

**MIT Coal-Free Policy Group
ESD.864 Assessment Process Memo**

1. What is the policy question or decision at stake and who are the relevant stakeholders?

In the 2011-2012 legislative session, Massachusetts lawmakers will consider an omnibus bill to phase out all coal-fired electric power plants in Massachusetts by 2020. The bill, titled *An Act Relative to a Coal-Free Commonwealth*, was submitted by State Representative Lori Ehrlich (D-8th Essex District) and has been favorably received by a number of environmental organizations, including the Conservation Law Foundation (CLF)¹ and the Environmental League of Massachusetts (ELM).² This bill is driven in part by legislative mandate, stemming from the 2008 Global Warming Solutions Act passed in Massachusetts. While the text of the bill is not yet available for review, ELM reports that the bill proposes:

- (1) a fee on Hazardous Air Pollutants (HAPs) to fund public health studies;
- (2) coal ash disposal provisions;
- (3) flat prohibition of new coal plants; and
- (4) creation of a Community Repowering Fund to mitigate any economic or employment impacts of coal-plant shutdown³

Because coal-fired power plants provide approximately 25% of all electricity generated in Massachusetts,⁴ phasing out all coal-fired plants by 2020 could affect a wide spectrum of stakeholders, as summarized in the table below:

Stakeholder	Scale	Potential Effects	+ - ?
Person near plant	Local	Local air quality improvements	+
Plant employee	Local	Loss of/change in employment	-
Plant owner	Local	Loss of/change in investment	-
Municipal government	Local	Loss of/change in property tax revenue	-
Ratepayers	MA	Possible increase in electricity prices	? / -
ISO-New England	N.E.	Grid reliability based new generation	? / -
Global citizen	Global	Reduction in greenhouse gases	+

2. What is your specific goal for your assessment? What sort of stakeholder/decision-maker are you targeting?

The goal for our Category 1 assessment is to conduct a targeted case study assessment of the economic, environmental, and public health consequences of decommissioning the largest coal-fired power plant installation in Massachusetts, Brayton Point. By conducting this assessment, we are not attempting to provide a commissioned study for a singular stakeholder or decision-maker. Instead, we believe that our assessment would be most useful as a more generalized contribution to the current discussion of the future of coal in Massachusetts.

In our (brief) experience discussing the coal-free idea with interested parties, the arguments advanced by stakeholders *qua* environmental advocacy organizations have largely been based on several studies. These studies include one each by the Union of Concerned Scientists⁵ and another by the Clean Air Task Force⁶. While these studies have been valuable, we believe that a *targeted, comprehensive, and objective* analysis of “what it would really mean to go coal-free” would be an important contribution that could be inserted into the state-wide discussion of the issue.

Last year, the MIT-affiliated *Consensus Building Institute*, assessed the nature of the organizations engaged in climate change related activities in the Boston area, and concluded that there

¹ “Coal-Free New England 2020.” Conservation Law Foundation. <<http://www.clf.org/our-work/clean-energy-climate-change/energy-safety-and-security/coal-free-new-england-2020/>>

² “ELM Working to Make Massachusetts Coal-Free.” Environmental League of Massachusetts. <<http://www.environmentalleague.org/news.php?news=98>>

³ “ELM Legislative Priorities 2011-2012 Legislative Session.” Environmental League of Massachusetts. <<http://www.environmentalleague.org/news.php?news=96>>

⁴ Energy Information Administration. <http://www.eia.gov/cneaf/electricity/st_profiles/massachusetts.pdf>

⁵ Union of Concerned Scientists. “Burning Coal, Burning Cash: Ranking States that Import the Most Coal.” May 2010.

⁶ Clean Air Task Force. “The Toll From Coal: An Updated Assessment of Death and Disease from America’s Dirtiest Energy Source.” September 2010.

was an opportunity to create a small-but-broad-coalition of interested parties focused on state climate policy. This consortium has now been created in the form of the *Global Warming Solutions Project*. We will thus provide our assessment to several stakeholders who form part of the Global Warming Solutions Project, including the advocacy organizations: CLF, ELM, Students for a Just and Stable Future, as well as to the advisory organization, Northeast States for Coordinated Air Use Management (NESCAUM). All of these organizations have indicated that a case-study such as our assessment would be “useful.”

While we recognize that our contacts and the plan of our assessment is *driven* by the legislative discussion and, more specifically, by the relevancy to proposals sponsored by advocacy organizations, we believe that the *results* of this study will be most useful if they are dissociated from any particular organization and can be viewed as a stand-alone product that can be used by the *diverse*, yet *coordinated* members of the Global Warming Solutions Project team.

3. How has your group interacted with stakeholders, and how will you manage this communication in the next month?

Our group divided up the tasks of contacting the following stakeholders: Dr. Praveen Amar (NESCAUM), Shanna Cleveland (CLF) Craig Altemose (Students for a Just and Stable Future), and Eugenia Gibbons (ELF). In our initial emails we outlined our central strategy to focus on one power plant and invited suggestions as to what themes would especially benefit from analysis. The first significant feedback we received was from Craig Altemose. We took up three major focal areas from his email: Health/Air Quality, Economic/Workforce, and Grid/Energy. Eugenia Gibbons agreed with our overall strategy and highlighted Economics/Jobs as a particularly important focal area, considering that it is a highlighted area of concern. Finally, two group members held a conference call with Dr. Praveen Amar and compiled a detailed report of the conversation for the rest of the team. Dr. Amar suggested specifics of what to investigate within each major focal area, and gave us additional contacts. He also presented his own views on some solutions related to each area e.g. carbon capture.

Our interactions with the stakeholders were most fruitful when we provided details of our own thinking and overall strategy so that the stakeholders had a jumping-off point to begin the discussion. They all responded well to the level of detail we provided, so we will continue to supply reasonably detailed information whenever we interact with them. Some of them also found the project schedule useful as an indicator of the depth of analysis we could realistically expect to complete.

After our next work phase is complete, we will collectively develop another round of thoughts and questions to discuss with these stakeholders. This will allow us to kick-start a second substantive discussion. We will likely do the initial follow-ups with Dr. Amar and Eugenia Gibbons via email. Craig Altemose provided very detailed email feedback and offered to teleconference. We have updated him on our current thinking and may schedule a conference call for specific questions.

Additional stakeholders that we will contact for specific information queries include: government agencies such as the Massachusetts Department of Environmental Protection (MassDEP) and the Executive Office of Energy and Environmental Affairs; the electric utility that owns the plant, Dominion Energy; the electric grid operator for the New England region, ISO New England; and the community of Somerset, MA, for which the Brayton Point Plant provides jobs (unless workers commute from elsewhere, to be determined) and property tax income but also adverse health effects.

4. How will you decide what counts as “science” and what counts as “policy”? How will you manage the boundary between your role as advisors and the decision-makers?

The division between science and policy will differ in each of our assessment sub-topics: Health/Air Quality, Economic/Workforce, and Grid/Energy. In the Health/Air Quality sub-topic, science will begin with air chemistry studies and evaluated public health studies and the fuzzy line with policy begins at decisions related to model inputs. Attempts will be made to make neutral modelling decisions. Policy recommendations will be made related to meeting mandated and desirable targets, with the caveat of uncertainty in outcomes. In the Economic/Workforce sub-topic, property tax and labor information will be used in conjunction with information from prior case studies to predict impacts. Policy recommendations will be offered based on comparison of alternative scenarios' ability to offset job loss and property tax loss. Finally, in the Grid/Energy sub-topic, prior studies in conjunction with location-specific information will be used to predict the feasibility of alternative energy replacements for the Brayton Point plant. Some options may be somewhat infeasible, and policy recommendations for best alternative energy replacement will be offered.

5. How will you treat uncertainty?

Uncertainty will be treated differently within each of our sub-topics, as well; generally, sources of uncertainty will be disclosed in the final report with estimated confidence. In the Health/Air Quality sub-topic, uncertainty in modelled estimates of health impacts (disease/deaths attributable to Brayton Point) will be made explicit when reporting numbers (i.e. we'll report the estimate and attached an uncertainty bound. This bound is derived from the model calculation itself, but has not frequently been reported in policy-summaries. In assessing the health/air quality impacts of replacing the plant, reported uncertainties will be based largely on relevant and available literature reports. These are largely uncertainties of models (rather than policy uncertainties, since our project is designed to test different policy outcomes). In the Economic/Workforce sub-topic, uncertainty in labor data, the future labor market, and property tax assessments will be addressed. Finally, in the Grid/Energy sub-topic, uncertainty estimating electricity rate impacts from various replacement technologies will be disclosed.

6. How will you communicate your results, and to whom will they be relevant?

In presenting our results to the stakeholders, depending on the stakeholder we may present our results to them in person or through a final report. We intend to share the final result with all relevant stakeholders, so that it does not appear to be more affiliated with certain stakeholders.

7. What questions would you like feedback from your colleagues on?

Transitioning major infrastructure to a new format is challenging in any sector, but it is particularly difficult in the electricity sector, which is well-established and resistant to major change. In our study, we are assessing the impacts of transitioning one major coal plant to alternate forms of electricity production (or reduction in the case of efficiency improvements). Despite narrowing our analysis to the scope of transitioning one plant (albeit a large one), several questions pertaining to the scale of the analysis still emerge.

In choosing between alternative electricity production schemes to replace Brayton Point, we've decided to focus on air quality and human health issues, economic and workforce changes, and grid reliability concerns. We have not yet fully established what the exact metrics within these areas will be. The MIT Energy Initiative for example has done a multitude of these types of studies:

1. What are the most meaningful metrics within these areas to a scientific assessment of electricity alternatives to Brayton Point?
2. What are the easiest to calculate given limited time and resource constraints?
3. Are there other impact areas that we are completely missing with associated important metrics? There is also concern over the differing scales of these impact areas. For example, the air quality and human health impact will likely be bounded by the local or regional scale near the plant while the economic impacts could have statewide influence and grid reliability effects impacting nearby New England states (decommissioning the plant eliminates 1,600 MW of base load generating capacity).
4. How can these variable scales be managed within the study such that the results are meaningful?
5. Are these scales reasonable?
6. Does it even matter that the scales are variable as long as we acknowledge that there is greater uncertainty in the impact as scale grows?

Scenario analysis is often a preferred methodology for evaluating alternative electricity generation options⁷. Despite being widely utilized, the decision space is severely limited, and portfolio diversification theory tells us that almost always a mix of options is preferred because it minimizes risk, regardless of the application (e.g. stocks, infrastructure investments, etc.). That being said, time and resources for this study are limited, and a portfolio optimization has drawbacks of its own (e.g. many potentially unrealistic assumptions to make the problem tractable computationally).

7. In evaluating alternative investments in electricity generation, are there any clever ways to include portfolio analysis, even to a limited extent?
8. Does this improve the assessment?
9. Are there alternative methodologies to scenario analysis and portfolio optimization that are achievable within the time constraint of the project?

⁷ Ontario Ministry of Energy. "Cost Benefit Analysis: Replacing Ontario's Coal-Fired Electricity Generation." April 2005. Prepared by DSS Management Consultants Inc. RWDI Air Inc.

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