CLEAN WATER ACTION
CONNECTICUT

Comments on EDC 2010 Integrated Resource Plan
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Clean Water Action is a national environmental non-profit with 25,000 Connecticut members. We have worked on power plant and energy related issues in Connecticut since 1998, including provisions of the 2007 energy law, Public Act 07-242. We also have promoted clean energy and energy efficiency at the town and individual level through the 20% by 2010 clean energy initiative.

We strongly support the CEAB's integrated planning approach to achieve the state's environmental, cost, security and reliability aims. The 2010 plan is a tremendous improvement from the earlier plans, and for the first time provides essential information to enable real choices between various policy scenarios under different cost and regulatory assumptions.

The legislature mandated that the CEAB create a plan balancing multiple state policy objectives, and we ask the CEAB to deliver the options which best fulfill the statute to DPUC. The DPUC's role is to implement policy set by the legislature, and we look forward to working with the CEAB to support full implementation of the Integrated Resource Plan.

Summary of comments:

1. **Energy Efficiency**- Clean Water Action asks the CEAB to recommend pursuing all cost-effective Demand Side Management as only this scenario fulfills the statutory requirement to maximize the impact of DSM and minimize environmental impacts
2. **Renewable energy**- we support a build-out of regional wind to meet our RPS goals but ask that the CEAB also consider a modest in-state renewable component. Solar is Connecticut's most abundant renewable resource and has real future economic potential as prices decline.
3. **Air quality**- ozone smog pollution is a pressing public health issue, and antiquated power plants running at peak times are a key contributor to our smog problem. We ask CEAB to assume stringent future DEP NOx standards, and to prioritize scenarios where lower-emitting resources replace old power plants, including energy efficiency, zero-NOx renewables (solar PV, fuel cells), and low-NOx combined heat and power.
4. **Combined Heat and Power** (CHP)- We need a rigorous assessment of a CHP ramp-up scenario, which analyzes the barriers to installation at businesses, schools and government sites, the types of incentives which would be needed to promote CHP and a quantification of both heating fuel *and* electricity cost benefits, and how to avoid potential NOx disbenefits.
5. **Nuclear Power-** We suggest that CEAB resources would be better spent on an analysis of combined heat and power as it more likely to be implementable on a relevant timescale.
6. **CEAB's future role** regarding natural gas and heating energy use- we that CEAB in the future analyze natural gas, and request that its mission expand to unregulated delivered fuels. The authorizing statue charged CEAB with creating energy, not electricity plans. The fewer the silos, the better the outcome for CT energy consumers.

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1. Energy Efficiency- fully fund all cost-effective Demand Side Management

The statutory requirement is clear (section 51 OF PA 07-242):

> (c) **Resource needs shall first be met through all available energy efficiency and demand reduction resources that are cost-effective, reliable and feasible**. The projected customer cost impact of any demand-side resources considered pursuant to this subsection shall be reviewed on an equitable bases with non demand-side resources. The procurement plan shall specify (1) the total amount of energy and capacity resources needed to meet the requirements of all customers, (2) the extent to which demand-side measures, including efficiency, conservation, demand response and load management can cost-effectively meet these needs…

which then continues with priorities the IRP must consider:

> (d) The procurement plan shall consider: (1) **Approaches to maximizing the impact of demand side measures**; (2) the extent to which generation needs can be met by renewable and combined heat and power facilities; (3) the optimization of the use of generation sites and generation portfolio existing within the state; (4) fuel types, diversity, availability, firmness of supply and security and environmental impacts thereof, including impacts on meeting the state's greenhouse gas emission goals; (5) reliability, peak load and energy forecasts, system contingencies and existing resource availabilities; (6) import limitations and the appropriate reliance on such imports; and (7) the impact of the procurement plan on the costs of electric customers.

We ask CEAB to endorse full funding for the "all cost-effective DSM" scenario, as only this scenario fulfills the statutory requirement to maximize the impact of DSM and minimize environmental impacts (including ozone-forming NOx and greenhouse gas emissions) at *negative* cost. As cited in the IRP, the ECMB's 2009 Energy Efficiency Potential study indicates that Connecticut could capture an additional 20 percent of cost-effective efficiency by 2018. Connecticut is falling behind other New England states as the IRP notes that "Vermont's and Massachusetts's annual savings targets (two and 2.4 percent, respectively) are at least twice that of Connecticut's (one percent)." As section 2-16 states that achieving all cost effective efficiency would mean a **savings of over $400 million *per year* in customer energy costs**, it would be foolish to leave any of this money on the table.

Ramp-up will Reduce Number of Non-Participants

Connecticut has tremendous potential to grow its energy efficiency programs in ways that significantly increase program participation and broadly lower customer bills. It is our understanding that much of the potential for growth in efficiency is in the small business and residential sectors. By definition, "*All* cost effective efficiency" requires **broader customer participation**, and this should reduce concerns about non-participants as people interested in taking part in the programs should no longer be turned away due to a lack of funds.

For example, improving residential programs to increase access should be a central part of a ramp-up. Current CT Energy Efficiency Fund programs like Home Energy Solutions are limited in the number of households they serve, do not holistically merge marketing with community-based outreach and education, or provide reasonable financing assistance to enable residential customers to implement deeper measures. This can and should change.

Finally, the customer rate differences between the DSM scenarios are nearly rounding errors compared to the variability of fuel costs. Table 2.8 on page II-10 states that due to uncertainty in

natural gas prices, rates in 2020 could vary by as much as 3.5¢/kWh, with rate differences among most efficiency scenarios *just .1 to .2¢/kWh*, which comes to $.70 to $1.40/month on a $140 electric bill for an average customer consuming 700kWh/month. This .2¢ on efficiency is the best money Connecticut ratepayers could invest in any energy resource.

Table 2.8
Average Customer Power Supply-Related Cost in Connecticut in 2020

Scenario	Strategy		
	Reference Strategy *(¢/kWh)*	Targeted DSM Expansion *(¢/kWh)*	All Achievable Cost-Effective DSM *(¢/kWh)*
Current Trends	13.70	13.68	13.81
Lo Gas/Lo CO2	11.01	10.91	11.35
Med Gas/Hi CO2	14.17	14.13	14.50
Hi Load	13.78	13.69	13.95
Hi Gas/Hi CO2	15.59	15.71	15.69

Environmental Benefits of All Cost-Effective Efficiency
As an environmental non-profit, we support energy efficiency in large part due to its ability to achieve environmental objectives. As greater efficiency yields greater pollution reductions this is yet another reason for CEAB to recommend the all cost-effective DSM scenario to the DPUC as it satisfies the intent of Public Act 07-242.

As stated in the IRP:

> Emissions vary substantially across strategies, as shown in Figures 31 through 37. DSM reduces emissions of all types, with more DSM causing greater reductions. The Targeted DSM Expansion strategy would reduce regional CO_2 emissions and Connecticut NOx and SO_2 emissions each by approximately one percent, and it would reduce Connecticut NOx emissions on the top ten High Energy Demand Days (HEDD) by about five percent. **In the All Achievable Cost-Effective DSM strategy, regional CO_2, NOx, and SO_2 emissions would decrease by about 4 percent (varying by scenario); Connecticut SO_2 emissions would decrease by as much as 22 percent while NOx emissions decrease about five percent.**
> CT IRP, II-29

It is clear that efficiency is key to avoid the environmentally most damaging scenarios. The high load growth scenario results in SO_2 emissions far greater than the reference scenario, the highest CO_2 emissions across all scenarios, among the highest NOx emissions, and the highest High Electricity Demand Day NOx emissions (figure 37, II-32). Environmentally, it is critical that Connecticut avoid high load growth by maximizing efficiency.

2. Renewable Energy- some in-state resources also appropriate
We support a modification of the reference scenario to also include some in-state renewable resources. The reference scenario, where the Regional Portfolio Standards are met, efficiency programs continued, and more stringent smog standards placed on power plants, provides a scenario "to beat" in terms of emissions, price volatility, costs and economic growth. This assumes a build-

out of wind in New England and corresponding transmission investments to bring these resources to Connecticut.

The result of implementing this would be environmentally very positive:

> This shows the increase in renewable generation from 6 percent of total regional supply in 2007 to 16 percent in 2020, a 40 percent reduction in coal generation, and a steep decline in oil generation. On net, gas-fired generation increases only slightly, partly because of an interesting decrease in winter gas usage that is due to the increased level of wind generation during the winter.
>
> 6. In 2020, the annual NOx and SO_2 emissions from power generation in Connecticut are expected to decrease by approximately 50 percent and 60 percent, respectively, from 2007 levels. This is due to the effects of strengthened environmental regulation and the regional buildout of renewable generation.
> IRP, II-12

While perhaps illustrative for comparison purposes, the "In-state Renewable" scenario is not a serious one. Connecticut would not implement the goals of the 2009 KEMA solar study (230MW of solar PV by 2020), build 100MW of biomass and then rely on fuel cells to meet the *entire remainder* of the RPS requirements, ignoring resources anywhere else on the regional grid. Not surprisingly, this would have greater cost than the reference scenario, but also a 30% increase in CO_2 emissions due to the fact that fuel cells use natural gas to produce hydrogen. (It is unclear if benefits of using waste heat from fuel cells in displacing heating emissions have been counted in the CO_2 figure.) We ask that there be some in-state renewable component in addition to regional wind.

CWA Recommends: Modest Solar Power Investments

We ask that the CEAB consider a modest in-state solar component as outlined in the KEMA solar strategy given solar's abundance as a resource and future economic potential. The purpose of the 2009 KEMA solar study and Clean Energy Fund solar strategy workgroup was to create a scenario to bring solar photovoltaics to a scale in Connecticut where installation costs will decline and the industry will be able to compete with conventional generation resources. This scale was estimated to be over 200MW by 2020, or about 1% of our overall generation needs. In comparison, Massachusetts is considering 400MW by 2020 and New Jersey committed to 5000MW by 2026.

- The **energy benefits** of such a strategy are that solar PV is generally coincident with peak load and displaces the most expensive electricity and lowers peak clearing prices, PV can be sited where power is needed, it provides a hedge against rising fossil fuel costs and provides its host with stably-priced electricity for at least 25 years.
- The **economic benefits** of investing in photovoltaics are as the costs of solar panels and installation decline with increased volume, there will be a self-sustaining industry by 2020 which will be able to compete with conventional sources without subsidy. Solar installations are inherently performed by local workers and dollars not spent on fossil fuels remain within the Connecticut economy.
- The **environmental benefits** include displacing high NOx-emitting power plants running at peak times with a zero-emissions resource.

Finally, any estimation of the costs of solar PV should reduce the installed cost over time as costs continue to significantly decline.

3. NOx and air quality

As we co-led the campaign to clean up SO_2 (soot) emissions from the "Sooty Six" power plants, Clean Water Action strongly supports ways to finish the job and reduce ozone smog-forming emissions from these plants. Ozone smog is a pressing public health issue, as smog triggers asthma attacks and causes hospitalizations and premature deaths. It is also a major quality of life issue, as the hazardous haze which engulfs Connecticut during hot summer days makes our state a less attractive place to live and work. Public health warnings to stay indoors and avoid exertion are not what families should have to hear as they try to enjoy our parks and beaches in the summer. As the health effects of ozone pollution are worse than was previously recognized, the US EPA announced a tightening of air quality standards in January 2010, which underscores the needs to achieve additional deep cuts in NOx emissions. **Failure to attain deep NOx reductions puts Connecticut at risk of losing $463 million of federal funding as well as avoidable health costs valued between $100 million and $1 billion annually,** according to the CT Department of Environmental Protection.

We were disturbed by Section II-15, which described the future under the reference scenario. Despite an increase in regional renewable energy and energy efficiency, overall NOx emissions on high demand (also high pollution) days do not decrease.

> Conversely, NOx emissions during the hottest days do not decline over time. From 2013 through 2020, the non-retiring steam-oil units, and also combustion turbines, actually produce increasing amounts of energy and NOx emissions during the highest-load periods in July and August when wind generation is at its low point. These units run more over time because load growth and unit retirements lead to declining reserve margins. Thus, daily NOx emissions on the 10 Highest Energy Demand Days (HEDD) do not decrease in spite of retirements and the installation of SCRs on non-retiring steam-oil units.
> IRP, II-15

As it appears that the key factor related to NOx is whether *any* antiquated oil-fired units continue to operate, as even with pollution controls, their emissions rates are higher than new gas plants. We ask CEAB to assume stringent future DEP NOx standards and to prioritize scenarios where lower-emitting resources are used instead of old oil units. Modeling by ISO-NE and Brattle Group show we need at least 100MW of energy efficiency a year to reduce 15 tpd (90/10 scenario) or 10 tpd (50/50 scenario) on our peak days, which would meet current state targets. An additional 200MW of solar PV could be worth an additional 5-10 tons per day by 2020.

CWA Recommends:

We ask CEAB to endorse a scenario which will minimize NOx pollution and combine all cost-effective efficiency with zero-NOx renewables (solar PV, fuel cells), energy efficiency, low NOx combined heat and power units, and potentially new combined-cycle natural gas turbines.

We do not have a strong preference as to whether existing units should be repowered or retired, so long as the public is not penalized for bad financial decisions freely made by generators in competitive markets. PA 07-242 asks CEAB to put a preference on demand side resources, renewable energy and distributed generation over expanded centralized fossil fuel plants, and we agree that is the right order of priority for the state.

4. **Combined Heat and Power (CHP)- more study and greater emphasis needed**
While UI suggests commissioning a more detailed study of nuclear power, for a variety of reasons we would suggest CEAB order a comprehensive CHP implementation study instead. The EDC IRP states that potential for large-scale CHP at industrial sites has been largely exhausted but that there is substantial additional potential remaining at smaller commercial sites, schools and government sites.

We need a rigorous assessment of a CHP scenario, which analyzes the barriers to installation at businesses, schools and government sites, the most appropriate incentives to promote CHP (such as: a return of the DPUC grants program, financing assistance, expansion of the Class III RPS, and/or long-term contracts under a program like Project 150). It should also analyze potential energy security impacts and benefits, and quantify both heating fuel AND electricity cost benefits (it's critical to not just look at capacity and electricity for a technology which displaces heating fuel use).

It is also critical to investigate the potential for NOx disbenefits and if any disbenefits can be avoided by tying incentives or financing to emissions standards or fuel standards (i.e. only providing incentives for CHP running on natural gas and of a type of CHP which achieves a stringent NOx rate). Distributed generation should not be permitted to worsen our peak day ozone problems when with proper planning it could be part of the solution.

5. Nuclear power- unrealistic in IRP timeframes
Clean Water Action questions whether UI's interest in more study of how to overcome the barriers to nuclear power is worth the CEAB's time or effort.

Nuclear power, despite being a relatively mature technology in place for over 50 years, is still handicapped by fundamental problems, including:

- Storage of long-lived radioactive waste
- Plant security risks and the potential for a catastrophic radioactive release
- Lack of interest by private financiers
- High water usage for cooling
- Siting difficulties
- Risk to ratepayers under cost of service of massive risk of cost overruns/outages
- Credit problems for utilities constructing plants

Given the uncertainty about construction cost, and long lead times to build new plants, unresolved environmental concerns regarding the storage of radioactive waste for many generations into the future, risk of accident and attack, we question whether nuclear power is a realistic option to meet Connecticut's electricity needs. We question whether it reduces NOx, CO2, and electricity costs faster and more affordably than ramping-up alternatives like energy efficiency, renewable energy and distributed combined heat and power plants.

We also question assertions that:

> Even some environmental advocates, most of whom have historically opposed nuclear power, have begun to support it as a response to global climate change. IRP 5-2

One of the individuals mentioned in the report, Patrick Moore, may have worked for Greenpeace in the past, but is currently a paid spokesperson for the nuclear industry and should be noted as such.

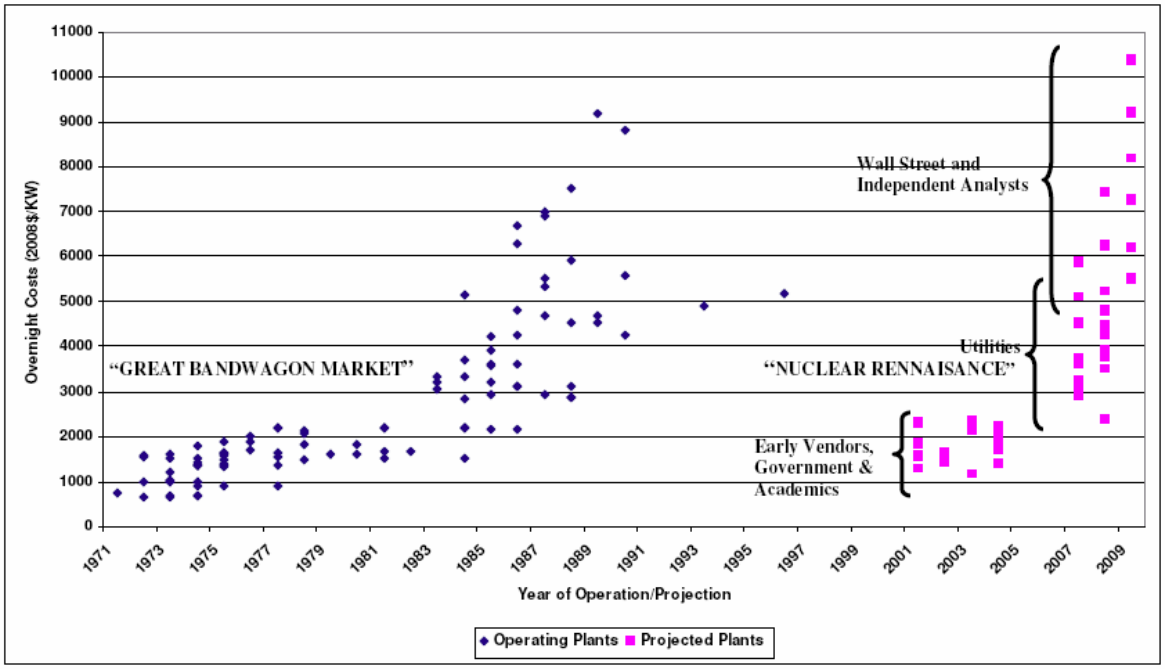
The Connecticut Climate Change Action Plan does not include an expansion of nuclear power as a measure needed to reach the state's near or mid-term emissions reduction targets. We are unaware of leading Connecticut environmental organizations which view new in-state nuclear power plants as a necessary or desirable means of achieving our climate targets.

CWA Recommends:
We suggest that CEAB resources would be better spent on an analysis of combined heat and power as it more likely to be implementable on a timescale relevant to Connecticut. With CHP, ratepayers would bear far less risk and cost and not burden future generations with the legacy of radioactive waste to meet our energy demands today.

Additional resources on nuclear power:

Mark Cooper, *The Economics Of Nuclear Reactors: Renaissance Or Relapse?,* Vermont Law School, June 2009

Figure ES-1: Overnight Cost of Completed Nuclear Reactors Compared to Projected Costs of Future Reactors



Sources: Koomey and Hulttman, 2007, Data Appendix; University of Chicago 2004, p. S-2, p. S-8; University of Chicago estimate, MIT, 2003, p. 42; Tennessee Valley Authority, 2005, p. I-7; Klein, p. 14; Keystone Center, 2007, p.42; Kaplan, 2008 Appendix B for utility estimates, p. 39; Harding, 2007, p. 71; Lovins and Shiekh, 2008b, p. 2; Congressional Budget Office, 2008, p. 13; Lazard, 2008, Lazard, p. 2; Moody's, 2008, p. 15; Standard and Poor, 2008, p. 11; Severance, 2009, pp. 35-36; Schlissel and Biewald, 2008, p. 2; Energy Information Administration, 2009, p. 89; Harding, 2009. PPL, 2009; Deutch, et al., 2009, p. 6. See Bibliography for full citations.

Cooper, p.3

Moody's Global Infrastructure Finance, *New Nuclear Generation: Ratings Pressure Increasing*, June 2009, p.2

> But from a credit perspective, the risks of building new nuclear generation are hard to ignore, entailing significantly higher business and operating risk profiles, with construction risk, huge capital costs, and continual shifts in national energy policy. Project risks are somewhat more clear today than during the last build cycle, in the 1970s, since we now have a track record that measures nuclear

> power's operating performance; strong plant economics due to low fuel cost; proven efficient and safe operating capabilities; new and refined regulatory procedures; and more certainty over reactor designs before construction begins.
>
> Less clear today is the effect that energy efficiency programs and national renewable standards might have on the demand for new nuclear generation. National energy policy has also begun eyeing lower carbon emissions as a key desire for energy production—theoretically a huge benefit for new nuclear generation—but the price tags associated with these development efforts are daunting, especially in light of today's economic turmoil. It isn't clear what effect such shifts, or changes in technology, will have for new nuclear power facilities.
>
> Credit conditions are yet another question. Few, if any, of the issuers aspiring to build new nuclear power have meaningfully strengthened their balance sheets, and for several companies, key financial credit ratios have actually declined. Moreover, recent broad market turmoil calls into question whether new liquidity is even available to support such capital-intensive projects.

6. CEAB's Role and Heating fuels:

We also ask the CEAB to implement CT's laws to achieve all cost-effective efficiency for both electricity ***and*** for natural gas. We recommend you consider asking the legislature to expand your scope to include other fuels used for heating. Connecticut needs to stop dealing with energy issues in narrow silos. In the EDCs IRP it was unclear if the benefits of CHP and fuel cells for reducing heating energy use was considered in these sections, or the benefits of increased wind generation on reducing demand for natural gas for heating in the winter.

We ask the CEAB recommend specific funding for a ramp-up of natural gas efficiency investments to capture all cost-effective gas efficiency. This should analyze the impacts of natural gas conservation on electricity rate volatility as well as energy security.

Reviewing the section of PA 07-242 which created the CEAB, it speaks generically to "energy," rather than electricity specifically:

> Sec. 51. (NEW) (*Effective from passage*) (a) The electric distribution companies, in consultation with the Connecticut Energy Advisory Board, established pursuant to section 16a-3 of the general statutes, as amended by this act, shall review the state's energy and capacity resource assessment and develop a **comprehensive plan for the procurement of energy resources**, including, but not limited to, conventional and renewable generating facilities, energy efficiency, load management, demand response, combined heat and power facilities, distributed generation and other emerging energy technologies to meet the projected requirements of their customers in a manner that minimizes the cost of such resources to customers over time and maximizes consumer benefits consistent with the state's environmental goals and standards.

Thank you for consideration of our comments,

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