Integrating Public Health into the State Strategy under the Global Warming Solutions Act (AB 32)

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The California Global Warming Solutions Act of 2006 (AB 32) initiated an important initiative to reduce emissions of greenhouse gases and start a transition to cleaner and more sustainable energy. In June, the California Air Resources Board (ARB) released a draft scoping plan to identify and assess strategies to achieve the goals of AB 32. The scoping plan represents an enormous amount of hard work, presenting an inventory of greenhouse sources and identifying actions to move toward achieving the goals for greenhouse reductions by 2020.

As has been pointed out by many others, the scoping plan does not address public health. It notes that reducing fossil fuel combustion will reduce emissions, leading to ancillary health benefits. It also notes the importance of achieving worldwide reductions in greenhouse agents to slow climate change and reduce public health effects. The plan does not, however, consider public health when analyzing alternatives or assessing strategies.

By thinking about public health during design, ARB may be able to increase the net benefits to the people of the State and cost effectiveness overall. Major actions to reduce greenhouse emissions and transition to cleaner and more sustainable energy can produce health benefits.

The ARB could incorporate public health in seven areas addressed here:

1. Incorporate public health into policy objectives

The plan should consider advancement of public health in the analysis and selection of strategies. Public health benefits have considerable value. Strategies that also maximize health benefits could increase cost effectiveness because they achieve greater gains (more benefit per cost expended).

2. Focus on energy solutions as much as pollution control

The solutions to climate change depend as much on the creation of new energy and conservation technologies as on pollution control. These deserve more emphasis, particularly in terms of incentives.

3. Recognize the role of communities

The interrelated factors of community design, location of facilities and transportation, activity patterns, and quality of the built environment are decided at the local level and profoundly affect greenhouse emissions and public health.

4. Allocate resources to help adaptation to on-going change for the vulnerable

The plan should provide a way to allocate resources to help vulnerable communities and individuals adapt to change that is occurring.

5. Enhance and support the capacity of the people to take voluntary actions

The plan should consider how to empower and support individual, voluntary actions by people to reduce emissions and energy demand.

6. Emphasize post-combustion technologies

The plan should emphasize moving beyond combustion to adopt clean and sustainable renewable energy sources that avoid the emissions and health concerns inherent to combustion.

7. Provide assessment of "cap and trade" and other economic incentives

The plan should provide an assessment of public health issues embedded in choice of "cap and trade" strategies and their variants, compared to other approaches.

The initial suggestions herein could be developed further in consultation with experts and stakeholders in the relevant areas. Much is known about how to advance public health in the areas discussed here.

1. Incorporate public health into policy objectives.

The most fundamental step would be to consider public health in the assessment of options and strategies. Public health can be considered as a policy goal, along with reductions in greenhouse emissions (and others.)

The scoping plan has strategies to reduce greenhouse emissions, to reduce demand for energy, and to increase supply from renewable energy sources. Public health can be affected by decisions in all three of these areas. Conversely, it is possible to evaluate and select strategies in these areas to maximize benefits on the dual dimensions of energy and public health. Moreover, the statute mandates that disproportionate impacts be avoided, and it would be important to consider public health opportunities and impacts of various options to achieve this.

Reducing fossil fuel combustion will reduce emissions of criteria and hazardous air pollutants and so have public health benefits. The location of reductions matters for pollutants that have localized or regional impacts, and in this way other products of combustion differ from CO_2. Reductions of emissions in areas or regions that are more impacted or that have more vulnerable populations would advance public health over reductions in other areas. The plan can consider how to achieve maximum reductions where they are most needed and adopt strategies that promote this. California has the best air pollution emissions inventory in the nation, and it can be considered against the greenhouse inventory.

Policies for replacement energy sources and technologies also matter. The plan could consider how to maximize early development of clean and sustainable energy sources in highly impacted areas and avoid use of combustion technologies that have adverse health impacts.

Energy conservation measures can also have impacts. Those in buildings can affect indoor environmental quality in positive or negative ways. We can learn from the mistakes of the energy efficiency movement in the 1970s, which failed to consider health impacts of reductions in ventilation intended to reduce energy use. Strategies can be evaluated to ensure that they do not create new problems.

Environmental justice communities that are disproportionately affected by combined effects of air emissions, traffic, industrial sites, and other health stressors could benefit from greater attention to public health goals of the plan as a whole and also to design of the energy infrastructure to support community needs.

To allow for continuous improvement and progress over time, it would be important to establish targets and metrics that reflect public health considerations. The plan now includes metrics related to cost and to greenhouse emissions. Metrics that reflect both reductions in negative public health impacted (such as greatest reduction in emissions per unit of energy produced or reduction in cumulative impacts) and gains in public health and other relevant public benefits (such as contribution to the energy security of California communities.) Use of metrics allows for on-going assessment and updating of the plan as strategies are tested. The management approach should be robust with regard to ability to incorporate unexpected successes and to rebound from unexpected failures.

2. Focus on energy solutions as much as pollution control.

The solutions to climate change are expected to depend as much on the creation of new energy and conservation technologies as on pollution control. The capacity of both individuals and businesses to reduce greenhouse emissions depends on the availability of other options. Communities with solar panels that meet their electricity needs are much better able to reduce

greenhouse emissions from electricity generation than those without. People who have access to transit are much better able to reduce use of gasoline than those who don't.

There are important and complex issues that need to be addressed to improve energy storage, transmission, and distribution, particularly for vehicles. The important point for the scoping plan is that the capacity to reduce emissions may be more closely related to the development of alternative energy systems than to the development of controls or changes in the fossil fuel economy. So the incentive structure needs to be designed to reflect more than the cost of achieving reductions in emissions.

The ARB should assess alternatives in terms of their likely impact on the investments needed to achieve a transition to clean and sustainable energy sources and technologies. Right now, the assessment focuses primarily on cost of reductions in emissions. The ARB needs to analyze whether the incentives offered by the mix of strategies that it adopts will create the right incentives in both of these areas.

The cap and trade model, for example, focuses on the pollution control sector (cost to reduce emissions and actions by current emitters). But it may be that the better investments are in a new energy system. It may be that it is in the greater public interest for an electric utility, for example, to spend their money on solar conversion that will allow retirement of fossil fuel combustion energy sources than on improving the fossil fusel combustion infrastructure.

Light bulbs offer an interesting example. Right now, people are encouraged to buy compact fluorescent bulbs because they are more efficient than incandescent. However, these bulbs are not clean and sustainable because they contain mercury. Meanwhile, clean and sustainable LED-based technologies are under development. Is it worthwhile to create incentives for investment in the intermediate technology of compact fluorescents and the companies that make them, when we know that they are not the long-term solution? This is a question worth considering.

The same is true for investment in CO_2 control. We know that we need to move beyond carbon-based technologies to solve the long-term problem of climate change while maintaining an acceptable standard of living. So, how much to invest in intermediate strategies driven by entities that need to achieve control of CO_2 emissions, rather than to invest in the institutions and technologies that offer a permanent future solution is a question worth considering and capable of analysis. This needs to be considered directly in the scoping plan process.

3. Recognize the critical role of communities.

Communities are crucial to greenhouse reductions and to public health.

Factors that affect greenhouse emission and public health are all interrelated in communities. Community design, transportation systems, placement of housing compared to sources of employment and services, availability of green spaces and parks, and so on all affect transportation choices and options, which affect greenhouse emission and also public health. Communities establish patterns of movement and interaction and so are key determinants of whether people get exercise and how much time they spend driving (known as "VMT). These patterns can contribute to inequalities among the people of the state with regard to environmental quality and health.

With regard to strategies to reduce energy demand, building design, construction, and operation; community design; transportation planning; land use; and decisions about facilities and resource such as parks, schools can all have significant public health impacts and offer great opportunities to pursue join policy objectives for greenhouse reductions and public health gains. Transportation decisions are a driver of both environmental quality and activity patterns that affect

health. Locations of parks and highways with regard to housing affect people's propensity to walk and thereby to exercise.

The scoping process needs to consider how it will address the many factors that converge at the local level. Local governments and the communities they serve have primary authority over building codes that can affect energy use and production and also the indoor environment.

The ARB could develop a framework to work with local governments and with communities to set goals and targets and to provide technical and perhaps financial assistance to transition toward community approaches that provide greater public health, reduced greenhouse emissions, and greater energy security and community well-being. California communities must be engaged and supported through this process, particularly those than start with greater vulnerabilities.

Communities are also the venues in which people experience multiple environmental factors and where the cumulative impacts of multiple stressors need to be assessed and addressed. As previously mentioned, the ARB should consider public health benefits in assessing its strategies for reducing greenhouse emissions and sources. It also needs to address the contribution of its strategies to avoid any increase in cumulative impacts in communities, per the terms of AB 32. More fundamentally, the ARB should assess its strategies with regard to reducing cumulative impacts as part of its assessment.

Many decisions that follow from the scoping plan will affect communities. These include what sources of emissions are reduced and which are not, how new facilities will be distributed, where investments are made to reduce energy conservation, and how the built environment will change. These are key questions that affect issues of public health and also impacts on communities, and the scoping plan needs to consider this.

The ARB could also assess the potential for community benefits in its assessment of strategies. The development of new energy sources and technologies could have great benefits for communities by providing energy security and by meeting energy needs. The investments can be targeted to improve public health and enhance development in underserved communities. This could also be directed in ways that create jobs and learning in areas of high unemployment. Such efforts could reduce inequalities and improve public health.

Such efforts could result in considerable health and welfare benefits for the people of California.

4. Allocate resources to help vulnerable groups adapt to climate change.

Finally, climate change has begun. The effects will accelerate for some period of time.

California is already facing extreme weather events and horrific fires. Changes in air pollution, allergens, insect borne disease, temperature, and water supply are already observable. Communities that are vulnerable to health effects will be vulnerable to climate change effects, and plans to aid such communities and populations should be considered.

Whatever form of economic incentive is used, the plan should provide a way to allocate resources to help vulnerable communities and individuals adapt to change that is unavoidable.

5. Enhance and support the capacity of the people to take voluntary actions.

Achieving adequate reductions in fossil fuel combustion will require broad commitments from the people. Many individuals have taken steps already to voluntarily reduce their consumption, by obtaining more energy efficient appliances and vehicles, reducing driving, and switching to outdoor clothes drying, for example. The "Flex Your Power" campaign during the

energy market manipulations of the Enron era showed remarkable capacity on the part of the people to act to advance the common good and prevent blackouts by reducing demand for power.

The reduction in greenhouse emissions and transition to clean and sustainable energy sources will require the support of individuals. The people of the state will need an informed understanding of the significance of their individual choices and actions. Governments including the state of California need to educate and lead their people to understand and support successful programs. Ultimately, people will need to understand the challenges and complexity of moving toward mitigation of global climate change and achievement of energy security for all. These need to be addressed as part of the process begun with AB 32.

The plan should assess strategies in terms of how they affect public understanding and participation.

6. Move toward post-combustion technologies.

The plan should recognize combustion as a technology that should be replaced as much as possible, because of its combined greenhouse and public health impacts. Combustion of fossil fuels is the primary contributor to greenhouse emissions. Combustion is hazardous. It inevitably creates byproducts and wastes, which can be gases or solid residues depending on fuels.

The plan makes a distinction between renewable v. non-renewable sources, but it should identify combustion sources as fundamentally undesirable from a public health and environmental perspective. Some sources have classified renewable energy sources into those that are clean and sustainable (solar and wind) from those that are not (bio fuels, nuclear, and hydropower). Such an approach would seem advisable.

7. Provide assessments of economic strategies that consider public health.

It is widely agreed that economic incentives are needed to provide a widely applicable, continuing impetus to reduce greenhouse emissions. The scoping plan recommends use of some form of "cap and trade." Additional options include fees or taxes.

The discussion of "cap and "trade" focuses primarily on the policy criterion of economic efficiency or cost effectiveness. [1] Analyses that consider only economic efficiency can be appropriate if no other factors matter. It would be important for the ARB to consider whether other factors such as public health might matter in this case. It would seem that it would.

Public health issues and concerns were not included in the analysis supporting the recommendation for "cap and trade." Nonetheless, from this it appears that the ARB will re-consider recommendations that have public health implications once a public health analysis are completed, at some point in the future.

Why the "trade" part of "cap and trade" can affect public health

The "trade" part of cap and trade can affect public health because it affects which sources reduce emissions and which buy allowances and thereby avoid reductions in emissions. Under "trade," this decision could be based solely on decisions about costs to reduce emissions made by the emitters. It can also be based on other objectives of emitters.

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[1] These terms seem to be used interchangeably by the ARB to mean, generally, achieving policy purposes at the lowest cost.

How this is likely to affect public health should be assessed. The first part of an analysis would be to consider where the cheapest reductions are likely to occur. Are the cheapest places to reduce emissions likely to be in the heavily polluted areas of California that are highly impacted by air pollution from combustion of fossil fuels? It seems unlikely that the sources that have the greatest impact on Californians through fossil fuel combustion are likely to be the ones that will be cheapest to reduce. If they aren't, then the allocation of investments in reductions may result in less improvement in public health that would have been achieved though more directed policies. The health benefits of reductions in combustion of fossil fuels can be forecast and quantified. These displaced health benefits to the public should be compared to the magnitude of expected cost savings to the emitters and their implication for the public, to allow a conclusion to be drawn about whether and in what case the "trade part" is in the interests of the people of the state.

California has the worst air quality in the nation, so there does not seem to be a credible argument that it is better to achieve health benefits in other states. If the states want to consider how to maximize public health benefits on a regional scale, the way to do that would be to rank the locations of adverse health impacts from fossil fuel combustion and other sources on a regional basis and then analyze the distribution of health benefits expected from the "trade" part for the region as a whole. This has not been done. It appears that the regional organization has given no thought to public health. A regional approach could be devised that also considered public health as a policy driver, allowing the Western Climate Initiative (WCI) to begin to factor in multiple policy goals into its analyses.

The second way that the trade part can affect key public interests including public health is through its effects on investment in the development of a clean and sustainable energy sources and technologies. The scoping plan describes the reasons for the "trade" part only in terms of reductions in greenhouse emissions.

What incentives will be applicable to holders of allowances?

The scoping plans says that the "trade' part of the cap and trade system is intended to create the market signals and incentives that will drive the entire energy system in the right direction. The idea is that the distribution and trading of allowances, creating economic incentives to find the cheapest way to transition over time to lower emissions, will lead to the right investments for the energy system.

But will it?

It is difficult to assess the incentives and actions likely to result from the strategy as presented because the scoping plan is silent with regard to how the allowances would be distributed. The effects of "cap and trade will depend on the decisions of the entities that own allowances that are to be traded. Who this will be is not defined because the mechanism for allocation has not been discussed. The incentives of these owners should be analyzed. The plan needs to address how allowances would be distributed.

If the recipients are expected to be corporate entities, such entities will make decisions that best contribute to the financial well being of their organizations, as they are obliged to do. The issue to assess is whether these decisions are likely to reflect the level of investment in innovation or in other public attributes that the people would make on their own behalf. A public-oriented investor, for example, might choose to select a non-combustion energy source that costs more per unit of energy but provides energy security and reduction in emissions for communities, both of which have quantifiable benefits. Such a decision could be cost effective in the public domain but not necessarily for a corporation.

Reliance on cap and trade to provide economic incentives to address greenhouse issues is likely to vest in industrial and commercial intermediaries investment decisions that determine complex choices among technologies and sources. Such entities may also have other incentives. Technologies of the future may come from commercial sources quite different from those that dominate today. One could easily imagine that it might not be in the best fiduciary interest of a firm holding allowances to invest in a technology that might, in the future, compete successfully against it. There are inherent conflicts of interest, and these should be assessed to allow the people of the state to understand the implications of the decisions that would be made on their behalf under a "cap and trade" program.

If elements of trading are adopted, it would be prudent to have a backup plan if they fail. Loss of control of energy security is a very risky future. During the Enron era, energy traders that were supposed to seek low-cost energy sources under the electricity deregulation decided instead to conspire to control the market and drive up prices to unprecedented levels. Gaming to achieve strategic objectives other than the intended ones can occur, and this potential should be considered.

Western Climate Initiative should have the same goal as the State

Governor Schwarzenegger has convened numerous western states and Canadian provinces to work together to address implementation of cap and trade in the Western Climate Initiative. It is very commendable and perhaps essential for the states to seek a common organization and capacity to address climate change, particularly in light of the lack of action at the federal level.

It would seem that the Western Climate Initiative (WCI) would also need to address public health in its analyses and strategies. Otherwise it is not clear how the WCI will meet the requirements of AB 32 or serve the interests of the people. Currently, the WCI is contemplated to focus on implementation of a multi-state trading program. The WCI should, like California, assess all of the strategies that could help it achieve the goal of reducing greenhouse gas emissions to sustainable levels while advancing other public policy goals.

The ARB, perhaps in cooperation with other members of the WCI, should identify all of the areas in which interstate cooperation and engagement could be beneficial. Some that some to mind immediately would be identification of all of the elements that contribute to climate change, beyond the greenhouse gases named in AB 32, and development of capacity to manage these. It would seem advisable for all states to have a common understanding of what these substances are, where they are being manufactured, what products they are found in, and how they can be controlled through producer responsibility or other kinds of similar initiatives or through use restrictions or bans.

In the scoping plan, the ARB should also analyze the issue of "leakage" more completely. Would the multi state program be expected to result in "leakage" of emission reductions and their co-benefits to other states? What strategy would optimize the retention of the public health benefits and community gains in California, which has the nation's greatest air quality challenges? Are there any circumstances would it be beneficial to expert reductions in combustion to other states?

Conclusion

Public health is an integral goal of the ARB and AB 32. The ARB and affiliated agencies should think about how to design a system that can scope, plan, implement, evaluate, and adjust, reflecting the multiple policy attributes that will best serve the people of the state, including economic efficiency and cost effectiveness but also including public health, protection of highly impacted communities and vulnerable populations, and advancement of community and individual

level energy security. The scoping plan should fully consider public health in analyzing and selecting strategies. This can lead to greater economic benefits, as health benefits that could be achieved may prove to be considerable, given the areas to be addressed through the scoping plan. Considerable knowledge and expertise exist already to apply to these tasks.