Lessons from Scandinavia

Gail L. Achterman
Oregon State University, Institute for Natural Resources
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1. Information Systems and Environmental Management. The European Environment Agency (EEA) is an agency of the European Union (EU) dedicated "to provide sounds, independent information on the environment" for "those involved in developing, adopting, implementing and evaluating environmental policy" for the general public. See http://www.eea.europa.eu. EEA was created in 1990 following the Chernobyl Disaster in 1986 when European countries realized that they lacked the information they needed across national borders in order to assess risks and inform the public. The crisis brought the realization that the historic practice of each country, and each agency within each country, collecting information for their own purposes did not work. A new independent organization separate from any policy making needed to be created. It is located in Copenhagen to assure its independence from the EU agencies in Brussels.

Oregon, the Pacific Northwest and the United States still suffer from the same problem. There are no integrated environmental information systems, even though many have called for them for years. For example, in 2000, the Oregon State of the Environment Report stated that Oregon lacks a "systematic environmental data management strategy which generates, manages, integrates and displays the type of environmental data" needed to "measure environmental health over time." In the U.S. dozens of separate federal agencies make policy and collect data with no independence and no integration. The same is true in most states. In Oregon, several entities (including the Institute for Natural Resources) are charged with data integration, but no one is funded to do the work.

The EU recognizes that reliable, accessible and timely data on the environment is a key factor in formulating good policies. A vast range of environmental data is being collected across Europe, generating valuable information for policy makers, citizens and business. To tap into all of this date and make it accessible to policy makers and the public, the EEA develops the standards and the roadmap for an integrated system. The EEA depends upon strong networks with EU member countries, universities, businesses, non-governmental organizations and others to do their work. The EEA has a staff of 200 and a budget of about $45,000,000 annually.

The EEA, as an independent information provider, gathers, analyzes and assesses data that supports policy making processes and informs the public. It focuses on building bridges between science and policy making. This is done through a State of the Environment Report every five years, development and tracking of a core set of environmental indicators, future scenario development, thematic and technical reports, briefings, highlights and information services on the web, multimedia and interactive web-based products in education.

The EEA is developing a shared environmental information system to interconnect existing databases and make data easily accessible to all. The EEA already coordinates the European environment information and observation network (Eionet) that provides advice and inputs on indicators, data flows and streamlining of information (the European version of our fragmented U.S. earth observing network).

Oregon's Progress Board recognizes the need for benchmarks to measure and track progress toward achieving our strategic vision. The EEA uses 37 indicators as communication tools and a logic structure to assure data continuity. Data and information are nested from the local to the national to the EU level. All themes and policy programs have indicators. EEA is now working with private corporations to develop corporate responsibility and accountability tools as well. In Oregon, the integrated information systems do not exist to support the benchmarks in the way the EEA data systems support their indicators.

2. Renewable Energy. Unlike the United States, Denmark and Sweden took action to achieve energy independence following the energy crisis of the 1970s. In 1973, Denmark was 99% dependent on oil. Today Denmark is 156% self sufficient, exporting energy. A comprehensive energy policy was developed from R&D through implementation across fuel sources from wind and solar to biofuel and geothermal. Economic growth and energy consumption were delinked. Svend Auken, a member of the Danish Parliament, emphasized that the energy policy created new jobs and new companies.

The U.S. Ambassador to Sweden decided upon taking office that he should focus on one big thing where he could make a difference. He chose renewable energy and has compiled a comprehensive list of 48 Swedish companies developing new technologies. He is seeking R&D partnership opportunities for them with U.S. companies. They are working on everything from biogas to wave energy.

Wind. In Denmark, the government and private business decided to pursue wind energy, leading to Vestas becoming the largest wind turbine manufacturer in the world. Vestas executives emphasized the importance of a long-term view for technology development, working over 25 years from research and development through the entire value chain to operations and maintenance. The contrast with the U.S. is stark, particularly in terms of our unwillingness to provide long term policies, like the tax credit. Offshore wind power has real advantages. The resources are better and without buildings in the way there is less turbulence and more capacity. Another advantage is that there are fewer physical limits to the size of turbines that can be installed. Good data on currents, waves and wind are essential for offshore operations.

Vestas is committed to Portland as a part of its North American operations, although the greatest wind resources in the U.S. are in Texas. Can Oregon create the policy environment and skills needed to develop wind energy in the same way Denmark has? Can the work we are doing on wave energy siting be applied to offshore wind projects?

Biofuel. Denmark's focus on renewable energy has combined with its investment in biotechnology. Companies like Novo Nordisk are now creating enzymes for use in biofuel production through their subsidiary, Novozymes. In fact, just after we returned from our trip Novozymes announced that they will build an $80-100 million production facility in Blair, Nebraska to meet future demands for enzymes in the bioethanol industry. The facility will produce enzymes for existing corn-based ethanol and later enzymes for cellulosic ethanol production.

District Heating. A key energy strategy in both Denmark and Sweden is district heating. The map of Denmark's energy generation shows facilities in virtually every town and village. A key change in both Denmark and Sweden was a shift in how waste-to-energy plants were operated from maximizing for electricity generation to maximizing for heat production and distribution. In contrast, the only waste-energy plant in Oregon, located in Brooks, is operated solely for electricity generation. By 2002, 59% of all Danish homes were heated by district heating and less than 6% of waste was sent to landfills. A carbon dioxide tax on all households supports the district heating system.

A wide range of fuel is used in the plants so they must be designed to run on everything from municipal solid waste to palm oil, natural gas and wood pellets depending upon prices. This requires a dynamic energy supply system. One 300 MW plant in Stockholm alone processes 25% of all of Sweden's solid waste. The private plant operator is paid to take the waste and then sells the heat and the power. Hot water is distributed to homes and commercial buildings through a 4-pipe distribution network built by the company in tunnels under Stockholm. The pipes run under the buildings.

In the Western Harbor redevelopment in Malmo, a vacuum system was installed to transport solid waste to the generation facility, avoiding the need for garbage trucks. The district heating system also provides cooling in the summer, as it does in Stockholm.

The slogan in Sweden is "Waste returned to the community in a refined form." A challenge to using district heating in Oregon will be the solid waste disposal cost and the market price for energy. Both must be higher than our current charges for the system to work economically. Another problem is figuring out how to put in the piping, especially in existing communities.

Geothermal. In the Western Harbor redevelopment project in Malmo, district heating is combined with geothermal heat exchange systems. Oregon has tremendous geothermal resources and the Oregon Institute of Technology is a leading center for research on geothermal heating systems, providing perhaps greater opportunities for Oregon than waste-energy plants.

Stormwater and Green Infrastructure. Throughout Denmark and Sweden communities were enriched by parks, gardens and other greenspace. The public parks and gardens provide open space for the residents in the dense central cities. These spaces ranged from intimate courtyards to royal gardens to old waterfront ramparts converted to parks. Access to the waterfront and the canal system in Copenhagen connects the cities

to the sea. Water is an essential environmental idea and aesthetic. As noted by Lars Gemzoe of Gehl Architects, recreation becomes inviting in the city improving the quality of life for everyone.

In new communities like Orestad, the Western Harbor and Hammarby Sjostad parks and greenspace are critical design elements. Every building in Orestad is adjacent to a park.

Rainwater is collected and used to create gardens, bioswales and canals. The effectiveness of these new stormwater systems for creating livable communities varied considerably. In Orestad the canals were very sterile and uninviting and the parks were huge open expanses with little spatial variation. Few people seemed to be using them. In contrast, the canals in the Western Harbor were inviting and small private gardens fronted on them attracting children and other residents to enjoy them. The Western Harbor developers also succeeded in developing functioning wetlands in and along the canals, providing green texture along the concrete edges. They also have used green roofs, softening rooflines, and they created sightlines to the Sund from everywhere in the development.

Ekostaden Augustenborg, http://www.ekostaden.com/information/ekostaden_tmpl_01.aspx?pageID=105&parentID=177&sectionID=4&level=4&introID=146, one of Sweden´s largest urban sustainability projects, showcased different approaches to green roofs and stormwater canals because the new systems had to be built into an existing development. Adding the greenspace and sustainable energy and transportation systems, revitalized one of the poorest parts of the city of Malmo. The people in the community were involved in all stages of the redesign process, adding greatly to its functionality and success. The green roofs do much more than process stormwater. They improve air quality and reduce noise, both of which benefit human health. The stormwater canal system is smaller scale, fitting well into the heart of the community. Augstenborg also showcases urban community gardens, which include a “rabbit hotel” allowing city kids to co-own animals. This all creates a sense of social belonging and community.

Innovation and R&D Strategies. The economic development strategy in both Denmark and Sweden has been to move from being industrial communities to “knowledge” communities. Both Orestad and the Western Harbor developments are anchored by new university facilities. Companies come to Copenhagen and Malmo to work with the universities.