ACE Strategic Plan Review

Introduction

EPA's Air, Climate, and Energy research program (ACE) has a strong strategic plan, linking well to the EPA Strategic Plan and agency priorities, and addressing some of the most important current and emerging issues facing environmental quality, human health, and society in the coming decades. The program is exceptionally broad, with its scope encompassing what has traditionally been viewed as the most important "criteria" air pollutants, greenhouse gases, climate change, and energy. Energy, in particular is an extensive charge, as the life cycle of energy influences all elements of the environment, and overlaps a good deal with the other 5 program areas. Below, we provide several recommendations related to the presentation of the strategic plan, as crafting a more integrated strategic plan may contribute to a more coherent program in coming decades. We organize these roughly by the Charge Questions.

Charge Questions 2a and b: *How well will the research directions in each Early Draft StRAP (20 16-20 19) support EPA in achieving the relevant Agency objectives and cross-cutting strategies, as described in the EPA Strategic Plan (2014 - 2018)?; and what are the SAB/BOSC perspectives on the proposed research directions in each StRAP providing research to address environmental issues o f2020 and beyond?*

1. Declare Success on Greenhouse Gases and Chart Bold Future Successes: While the committee found the overall structure and substance of the ACE strategic plan to be solid, we suggest a few changes that will strengthen the presentation and sharpen the focus. The plan is ambitious, and as such, may seem to be a bit unachievable. We recommend crafting a bold statement of what EPA can do to forge a better future. A compelling introduction might begin by reporting on the enormous potential success of the new greenhouse gas regulations for energy utilities; while the Climate Action Plan is mentioned, the transformational nature of EPA's new role in greenhouse gas emissions should be declared as an example of how the new vision and strategic plan can compel major advances for air, climate, and energy in the United States and the for the globe..

2. Include a Conceptual Framework Linking Program Elements: A graphic representation of a conceptual framework at the outset will allow the reader to understand the scope, focus, and anticipated impact of the program (such as that provided in the presentation given by Dan Costa, side #4). Such a figure should show linkages among the elements of the complicated program hierarchy: a) 3 elements of the program (air, climate, and energy), b) the 3 research objectives (assess impacts, prevent and reduce emissions, and adapt/mitigate), c) the 5 research topics, and d) their short- and long-term aims. Such a diagram and description at the outset might allow the team to further crystallize motivations and necessary interactions among the teams. The objectives are not presented until quite late in the document, but represent the driving force for the strategic plan. We recommend that a crisp vision for each of the research objectives be presented at the very outset, in a pithy format that links clearly to the conceptual framework.

3. Clarify Relative Priorities: Budget Distribution and Agency Interactions. The scope of the program is very large, but investments in the individual components (air, climate, and energy) are skewed, with a very large proportion of the effort focused on the "air", relative to the "climate" and "energy" elements. This occurs both as a result of the traditional focus on criteria pollutants within EPA, and because other federal agencies deploy enormous resources toward climate and energy research issues (e.g. NOAA, DOE, the Global Change program, etc). Explicit recognition of the priorities, how they are reflected in the budget, and in turn how ACE anticipates resource allocations shifting as a result of the strategic plan should occur early and clearly in the document. Targets for inter-agency actions that will assist ORD in meeting its climate and energy goals should be elaborated. Research on mitigation represents a special opportunity for collaborative work that could be led by EPA.

4. Elaborate and/or expand the research to be conducted on mitigation. (Research topic Climate Change Impacts, Mitigation, and Adaptation). The current document is fuzzy with respect to the planned work related to mitigation. It is unclear what this work will be; for instance, there are no short-term goals at all related to mitigation. We recommend proposing tractable work in this arena. Connecting the work to the IPCC report on mitigation would be helpful.

5. Focus the distributed monitoring of air quality on quality data collection and distribution to citizens. (Research Topic 2 – Emissions and monitoring). The current document mixes two endpoints of a spectrum of environmental data from, on one end, accurate and precise regulatory-quality data from a limited number of sites, to the other end ubiquitous citizen-science generated data of uneven overall accuracy and precision. We recommend that ACE work with and motivate entrepreneurs for the development of extensive high quality data that are available to civil society in real time and potentially available for use for regulatory purposes. With the rapid advances in sensing technology and the concomitant increases in accuracy and precision and decreases in cost has highlighted the potential to deploy environmental sensors at orders of magnitude greater density than is currently the case. When combined with effective visualization it is possible to provide civil society with a much greater understanding of variations in environmental quality at a scale that matters to individuals. ORD is well positioned to help ensure that the quality of the data that flows from this sensor revolution is both accurate and inter-compatible. Given the large private investment already being made in the development of sensors a convening and coordinating role is where ORD's investment would have the largest leverage.

6. Consider Explicit Focus and Analysis of Agricultural Sources and other Land Use Contributions (Essentially all research topics: Climate Impacts, Mitigation and Adaptation; Emissions and Measurements; Modeling and Decision Support; NAAQs and Multipollutant; Sustainable Energy Evaluation). Agricultural sources of air pollutants are significant, including HAPs, ammonia, methane and N_2O fluxes stemming from fertilization and livestock, particulate matter from cultivation practices, and both direct and indirect impacts of energy use in agricultural product. The strategic plan is silent on agricultural sources, and inclusion in the strategic plan and subsequent research seems important.

7. Provide more specific targets for the short-term research aims. The current table in the strategic plan provides both short- and long-term research aims for each of the research topics. The short-term goals are likely still too diffuse and it will be difficult to identify metrics that will allow evaluation of success. We recommend more specific targets focused on key knowledge gaps that can be used to define those metrics and actionable work plans.

Charge Question 2c: *For each program, do the presentations and plans indicate that ORD is designing for integration, where appropriate, on topics that are relevant to other research programs?*

8. Consider specifying projects that will integrate ACE with other programs. The current ACE strategic plan presents opportunities for integration with other programs, but does not identify goals of integrated research. Such goals for integrated projects would assure that the work occurs. The Sustainable and Healthy Communities program provides especially good synergy, with respect to the Emissions and Monitoring research aim, and the Sustainable Energy Evaluation research aim. Neither of these relationships is currently identified.

Charge Question 3a. *Does the SAB/BOSC have suggestions regarding how ACE should target its efforts to understand, model, and convey the potential environmental impacts of possible energy choices?*

9. Consider Incorporating Energy Efficiency/Conservation Research. (Research Topic 5: Sustainable Energy Evaluation). The document avoids the topic of energy efficiency and energy conservation, even though energy use represents the single largest source of pollutants, and one of the most achievable sources of progress can be gained through reducing energy use through increased efficiency. The Office of Atmospheric Programs, in the regulatory division, drives the Energy Star program, which emphasizes the implementation of incentives for energy efficiency on a small-scale. Will ACE conduct research related to the behavioral and economic forces related to energy efficiency, or on the opportunities for innovation in the arena of energy conservation and efficiency?

10. Consider Incorporating Analysis of Energy Scenarios and Pathways. Similarly, research on the role of renewable energy is missing in the ACE Strategic Plan. One of the most valuable contributions of the ACE program could be an analysis of the ecological and lifecycle impacts of a number of possible energy scenarios (e.g. large scale deployment of centralized solar or wind) and pathways for the future. This type of research could be conducted in collaboration with DOI, DOE, industry, and other institutions.