



CLIMATE PROTECTION PLAN DEVELOPMENT

Prelude to a Plan :

“Why act now when there’s still so much uncertainty?”

Managing the “shifting sands” of regulatory development and external programs:

It is simple to find reasons *not* to act now – or to simply implement “actions” that defer hard decisions by continuing to study the issues without committing significant resources. Addressing climate change is expensive, the issues are complex, and the regulatory environment is still evolving. But in this case, early action is critical, cost effective, and strategic for the following reasons:

- 1) **Stay ahead of regulation.** The ports and maritime sectors are well known as significant emitters of greenhouse gases. These sectors are a prime target for regulators because the industry has undergone relatively less direct regulation due to its complexity and international reach. By taking early action and implementing robust plans, the ports and maritime community may avoid regulations that create more burdensome, inappropriate, or costly mandates.
- 2) **Create Precedent.** In developing regulations that may affect a port, regulating agencies will often investigate what programs are already in place to manage the subject of regulation. Well conceived and implemented measures and strategies are much more likely to be incorporated into regulatory policies. Contributing with specific, successful examples as policies are being developed will result in more productive regulation than trying to amend the regulation after it is developed.
- 3) **Document Early Action.** In addition to the public relations benefits achieved by being proactive on an issue that is routinely rated as a top public priority worldwide, undertaking early actions and documenting them rigorously gives regulators a tool by which to give credit for early action. This sort of credit may in the form of credit toward future carbon trading programs, less drastic regulation, more lenient timeframes for implementation, or an opportunity to offer a stronger voice in the development of regulations.
- 4) **Lock in Talent.** The nature of the challenge of combating climate change, especially as it relates to the complex set of political and technical issues faced by ports, is that there are relatively few people and organizations available with the real experience and expertise to understand the issues and help develop the best plan. Consultants will be teeming to portray themselves as experts in this rapidly growing field, but the organizations with the most appropriate talent will be locked in by early actors. Likewise, if the program is



sufficiently large that it warrants staff augmentation, the most qualified program managers and subject matter expertise will become committed early on.

- 5) **Start Improving Infrastructure.** The sooner a strategic plan is in place to manage GHG emission reductions over the long term, the sooner a port can begin to adjust its infrastructure development program to ensure that appropriate systems can be implemented in coming years. Retrofitting terminals and infrastructure after the fact can incur far greater costs and disrupt operations.
- 6) **Invest Now, Save Sooner.** The majority of strategies for reducing greenhouse gas emissions focus on reducing fuel use and conserving energy. Many of these strategies will create a positive return on investment by reducing fuel and energy costs. An important side effect of improving fuel and energy efficiency is that it reduces the impact of fuel price increases and variations allowing better long term planning and program viability.

WHERE TO BEGIN

Establish a port-wide vision:

Before any progress can be made towards developing and implementing a climate protection plan, the port has to commit to a vision that will guide the port's overall response to climate change. This commitment is especially important among the port's management and major stakeholders. Everyone involved must recognize the potential dire consequences of climate change on international goods movement and on the vitality of port operations. Inaction would result in economic and societal losses with devastating effects internationally. It must be recognized that operations involving cargo movement contribute to climate change and these operations will produce a much greater impact with an increasingly interdependent global economy.

Committing to address the climate change impacts must include all port-related operations in order to maintain current levels of operation or accommodate growth while minimizing the contribution to this global problem. An ambitious vision will seek to create an emissions-free port that not only addresses the environmental impacts of its own operations but serves as an example to the larger maritime and goods movement community. Such a port will be more competitive, efficient, and able to thrive in a changing economic environment.

Develop internal coordination – identify relevant existing programs and potential synergies.

Undertaking a climate protection program is greatly aided by having other programs and policies in place that can be leveraged for either existing efforts to improve energy efficiency and emissions reduction or for frameworks that facilitate quicker implementation of GHG emission reduction actions. Examples of programs and policies that will enhance a climate protection plan include:



Environmental Program Policy: This is the policy or set of policies at the core of a port's environmental mission. It guides how resources are used and how a port conducts developments and operations in both an environmentally and fiscally responsible manner. This policy seeks to implement business practices that improve quality of life and minimize the impacts of development and operations on the environment and surrounding communities. This is accomplished through the continuous improvement of its environmental performance and the implementation of pollution prevention measures, in a technically feasible and cost effective manner that is consistent with a port's overall mission and goals, as well as with those of its customers and the community.

Environmental Management System (EMS): An EMS weaves environmental decision-making into the fabric of an organization's overall business practices, with a goal of systematically improving environmental performance. An EMS follows the "Plan-Do-Check-Act" model of continual improvement. An EMS may be limited in scope to specific facilities or functions at a port or it may be integral to all aspects of the port's business.

Green Development Policy: This policy aims to promote responsible growth while implementing innovative and environmentally sustainable development practices. This policy utilizes sustainable building design and construction guidelines based on established standards that have been developed to promote buildings that are environmentally responsible, profitable and healthy. An example is the LEED Green Building Rating System, a voluntary green building rating system based on existing, proven technology that evaluates environmental performance in five categories:

- Sustainable Site Planning
- Improving Energy Efficiency
- Improving Water Efficiency
- Materials and Resources Conservation
- Embracing Indoor Environmental Quality

Green Purchasing Policy: An "Environmentally Preferable Purchasing Policy" implements a process for establishing a baseline for all purchases, researching environmentally preferable products to replace current items, and evaluating new products using environmentally oriented criteria.

Sustainability Plan: In its most basic form, sustainable development is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainability at a port seeks to balance environmental sustainability with economic sustainability (jobs and profits) and social sustainability (community and neighboring residents). A viable sustainability plan will cover specific criteria for evaluating plans and actions.



Economic Development Plan: An overall economic development strategy will focus on business development for the port and its stakeholders, redevelopment of unused or inadequately used assets, and workforce development. The plan will seek to maximize use of the ports assets in accordance with its governing principles and core values.

Create a Climate Protection Plan:

A climate protection plan establishes specific goals (i.e., near-term, mid-term, and long-term) for reducing greenhouse gas emissions from port -related operations and provides a framework for developing emission reduction strategies. A plan will include existing strategies with GHG emission benefits and add new near-term, mid-term and long-term strategies based on advanced and innovative control technologies. It may rely on a diverse set of implementation mechanisms including investment in the development, demonstration and integration of new/cleaner technologies, and a comprehensive monitoring and tracking program that will document progress on all of these elements. Achieving the plan's long-term goals will necessitate significant changes and adaptation of existing policies and practices. It may also include planning to include strategies that presume the future availability of technologies and process that are not yet available in the market.

A climate protection plan must be based on specific principles that may include the following:

- The climate protection plan will build upon past efforts, will be updated regularly and will be improved by incorporating the most recent available emissions inventory and technology information
- The plan will remain open to and supportive of new technologies and other advancements to meet the climate protection plan's emission reduction goals
- The port undertaking the plan will seek to maximize and accelerate greenhouse gas reductions from all port-related operations and will work closely with tenants, shipping lines, and other key players in the maritime and freight communities.
- The port will coordinate the implementation of the climate protection plan with local and regional regulatory agencies or other authorities and seek input, where appropriate, from stakeholders and the public.

A basic methodology for creating a climate protection plan is described in the following section.



METHODOLOGY

A comprehensive climate protection plan will address both a port's directly controlled sources as well as the port's tenants' sources. The overall methodology in developing and implementing a plan may include six steps which are briefly described here:

1. Develop Current Inventory – In order to have a better understanding of the contribution of the existing port-related sources to climate change, a port should develop a comprehensive inventory of greenhouse gas emissions or a “carbon footprint” for both the port's directly-controlled sources as well as sources controlled by port tenants. For the purpose of creating a plan, the port should select an appropriate base year to develop its current inventory. The baseline greenhouse gas inventory should be categorized into three GHG emission scopes¹:

- a) Scope 1 includes all direct GHG emissions from a port's directly-controlled stationary and mobile sources. Examples of Scope 1 include port-owned fleet vehicles and port employees commute vehicles, stationary generators, and buildings (i.e., natural gas combustion);
- b) Scope 2 includes indirect GHG emissions associated with the import and consumption of purchased electricity by a port for its directly-controlled sources (i.e., electricity used for in port-owned buildings and operations); and
- c) Scope 3 accounts for emissions associated with the operations of a port's tenants. Although inclusion of Scope 3 emissions in the Port's GHG inventory is optional, it provides an opportunity for overall management and control of GHG emissions on a port-wide basis. Scope 3 emissions include a port's tenants' direct emissions from stationary sources (i.e., natural gas combustion in buildings), mobile sources, and indirect emissions associated with purchased electricity. Mobile source emissions include emissions from cargo handling equipment operating on a port's property, rail locomotives and on-road trucks transporting cargo to or from a port up to the cargo's first point of rest within a defined regional boundary, and commercial marine vessels operating within the vicinity of a port and up to a chosen over-water boundary.

A basic GHG emission inventory will include only direct exhaust emissions from stationary and mobile combustion sources as well as indirect source emissions associated with the consumption of purchased electricity. Ideally, these emissions would include all of the “Kyoto Six,” referring to compounds identified by the 1997 Kyoto Protocol: carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs). Life cycle emissions associated with extraction, production, processing, and distribution of fuels used in mobile and stationary sources and for electricity generation may be included in the most comprehensive plans but need much greater resources due to the additional research and accounting required.

¹ Local Government Operations Protocol for the quantification and reporting of greenhouse gas emissions inventories, Version 1.0, September 25, 2008



2. Establish Emissions Baseline and Forecast – This step requires looking into the past and looking into the future – both of which can be complicated. Establishing a baseline greenhouse gas emissions inventory is a critical step, though, for a climate protection plan because it provides a benchmark from which progress can be measured. Ideally, a plan would establish a baseline for the 1990 calendar year consistent with the GHG baselines under Kyoto Protocol and other programs. The Kyoto Plan sets a reduction goal from the 1990 levels in 2010-2012 timeframe.

While international-level discussions have yet to determine exactly which goals will be in place beyond 2012, national and local-level programs may set long-term reduction goals that seek emission reductions of over 80% below 1990 levels. Reductions of such magnitude are anticipated to be necessary to prevent the most severe effects of climate change by stabilizing the amount of greenhouse gas emissions in the atmosphere. By undertaking early, voluntary efforts, organizations or regions will ease the transition into the impending carbon-constrained economy. Since a 1990 GHG emissions inventory is unlikely to have been developed in the past and 1990 activity data may not be readily available, a strategy may be to “back-cast” a current inventory. This is done assuming that 1990 port activity levels are known, incorporating changes in emissions standards and operations protocols, and by assuming that GHG emissions are proportional and scalable to activity.

Projecting for future milestone years (i.e., 2020 and 2050) can be done in a similar manner using the latest published cargo forecast and existing and any adopted or future regulations affecting the various source categories. Development of the emissions forecasts is critical for monitoring how a port’s overall carbon footprint is expected to change in the absence of additional GHG control programs and for determining the level of additional reductions needed in the future to achieve the Plan’s goals. A forecast is also key to designing abatement strategies that are tuned to expected changes in activity among specific source categories. It is important to recognize that cargo forecasts developed in the past year may not accurately account for the most recent global economic changes and may result in overestimations. These forecasts may be useful, though, in providing an upper-bound for a revised forecast, and indicate levels that the most stringent measures would have to achieve.

3. Set Goals – The next step in developing a climate protection plan is to set goals to achieve emission reductions for a port’s direct operations as well as on a port-wide basis to include the port’s tenants’ emissions. A climate protection plan should establish specific near-term, mid-term, and long-term goals, for example for the years 2020 and 2050, or other timeframes corresponding to local or national programs. These reduction targets will be set against the previously described 1990 baseline GHG levels. Examples of goals for reducing port-wide GHG emission during the various timeframes are as follows:

2020: Meet 1990 GHG emissions levels

2050: Achieve GHG emission levels 80 percent below 1990 levels

These figures correspond roughly to various national and international targets that have been proposed, though actual values will likely vary. By adopting such ambitious targets, a port illustrates their commitment to addressing climate change from their sector and signals the need for action to the broader maritime and freight transportation industry.



4. Develop Strategies – This toolbox includes a suite of strategies aimed at reducing GHG emissions from port-related operations to help achieve a port’s climate protection plan’s goals. The strategies range from those that may already be in place to improve air quality (see section on Integration and co-benefits) to other near-term and mid/long-term strategies that are specifically aimed at GHG emission reduction. These strategies are based primarily on integration of advanced zero-emission or near-zero-emission technologies (e.g., electrification, Maglev, hybrids). It also includes other innovative long-term strategies (e.g., offshore wind farms and wave power generation) which offer the potential for achieving significant levels of additional greenhouse gas emission reductions beyond existing programs and regulations. Some of these strategies may seem drastic or overly-costly, but there is no easy path. The reality is that to meet prescribed goals, a port of the future will look and operate much differently than they do today. Different ports will have different needs and capabilities, though, so these strategies can be considered a-la-carte options to be combined or adjusted to suit specific conditions. These strategies are intentionally general due to the wide variety of ports and goods-movement operations. They are meant to provide a starting point for internal discussions and planning about how an individual port may best build a robust and appropriate set of strategies.

As critical as identifying which strategies are technically appropriate for a port is understanding how these strategies may be implemented. Nobody wants to spend money, though many of the strategies result in long-term financial benefit. A port’s primary role may be less in providing technical direction and more in helping to bridge the distance between project capital costs and eventual cost savings. Several general mechanisms are presented for implementing the strategies outlined in this plan and individual strategies indicate which mechanism may be appropriate to that strategy. These mechanisms include augmenting a port’s policies and programs, adjusting lease requirements, implementing tariffs, providing incentives and initiating voluntary measures.

5. Monitor Progress – The level of progress in implementing the overall climate protection plan as well as its individual strategies should be tracked and documented in regular updates. These updates should occur at least every two to three years given how quickly economic conditions, available technologies, and regulatory requirements are changing. In these updates, the current and future inventories of GHG emissions from all sources should be updated to reflect the latest activity level, growth forecasts, and understanding of the success of various strategies. New and evolving technologies and existing strategies should be evaluated for applicability and old strategies may be revisited to re-assess costs and appropriateness. It also may be prudent to provide regular updates on the progress of implementing the plan to port stakeholders and interested local and regional authorities. These updates may be provided in brief reports, several times a year, which would detail significant progress for implementation of all plan strategies. Alternately, a web site that is regularly updated with the plan status and milestones for individual strategies may be a simple and effective way to communicate progress without the formality of an interim report. Also, this site provides an opportunity to upload information about specific on-going or completed projects that may be useful to other ports. All members are encouraged to use this function to add information that will increase the collective understanding of how to implement successful strategies.



6. Adaptation Planning – Given a ports’ inherent vulnerability to climate change impacts associated with sea level rise, increased temperatures, shifting precipitation and extreme weather events, a climate protection plan should include provisions for an adaptation strategy. A viable adaptation strategy would be developed and implemented in parallel with the specific control strategies identified in the climate protection plan in order to ensure that the long-term goals of the plan are achieved.

Developing a specific adaptation strategy helps a port prepare for and reduce vulnerability to climate change impacts. Development of such a strategy would entail conducting a detailed vulnerability assessment for the port (human populations, infrastructure, economy, natural habitats), identification of areas for further research and data collection, and development of specific adaptation strategies for both existing infrastructure and new developments. An adaptation plan that is developed in conjunction with regional plans will be especially robust. A port may reach out to prominent universities to determine existing research underway that may be applicable to the port and maritime sector and explore opportunities to partner on future studies.