

**CHP FIVE YEARS LATER:
FEDERAL AND STATE POLICIES AND PROGRAMS UPDATE**

**R. Neal Elliott, Ph.D., P.E., Anna Monis Shipley,
and Elizabeth Brown**

January 2003

Report Number IE031

**©American Council for an Energy-Efficient Economy
1001 Connecticut Avenue, NW, Suite 801, Washington, D.C. 20036
(202) 429-8873 phone, (202) 429-2248 fax, <http://aceee.org> website**

Table of Contents

Acknowledgements.....	ii
Executive Summary.....	iii
Introduction.....	1
Background.....	2
Generation Update.....	3
Program Updates.....	4
Federal.....	4
States.....	5
Organizational Updates.....	6
USCHPA.....	6
Regional Initiatives.....	7
Remaining Work.....	8
Utilities.....	8
Environmental.....	9
Tax Treatment.....	9
Conclusion.....	9
References.....	11

Acknowledgements

The authors express their appreciation to the Energy Foundation for its support that made this report possible. In addition, we thank the reviewers who added significantly to the accuracy of this report and contributed additional insights: Joel Bluestein and Bruce Hedman of Energy and Environmental Analysis, Inc.; Bruce Diamond of NiSource; Steven Nadel of ACEEE; and Suzanne Watson of the Northeast Midwest Institute. Finally, we thank our technical editor Renee Nida.

Executive Summary

In preparation for the Kyoto Treaty meetings in 1997, by nonprofit organizations and national laboratories prepared studies that identified combined heat and power (CHP) as a viable resource for maintaining current power supplies while mitigating climate change. Since this initial support, the movement aimed at creating a market for CHP has grown and strengthened. This report reviews what progress has been made and what challenges remain for the development of a fair market for CHP in a changing energy climate.

While the growth rate of CHP capacity in the United States has leveled off over the past five years, progress has been made on the following fronts.

- *Federal Policy*
 - The current presidential administration promoted CHP in its National Energy Plan.
 - The 107th Congress took steps to address the barriers facing CHP by establishing national utility interconnection standards, as well as many other steps promoting CHP.
 - National model rules for emissions regulations are currently under development by several organizations.
 - The Federal Energy Regulatory Commission (FERC) has addressed small generator interconnection standards and continues to move forward.
- *State Policy.* Many states and regions have begun their own rulemaking processes on interconnection policies, emissions barriers, and tax issues for CHP.
- *Coalition Building.* The backbone of this progress is the growing coalition supporting CHP. Over the past five years, politicians from various political parties, manufacturers, utilities, and advocates have built a broad-based support community for CHP. This community is responsible for the background research, technical expertise, promotion of technologies, and education of the public as well as the formation of a national CHP association and several region-specific associations.

As support for CHP has grown over the last five years, many barriers have been broken down. However, some barriers remain and new barriers have emerged that will need to be broken down to create an open market for the installation of more CHP.

- *Utility Practices.* While work continues at the federal and state levels on interconnection issues, experts report that the largest barrier to CHP are the interconnection and tariff policies of utilities.
- *Environmental Barriers.* The New Source Review process (NSR) presents significant barriers to CHP capacity growth, as the required emissions criteria do not take into account the many positive features of CHP.
- *Tax Treatment.* Little progress has been made on tax issues at the federal level. While federal incentives have been proposed in federal legislation, no legislative or regulatory proposal has moved forward on adjusting the depreciation of CHP systems. It appears unlikely that this situation will change in the current fiscally challenged environment. In

addition, the tax credit approach to incentivizing technology may also need to be reassessed in view of other tax changes.

While barriers remain to the CHP market, much progress has been made over the last five years. The challenge for CHP advocates now is to promote continued and growing support for CHP through state and federal legislation and regulation, as well as encouraging increased public support. Progress has been slower on the state level than the national level, and this report concludes that much of the progress necessary to open the market for CHP will be on the state level. Continued support on a national level and increased advocacy at the state level will yield growth in CHP generation capacity, as well as reliable power and cleaner air throughout the United States.

Introduction

Five years ago, the United States was preparing for the Kyoto meeting of the United Nations' Framework Convention on Climate Change. Efficiency advocates in government, industry, and the public interest sector were seeking technology responses to climate change that could provide significant reductions of domestic greenhouse gas (GHG) emissions. Two studies prepared by nonprofit research groups (Alliance et al. 1997; Bernow et al. 1997) along with another study prepared by five national laboratories for the U.S. Department of Energy (Interlaboratory Working Group 1997) identified CHP as one of the most important technology responses to climate change, with the potential to provide almost 10 percent of the GHG emission reductions in the United States required under the Kyoto agreements.

These studies, together with activities by CHP market leaders, captured the attention of the Clinton Administration. During his October 22, 1997 climate change speech at the National Geographic Society in Washington, D.C., the President said:

“We must unleash competition in the electricity sector to remove outdated regulations and save Americans billions of dollars. We must do it in a way that leads to even greater progress in cleaning our air and delivers a significant down payment in reducing greenhouse gas emissions. Today, two-thirds of the energy used to provide electricity is squandered in waste heat. We can do much, much better.”

President Clinton went on to acknowledge that conventional electricity generation is inherently inefficient, converting only about a third of a fuel's potential energy into usable energy. Furthermore, he stated that CHP is not just a climate change strategy. Because of its inherent efficiency, CHP represents an economically attractive strategy for addressing energy supply requirements in many sectors of the economy, while helping to address local and regional air quality concerns.

In the five years since President Clinton delivered this speech, CHP has gained significant national prominence. Support for CHP has become a standard element in national energy policy, with both the Clinton and Bush administrations voicing strong support for policies and programs. CHP has been included in numerous congressional proposals, achieving bipartisan support. CHP programs have been initiated at both the U.S. Environmental Protection Agency (EPA) and Department of Energy (DOE). FERC recently undertook federal rulemakings and a number of states also have undertaken rulemakings or legislation to deal with interconnection issues.

Five years ago, the promotion of CHP fell to a small group of advocates. Today, a strong national association has emerged, spawning companion regional initiatives. The U.S. Combined Heat and Power Association (USCHPA) worked with the EPA and DOE to develop a national vision and roadmap that is being used as a framework for action. CHP has a large base of support, with champions existing in both political parties, as well as with supporters spanning the interest spectrum from environmental advocates to large industrial companies.

In spite of the success in creating awareness and garnering support, CHP continues to face challenges in the marketplace as evidenced by the steady, but slow growth in nationwide generation by CHP. Many of the challenges are the same as were faced by system developers five years ago. The most significant hurdles relate to utility interconnection. While progress has been made in a few states, we continue to lack national or state-based standards and some utilities continue to actively discourage new CHP in their service territories.

While much has been accomplished, much work remains to be done. This report looks at the accomplishments of the last five years, as well as the challenges that remain for developing a functioning market for CHP.

Background

The thesis established by the early proponents of CHP was that the challenge was not in the technology but in the markets. Elliott and Spurr (1998) argued that advances in technology (in particular turbines and reciprocating engines); a push toward utility regulation; and increasing demand for reliable, affordable, and clean power have made CHP more cost-effective and appealing to many different stakeholders.

Several publications (Casten 1998; Elliott and Spurr 1998; Kaarsberg and Elliott 1998) identified barriers to the broader adoption of CHP. These were delineated in Elliott and Spurr as:

- A site-by-site environmental permitting system that is complex, costly, time consuming, and uncertain.
- Current regulations do not recognize the overall energy efficiency of CHP or credit the emissions avoided from displaced grid electricity generation.
- Many utilities currently charge discriminatory backup rates and require prohibitive interconnection arrangements. Increasingly, utilities are charging (or are proposing to charge) prohibitive “exit fees” as part of utility restructuring to customers who build CHP facilities.
- Depreciation schedules for CHP investments vary depending on system ownership and may not reflect the true economic lives of the equipment.
- The market is unaware of technology developments that have expanded the potential for CHP.

Proponents organized to address these market imperfections and attempt to create a market in which the most efficient, cleanest, and cost-effective technologies can compete with central station generations. The following sections review what progress has been made and what work remains to be done.

Generation Update

Ideally, progress toward creating a CHP market would be measured by increased national capacity of CHP facilities. Difficulty in measuring actual capacity due to categorization problems and data gaps leaves the proxy of generation, which is measured by DOE's Energy Information Agency. While the CHP market continues to grow, the growth rate has leveled off in recent years (see Figure 1). The economic slowdown in the United States and uncertainty in the utility markets may be partially to blame for this. Although CHP is not a new technology, it does have a significant first cost barrier in most cases, and that may be the determining factor for decision-makers in the current economic climate.

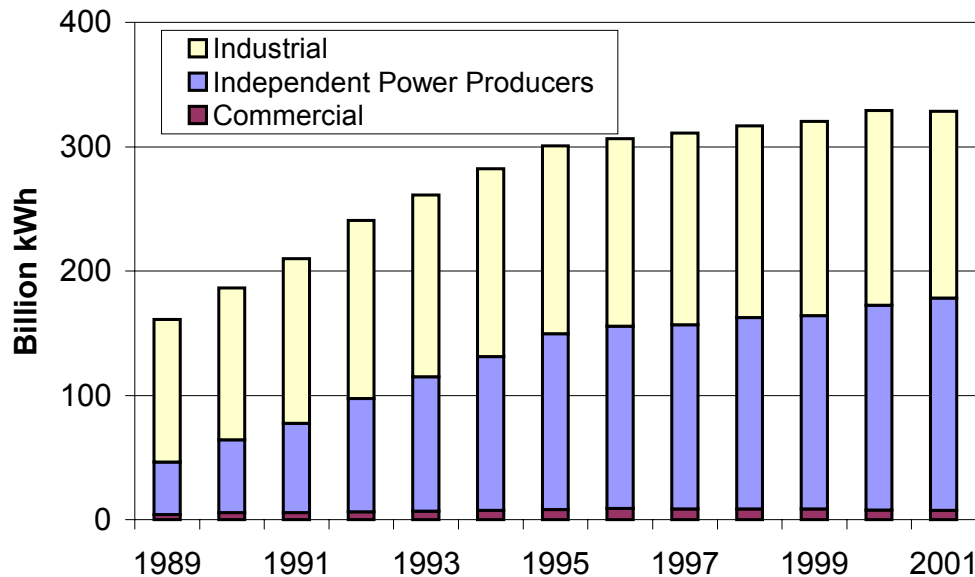


Figure 1. CHP Generation Capacity in the U.S.: 1989-2001 by Sector
Source: EIA 2002

A more generally accepted explanation for the slow rate of growth for CHP is the implementation of the Energy Policy Act (EPACT) of 1992 (EEA 1999; Elliott and Spurr 1998). The Public Utility Regulatory Policy Act (PURPA) of 1978 had created a market for CHP in which utilities were required to purchase power at avoided costs from facilities that met PURPA qualifications (qualifying facilities or QFs). However, EPACT created a class of independent power producers that did not need to be PURPA qualified, and declining power prices decreased the attractiveness of a PURPA contract. While EPACT had created opportunities for new business models, many of these facilities were faced with the barriers that PURPA had alleviated. This significantly slowed the growth of CHP generation in the United States and called for a different approach to promoting CHP. Fortunately, a groundswell of political and industry support for CHP resulted from this event.

However, power plant production is a time-consuming process, and federal as well as state programs and advocacy take time to contribute to growth within any industry. Market growth for CHP is no different. The programs described below have broken down barriers to CHP and will continue to conquer barriers as time passes and demand for clean, efficient power continues. This in turn should lead to increased CHP capacity and generation in the future.

Program Updates

Through the 1990s, the atmosphere for CHP on both the state and federal level changed from no formal programs to a proliferation. In addition, we have seen the emergence of private sector initiatives, many of which bridge across common divisions between business and environmental interests.

Federal

At the first national CHP symposium in December 1998, DOE and EPA committed to the challenge of doubling installed CHP by 2010. Both agencies initiated national programs to support CHP within the policy community and supported the development of state and regional initiatives that address the barriers to CHP. In particular, DOE has been instrumental in the development of interconnection standards by the Institute of Electrical and Electronic Engineers (IEEE), while EPA began to review environmental regulations to understand whether the way regulations were written and implemented influenced CHP systems.

Beginning in 1998, the Clinton Administration began to include CHP in its national energy recommendations and as part of its *Climate Change Technology Initiative* (Clinton 1998). With the change in administration in 2000, the Bush administration showed its commitment by referencing CHP in its *National Energy Policy* report (NEPDG 2001) and *National Climate Change Technology Initiative* (Bush 2001). These reports broadly endorsed removal of regulatory and market barriers that have inhibited wider implementation of the technology and made three significant policy recommendations for CHP.

Several efforts have been underway to remove the environmental barriers to CHP. Among these has been a model rule for distributed generation (DG) emissions developed by the Regulatory Assistance Project (RAP). In this model rule, system guidelines for establishing output-based emissions that give 100 percent credit for thermal output are detailed. The rule emphasizes that CHP is among the most efficient and non-polluting forms of DG (RAP 2002).

The 107th Congress introduced CHP measures in eight bills, including the overarching “energy bill.” These bills took concrete steps to address the barriers identified by the CHP communities, including establishing national utility interconnection standards and procedures, and funding further development of CHP technologies. In addition, a bipartisan coalition led by Senators Carper (D–DE) and Collins (R–ME) protected existing qualifying facilities from a blanket repeal of the “must buy” and “must sell” provisions in Section 210 of PURPA. While the fate of the energy bill remains unclear at the time of this writing, the CHP community has gained important credibility through the process.

FERC has emerged as a national leader in addressing utility barriers with its small generator rulemaking (FERC 2002). This process, begun in the spring of 2002, attempts to provide consistency in technical and procedural interconnection for distributed generators. The rule applies to all wholesale generators and also to retail generators interconnecting at the transmission level. The final rule is anticipated in the spring of 2003.

States

While much of the focus on CHP has been at federal level for the past few years, many of the market barriers to CHP exist at the state level. As a sign of the maturing of the CHP market, a number of states are now undertaking activities to address barriers to CHP, with some states beginning to provide incentives to encourage the development of systems in their states.

ACEEE recently catalogued the state efforts (Brown, Scott, and Elliott 2002). States, departments of environmental control, and public utility commissions were surveyed to determine which state level barriers to CHP were being approached and how. ACEEE found that while many states have yet to begin efforts to create a market for clean CHP, there are a few states that have made significant progress and can serve as models. In particular, Texas, New York, and California can offer models that other states can look to in developing state program and regulations.

CHP has been highlighted in the work of the California Clean DG Working Group. This group is working to encourage highly efficient and low-emitting DG technologies. ACEEE has worked closely with this group to develop methods of determining appropriate application-focused DG technologies. The group has advocated an output-based approach to calculating emissions from CHP systems.

In Texas, a standard permit rule for small engines and turbines has been established (TNRCC 2001). ACEEE and other clean DG advocates worked to establish 100 percent credit for the thermal output of CHP systems. The rule was passed with these provisions.

Table 1 summarizes the research from ACEEE's state efforts report. The first column indicates whether a state-level incentive for CHP is available. The second column indicates (where applicable) the existence of interconnection standards in the state and which agency has them. If no standardized interconnection agreement system exists in the state through either the public utility commission ("P") or state ("S"), the utility companies ("U") determine the interconnection rules on an individual basis. The final column represents the emissions regulations regarding CHP in the state. All the states have pollution regulations for most power-producing facilities (with the exception of emergency generators), but not many of these regulations take into consideration the increased efficiency of CHP by using output-based standards. States that do take this into consideration are marked in the last column with an "S." States not listed in Table 1 fall into the category of "NUN": that there are no state-level financial incentives ("N") would be in the first column; that the utility ("U") regulates interconnections to the grid would be in the second column; and that there are no state-level special emissions rules for CHP ("N") would be in the third.

To date, many of these state-focused activities have been reactive rather than proactive. While important efforts, the CHP community has yet to develop a focused state-based approach as we saw deployed at the national level over the past few years.

Table 1. Summary Results for State Activities

State	Financial Incentives	Installation/ Interconnection	Emissions Regulations
Arizona	N	P*, U	N
Arkansas	N	P	N
California	N	S	S
Connecticut	N	P*, U	S*
Delaware	N	P^, U	N
Florida	N	S^, U	N
Georgia	N	S^, U	N
Hawaii	S	U	N
Illinois	N	P*, U	N
Indiana	S	P*, U	N
Maine	N	P^, U	N
Massachusetts	N	U	S*
Michigan	S	S	N
Minnesota	N	S*, U	S*
New York	S^	P	S*
North Carolina	S	U	N
North Dakota	N	U	N
Ohio	N	P	N
Pennsylvania	N	P	S*
Texas	N	P	S
Virginia	N	P*, U	N
West Virginia	N	P	N
Wisconsin	P	P*, U	N

Key: N = no special considerations for CHP; S = state; P = public utility commission or equivalent; U = utility company; * = in progress; ^ = offers standards to a certain size (or type—NOT CHP) of distributed generation

Organizational Updates

When CHP proponents organized in 1997, no national organizations existed that were promoting CHP. Furthermore, there was little awareness of what CHP was and no defined constituency. Five years later, a national association has been formed, taking the lead in organizing interested groups at the national, regional, and state levels.

USCHPA

The United States Combined Heat and Power Association was formed in 1999 to bring together diverse market actors interested in CHP. The goal of USCHPA is to promote CHP at a national level, including endorsing federal public policy that benefits CHP efforts. USCHPA attacks the barriers to CHP by using technical assistance and marketing to educate policymakers and the public about the benefits of CHP. USCHPA also plays a role in creating and coordinating the regional initiatives described below. Working in conjunction with the regional organizations

offers valuable feedback loops to USCHPA so it can promote the policies that the regions value the most.

The USCHPA has been successful with many of its goals. The organization is involved with the DOE and EPA programs that promote CHP and clean energy. During the 107th Congress, USCHPA found numerous champions in many political parties. Finally, the rigor of the Associations analysis is reflected in the information clearinghouse on its website.

One of the most important activities for the association has been its leadership of the national CHP vision and roadmap. USCHPA worked with DOE and EPA to develop a national CHP vision in 1999 (USCHPA 1999). This document was the basis for a series of regional roadmapping meetings culminating in a national CHP roadmap workshop held in October 2000. This workshop led to the publication of a national CHP roadmap in March 2001 (USCHPA 2001). The association coordinates with federal, regional, and state programs to continue to hold annual workshops at which stakeholders chart the nationwide progress towards the CHP Challenge's goal of doubling the capacity of CHP by 2010.

Regional Initiatives

Out of the regional roadmapping efforts, several regional initiatives have emerged. These cohesive groups of industry stakeholders work together to determine what the specific regional needs are to promote CHP and overcome regional barriers. Regional analysis and teamwork allows networking on a localized level as well as larger impact on local policies. Since 2000, when the first initiative meetings took place to give input to the national roadmap, the initiatives have been growing and expanding. Currently, there are five regional groups, spanning nearly the entire United States.

Midwest

The Midwest regional CHP initiative (MWCHP) is the oldest of the regional initiatives, with its genesis occurring at the first of the regional roadmap workshops in October 2000. The initiative includes Illinois, Indiana, Michigan, and Wisconsin. The threefold mission of MWCHP is to lead the region in encouraging the use and implementation of CHP technologies, drive the CHP roadmap as developed by the U.S. Department of Energy, and provide a central communications point for all Midwestern stakeholders. Successes of the Midwestern program include the opening of the CHP Application Center, and developing a network of contacts for various groups of stakeholders to use while creating a market for CHP. More information on MWCHP is available at <http://www.CHPcenterMW.org>.

Northeast

The Northeast CHP initiative is split between the Northeast section (New York, New Jersey, Connecticut, and Pennsylvania) and the New England section (Maine, Massachusetts, Vermont, and New Hampshire) that merged after the first national roadmapping workshop. The merged group hosted a conference in early 2002. The groups had prioritized the actions needed to facilitate increased CHP capacity in the Northeast: legislative strategy; streamlined permitting

process; and quantifying the benefits of CHP. More information on this initiative is available at <http://www.nemw.org/uschpa/regional.htm#noreast>.

Southeast

The Southeast CHP initiative is the newest of the regional initiatives, formed in the spring of 2002. The group intends to gather stakeholders to support the goal of doubling CHP in the United States by 2010. Currently, representatives from the USCHPA and MWCHP are assisting the group in determining leadership and defining a course of action that is specific to the needs of Southern states. More information on this initiative is available at <http://www.nemw.org/uschpa/regional.htm#southeast>.

Pacific Northwest

In 2000, the Pacific Northwest Regional Initiative met to define its regional needs in preparation for the national CHP roadmap meeting. States in this initiative are Washington, Oregon, Idaho, Montana, and Alaska. The initiative outlined needs including designing and delivering a message to all the stakeholders, determining interest in CHP within the region, gathering marketing information, and maintaining cohesion of the group. The next meeting will be in the fall of 2002 and will explore CHP issues and development within the Pacific Northwest. More information on this initiative is available at <http://www.nemw.org/uschpa/regional.htm#pacnw>.

Western

The first meeting of the Western CHP Initiative will be in the winter of 2002. In 2000, there was a CHP meeting in New Mexico to determine the needs of the state. The national CHP working group is attempting to determine which states are best fitted to be included in the initiative. The goal of the next meeting is to commence networking of concerned stakeholders and generate interest in CHP. More information on this initiative is available at <http://www.nemw.org/uschpa/regional.htm#west>.

Remaining Work

While some modest success has been realized at the federal, many of the remaining challenges facing CHP are now at the state level.

Utilities

Some significant progress on these issues has been made in the past years. In October 2002, IEEE approved a new interconnection standard for small generators (IEEE 2002). While the prospect for national interconnection legislation is not promising, the FERC rulemaking on interconnection offers hope for the emergence of some national consistency. In addition, the National Association of Regulatory Utility Commissioners (NARUC) issued a paper on model DG interconnection procedures and agreements (NARUC 2002), and as noted in the discussion of state activities, a few states have also implemented CHP-friendly interconnection procedures.

Unfortunately, the interconnection and tariff practices of many utilities remain the most significant barrier to CHP. Due to limited national activities, it appears that these barriers will need to be addressed on a state-by-state basis either through legislation or regulation.

Environmental

Two large barriers to CHP are the complicated and lengthy plant siting and environmental permitting processes. In nitrous oxides (NO_x) and ozone environmental quality non-attainment areas, major new emission sources are required to meet New Source Review requirements to obtain operating and construction permits. NSR sets stringent emission rates for criteria pollutants and requires the installation of the best available control technology. New sources are also required to offset existing emissions in non-attainment areas. However, current emissions standards are generally based on fuel input, an approach that does not recognize the fuel efficiency of CHP technologies (Shiple et al. 2001).

The significant increase in efficiency with CHP results in lower fuel consumption and reduced emissions compared with the separate generation of heat and power. Emission reductions include GHGs and regulated air pollutants such as NO_x, sulfur dioxides (SO₂), and particulates. Compared with NO_x emission rates of between approximately 0.5 and 2.2 lbs/MWh_e¹ for non-diesel, small, distributed generation (DG) technologies, CHP can emit less than 0.1 lbs/MWh_e. Carbon monoxide (CO) emissions can easily be reduced by 70 percent (Bluestein 2001).

Tax Treatment

Unfortunately, little progress has been made on tax issues at the federal level. While federal incentives have been proposed in federal legislation, no legislative or regulatory proposal has moved forward on adjusting the depreciation of CHP systems (Elliott 2001). It appears unlikely that this situation will change in the current fiscally challenged environment. The tax credit approach to incentivizing technology may also need to be reassessed in view of likelihood of future business tax cuts. Already many companies have more tax credits available to them than they can use in any tax year due to low business rates, alternative minimum tax, and limit on credit reductions (Elliott 2001).

Conclusion

Progress has been made in the creation of a market for CHP, the slowing growth of the CHP market in the 1990s due to the change in regulatory policy notwithstanding. Policy issues have been brought to the attention of federal legislators, and introduced for discussion in Congress. New emissions regulations at the state level have broken some barriers for CHP.

The past five years have seen a significant increase in awareness and visibility of CHP in the United States. A network of advocates (including environmental and energy efficiency groups, many government entities, equipment manufacturers, developers, and system owners) has grown into a powerful political force. These proponents are positioned to have a significant impact at the federal and state level in creating a friendlier environment for CHP. The environmental and

¹ Megawatt hours of electric energy

economic opportunities for CHP have increased from what was available in the late 1990s, and the efforts of this group to continue to work through market barriers will be key to realizing those opportunities.

While significant progress has been made or is in the works for environmental and legislative barriers to CHP, the utility company barriers have not yet been effectively approached. Even within the markets of states that have restructured their electricity markets, some utilities have successfully ended CHP projects in their infancy. With the removal of environmental and legislative barriers, this is becoming the overriding cause of CHP not having a fair market share. To fully integrate CHP into the energy economy, a strategy altering detrimental utility practices must be designed and carried out.

To address these remaining barriers will require developing a concerted effort focused not just at the national level, but also at the state and regional level. The infrastructure for these state-level efforts is now being built. The challenge will be to develop a state policy agenda that offers the same clarity and focus that the CHP community has developed at the federal level over the past few years. The extension of the national strategy to the state level is not appropriate. What is needed is for the community to develop a set of recommended state legislative and regulatory recommendations that can be used by state and regional advocates.

References

- Alliance to Save Energy, American Council for an Energy-Efficient Economy, Natural Resources Defense Council, Tellus Institute, and Union of Concerned Scientists. 1997. *Energy Innovations: A Prosperous Path to a Clean Environment*. ACEEE-E974. Washington, D.C.: American Council for an Energy-Efficient Economy.
- Bernow, Stephen, William Dougherty, Max Duckworth, Sivan Kartha, Michael Lazarus, and Michael Ruth. 1997. *Policies and Measures to Reduce CO₂ Emissions in the United States: An Analysis of Options for 2005 and 2010*. Boston, Mass.: Tellus Institute.
- Bluestein, Joel. 2001. "Memo to the Distributed Generation Workgroup of the Regulatory Assistance Project Regarding the Calculations of CHP Thermal Output in an Output-Based System." Arlington, Va.: Energy and Environmental Analysis, Inc.
- Brown, Elizabeth, Kalon Scott, and R. Neal Elliott. 2002. *State Opportunities for Action: Review of States' Combined Heat and Power Activities*. ACEEE-IE022. Washington, D.C.: American Council for an Energy-Efficient Economy.
- Bush, George. 2001. *National Climate Change Technology Initiative*. Washington, D.C.: The White House.
- Casten, Tom. 1998. *Turning Off the Heat: Why America Must Double Energy Efficiency to Save Money and Reduce Global Warming*. Amherst, N.Y.: Prometheus Books.
- Clinton, William Jefferson. 1998. *Climate Change Technology Initiative*. Washington, D.C.: The White House.
- [EEA] Energy and Environmental Analysis, Inc. 1999. "Summary of the 1999 Industrial Cogeneration Projection." Prepared for the Gas Research Institute. Arlington, Va.: Gas Research Institute.
- [EIA] Energy Information Agency. 2002. Annual Energy Review 2001. DOE-EIA 0384 (2001). Washington, D.C.: United States Department of Energy, Energy Information Agency.
- Elliott, R. Neal. 2001. *Federal Tax Strategies to Encourage the Adoption of Combined Heat and Power*. ACEEE-IE015. Washington, D.C.: American Council for an Energy-Efficient Economy.
- Elliott, R. Neal and Mark Spurr. 1998. *Combined Heat and Power: Capturing Wasted Energy*. ACEEE-IE983. Washington, D.C.: American Council for an Energy-Efficient Economy.
- [FERC] Federal Energy Regulatory Commission. 2002. *Standardization of Small Generator Interconnection Agreements and Procedures, Advance Notice of Proposed Rulemaking*. Docket No. RM02-12-000. Washington, D.C.: Federal Energy Regulatory Commission.

- [IEEE] Institute for Electrical and Electronic Engineers. 2002. *Standard for Interconnecting Distributed Resources with Electric Power Systems*. IEEE-1547. Piscataway, N.J.: Institute for Electrical and Electronic Engineers.
- Interlaboratory Working Group. 1997. *Scenarios of U.S. Carbon Reductions: Potential Impacts of Energy Technologies by 2010 and Beyond*. Berkeley, Calif.: Lawrence Berkeley National Laboratory and Oak Ridge, Tenn.: Oak Ridge National Laboratory.
- Kaarsberg, Tina and R. Neal Elliott. 1998. "Combined Heat and Power: Saving Energy and the Environment." *Northeast-Midwest Economic Review*, March/April: 4–10.
- [NARUC] National Association of Regulatory Utility Commissioners. 2002. *Model Distributed Generation Interconnection Procedures and Agreement*. <http://www.naruc.org/programs/dgia/dgiaip.pdf>. Washington, D.C.: National Association of Regulatory Utility Commissioners.
- [NEPDG] National Energy Policy Development Group. 2001. *National Energy Policy*. Washington, D.C.: U.S. Government Printing Office.
- [RAP] Regulatory Assistance Project. 2002. *Model Regulations for the Output of Specified Air Emissions from Smaller-Scale Electric Generation Resources*. <http://www.rapmaine.org/workgroup.html>. Montpelier, Vt.: Regulatory Assistance Project.
- Shipley, Anna Monis, Nathanael Green, Katie McCormack, Jia Li, and R. Neal Elliott. 2001. *Certification of Combined Heat and Power Systems: Establishing Emissions Standards*. ACEEE-IE014. Washington, D.C.: American Council for an Energy-Efficient Economy.
- [TNRCC] Texas Natural Resource Conservation Commission (now called Texas Commission on Environmental Quality). 2001. *Air Quality Standard Permit for Electric Generating Units*. http://www.tnrcc.state.tx.us/permitting/airperm/nsr_permits/files/segu_final.pdf. Austin, Tex.: Texas Natural Resource Conservation Commission.
- [USCHPA] U.S. Combined Heat and Power Association. 1999. *Combined Heat and Power (CHP): A Vision for the Future of CHP in the U.S.* Washington, D.C.: U.S. Combined Heat and Power Association.
- . 2001. *National CHP Roadmap*. Washington, D.C.: U.S. Combined Heat and Power Association.