

CITIES FINDING MORE SUSTAINABLE ENERGY SOURCES

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Local governments have long known that energy is a critical building block to sustainable human development. The importance of energy as a means to achieving this goal has been acknowledged at every major international conference since the Rio Earth Summit (UN Conference on Environment and Development) in 1992. And the role of energy in the pursuit of sustainable development has been enshrined in the text of the Johannesburg Plan of Implementation, the UN Habitat Agenda and the UN Millennium Development Goals to name but a few.

Despite the rhetoric, however, local governments are concerned that today's energy systems and patterns of consumption do not address the basic needs of current and future urban dwellers. The world's current energy systems put these communities at risk of climate change, local environmental degradation, disturbances in international energy markets, etc.

In response, local governments have long worked to improve their own management of energy systems and have called for more aggressive international attention to devising a sustainable energy future. Examples of such actions include the initiation of Local Agenda 21's by thousands of local governments worldwide since 1992, and the Johannesburg Call issued at the Local Government Summit to the 2002 World Summit on Sustainable Development. Efforts of hundreds of local governments to introduce renewables also support the implementation of global targets to reduce CO₂ emissions. With these undertakings, local governments seek to make themselves resilient to environment and man-made calamity, build more viable local economies, and enhance the health and welfare of their constituents while simultaneously protecting the global common goods: air, water, health, biodiversity, etc.

The Context: Neither rich nor poor make sustainable use of energy resources

Today's energy systems—be they for heat, lighting or transportation—are built largely upon the use of fossil fuels by the rich and of traditional biomass by the poor.¹ Fossil fuels account for almost 80% of the world's primary energy consumption, and our dependence on these fuels poses a number of dilemmas. Air pollution, global climate change and inequitable access to this modern form of energy supply are the most visible and pressing concerns resulting from this system. In addition, declining reserves of fossil fuels in many parts of the world are making communities around the world ever more dependent on imported energy, reducing cities; energy security and draining jobs from the local economy.

Traditional biomass fuels account for an additional 10% of the world's primary energy use, providing basic energy services to more than two billion people.² As currently used, the combustion of biomass in poor communities is perhaps even more damaging than the use of fossil fuels by richer

¹ Traditional biomass consists mainly of firewood and agriculture residues, and dung for cooking and heating. Modern biomass is the use of biomass to produce electricity, steam and biofuels.

² The balance of the world's primary energy comes from large hydro (2%), nuclear (6%) and 'new' renewables (2%). 'New' renewables include modern biomass, small hydropower, geothermal energy, wind energy, solar energy and marine energy.

communities. The combustion of biomass leads to high levels of indoor air pollution adversely affecting the quality of life of women and children, burdens women and children with the duty of fuel collection, creates a fire hazard, and places increasing pressure on natural biomass resources.

Our energy systems were not created by chance. While local governments acknowledge their role in crafting this system, the drivers of these systems have largely been national and international bodies that have given preference to fossil fueled energy systems and have done far less than necessary to address traditional biomass use.

National governments—through the creation, support and/or operation of centralized electric utilities, subsidies for road and highway creation, and taxes and subsidies that favor fossil fuels—have strongly influenced our energy infrastructure. And by disbursing the majority of their financial resources to support centralized energy projects, international donor agencies and multilateral financial institutions also have significantly influenced the shape of our energy systems.

To achieve clean and sustainable energy systems changes are necessary. We must harness new sources of energy, change the patterns and modalities of distributing energy, and alter the demand for energy. These changes must come from all levels of government and international agencies; and these changes must come with the cooperation and participation of the private sector and individuals. This dialogue paper will explore one aspect of change that is needed: the opportunities, challenges, and assistance needed for local government to increase the deployment of renewable energy technologies.

Opportunities for Local Government to Promote Renewable Energy

As agents of change, local governments have a particularly vital role to play. Although generally in the background of the debate, local government authorities have significant influence on energy use and demand. A number of policies are designed to provide incentives to stimulate voluntary investments in renewable energy by reducing the costs of such investments. These policies can be characterized as falling in six broad categories: (1) subsidies and rebates; (2) tax relief; (3) financing; (4) infrastructure policies; (5) procurement and (6) awareness raising.

1. **Subsidies and Rebates.** Local governments, especially those that operate municipal utilities or regulate (via the provision of licenses, permits, etc.) private energy providers, can use or require the utility to offer subsidies and rebates to reduce the initial capital outlay that businesses and residences face in installing renewable energy systems.
2. **Tax Relief.** For local governments that levy property taxes, the municipality can: (1) make renewable energy property partially or fully excluded from property tax assessment, (2) cap renewable energy property value at the value of an equivalent conventional energy system providing the same service, and (3) award tax credits to offset property taxes.
3. **Loans.** Cities or municipal utilities can offer financing for the purchase of renewable energy equipment. Loans can be market-rate, low-interest (below market rate), or forgivable.
4. **Infrastructure Policies.**
 - a. **Grid Extension.** Where local government is considering incorporating new regions or has been given responsibility for providing services to peri-urban and rural areas, local government can promote and facilitate the development of decentralized, renewable energy generation as a cost-effective alternative to grid extensions.
 - b. **Construction and design policies.** Local governments often have regulatory influence or responsibility for building codes. By setting new requirements for the inclusion of renewables in new construction or major retrofits—as pioneered by Barcelona, Spain, local governments can dramatically alter the direction of our energy systems. Construction and design standards can include building-code standards for PV installations, design standards evaluated on life-cycle cost basis, and performance requirements.

- c. **Industrial recruitment.** Local governments can recruit local industry through the use of financial incentives such as tax credits, grants, and government procurement commitments to attract renewable energy equipment manufacturers to locate in a particular area. These incentives are designed to create local jobs, strengthening the local economy and tax base, and improving the economics of local renewable development initiatives.
 - d. **Direct equipment sales.** Local governments that operate a municipal utility can allow residents to buy or lease renewable energy systems directly from electric provider at below-retail rates.
 - e. **Methane Recovery.** The management and operation of landfills and waste treatment plants by local governments give local government access to a potentially large source of methane that can be trapped, tapped and turned in useful fuel. eThekweni Municipality (formerly known as Durban) in South Africa is among the first southern cities to investigate the potential for developing a landfill gas to energy project.
5. **Government Procurement:** Local governments are significant energy purchasers, owning and operating buildings, streetlights, water supply and treatment facilities, etc. All of these systems use large amounts of energy that directly consume large quantities of fuel and electricity. By specifying the purchase of renewable electricity—as done in, Adelaide, Australia—local government can reduce uncertainty and spur market development, helping overcome institutional barriers to commercialization, encouraging the development of appropriate infrastructure, and providing a “market path” for technologies that require integrated technical, infrastructure, and regulatory changes. Research by ICLEI shows that the purchase of 100% green electricity by public authorities in the European Union would save 60 million tonnes of CO₂-equivalent per year.
 6. **Awareness Raising:** Through well-established methods of participatory governance, such as Local Agenda 21, local governments are well positioned to advocate for sustainable patterns of consumption and production, and to promote the use of renewables among various local stakeholder groups.

Challenges Faced by Local Government in Promoting Renewable Energy

While there is a lot that local government can do on its own, there are many areas in which local government needs national government, international agencies and the private sector to enable an environment in which renewables can flourish. The need for enacting policies to support renewable energy is often attributed to a variety of “barriers” or conditions that prevent investments from occurring. Often the result of barriers is to put renewable energy at an economic, regulatory, or institutional disadvantage relative to other forms of energy supply. Barriers that local governments face when trying to promote or purchase renewable energy include:

1. **Subsidies for competing fuels.** Large subsidies for fossil fuels put in place by national governments can put renewable energy at a competitive disadvantage. Reducing permanent subsidies would improve market competitiveness for new renewable energy and energy efficiency technologies while yielding the added benefits of improving market efficiency and of considerably decreasing the burden on public spending.
2. **Lack of skills and information.** While many local governments have already embraced renewables, some local governments still require assistance in building a policy environment that enables the introduction and proliferation of renewable energy technologies. In other communities, an enabling policy environment may exist, but skilled personnel who can install, operate, and maintain renewable energy technologies may not.
3. **High initial capital costs.** Renewable energy investments generally require higher amounts of financing for the same capacity. Depending on the circumstances, capital markets may demand a premium in lending rates for financing renewable energy projects because more capital is being risked up front than in conventional energy projects.

4. **Lack of access to credit.** Local government and local citizens may not be able to access credit to purchase or invest in renewable energy because of lack of collateral, poor creditworthiness, or distorted capital markets.
5. **Perceived technology performance uncertainty and risk.** Proven, cost-effective technologies may still be perceived as risky by local government decision makers as well as by the public if there is little experience with them in a new application or region.
6. **Lack of Research and Development Funds.** Research and development funds from national governments and international donor agencies need to be directed to renewable energy technologies to achieve the production of state of the art clean technologies and renewable energy generation.

Recommendations

To help overcome the barriers described above, local government calls for the following action:

1. **Remove subsidies.** National government (with prodding from international agencies) must initiate a process of reforming policies, as examples by removing subsidies for fossil fuels and eliminating levies that inhibit new clean technologies. These reforms are needed at all levels of government and multi-lateral agencies
2. **Invest in capacity building.** International donors and national agencies need to invest in helping to create enabling environments for renewable energy at all levels of government and civil society. In particular, resources must be directed to local government decision makers throughout the world to make them understand the applicability and availability of renewable energies.
3. **Utilize Public Investment to Achieve Accessible and Clean Energy Infrastructure.** Public investment from all levels of government as well as from international aid agencies and multilateral financial institutions should be directed to develop decentralized renewable energy generation.
4. **Set National Standards for Renewable Energy Production.** Ceilings on standard air pollutant and carbon emissions promote clean electricity generation and provide consumers a clean energy product. To facilitate renewable energy production, national standards need to be set that regulate energy generation and place limits on the pollution and emissions generated from power plants regardless of fuel type.
5. **Provide Choices to Consumers.** Consumers should also be guaranteed a clean energy choice. This can be achieved by electricity market restructuring or new standards on electricity production that provide customers the ability to select either a clean energy source or their own power provider. Information must be provided to all customers on contract terms, cost, generation sources, and emissions characteristics of power being offered. Local governments can prepare the community by informing them about new opportunities in purchasing power from renewable energy sources, such as solar, wind, biomass, or hydroelectric.
6. **Fund Research and Development of Renewable Energy.** National governments and international monetary and donor agencies need to direct funds to produce state of the art clean technologies and renewable energy generation.

Case Studies³

Examples of the power that local government has exerted over the past decade and that can be replicated throughout the world include:

The Political Will of Local Government

- **Austin, USA** requires 5% of the city's electricity be generated from renewables. The municipal utility's Green Choice pricing program will meet over 50% of projected load growth between 2000-2003 from renewable energy sources. It provides 340 gigawatt-hours per year of electricity from wind power, biogas, and solar power generation, reducing emissions of CO₂ by ~255,000 tons year.
- For the last 15 years, **Saarbrücken, Germany** has engaged in a comprehensive solar energy initiative. The city has focused on long-term, incremental change by undertaking small but increasingly progressive projects and by using social marketing techniques to gain public acceptance. Projects include a solar rooftop program, swimming pool solar heating retrofits, installing photovoltaic arrays alongside roadways as part of noise barriers, and innovative zoning to allow new subdivisions development so that about 700 buildings will be situated with southern exposures and will be constructed with large southern facing windows.
- **Brisbane, Australia's** Luggage Point sewage treatment plant, methane is being converted into electricity, offsetting approximately 5% of municipal electricity consumption. A landfill gas project is using recovered gas to heat a municipal swimming pool. In 1999, these initiatives saved the city more than \$1 million in electricity costs.
- The City of **Portland, USA** developed a contract with an electric utility to guarantee that 5% of electricity available to utility customers was generated from new wind power sources, resulting in 4 million kilowatt-hours switched to wind power. (*Note: Could be reworded for Ann Arbor, Michigan.*)
- Despite carrying a considerable price premium compared to coal-generated electricity, **Cape Town, South Africa** is about to confirm a US\$12 million deal to purchase wind generated electricity from outside the borders of the City. The City is preparing a marketing and communications plan to customers willing to purchase green electricity. The City is leading the way and has provided green electricity for the Cape Town International Convention Centre for several conferences in 2003.
- **Växjö, Sweden** has set aggressive targets to reduce greenhouse gas emissions. In 1996, it committed to eliminating the use of fossil fuels in municipal operations and to achieving a 50 percent per capita reduction in CO₂ emissions in the entire community by 2010, as compared to 1993 levels. To meet these goals, the city is making a major effort to switch from oil to biofuel for heating, electricity generation and transportation. A bio-fuel powered heating and power unit brought into production in 1997 has already reduced emissions in the municipality by 20%.
- At the Council's Wingfield Landfill in **Adelaide, Australia**, 65% of the methane produced is being extracted and converted to electricity for the grid. Not only is the methane captured and prevented from entering the atmosphere, but there is a double-effect as the electricity generated replaces fossil fuel generated electricity that would otherwise have been required. It is planned to eventually increase methane recovery to 80%. Each year approximately 15 gigawatt hours of electricity with an estimated value of \$1,500,000, are produced from the methane extracted from the landfill and fed into Adelaide GL. Corporations power grid, providing enough power for about 5000 homes for an entire year. It is anticipated that this rate should be sustainable for approximately 20 to 30 years beyond the completion of landfilling operations at the Wingfield Waste Management Centre.

³ Most likely, the case studies will appear in boxes or sidebars throughout the paper. In addition, it is likely that the final version of the dialogue paper will contain more and/or different case studies with the final selection chosen to have sectoral and geographic breadth.

Innovative Financing

- **San Francisco**—a city often shrouded in fog—is set to become the United States' largest municipal producer of sun-generated electricity. On 6 November 2001, the citizens of San Francisco approved a ballot measure that allows the city to issue a \$100 million revenue bond to finance construction of solar and wind-power systems. The measure pays for itself entirely from energy savings at no cost to taxpayers. Moreover, the City's venture is of a size that should help cut renewable electricity costs for everyone by increasing production of solar cells and wind generators.
- **Ethekwini, South Africa** is one of the first cities in the world to develop a project for funding through the Clean Development Mechanism (CDM) which allows Ethekwini to sell the rights to reductions that it makes greenhouse gas emissions to investors from the developed world. The project consists of enhanced collection of landfill gas at three landfill sites owned by the municipality and of the use of the recovered gas to produce electricity. Over a 7-year period, the project will reduce equivalent carbon dioxide emissions by more than 3 million tonnes, generating as much as \$15 million in revenue to help offset the project's \$40 million price.

Innovative Procurement Policies

- In **Australia**, 45 local councils have made the commitment to purchase green power. The purchase of green power supports the local economy and local industry through the development of new renewable energy generators within council jurisdiction. The **City of Greater Dandenong**, for example, signed a contract for the supply of green power electricity for 107 of its facilities and streetlights, reducing annual greenhouse gas emissions by 7,970 tonnes. Similarly in Europe, **ICLEI's Procura⁺ Sustainable Procurement Campaign**—which has been initiated by the cities of Kolding, Denmark and Barcelona, Spain—made procurement of green electricity one of their six priority products.
- In 1995, **Mexico City** undertook a new and comprehensive effort to improve the region's air quality. The effort, known as "Proaire" seeks to cut emissions of both standard air pollutants and greenhouse gases. As one element of Proaire, Mexico is installing solar water heating systems in 50,000 new housing units over a 5-year period. The project will be initiated with an 8-month pilot phase during which various solar water heaters will be assessed for their performance characteristics, cost effectiveness, and suitability.

Innovative Technologies

- In **Rayong, Thailand** and **Cebu City, Philippines**, local government is putting locally produced waste to use, helping to create jobs and improve the environment. Using slightly different technologies, both municipalities are turning biomass into biogas, creating jobs at the new biogas facilities and displacing imported fuel use. In addition, in the case of Cebu City, the biogas is being piped to neighboring households as a fuel for cooking, cutting household energy costs among some of the city's poorest populations.
- **Graz, Austria** runs 55 of the city's bus fleet on biodiesel created from used cooking oil collected from more than 200 restaurants and households. Since the inception of the project, the buses have consumed over 2.5 million liters of biodiesel, reducing CO₂ emissions by 6,300 tonnes.) Similarly in **Kyoto, Japan**, 220 municipally-owned refuse collectors (almost the entire city fleet) and some municipally-owned buses run on biodiesel created from used cooking oil now. Kyoto City collected 123,032 liters of used cooking oil in 2002 from 823 collecting points.
- The Columbia Boulevard wastewater treatment plant in **Portland, Oregon, USA** handles approximately 82 million gallons of wastewater per day. As a byproduct of the sewage treatment process, the plant produces biogas that a fuel cell at the plant uses to generate electricity. The 170 kW fuel cell, only the third of its kind in the United States, produces about 1,400,000 kilowatt-hours of electricity per year. By producing its own electric power from the fuel cell, Portland expects to save over \$60,000 a year in energy costs and to carbon dioxide emissions by 625 tons annually. The total cost of the system was about \$1.3 million.

- With an eye to securing funding from the Clean Development Mechanism, **Cape Town, South Africa** is building passive solar design and solar water heating as well as numerous energy efficiency measures into its subsidized housing stock. Initial results show energy savings of R50 per month in households having an approximately R600 monthly income. Household temperatures have been five degree warmer in winter and five degrees cooler in summer when compared to surrounding households.

This paper is being prepared by ICLEI – Local Governments for Sustainability, on behalf of and in consultation with Local Government worldwide, as represented by their various associations, and by individual cities.

Please send your comments by 30 April 2004 to both:
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