: none"> USCHPA joins GBC by 11/1 Obtain GBC/LEED adopter list by 11/1 Get LEED proceedings to USCHPA members by 11/1 USCHPA joins points groups ASAP Case studies, papers, and booth materials for 9/05 GBC conference 	<ul style="list-style-type: none"> Lead: USCHPA Members on scouting committee Members in A&E education 	<ul style="list-style-type: none"> Join GBC Get USCHPA member volunteers to do initial staff work

UTILITY AND REGULATORY ISSUES

SUMMARY

Since 1998, a significant amount of activity has occurred in the utility regulatory, environmental, and legislative areas in an effort to reduce barriers to CHP implementation. However, more tools, products, and services need to be developed to better arm decision makers with the information needed to create CHP-friendly regulations and policies.

The need for fair and equitable rate structures continues to dominate the CHP utility regulatory arena. Incentives for utilities to embrace DG and CHP need to be created and a negotiation strategy to “bring utilities to the table” should be developed. Rates need to be made neutral between customers with and without CHP. Utility revenues need to be made independent of throughput on the T&D system. Locational pricing strategies and incentives need to be developed. Utility business practices should be standardized with a consistent approach for timing and fees. Public utility commissions should be required to more clearly separate the components of reliability and the costs associated with each.

The need for the development and dissemination of additional “model” utility regulatory principles, tariffs, and legislative provisions for DG and CHP projects still exists. Creating model utility distribution service rate designs and tariffs that demonstrate customer choice in level of service would be one approach. Working with the Regulatory Assistance Project (RAP) to develop model regulatory standards would be useful. Exit and standby fees need to be challenged; the CHP community needs to work with NARUC on the establishment of reasonable/customary standby charges. The role of the distribution utility in DG/CHP development needs to be better clarified in order to prevent anti-competitive actions.

Analysis of the merits of output-based standards has been conducted and now it is time to be sure that regulators have this information readily available. The CO₂ benefits of CHP should be better disseminated; one idea is through the establishment of a database that converts “Gigawatts installed” into “CO₂ emissions abated.” A CHP portfolio standard could be established by converting the roadmap goal into percentage age of load. Finally, a CHP “Recycled Energy” Portfolio Standard could be established as a separate category or sub-category under “Renewables” Portfolio Standards.

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A fair and accurate definition of CHP efficiency still needs to be developed, and the development and promotion of a standard and accepted methodology for giving credit for thermal in all proceedings is needed. CHP “champions” need to be identified at regulatory bodies in all states. The CHP community needs to assess what it is doing in the ever-growing area of homeland security.

TABLE 5. LIST OF TOOLS, PRODUCTS, AND SERVICES TO ARM DECISIONMAKERS WITH THE INFORMATION NEEDED TO CREATE CHP-FRIENDLY REGULATIONS AND POLICIES

◆ = HIGHEST PRIORITY

UTILITY	ENVIRONMENT	LEGISLATIVE/PUBLIC POLICY
<ul style="list-style-type: none"> • Identify and promote fair and equitable rate structures for CHP ◆◆◆◆◆◆◆◆◆◆ - Establish a marginal distribution capacity cost in order to pay CHP for value created by locating in congested areas (T&D capacity planning process) - Require PUCs to separate more clearly the components of reliability, and the cost associated with each. - Establish PUC rate drivers for CHP projects - Design rates that are neutral between customers with and without CHP - Utility revenues independent of throughput on T&D - Utility business practices – develop standard approach for timing/fees, etc. - Require utilities to offer uninterruptible class of service – driving them by necessity to DG/CHP - Economic value (PBR, PBS), AE, indifference • Develop model rule and principles for standby tariff ◆◆◆◆◆◆◆◆◆◆ - Model utility distribution service rate designs and tariffs – customer choice in level of service (pay for what you use) - Develop Regulatory Assistance Project (RAP)/NRRI-style model regulatory standards (work with RAP to develop) - Challenge exit fee and standby/reservation charges - Work with NARUC on reasonable/customary standby charges - Model utility-tariff and standby; barrier reduction regulation and legislation - Clarify role of distribution utility in DG/CHP development (anti-competitive actions) • Develop negotiation strategy to bring utilities to the table ◆◆◆◆◆◆ - Encourage utility ownership of CHP • Encourage utilities to address new load with CHP/develop method for incorporating CHP into integrated resource planning (IRP) ◆◆ • Publicize facts of NStar case (and others) that can be leveraged in future standby cases ◆◆ • Cost-sharing for grid improvements avoidance ◆ • Define CHP as demand-side management (DSM) ◆ 	<ul style="list-style-type: none"> • Incorporate CO2 benefits into policy position ◆◆◆◆◆◆◆◆◆◆ - Use CHP database to convert GW installed into CO2 emissions abated. Create/develop as an RPS or recycled energy standard (RES). • Establish CHP portfolio standard (convert roadmap goal into percentage age of load) ◆◆◆◆◆◆◆◆◆◆ - Qualify all recycled energy as renewable energy • All states apply/adopt uniform output-based emissions ◆ • Incorporate CHP/EE in SIPs (educate states on how to do this) ◆ • Identify utility consumer savings from CHP and communicate to consumer advocates ◆ • Work with air regulator to credit clean CHP through existing programs. Streamline emission reduction credits and emissions allowances to lower transaction cost for small CHP ◆ • Establish agreed-upon values for CHP savings: greenhouse gas savings, transmission infrastructure and line losses • Environmental L.E.E.D. promote/grown CHP to earn up to 6+ points if done <i>right</i>; increase potential points 	<ul style="list-style-type: none"> • Develop fair and accurate definition of CHP efficiency/performance ◆◆◆◆◆ - Engage ASHRAE to assist in standards for CHP efficiencies (like 90.1 targeted to CHP) • Develop and promote standard and accepted methodology for giving credit for thermal in all proceedings ◆◆◆◆◆ • Recruit and educate/identify “champions” at regulatory bodies in all states (Example, Chairman Flynn in N.Y., Chairman Soward in Texas) ◆◆◆◆◆ • Increase size advocacy to <i>all</i> sizes ◆◆◆◆ • Tie economic development and jobs to CHP (communicate to PUC and state legislatures) ◆◆◆◆ • Homeland security – need to assess: what are we doing? ◆◆◆◆ • Tax incentives and barriers – get IRS to clarify depreciation for CHP; encourage state-level credits; ITCs or niche credits such as brownfield sites ◆◆ • Create campaign/document that captures/quantifies all public benefits of CHP ◆ • Develop white papers (or other materials and strategies) that address intersection of environmental legislation, rates, and benefits for regulators ◆ • Net metering for CHP ◆ • Existing case study examples (EPA and CARS) – economic viability, environmental value, fuel feedstock reduction ◆ • Pass laws to ban commissioners from going to work for utilities five years after term ends◆ • Obtain support from state public counsel • Get results of USCHPA natural gas study to regions • Engage IDEA (and similar organizations) – there are too many district energy systems built without recycled energy; mandate incentive from GENCO to buy kW from CHP serving DE

UTILITY	ENVIRONMENT	LEGISLATIVE/PUBLIC POLICY
<ul style="list-style-type: none"> • Develop pre-certification procedures/standards for interconnection • Highlight CHP-friendly utilities to other utilities (models, conferences, references) 		<ul style="list-style-type: none"> • Develop analysis tools, data, and case studies for assessing the value and impacts of district energy systems and CHP on local electric and natural gas district systems (page 12 of matrix) • Create political environment that makes it impossible for PUCs to be quietly incompetent (media campaign) • Support rapid resolution of utility restructuring uncertainty (for utilities and PUCs) • Municipal revenue bonds – allow for CHP • Encourage workshop presenting “out of the box” ideas to overcome low spark spreads

TABLE 6. CHP UTILITY AND REGULATORY ISSUES ACTION PLANS

ACTION	DESCRIPTION	KEY ACTIVITIES	MILESTONES AND DEADLINES	LEAD AND SUPPORT ORGANIZATION	IMMEDIATE NEXT STEPS
Identify and promote fair and equitable rate structures for CHP		<ol style="list-style-type: none"> 1. PBR (utility cost recovery) 2. Capital planning/resource acquisition 3. Analyze average-embedded vs. forward-looking costs allocation 4. Neutral rate designs that expand customer choices for regulated services 5. Tariff details/standard utility business practices 		<ul style="list-style-type: none"> • Initiatives and RACs (Lead) • Professional organizations (NRRI, NARUC, NRDC) (Support) 	<ul style="list-style-type: none"> • Identify and contact key experts and stakeholders
Adopt model barrier reduction regulations/legislation	<ul style="list-style-type: none"> • Develop model rules for standby tariffs 	<ol style="list-style-type: none"> 1. Assemble experts and stakeholders 2. Draft principles 3. Draft model tariffs and legislation 4. Outreach 		<ul style="list-style-type: none"> • Initiatives and RACs (Lead) • Professional organizations (NRRI, etc.) (Support) 	<ul style="list-style-type: none"> • Convene principle drafting workshop(s) • Draft principles and contact NARUC
Create CHP “Recycled Energy” Portfolio Standard	<ul style="list-style-type: none"> • Thermal energy is national resource • Free, clean, reliable • Separate category or sub-category under Renewables 	<ol style="list-style-type: none"> 1. Craft definition 2. Play in upcoming Presidential election 3. Define key stakeholders 	<ol style="list-style-type: none"> 1. Started/now 2. Engage Campaign/by October 1 3. Friend/foe regulatory/legislative contact list/by December 1 	<ul style="list-style-type: none"> • USCHPA/Industry 	<ul style="list-style-type: none"> • Establish Champion
Incorporate CO2 benefits into policy position	<ul style="list-style-type: none"> • Develop modeling and reporting of CO2 impacts of CHP in two pilot regions (Northeast and Gulf Coast) 	<ol style="list-style-type: none"> 1. Complete the model (get buy-in) 2. Complete the reports 3. Integrate this information into community's message 	<ol style="list-style-type: none"> 1. 3+ months 2. 6 months 3. Complete by next Roadmap workshop 	<ul style="list-style-type: none"> • EPA, NESCAUM, NYSERDA, NECHPI, Gulf State RAC, NRDC, WRI, CLF, WWF 	<ul style="list-style-type: none"> • Convene two working groups in each region
Develop negotiation strategy to bring utilities to the table		<ol style="list-style-type: none"> 1. Support regulatory change to allow profit for utility 2. On non-capital investment 3. Encourage utility ownership of CHP 4. Support emissions credits to utilities for CHP portfolio 	<ol style="list-style-type: none"> 1. 6 months 2. 6 months 3. 6 months 4. Complete by next Roadmap workshop 	<ul style="list-style-type: none"> • DOE filter; Regional Application Centers • RAP • DOE filter and Regional Application Center studies • EPA filter; Regional Application Centers and ? 	<ul style="list-style-type: none"> • Find success stories in California, Texas to use as models • Find out if anyone is doing it/make model rule • Find examples of utility-owned CHP and show it off to peers • Identify utility that cares about emissions credit

CHP EDUCATION AND OUTREACH

SUMMARY

Although the use of combined heat and power has grown significantly in the last five years, there remains a need to continue and enhance across-the-board education, awareness, and outreach activities. Such activities have helped to expand CHP products and services in federal, regional, state, and local communities, and in market segments such as hospitals, health care environments, public and government buildings, colleges and universities, and industrial facilities throughout the country. Education, awareness, and outreach activities have included establishment of the trade association, the U.S. Combined Heat and Power Association (USCHPA), development of industry-government research, development, and demonstration partnerships for “next generation” CHP systems, subsystems, and components; publication of success stories; expanded RD&D programs that affect CHP, such as advanced turbines, micro-turbines, and advanced materials; expanded efforts to install CHP in Federal government facilities; improved state and regional information exchange networks through the CHP Initiatives and Regional Application Centers; development of targeted CHP case studies for all end use sectors; among other accomplishments.

There is still much to be accomplished in providing consistently accurate and clear information on CHP, and in providing education, training, and outreach on CHP opportunities throughout vertical markets. Among the most pressing needs are development of tools, such as web-based information, reports, white papers, etc. that provide accurate and timely information; information organization and management for easy and prompt retrieval; market research; outreach to the regulatory community; targeted marketing and educational materials; training to various groups; and better marketing and public relations about CHP technology, its uses, and its impact on energy supply and demand.

Key action items identified during the CHP Education and Outreach Breakout Group address development of fact sheets for both web and hard copy that can reach out to regulators, legislators, and technologists; a way to categorize CHP information for easy retrieval on the Web; finding a “win-win” proposition with utilities that allows them to find the value proposition in CHP; identifying a marketing strategy for target audiences, such as LEED; and encouraging the USCHPA to be a stronger presence on both national and local policy.

PARTICIPANTS

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TOOLS (WEB, REPORTS, WHITEPAPERS, DATA, FAQs)	INFORMATION ORGANIZATION AND MANAGEMENT	MARKET RESEARCH	REGULATORY ENGAGEMENT	POLICY DECISION MAKING	TARGETED EDUCATION AND OUTREACH	TRAINING	MARKETING AND PUBLIC RELATIONS
<ul style="list-style-type: none"> • Create a CHP Roadblock Task Force • Build and a distribute “lists you should be on” list • Create a CHP portal for state agencies • Identify and publicize “external” or “over the fence” economic issues, i.e., emission credits • Avoid technical jargon – tell stories 	<ul style="list-style-type: none"> • Utilize results of regional roadmaps in developing the national roadmap <ul style="list-style-type: none"> ◆◆ - Last year the reverse was very worthwhile • Develop and collect data of use to “targeted groups,” i.e., utility and environmental regulators <ul style="list-style-type: none"> ◆ • Organize more information by industry sector • Determine audience for tools; who are end-users of CHP materials and what are their needs? 						

TABLE 8. CHP EDUCATION AND OUTREACH ACTION PLAN

ACTION	DESCRIPTION	KEY ACTIVITIES	MILESTONES AND DUE DATES	LEAD AND SUPPORT ORGANIZATIONS	IMMEDIATE NEXT STEPS
Integrate CHP into the LEED process	<ul style="list-style-type: none"> Work to ensure CHP systems earn maximum credit in LEED standards 	<ul style="list-style-type: none"> Join USGBC (or designate a current member) Analyze standards and integrate CHP Join process (through coalition) Educate green buildings community on CHP 	<ul style="list-style-type: none"> Enter process in time to influence it 	<ul style="list-style-type: none"> USCHPA IDEA DE organizations State and regulatory organizations 	<ul style="list-style-type: none"> Develop budget Build coalition Caution: USGBC has membership criteria
Strengthen USCHPA as a stronger presence	<ul style="list-style-type: none"> Become domestic focal point for CHP <ul style="list-style-type: none"> Need to be “go to” organization not funded/guided by feds 	<ul style="list-style-type: none"> Build membership numbers and diversity Financial/strategic plan Re-evaluate services <ul style="list-style-type: none"> Staff Information resources to become true CHP focal point 	<ul style="list-style-type: none"> Unveil new strategic/financial plan by Policy Day <ul style="list-style-type: none"> Membership drive Plan must be specific: who, what, when and where 	<ul style="list-style-type: none"> USCHPA and key members 	<ul style="list-style-type: none"> Retreat Plan Membership Drive
Develop quantifiable database on CHP benefits beyond lower utility bills	<ul style="list-style-type: none"> Fully functional database search by <ul style="list-style-type: none"> Technology Industry State Etc. 	<ul style="list-style-type: none"> Identify non-\$ CHP benefits Assign associated data points, input into database Funding (DOE) Multi-Year \$\$ University Market DOE Solicitation 	<ul style="list-style-type: none"> Identify benefits by March 31, 2005 Award in FY05 Functional in FY07 	<ul style="list-style-type: none"> CHP Initiatives DOE/university RACs 	<ul style="list-style-type: none"> Identify list of benefits Circulate list to CHP community
Develop web based CHP-specific search engine	<ul style="list-style-type: none"> Comprehensive list of questions asked by all audiences 	<ul style="list-style-type: none"> Update/compile current FAQs and get experts to provide answers 	<ul style="list-style-type: none"> Complete list done by September 2005 		<ul style="list-style-type: none"> Propose idea at RAC meeting on 9/22 Determine next steps from that point
Develop CHP marketing strategy for specific subgroups	<ul style="list-style-type: none"> Involve regional and state CHP stakeholders in developing CHP marketing strategy for target sectors 	<ul style="list-style-type: none"> Identify markets Set priorities Drivers and quantifiable benefits for target markets Develop business case for target markets Identify key decision makers in specific target markets Tap into existing resources Develop strategy on how to deliver message Identify potential profit and loss scenarios for target market follow on assist Identify metrics 	<ul style="list-style-type: none"> Establish task force as soon as possible to address and set milestones as well as develop more action items . . . how to take regional efforts and build to national program 	<ul style="list-style-type: none"> USCHPA DOE IDEA Private sector organizations and industry groups 	<ul style="list-style-type: none"> Review existing market analysis and materials Identify success to date Select target markets and develop game plan

ACTION	DESCRIPTION	KEY ACTIVITIES	MILESTONES AND DUE DATES	LEAD AND SUPPORT ORGANIZATIONS	IMMEDIATE NEXT STEPS
<p>Find “win-win” proposition with utilities and regulators. Better engage them in “win-win” scenarios.</p>	<ul style="list-style-type: none"> • Find common ground between utilities and CHP community • Determine utility infrastructure needs • Inform regulators about CHP 	<ul style="list-style-type: none"> • Initiate collaboration among regulators, utilities and CHP community to identify common goals 	<ul style="list-style-type: none"> • Planning session by June 1, 2005 • Establish initial framework by June 1, 2006 	<ul style="list-style-type: none"> • USCHPA • NARUC • DOE • EPRI/EEI 	<ul style="list-style-type: none"> • Establish working committee • Set program venues

NEXT STEPS

The Austin CHP Roadmap Workshop was the half way point in our CHP Challenge—in fact, we are more than halfway to our 92 GW goal for the year 2010. In preparation for the workshop, the CHP Action Agenda: A Status Report was prepared to assist us in determining which actions, recommended at prior roadmapping workshops, had been actually accomplished, and which had not. We hoped to zero in on those action items not accomplished and discuss whether they indeed needed to be addressed in the coming year. Only the utility/regulatory breakout session adhered to this modus operandi – and so, the “un-done” actions from prior roadmap workshops will again be circulated and input will be requested on whether they still need attention from national CHP stakeholders.

It is clear that in 2005, a new approach to the Annual CHP Roadmap Workshop needs to be identified. We will need to provide participants with a “situational analysis” of what we’ve done to enhance CHP in the prior year, and set our priorities for the coming year, without “re-hashing” barriers and opportunities. During the coming year, our next gathering will be planned to better recognize our past accomplishments, and hone in more clearly on our future needs.

APPENDIX

TABLE A1. CHP TECHNOLOGIES BREAKOUT GROUP SUPPLEMENTAL STORYBOARD RESULTS

BRAINSTORMING	MINDSET SHIFT	WHAT'S NOT?	WHAT'S WORKING	ROLES AND RESPONSIBILITIES
<ul style="list-style-type: none"> • Terms Correction: <ul style="list-style-type: none"> - Pg 17 Industrial item 1b: not "ethanol," but use term "biofuels" 	<ul style="list-style-type: none"> • Micro-CHP applications <20 kW • Package: <ul style="list-style-type: none"> - 1. Conversion technologies - 2. Prime movers - 3. CHP systems optimization • DOE → USDA shift in administration focus forces CHP "re-think" • Huh? 	<ul style="list-style-type: none"> • Need to increase emphasis on "bottoming-cycle" systems • VOC destructors generators • Increase emphasis on equipment to utilize opportunity fuels • Storage? Heat and electricity • Dissemination of information regarding integration success • Work to bring A/E into room • Education • Optimize packaged systems with packagers and end users for specific markets <ul style="list-style-type: none"> - Office buildings - Schools - Hotels - Health clubs • Lack of system integrators • Emission credits • Emission regulators are working – sets goal to work to 	<ul style="list-style-type: none"> • Near-term opening markets integration of CHP with base and bi-product conversion to fuels, products • IES packaged system program • Tech transfer through RACs 	<ul style="list-style-type: none"> • CHP technology alignment • Technology gaps • Owner operators (3rd party) • What more needs to be done? • What about? • Design professionals • OEMs