Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

2014 NASCIO State IT Recognition Award Nomination

Tracking Towards a Greener Tomorrow

Project: Clean Energy and Climate Performance Management System and Global Warming Solutions Dashboard

Category: Cross Boundary Collaboration

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Executive Summary

The issue of climate change is inherently cross-boundary; greenhouse gas emissions simply do not respect state or national borders. It is also an issue of risk to our health and cost to our economy. According to the U.S. Environmental Protection Agency (EPA), climate and weather disasters in 2012 cost Americans more than $100 billion.

The EPA's recently proposed *Clean Power Plan* is intended to help the nation "maintain an affordable, reliable energy system, while cutting pollution and protecting our health and environment now and for future generations." To comply with this plan, every state will need to measure, track, and work towards reducing greenhouse gas emissions.

In Massachusetts, our Global Warming Solutions Act (GWSA) of 2008 established the most ambitious goals for reducing greenhouse gas emissions for any single state. By 2020, we aim to reduce emissions by 25% from the state's 1990 level; by 2050, we aim to achieve our goal of an 80% reduction from that 1990 level.

As we work toward that goal, twenty-seven policies and strategies are being implemented across the state. More than 130 related, ongoing projects – and tracking of ~600 environmental indicators – support this important work.

Measuring and reporting to a wide range of stakeholders on progress for dozens of policies, strategies, and projects presents a staggering performance management challenge. To meet that challenge, we launched a sophisticated cloud-based performance management system and public-facing dashboard.
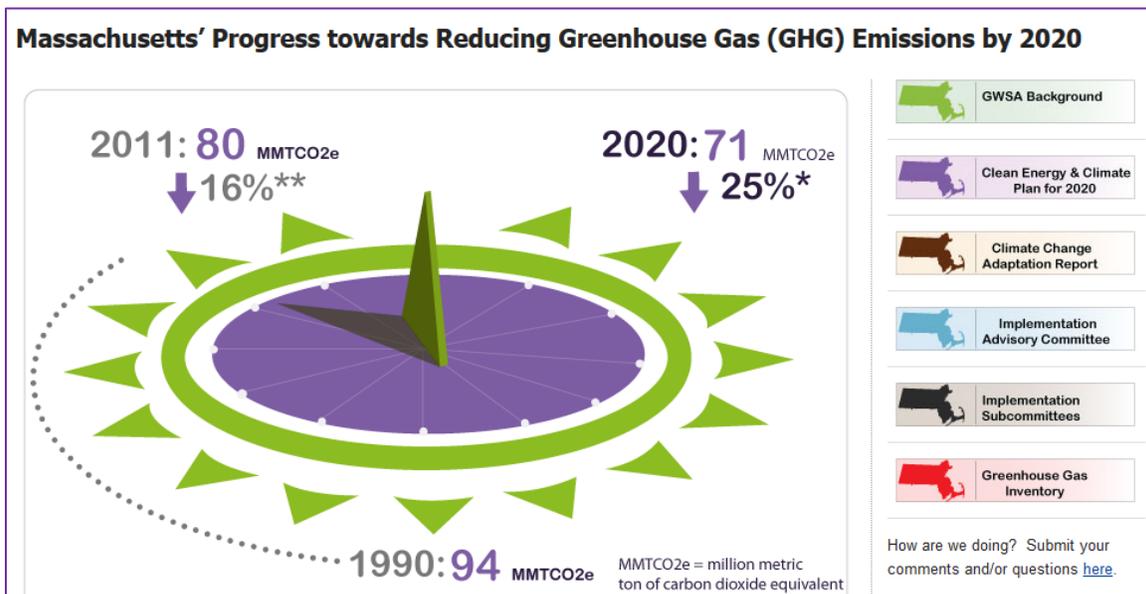
As the first of its kind in the nation, our system is already serving as a model for other states and regions as they work to reduce their greenhouse gas emissions.

Massachusetts is proud to be a leader among states in tackling – and solving – many of the challenges related to measuring and validating the data that informs policies for reducing greenhouse gas emissions.

Business Problem

Our Executive Office of Energy and Environmental Affairs (EEA) is charged with implementing and monitoring policies and strategies intended to help Massachusetts meet our ambitious goals for reducing greenhouse gas emissions. To that end, the EEA published *The Massachusetts Clean Energy & Climate Plan for 2020* (*The 2020 Plan*), which serves as our roadmap. The EEA must also report on performance towards those goals to the Legislature and the public.

Staff across agencies have been implementing policies and collecting and analyzing large amounts of resulting data for years. Data was stored in spreadsheets on individual computers or on shared agency drives. No comprehensive, coordinated system existed to track, evaluate, and report on progress. One could not obtain a complete picture – quantitatively or qualitatively – of how the Commonwealth was performing against our goals.

Our cross-agency GWSA Team needed an integrated project tracking and performance management system that would be easily accessible to multiple users across state agencies and affiliates. The system must also facilitate assessment across a range of sectors, from energy efficiency of buildings to transportation and land use, to name just a few. To ensure that future evaluations will continue to be made on an apples-to-apples basis, our metrics and methodologies also needed to be evolved and validated.

To meet our state-wide commitment to transparency, creation of a user-friendly public-facing dashboard for reporting results was an important component of the project. Finally, well-documented results were needed to inform the *GWSA Five-Year Progress Report*, mandated for delivery by January 1, 2014, and every five years thereafter.

Based on EEA's research, it appeared that no other state had developed a system to meet these needs. EEA issued a request for information and outlined a project timeline.

The Solution

EEA applied for and received a grant from the Boston-based, non-profit Barr Foundation to fund this project. With environmental sustainability as a key area of focus, the Barr Foundation works to help create "a vibrant, just, and sustainable world with hopeful futures for children."

Use of a cloud-based, commercial off the shelf (COTS) solution was deemed the best approach for reasons of cost-effectiveness and speed. The selected vendor, Abt Associates, had already demonstrated success with its CarbonCounts™ COTS solution in Mexico.

Massachusetts and Abt worked together to customize the solution to meet our needs. It was developed using the Microsoft.NET technology stack and is hosted on Amazon's Elastic Compute Cloud (Amazon EC2), which is considered best of breed for such services and has one of the highest degrees of reliability in the industry.

The system is designed for greenhouse gas mitigation tracking and reporting, with built-in capability to convert metrics to savings of carbon dioxide equivalents (CO_2e). It has

interactive graphical capabilities – including pie charts and area graphs – and enables users to export the charts to .png, .jpg, .pdf, and .svg formats for robust reporting.

Network security is controlled via the servers' firewall as well as Amazon's Security Group feature. In addition, the server is configured with a virus scanning solution and has been hardened against intrusion following the Microsoft Hardening Guide for Specialized Security – Limited Functionality (SSLF). In addition, CarbonCounts™ is ADA Section 508 compliant.

The Commonwealth spent ~$130,000 in grant funds – provided by a private, non-profit benefactor – for customization of the system and two years of maintenance and support. After that, annual costs are expected to be in the range of $12,000 to $15,000.

Other potential solutions were considered and rejected because they could not clearly meet our needs, had no demonstrated application, and/or would require significantly more customization.

The result is a secure, externally-hosted cloud solution with low long-term maintenance costs called the Clean Energy and Climate Performance Management System (CCPMS) and public-facing GWSA dashboard.

Project Management

The project was jointly managed by the cross-agency GWSA Team and the EEA IT organization, with vendor resources included on the project team. The team used the Commonwealth's CommonWay Project methodology based on the Project Management Institute's Project Management Body of Knowledge (PMBOK).

Roles, responsibilities, and channels of communication, were clearly identified. During weekly conference calls, agendas were followed, action items were assigned with clear due dates and project issues were discussed and addressed in a timely manner. The project was delivered on-time and on-budget and deemed a success on all counts.

Cross-Boundary Input

The project team solicited input on design of the system and dashboard from members of the state's GWSA Implementation Advisory Committee (IAC), which represents a large network of diverse stakeholders from both the public and private sector.

Our dashboard design process involved close collaboration with the Environmental League of Massachusetts (ELM), an IAC member that was coordinating a related project, also funded by the Barr Foundation, with a network of ~20 other organizations.

Through this fruitful collaboration, we shared ideas and data, and gained a better understanding of the information our stakeholders need to assess the state's performance in reducing greenhouse gas emissions. The result was an initial dashboard release, through which data was provided to the public.

Preliminary design of the internal system was showcased and input on creating the next-stage dashboard was solicited from other representatives of the eighteen IAC member organizations, including leaders from the business, energy, environmental, building, transportation, and academic communities in Massachusetts.

Training and Communication

Training on how to use the internal system was provided to state users before launch and continues on an ongoing basis. Close to thirty users from a range of state entities have been trained to date.

Access to the public-facing dashboard was announced via joint press release from the Executive Office of Energy and Environmental Affairs and the Office of the Governor.

Significance of the Project

This project represents an innovative use of technology to address a complex climate-related data challenge. Collaboration across not only state agencies, but also with business leaders, state and national environmental advocates, and an engaged public was – and continues to be – imperative for sustaining success.

By optimizing existing processes through use of analytics in a consolidated system via the cloud, the project embodies several of the State CIO priorities identified by NASCIO.

No other state has yet publicized a performance management tool that quantifies the effectiveness of policies in terms of CO_2e emission reductions. Massachusetts is already serving as a model and responding to requests for information from other state and city governments.

The system also directly supports compliance with our Executive Order 540, which requires annual publication of a strategic plan with results against measurable goals.

The GWSA created an opportunity for Massachusetts to develop innovative solutions to help prevent the costly, negative effects of climate change while improving the quality of our environment and public health. This project helps us make the most of that opportunity by building capacity for measurement, validation, collaboration, and transparency.

Benefits of the Project

Prior to developing the system, it was not clear how well Massachusetts was performing overall in relation to our GWSA goals. Information was stored in different locations and systems across a number of entities including, but not limited to, our:

- Executive Office of Energy and Environmental Affairs
- Department of Energy Resources
- Department of Environmental Protection
- Massachusetts Clean Energy Center
- Massachusetts Department of Transportation

In many cases, access to comprehensive data and information needed for policy evaluation was simply unavailable. Additional agencies and entities that now have access to the new system include:

- Executive Office of Housing and Economic Development
- Department of Housing and Community Development

- Department of Conservation and Recreation
- Department of Food and Agriculture
- Department of Fish and Game
- Department of Public Utilities

By securing funding from a private, non-governmental organization, the state saved taxpayer dollars. Use of the cloud ensures that ongoing costs will be minimal.

For the first time, Massachusetts has a centralized, cost-effective tool that manages and presents this complex information in a meaningful way. Additional benefits include:

Enables Cross-Boundary Policy Evaluation and Decision-Making

Across state entities and non-governmental agencies, cross-program policy analysis and performance management have been dramatically improved and streamlined.

Because the system enables us to monitor and share progress and evaluate performance of our strategies in a timely way, we are able to make adjustments as needed. As we work toward shared goals, we productively share lessons learned.

In addition to tracking quantitative metrics, the system captures qualitative information such as milestones achieved and barriers to progress. This provides a valuable central repository of supporting information – above and beyond traditional metrics – that informs policy evaluation.

Drives High-Level Communications and Collaboration

The system presents complex data in an accessible, easily understandable, visually engaging, and meaningful way. Access to valuable information about how climate change is being addressed in Massachusetts has been dramatically improved for environmental advocates, business leaders, academics, and other interested parties.

Enhances Cross-Agency Communications and Coordination

Use of this powerful tool has enhanced cross-agency coordination across our state government. We now enjoy more meaningful collaboration than ever before among EEA agencies, especially with our Department of Energy Resources, our Department of Environmental Protection and the Massachusetts Department of Transportation.

The working relationships developed during the course of this project will be of lasting benefit as teams continue to collaborate on implementation of *The 2020 Plan*.

Drives Targeted, High-Value Communications

The system enables more meaningful communication with audiences engaged in environmental work in government, academia, and communities across the state.

Inclusion of results and information made possible through the system are key components of reports and presentations including, but not limited to:

- In findings of the *Five-Year GWSA Progress Report*, submitted by EEA as required by legislation to several state House and Senate committees;
- In presentations given by the GWSA Team at a Sustainability Fair at Worcester State College and the Massachusetts Sustainable Communities conference;

- Being highlighted at the upcoming annual MassResults performance management conference, which engages top-level policy and agency leaders.

Enables Sophisticated Performance Management and High Quality Control

The system allows extensive querying, filtering, and sorting of data, which is particularly valuable in meeting quarterly and annual reporting requirements.

Built-in formulae automatically calculate CO_2e emission reductions associated with specific policies and strategies, enabling agency staff to assess progress and modify approaches in a timely manner.

Secure access to the internal system is allowed via user profiles with different levels of permission. After staff enter data, higher-level users validate that data before it is incorporated and reported out. The system also enables identification of data gaps and deviations from goals.

Provides Unprecedented Transparency and Increased Public Engagement

The online dashboard is accessible, user-friendly and engaging, making information readily available through attractive, interactive graphics and case studies.

Visitors to the GWSA site can access in-depth information about each of the specific areas (from left to right):

- Buildings, Energy Efficiency and Demand-Side Management
- Energy Generation and Distribution
- Transportation, Smart Growth, and Land Use
- Non-Energy Emissions
- Cross-Cutting Policies

The dashboard also provides detailed documentation regarding methodologies used for emission calculations. Since the launch of the dashboard, traffic to the GWSA website has increased by ~34%.

In conclusion, Massachusetts has developed an incredibly useful tool to help manage, share, and evaluate environmental data that will be of long-lasting value to stakeholders across our state and of interest at a national and international level.

We anticipate that our robust performance management system and public-facing dashboard will continue to play a critical role in our ongoing work as we track towards a greener tomorrow.