Renewable Energy for Cities: Opportunities, Policies, and Visions

Dr. Eric Martinot

Teaching and Research Fellow, Victoria University of Wellington
Senior Research Director, Institute for Sustainable Energy Policies (Tokyo)
Senior Research Fellow, Worldwatch Institute
Lead Author, REN21 Renewables Global Status Report*

martinot@isep.or.jp
www.martinot.info

*Report sponsored by the REN21 Renewable Energy Policy Network (www.ren21.net)
Note: data for 2008 are provisional based on draft 2009 report, and subject to revision

Seminar sponsored by the NZ Centre for Sustainable Cities at the University of Otago,
the Institute of Policy Studies at Victoria University of Wellington,
and ICLEI-NZ Local Governments for Sustainability (with thanks also to ICLEI-Europe)

Wellington, New Zealand
April 1, 2009

Presentation Topics

1. Renewable energy situation globally – markets and policies
2. The future – electricity from renewables, electric vehicles, and “smart grids”
3. Technologies, policies and transitions for NZ – how far and how fast?
4. City policies for renewable energy
5. Further research – status report on local renewable energy policies worldwide

Selected Municipal Targets and Goals for Renewable Energy

City	Targets for renewable share of electricity	CO2 emissions reductions goals	Other targets/goals
Austin (TX), USA	30% by 2020	carbon-neutral by 2020	100% of own elec. use by 2012
Adelaide, Australia	15% by 2014	transport/buildings zero net emissions by 2010/12	2 MW of solar PV on residential and commercial buildings
Berlin, Germany		25% below 1990 by 2010	
Cape Town, South Africa	10% by 2020		10% of homes by 2010 with solar hot water
Chicago, USA			20% of own elec. use by 2006
Daegu, Korea			5% of energy by 2012
Freiburg,Germany	10% by 2010	25% below 1992 by 2010	
Gwangju, Korea		20% below 1990 by 2020	2% of energy by 2020
Leicester, UK			10% of energy by 2010 and 20% by 2020
London, UK		20% below 1990 by 2010	
Malmö, Sweden		25% below 1990 by 2012	
Melbourne		20% below 1996 by 2010	25% RE in buildings by 2010
New York, USA		7% below 1990 by 2012	
Oxford, UK			10% of homes by 2010 with solar hot water/PV
Portland (OR) USA		10% below 1990 by 2010	100% of own elec. use by 2010
Sacramento, USA	20% by 2011		
Salt Lake City, USA			10% of new building energy use
San Francisco, USA			1 MW/year added
Santa Monica, USA			100% of own use (current)
Sapporo, Japan		10% below 1990 by 2012	
Tokyo, Japan			20% of energy by 2020 (proposed); 5% of own use
Toronto, Canada		30% by 2020; 80% by 2050	
Vancouver, Canada		30% by 2020; 80% by 2050	

Types of City Policies That Can Influence Renewable Energy

1. Targets and Planning

- Future shares/amounts of renewable electricity for all consumers in city
- Future shares/amounts of renewable electricity for city's own operations and buildings
- Future shares/amounts of biofuels for city's own vehicles and for public transit
- CO2 reduction targets (similar to Kyoto Protocol, i.e., 20% below 1990 levels by 2020)
- Urban planning that designates certain "green development" zones or infrastructure
- Urban planning for future electric vehicle infrastructure
- Planning to include renewable energy in public infrastructure in some systematic way – e.g. street lighting or public heat networks)

2. Integration with Core Responsibilities

- Building codes & permits – e.g. requirements for solar hot water, solar PV; shading laws
- Sales taxes, property taxes & fuel taxes – e.g. tax credits, tax exemptions
- City government departments or bodies devoted specifically to renewable energy
- Controlling or regulating the local electric utility (only for municipally-controlled or owned utility) – e.g., feed-in tariffs, portfolio standards, net metering, interconnection standards

Types of City Policies That Can Influence Renewable Energy (continued)

3. Voluntary Activities by City

- City-financed investment funds or demonstration projects
- "Market transformation" programs – e.g. for solar hot water, energy-efficient products
- Purchases of green electricity or biofuels
- Investment in renewable energy for city buildings and infrastructure

4. Policies/Activities that Influence Actions by Others

- Information, media, promotion, and public awareness campaigns/programs
- Allowing use of city land/property for renewable energy installations
- Regulations and recognitions on/of corporate activities
- Enabling conditions to support community actions

Case Study: Yokohama

"Yokohama Energy Vision" (March 2008) with five pillars: (1) changing lifestyles and promoting environmental education, (2) promoting energy performance improvement, (3) promoting renewable energy use, (4) harmonizing energy policies with community development, and (5) supporting technology development and market formation.

- Target to reduce fossil-fuel use by 30% by 2025, relative to 2004 levels; one-third of the target will be achieved from renewable energy and two-thirds from energy efficiency
- Commercial buildings (> 6 million kWh/year) required to formulate CO2 reduction plans
- Promoting purchases of green power certificates by commercial consumers
- Wind power projects financed by sales of green power certificates and citizen-purchased municipal bonds (no general tax revenues)
- Solar PV installations on government buildings and schools
- Solar PV subsidies of $300/kW equivalent, up to 4-kW per household
- Considering solar hot water requirements for new construction, similar to Barcelona
- Promoting use of electric vehicles by city residents and businesses
- Established the Climate Change Policy Office, headed by a deputy mayor, responsible for reducing greenhouse-gas emissions and promoting renewable energy

Spain Solar Hot Water Ordinances

- Barcelona started in 2000 to require solar hot water in all new buildings and major renovations above a specific size (typically all commercial buildings and residential buildings of 16 or more households). In 2005, eliminated minimum size requirement.
- Barcelona requirement is for 60% of hot water energy to come from solar.
- Barcelona was followed by 70 municipalities and cities throughout Spain enacting similar ordinances
- March 2006: Spain enacted a national building ordinance requiring solar hot water and solar PV in new construction and renovation for larger buildings.
- National ordinance requires 30-70% of hot water energy from solar, depending on consumption level, geographical location, and back-up fuel.
- National ordinance applies to several types of buildings: shopping centers > 3,000 m^2, warehouses > 10, 000 m^2; office buildings > 4,000 m^2; hotels > 100 rooms; hospitals > 100 rooms; convention centers > 10,000 m^2

Some Examples of City Policies

- Boulder, Colorado: no-shade ordinance entitles all structures to sunshine; plus carbon tax on fossil-fuel electricity sales with renewables exempt
- Tokyo: Solar Energy Expansion Committee targets 1GW of solar PV and solar hot water by 2017; also requires property developers to assess possibilities for solar hot water and other renewables and report assessments to owners; establishes green-heat certificates based on solar hot water; establishes carbon cap-and-trade system
- Vancouver, BC: all new construction should be carbon-neutral by 2030
- Toronto: $20 million Green Energy Fund to support renewable energy investments
- Austin, Texas: renewables portfolio standard (RPS) for utilities, 30% of elec. by 2020
- Stockholm: reduce per-capita CO2 emissions below a specific threshold
- Woking, UK: purchase 100% of government power needs from renewables by 2011
- Betim, Brazil: require biofuels in public transport and municipal vehicles
- Japan “Regional New Energy Vision” by more than half of all municipalities
- Gothenberg, Sweden: long-term plan to become fossil-fuel free by 2050
- Barcelona: targets 100,000 m2 of solar hot water by 2010
- Salt Lake City: 10% of energy used by new buildings to come from renewables
- Melbourne, Australia: 25% of residential electricity and 50% of public lighting by 2010
- Milagro, Spain: citizen-owned 10-MW solar PV power plant (60% of city’s electricity)
- Gainsville, Florida: feed-in tariff for solar PV (32 cents/kWh for 20 years; max 4 MW)
- Los Angeles: feed-in tariff for solar PV, with target of 150 MW by 2016
- India: 60 “solar cities” to be established to reduce energy demand by 10% in 5 years
- Europe: “Covenant of Mayors” to reduce CO2 emissions beyond EU 20% by 2020

Research and Information About Individual Cities

1. Policies and targets: Which policies exist? What are future targets?

2. Indicators: Show extent renewables are used or possible (actuals and potentials)

3. Enabling (framework) conditions: What factors influence city action or inaction?

- What legal authorities exist that allow city action?
- Do national or state policies help the city in its goals? Do they hinder?
- Have city policies keyed off the national or state policies?
- Who are key stakeholders in regard to renewable energy and how do they participate?
- Is there a "renewable energy champion" within the city government?

4. Influence on national policies: how are national policies affected by local policies?

5. Policy-making processes: What are the historical and ongoing policy-making processes related to renewables? Who has shaped, led, and/or hindered those processes?

6. Results: Have policies been effective? What are the impacts and outcomes? Evidence?

7. Associations: How does the city participate with national or global associations related to renewable energy or climate change? Which associations and what benefits result?

Status Report on Local Renewable Energy Policies Worldwide (REN21, ISEP, ICLEI-Europe, others)

Purpose

- Give understanding to global energy/environment community of the importance of cities for renewables and show how much is being done

- Inform and inspire people in cities (especially local governments) to do more and give them basic knowledge to understand opportunities and possibilities

- Given insight into potentials -- how much renewables are possible at the local level given specific conditions and policies

Scope (partial)

- Describe and catalogue local renewable energy policies and range of policies/activities

- Show how communities are influenced by local governments (and vice-versa) in investing in renewable energy

- Tied to REN21/ICLEI web portal being developed that will provide policy guidance

- At least 300-400 cities represented, with perhaps 20-30 in-depth case studies and geographic balance globally and balance between large and small cities