

# **MEMO #22**

## **INVESTING IN ENVIRONMENTAL PROTECTION: Energy and Water**

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In 2013, the American Society of Civil Engineers awarded a grade of D+ to the state of American infrastructure (ASCE). The grades for energy, drinking water, hazardous waste, and wastewater infrastructure were D/D+ across the board. The Society estimates that investments of some \$3.6 trillion are needed to bring the nation's entire infrastructure up to par, well below what is currently likely to be available. That the nation is underinvesting in critical infrastructure and needs to increase levels of investment to maintain our economic vitality and physical and social well-being is generally agreed-upon. In addition, strategic investments in what are termed "green" sectors like energy and water offer options for linking environmental, economic, and social goals in positive ways.

An issue that presents both an opportunity and a challenge to a new administration is that of investing in critical needs in the energy and water sectors—environmental quality, clean energy, water infrastructure, and energy and water efficiency. Investments in each of these sectors addresses national needs and, moreover, presents options for environmental and energy win-wins. A smart energy and water investment strategy offers such benefits as:

- Substantial reductions in a range of air emissions, leading not only to improved public health through less exposure to pollutants like fine particulates and nitrogen dioxide but to lower emissions of greenhouse gases that promote climate change;
- Through clean energy and efficiency investment, generation of large numbers of durable, family-supporting jobs, done more effectively than under existing investment strategies;
- Upgrading aging, unreliable energy and water infrastructure—a critical national need; and
- Opportunities for stimulating new technologies, economic sectors, and exports.

This paper recommends investment in two broad categories: *energy* and *water* technology and infrastructure. It recommends areas of investment and policy strategies that will promote needed investments. Energy and water issues are addressed separately. For each set of issues, the paper presents relevant background, the opportunities, and a set of recommendations.

Valuable lessons may be drawn from the green investment components of the American Reinvestment and Recovery Act of 2009. Directed largely at providing an economic stimulus, about 12% of the funds went to clean energy, energy efficiency, climate mitigation, and water innovation (HSBC 2009).

Although this was substantial, it was a one-time shot in the arm rather than a long-term, predictable investment strategy that could pay consistent dividends over time.

## **The Energy Sector**

The energy sector is central to any strategy for addressing climate change. From an environmental perspective, power generation in particular is a major contributor to climate change and accounts for some one-third of greenhouse gas emissions in the United States. Due largely to emissions from coal-fired power plants, it also accounts for a range of health-related pollutants, among them particulates and nitrogen dioxide, as well as other ecological impacts.

The United States also has made international commitments as part of the agreement negotiated at the Paris Conference of the Parties (COP) in December 2015. The administration committed to a 26-28% reduction in greenhouse gas emissions from 2005 levels by 2025, one of 195 commitments made by individual nations (Davenport 2015). As a matter of international political credibility as well as global climate urgency, it is essential to be able to meet these and even exceed these commitments.

Contrary to criticism of the administration's overall climate strategy, which has been strong despite the lack of any new legislation dedicated to climate, there are a range of economic benefits to be gained from a climate action agenda. For example, implementation of the EPA's Clean Power Plan by 2030 is estimated to generate in the range of 250,000 jobs in the production of new energy technologies, specifically renewables; the construction of new power plants using these technologies; the range of actions that will lead to substantial improvements in energy efficiency, which in itself offers financial benefits to consumers; and the economic development prospects in creating new sectors. Despite job losses in the coal and traditional utility sectors, the 250,000 is a net gain and offers a leading rather than a lagging strategy (IEC 2014).

Economic studies have concluded that each dollar invested in renewable energy, mass transit, and energy efficiency generates some two to four times as much employment as similar investments in fossil fuel sectors. This is largely because the clean energy is more labor-intensive and generates economic activity in the United States rather than flowing overseas, as is the case with oil imports (Pollin, Heintz, and Garrett-Peltier 2009). Like any other process of change, a transition to a clean energy economy costs jobs in some economic sectors (largely those related to fossil fuels) but adds the in others; in this case the net gains of such a transition are substantial.

## **Recommendations for the Energy Sector**

### **1. Continue to Implement the Clean Power Plan**

The environmental and health benefits of the plan already are clear. Although currently under litigation, implementation of the Plan will stimulate emission reduction and the economic activity associated with a clean energy economy. This should continue until other measures are in place.

## **2. Adopt Policies that put a Price on Carbon**

Putting a price on carbon integrates a climate reduction and clean energy strategy into the economy for the long term. Although many experts recommend a straight tax on carbon, California and the Regional Greenhouse Gas Initiative (a consortium of 9 northeastern states) offers experience with emissions trading—another means to the same end. This policy would place renewables on a more favorable economic footing, promote efficiency, and generate capital for investment in a clean and renewable energy transition.

## **3. Create an Infrastructure Fund for Clean Energy Investments**

Using a model of a revolving fund would degenerate capital for renewable energy technologies, needed improvements in the electricity grid (including a “smart grid”), energy efficiency, mass transit, and other areas, with the associated environmental and economic benefits. Again, this offers a substantial economic return on investment relative to fossil fuels. One report recommends a goal of some \$150 billion in annual clean energy investment (Pollin, et al 2014). A 2011 report of the United Nations Environment Programme recommended annual investments in green sectors of some 2% of GDP each year, which in the US would come to \$180 billion (UNEP 2011).

## **4. Increase Federal Investment in Basic Science and Technology Research**

Much of the investment in research and development is a public good, so federal action is essential. Federal investment in energy research and development currently is at a level of about one-half, relative to GDP, of what it was in the 1980s.

## **The Water Sector**

The water sector also offers substantial investment needs and opportunities. Many parts of the country—in particular California, the Southwest, and the Southeast—increasingly will be vulnerable to stresses on water availability. Many of the more serious effects of climate change will fall on the water sector. Many of these involve interactions with energy production and distribution. Warmer water temperatures, for example, will affect the use of water for nuclear and conventional fossil fuel-fired electrical generating plants for cooling; lower water flows will have effects on hydropower facilities, currently the nation’s leading source of renewable energy (DOE, 2014).

Climate change raises other water availability and quality issues. Warmer temperatures leading to reduced snowpack reduce supplies; changing precipitation patterns will affect the availability of water for irrigation, manufacturing, and public use and increase water stress;

Several factors have brought us to where we are now in water supplies and efficiency. Historical patterns of water allocation have led to inefficiencies and to water uses that are of low productivity in terms of meeting human and economic needs. Traditionally low water prices, for a variety of political and economic reasons, have starved utilities of needed capital. Although the price of water has been rising slowly in recent years, it still is below what the actual costs are. This will have some impact on consumers, although gains in efficiency and tiered pricing to protect low-income users (low prices for

meeting essential needs and rising prices for lower priority needs) will help to offset some of these impacts.

The water sector offers a range of productive investment opportunities. An assessment by the Water Environment Federation of the design and operations of a water “utility of the future” identifies ways in which traditional water treatment plants could become “resource recovery” facilities that use zero net-energy, or even produce energy for other users; generate revenue by removing nutrients from wastewater and selling it to agricultural users; and reuse and recover water as a conservation measure. Investments in monitoring technologies could conserve water in drinking water lines, some six billion gallons a day of which is now lost due to leaks in aging infrastructure. As a matter of basic health protection, particularly for children, major investments could be made in replacing old lead service lines and reducing harmful exposures (Ajami et al 2014; NACWA 2013). The U.S. Environmental Protection Agency estimates needs for investments in drinking water infrastructure alone for the next twenty years at nearly \$400 billion (EPA 2011).

## **Recommendations for the Water Sector**

### **1. Adopt Better Water Pricing Policies**

For a variety of historical and political reasons, water prices to consumers are lower. They need to be revised to reflect the actual costs of providing safe water and generate needed capital for investments in infrastructure. Various assessments have concluded that a combination of organizational inertia, regulatory constraints, and a lack of capital have been a barrier to needed investments.

### **2. Expand Mechanisms for Infrastructure Investment, such as the State Revolving Fund**

The nation has an existing infrastructure resource in the form of the State Revolving Fund. Contrary to public needs, this has been declining in recent years as a result of budget pressures. This offers an available and tested mechanism for increasing investments in water technologies and infrastructure.

### **3. Convene a National Dialogue on Water Sector Technology and Infrastructure**

The water sector is a decade or so, and perhaps more, behind energy in taking advantage of options for efficiency and more sustainable investments and policies. The variety of interests involved and existing barriers to capital investment in the sector warrant a national dialogue on barriers to technology and management innovation, methods for more appropriate pricing and allocation of water resources, the impacts of climate change on water resources.

## **Summary and Conclusions**

Clearly, many difficult issues have to be addressed in meeting these needs and taking advantage of the opportunities. Among them are achieving a consensus on how to raise the revenue for these investments; determining how to allocate the funds; evaluating investment options to deliver the most environmental,

economic, and social return; and maintaining stable and predictable investment patterns over time to send clear signals to innovators and markets.

The energy and water sectors are vital to the nation's economic and social well-being and are implicated in a range of environmental and health issues. The evidence on opportunities for environmental-economic win-wins is well-documented. Progress on these issues has been blocked due to political barriers, opposition from established interests, organizational inertia, and a lack of honest and informed public debate. These barriers remain, but the political case for change can be made. Investments in environmental quality, clean energy, water infrastructure, and energy and water efficiency offers many opportunities for American society.

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