4TH ANNUAL COMBINED HEAT AND POWER (CHP) ROADMAP WORKSHOP

Holiday Inn Chicago Mart Plaza 350 N. Orleans Street ← Chicago, Illinois September 22-24, 2003

CHP ROADMAP BREAKOUT GROUP RESULTS

UTILITY ISSUES BREAKOUT GROUP

Key issues and actions include:

- 1. Work with NARUC to sponsor and organize a report and workshop on utility barriers to CHP and DG, ways to overcome these barriers, and model rates and rules
 - Identify key commissions/staff/champions
 - > Use regional CHP Initiatives to coordinate/reinforce
 - > Develop new and use existing templates for standby energy charges, interconnection costs, processes, etc.
- 2. Create a methodology to monetize non-traditional benefits of CHP
 - Facilitate open disclosure of T&D upgrade sites, needs and costs
 - Include DG/CHP alternatives
 - Identify exit and standby fees in key geographic areas
- 3. Work with NARUC to establish "reasonable and customary" standby and exit fees or develop a process to establish them

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- Target one or two states
- Hold workshops with key stakeholders
- 4. Develop locational pricing strategies and incentives
 - Encourage development of locational pricing theory and tariff structure
 - Identify locations with a likelihood of success

- 5. Work to pass legislation at the state level to adopt IEEE interconnection standard
 - Coordinate efforts with IEEE, PUCs, NARUC Use Model Language as appropriate
 - Target Illinois to pass IEEE 1547
 - Publish lessons learned and IEEE 1547 Implementation Plan
 - > Allow independent review of utility interconnect upgrades
 - Create database of interconnection progress
- 6. Use Midwest CHP Application Center as a guide for RACs around the country
- 7. Expand net metering up to 1 MW for CHP
 - > Seek state legislative action and FERC implementation as appropriate
- 8. Create a "value proposition" for CHP
 - > Create incentives for utilities to embrace DG and CHP
 - > Prepare a white paper on quantifiable financial benefits of DG
 - > Develop alternatives to "cost plus" utility scenarios
 - Present to key utilities, regulatory commissions, NARUC

UTILITY ISSUES STORYBOARD RESULTS

Encourage NARUC to sponsor and organize a report/workshop on utility barriers to CHP/DG and how to overcome them with model rates and rules (with coaching from USCHPA) *******	Develop a strategy to monetize non- traditional benefits of CHP plants (e.g., ancillary services) ********	Work with NARUC to establish reasonable and customary stand- by and exit fees or a process to establish them *****	Develop locational pricing - Incentives - T&D least cost plan	Consider legislation at state level to accept/adopt IEEE interconnect standard. Uniform accepted interconnection standards. ++	Resource centers accumulate/ disseminate interconnection requirements ****
 Identify key committees Key commission/staff Key contractors (RAP, NRRI) Champions (past, present) Use regional initiatives Call on states directly Reinforce national planning Web site link to regulatory practices, USCHPA PUC "Star" White papers that speak to issue Utility "templates" Standby/energy I/C cost, process Ownership vs. service 	 Open disclosure of T&D upgrade sites, needs and costs Include the DG/CHP alternative Remove exit and standby fees in these hot spots Final PUCs 	 Openly identify the premises used to establish standby and exit fees in one or two targeted states Hold workshops with PUCs, IOUs, munis/co-ops and other DG stakeholders "Lay of land" ACEEE review of states 	 Encourage development of locational pricing theory and tariff structure Identify locations with likelihood of success 	 USCHPA to become involved with public utility commission Work with Illinois to get IEEE 1547 accepted Publish lessons- learned in process of accepting the standard Publish utility-level IEEE 1547 implementation plan 	 Replicate Mid- west's guide to interconnection Facilitate information exchange between DG and utility technical resources

UTILITY ISSUES STORYBOARD RESULTS (CONTINUED)

Issue model interconnection and tariff rules for Renewable, CHP ****	Allow individual review and estimate of utility interconnect upgrades. Create independent review board to oversee interconnection applications.	Expand net metering up to 1 MW for CHP (real-time pricing) ******	Create value proposition for - Recycled energy/CHP portfolio standard - Green Power - Environmental credits Create carrots for utilities who encourage customer-sited, customer-optimized DG (overhaul "cost-plus") ++++++
 Develop NARUC-approved model framework for network interconnection Model standby methods Model for value reactive power 	Create database of regulations for public access	 Encourage state legislative action Engage NARUC in this effort USCHPA lead State – regional efforts Engage end users 	 Prepare white paper showing quantifiable financial benefits of DG, then showing which of those legally accrue to the regulated utility Schedule USCHPA brainstorming on alternatives to "cost-plus" utility regs Compile state portfolio standards Establish position on CHP portfolio standards Present to key utilities/PSCs/NARUC

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CHP TECHNOLOGIES AND MARKETS

Key Issues and Actions:

- 1. Establish new metrics for valuing multi-faceted CHP benefits
 - Focus on thermal performance
 - > Make metrics easy for decision-makers to grasp
 - Utilize concept of CHP as "free work"
- 2. Work with ASHRAE to develop a BCHP standard for integrating CHP into HVAC design
 - > Utilize on-going ASHRAE committee (1.10) to create the standard
 - > Coordinate with ASERTTI, U.S. DOE, USCHPA and other design and integration professionals
- 3. Continue and Expand DE/CHP Road Shows
 - Expand program to reach out to trade associations, code officials, building associations, the environmental community
 - Focus on end-users
- 4. Monetize "non-market" revenue streams
 - > Design innovative rates for ratepayers in all customer classes
 - Educate NASEO and NARUC members on the need and structure for tax incentives (credits and rebates)
- 5. Reach out to agricultural marketplace
 - Develop market entry strategy
 - > Design new CHP designs and applications in agricultural environments (on-farm, processing, storage, etc.)
- 6. Promote innovative rate structures for CHP systems
- 7. Conduct market analysis of CHP
 - > Target low-income/multi-family buildings, schools and hospitals, and federal buildings
 - > Change tax code to increase use of municipal tax-exempt bonds to fund CHP in public buildings/facilities

- 8. Conduct RD&D on multi-fuel prime movers
 - Fossil and renewable fuels
 - Target DOE labs to sponsor work
- 9. Identify market opportunities driven by replacement or expansion of existing systems
 - Boiler Replacement
 - Collect data from states

TECHNOLOGY & MARKETS STORYBOARD RESULTS

The current roadmap metric is not accounting for the true value of CHP. We should establish a new metric that focuses on thermal performance, e.g., efficiency, emissions reduction.	Work with ASHRAE to develop a BCHP standard for integration of CHP into HVAC design **********	Continue road shows (DG and CHP) - Trade association involvement - Local Chambers of Commerce - Co-ops/Muni's - Focus on end users ******	Monetize the soft benefits of CHP through a combination of tax credits (social benefits) and rate payer rebates.	Encourage CHP in agricultural markets (on- farms, at co-ops, munis, etc.) **********	Promote innovative rate structure for CHP systems ********
 Milestones Establish metric Establish the benchmark M&V protocol Who: USCHPA, EIA, Consultants Free work – amount of beneficial work produced by CHP system minus amount of work that would otherwise be proposed using the same amount of fuel by a non-CHP system 	 ASHRAE T_c 1.10 will have formed a standards committee to create a CHP standard ASHRAE T_c 1.10 has initiated a CHP handbook project (funded by DOE) Coordinate with ASERTTI project Who: ASHRAE, ASERTTI, DOE, USCHPA members 	 Milestones Solidify/define program Develop marketing plan – identify target areas Who: DOE, USCHPA, EPA CHP Partnership, BCHP, FEMP, CIBO Trade associations TAPPI = Pulp & Paper/NPRA Plastics industry/food/ ch@nitate coating, automobile, hospitals 	 "Educate" NARUC and NASEO members on the need for tax credits and rate payer rebates for CHP benefits 	 Warehouse refrigeration Spray charging Greenhouse hydron Desiccants Chill storage Uses CO₂ to crops Cost/cash flow Design Education Tech conversion Gasification AD Direct comb Identify, assess subset of co-ops AG Three roundtables in 2004 Who: NCPA/WAPA CMUA, National Associations, National Food Processors Association, Farm Bureau (USDA) 	 Tabulate state by state, federal, and state incentives Engage regional DOE directors in rebate discussions

TECHNOLOGY & MARKETS STORYBOARD RESULTS (CONTINUED)

Conduct detailed market analysis of CHP – Focus on value points and nuances ******	Conduct RD&D on multi-fuel prime movers • Fossil - Coal gasification - Natural Gas - Diesel • Renewable - Biogas - Solar *****	Identify market opportunities driven by replacement and/or expansion of existing systems (i.e., boiler replacement) *****	Design a metric for revealing CHP's financial and energy advantages to convince decision makers ↔
 Multi-family Low income Senior Assisted living Use state energy assistance funds to leverage private investment in CHP Change tax code to increase use of municipal tax exempt bonds to fund municipal CHP Do market plan with details Hospitals Colleges/Universities Low income housing Federal sector Who: ORNL IDEA CHP Application Centers HUD/FHA's 	 Target DOE Research Labs to sponsor work Fund multi-fuel generators Fund small gasifiers Identify: low cost coal regions and bio-gas sites Make information available on USCHPA and other web sites 	 Coordinate with EPA or state DEPs to form database of boilers that represent CHP opportunity Identify key end-user organizations that have CHP potential benefit and engage with directed case studies CMA, ASHRAE, ASME, NPRA 	 Create a new metric – an activity- based accounting metric as a function of process value, not commodity metering By end of 2004, utilize existing application centers to collect energy consumption data per unit of economic activity and try to prove validity of new metric

ENVIRONMENTAL ISSUES FOR CHP

Issues and Actions:

- 1. Establish a basis for offset credits for CHP
 - > Promote trading credits within the commercial and industrial (C&I) sectors as economic drivers for CHP
 - > Develop guidance to establish credits on a national basis
 - Other suggestions: separate CO₂ from other emission types; allow distributed CHP sites to recover avoided distribution costs through credits; and establish lower emissions limits predicated on the heat rate of the local utility serving area (likely accomplished through an independent, third-party certification group)
- 2. Encourage and support local and national implementation of output-based standards
 - The U.S. EPA should primarily be responsible for accomplishing this, with assistance from the USCHPA and new CHP Application Centers where applicable
 - The U.S. EPA should aggressively reach out to states; attend Air Bureau Directors' meetings; and get the final version of its "How To" guidebook completed and out to the states
 - The USCHPA should continue to educate Congress on how/why output-based emissions fit into air pollution legislation
 - The new CHP Regional Application Centers should work to get utility regulators involved and educated on state implementation plans (SIPs)
 - > All CHP Stakeholders should encourage EPA officials to accept output-based emission standards
- 3. Incorporate CHP criteria in Brownfields development.
 - Apply criteria for utilizing CHP into Brownfields redevelopment (as previously developed for the U.S. EPA and the U.S. DOE)
 - > Hold between regular meetings of the U.S. EPA CHP partnership and U.S. EPA Brownfields teams
 - EPA and the USCHPA should provide information about CHP and Brownfields to the U.S. Green Buildings Council
- 4. Create a tax on output-based emissions
 - > Accomplish this via acceptance of output-based emissions limits
 - Support tax credits could be provided for CHP systems; the use of taxes for such purposes in other countries (such as Sweden) should be studied and documented in an effort to accumulate "lessons learned"

- EPA and/or local economic development offices should develop and market an economic model based on output-based emissions
- 5. Establish emissions credits for CHP applications using alternative fuels
 - Biomass a good example of such an alternative fuel
 - Find a way to link CHP with state renewable portfolio standards (RPSs); the existing CHP regional initiatives could work to achieve this

ENVIRONMENTAL ISSUES STORYBOARD RESULTS

Establish basis for offset credits for CHP *************	Support local and national implementation of output- based standards ******	Incorporate CHP criteria in Brownfields development +++++++++	Develop tax policy on output-based emissions *******	Establish emissions credits for CHP applications using alternative fuels (e.g., biomass) ****
 Promote trading credits within C&I sector as economic driver to CHP Separate CO2 from other emissions types Develop guidance establishing national basis Allow distributed CHP sites to recover avoided distribution costs through credits Establish lower emissions limits predicated on heat rate of local utility serving area (would likely be accomplished through an independent third party certification group, e.g., Green-e, etc.) 	 Aggressive EPA outreach to states EPA attend Air Bureau Director's meeting EPA gets final "How to" guidebook for states out A.S.A.P. On the national level, educate Congress on how/why output-based emissions fit in air pollution legislation (Multi-P) Get utility regulators involved and educated on SIPs (state implementation plans); Encourage Administration/high-up EPA officials to accept output-based emission standards 	 Apply the criteria for CHP in Brownfields redevelopment (as developed for EPA and DOE) Hold frequent/ regular meetings between EPA CHP partnership and Brownfields teams Provide information on CHP to LEEDS (EB) protocol at US Green Buildings Council 	 Promote acceptance of output-based emissions limits (example: Southern California Air Qual. Monitoring District) Provide tax credits for CHP systems Document use of taxes in other counties (e.g., Sweden) Develop and market economic model on output-based emissions Have Surgeon General announce that power plant emissions are harmful to your health 	 Find a way to link CHP with state RPSs Structure at different levels (do not limit to alternative fuels only)