Status Report on Local Renewable Energy Policy Worldwide: Local Policy Landscapes and a Research Agenda

Dr. Eric Martinot

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)

Local Renewables Freiburg 2009
Freiburg, Germany
April 27, 2009

(This presentation available at www.martinot.info/Freiburg2009.pdf)

RENEWABLES 2007

GLOBAL STATUS REPORT

SELECTED INDICATORS	2006 ➔	2007 ➔	2008
Investment in new renewable capacity (annual) [1]	63 ➔	104 ➔	120 billion USD
Renewables power capacity (existing, excl. large hydro)	207 ➔	240 ➔	280 GW
Renewables power capacity (existing, incl. large hydro)	1,020 ➔	1,070 ➔	1,140 GW
Wind power capacity (existing)	74 ➔	94 ➔	121 GW
Grid-connected solar PV capacity (existing)	5.1 ➔	7.5 ➔	13 GW
Solar PV production (annual)	2.5 ➔	3.7 ➔	6.9 GW
Solar hot water capacity (existing)	105 ➔	126 ➔	145 GWth
Ethanol production (annual)	39 ➔	50 ➔	67 billion liters
Biodiesel production (annual)	6 ➔	9 ➔	12 billion liters
Countries with policy targets		66 ➔	73
States/provinces/countries with feed-in policies [2]		49 ➔	63
States/provinces/countries with RPS policies		44 ➔	49
States/provinces/countries with biofuels mandates		53 ➔	55

Table 3. Selected Cities with Renewable Energy Goals and/or Policies

City	Renewable energy goals	CO_2 reduction goals	Policies for for solar hot water	Policies for solar PV	Urban planning, pilots, and other policies
Adelaide, Australia	✓	✓			✓
Austin (Texas), USA	✓	✓			✓
Barcelona, Spain			✓		
Berlin, Germany		✓	✓	✓	
Betim, Brazil		✓	✓		✓
Cape Town, South Africa	✓	✓			✓
Chicago, USA	✓				
Daegu, Korea	✓	✓			✓
Freiburg, Germany	✓	✓	✓	✓	✓
Gwangju, Korea	✓	✓			✓
The Hague, Netherlands		✓			
Leicester, UK	✓				✓
London, UK		✓			
Malmö, Sweden		✓			✓
Melbourne, Australia	✓	✓			✓
Mexico City, Mexico				✓	✓
Minneapolis, USA	✓				✓
Nagpur, India		✓	✓	✓	
New York, USA		✓		✓	✓
Oxford, UK	✓	✓	✓	✓	✓
Portland, United States	✓	✓	✓	✓	✓
Rizhao, China			✓	✓	
Salt Lake City, USA	✓	✓			✓
Santa Monica, USA	✓				✓
São Paulo, Brazil			✓		
Sapporo, Japan		✓			✓
Stockholm, Sweden	✓	✓			✓
Toronto, Canada		✓			
Tokyo, Japan	✓		✓	✓	✓
Townsville, Australia			✓	✓	
Vancouver, Canada		✓			
Växjö, Sweden	✓	✓	✓	✓	✓
Woking, UK	✓	✓	✓	✓	✓

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

United States: Selected Local Renewable Energy Policies

	Elec. utility policy	Building codes	Tax credits & subsidies	Govt. funds/ demos	Urban planning	Purchases electricity or biofuels	Targets elec & CO2	Information public campaigns	Govt. owned land	Private sector	Public infra-structure	Govt. depts.
Ann Arbor			X	X	X	X	X	X	X	X	X	X
Austin	X		X			X	X	X		X		X
Berkeley		X	X	X			X	X		X		
Boston			X	X		X	X	X			X	
Denver					X		X	X		X	X	
Houston	X			X		X		X				X
Knoxville				X				X		X	X	
Madison				X	X	X	X	X		X	X	
Milwaukee						X	X	X		X	X	X
Minneapolis	X			X		X	X	X		X	X	
New Orleans				X		X	X	X		X		
New York City				X		X	X	X		X		
Orlando			X				X	X		X		
Philadelphia					X	X	X	X			X	
Pittsburgh				X		X	X	X			X	
Portland			X	X	X	X	X	X		X	X	X
Sacramento				X		X	X	X			X	
Salt Lake City						X	X	X				
San Antonio				X	X	X		X		X	X	
San Diego						X		X	X	X	X	X
San Francisco		X	X	X		X	X	X			X	
San Jose			X				X	X		X	X	
Santa Rosa				X		X	X	X		X	X	X
Seattle		X	X	X			X	X		X		
Tucson		X	X	X	X	X	X	X		X		

Australia and UK: Selected Local Renewable Energy Policies

	Elec. utility policy	Building codes	Tax credits & subsidies	Govt. funds/ demos	Urban planning	Purchases electricity or biofuels	Targets elec & CO2	Information public campaigns	Govt. owned land	Private sector	Public infra-structure	Govt. depts.
Adelaide		X			X		X					
Ararat					X		X					
Auburn								X				
Ballarat							X	X				
Baw Baw		X					X	X				
Brisbane		X					X	X				
Canberra	X											
Clarence Valley		X					X					X
Melbourne					X		X					
Perth							X	X	X			X
Sydney						X	X	X				
Townsville	X					X						
UK												
Cambridge		X		X								
Craigavon								X				
Edinburgh		X					X		X		X	
Glasgow		X					X	X				
Leicester					X		X					
London	X	X			X		X	X				X
Newcastle		X					X		X			
Nottingham							X	X				
Oxford		X		X	X	X	X	X				
Woking Borough					X	X	X					
York	X							X				

Developing Countries: Selected Local Renewable Energy Policies (*)

	Elec. utility policy	Building codes	Tax credits & subsidies	Govt. funds/ demos	Urban planning	Purchases electricity or biofuels	Targets elec & CO2	Information public campaigns	Govt. owned land	Private sector	Public infra-structure	Govt. depts.
ASIA												
Astana								X				
Daegu, Korea				X	X		X	X			X	
Gwangju, Korea							X					
Kuala Lumpur			X									
Nagpur, India					X							
New Delhi					X							
Rizhao, China		X			X							
SOUTH AMERICA												
Betim, Brazil						X						
Kuritiba, Brazil							X					
Sao Paulo, Brazil		X										
MIDDLE EAST												
Dubai												X
Sharjah	X											
AFRICA												
Cape Town		X										

(*) Note: research on these cities and regions is still very incomplete so other policies not shown for these cities may exist, and there are many more cities that have not been investigated yet.

Japan: Selected Local Renewable Energy Policies

	Elec. utility policy	Building codes	Tax credits & subsidies	Govt. funds/ demos	Urban planning	Purchases electricity or biofuels	Targets elec & CO2	Information public campaigns	Govt. owned land	Private sector	Public infra-structure	Govt. depts.
Tokyo (*)	X	X	X			X	X					
Yokohama (*)		X	X	X	X	X	X	X			X	X
Kanagawa P. (*)					X	X	X	X				
Kawasaki (*)			X		X		X	X				
Aichi			X	X		X	X	X				
Aso							X		X			
Bizen						X		X				
Fukushima			X		X	X	X	X				
Hita				X			X	X				
Iida					X	X		X	X			
Iwate				X	X		X	X				
Kamikatsu				X		X	X					
Kouchi						X	X					
Kuzumaki	X		X		X	X						
Kyoto			X	X	X		X	X		X		
Ogawa				X	X	X	X					
Saga			X		X	X	X	X				
Sapporo				X		X		X				
Shiga					X	X	X	X				
Shonai						X	X	X				
Tomamae				X		X						
Yasu			X				X	X	X			
Yusuhara						X						

(*) Partners in “MetroCAP” partnership launched in 2008 to facilitate effective legislation and to share knowledge and experience with renewables, efficiency, sustainable transport, and carbon cap-and-trade

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

Selected Cities with Targets for CO2 Emissions Reductions

	CO2 Emissions Reductions
Austin (TX), USA	carbon-neutral by 2020
Adelaide, Australia	transport/buildings zero net emissions by 2010/12
Berlin	25% below 1990 by 2010
Freiburg	30% below 1992 by 2020
Gwangju, Korea	20% below 1990 by 2020
London	20% below 1990 by 2010; 60% by 2050
Malmö, Sweden	25% below 1990 by 2012
Melbourne	20% below 1996 by 2010
New York	7% below 1990 by 2012
Portland (OR) USA	10% below 1990 by 2010
Stockholm	reduce per-capita CO2 emissions below a threshold
Sapporo, Japan	10% below 1990 by 2012
Tokyo	25% below 2000 by 2020
Toronto	30% by 2020; 80% by 2050
Vancouver, BC	30% by 2020; 80% by 2050

Selected Cities with Targets for Renewable Energy

Government Own-Use Purchases of Renewables	
Austin (TX), USA	100% of electricity by 2012
Boston	11% of electricity (current)
Chicago	20% of electricity by 2006
Houston (TX), USA	50% of electricity (current)
New York	20 MW of wind power by 2008
Philadelphia (PA), USA	15% of electricity for city buildings by 2015
Portland (OR) USA	100% of electricity by 2010
Santa Monica (CA), USA	100% of electricity (current)
Sydney	100% of all government energy use carbon-neutral
Woking, UK	20% of electricity by 2011
Tokyo	5% of electricity by 2020
Installed Capacity	
Adelaide, Australia	2 MW of solar PV on residential and commercial buildings
Barcelona	100,000 m2 of solar hot water by 2010
Kunming, China	6 million m2 surface area covered by of solar PV and solar hot water, with at least 100 MW solar PV
Los Angeles	1.3 GW of solar PV by 2020
Philadelphia	58 MW of solar PV by 2021
Shanghai	200-300 MW of wind and 7-10 MW of solar PV by 2010
Tokyo	1 GW of added solar PV by 2010

Selected Cities with Targets for Renewable Energy

Share of Buildings	
Cape Town	10% of homes with solar hot water by 2010
Dezhou, China	50% of buildings with solar hot water by 2010
Kunming, China	50% of buildings with solar hot water and/or solar PV by 2010
Oxford, UK	10% of homes with solar hot water and/or solar PV by 2010
Share of Electricity	
Austin TX, US	30% by 2020
Adelaide, Australia	15% by 2014
Ann Arbor MI, US	20% by 2015
Cape Town	10% by 2020
Freiburg	10% by 2010
Taipai City, Taiwan	12% by 2020
Share of Energy	
Beijing	4% of total energy by 2010
Daegu, Korea	5% of total energy by 2012
Leicester, UK	10% of total energy by 2010 and 20% by 2020
Melbourne	25% of electricity for residential bldgs & 50% of public lighting 2010
Salt Lake City	10% of energy used for new buildings
Tokyo	20% of energy by 2020

Policy Examples

Electric Utility Policies	
Austin TX, US	Renewable portfolio standard 30% by 2020
Boulder CO, US	Carbon tax on fossil-fuel electricity purchases
Gainsville FL, US	Feed-in tariff for solar PV (32 cents/kWh for 20 years)
Los Angeles	Feed-in tariff for solar PV
Minneapolis MN, US	Renewable portfolio standard 30% by 2020 (for Xcel Energy)
New York	Net metering up to 2 MW capacity
Building Codes and Mandates	
Barcelona	Mandates 60% of hot water heating energy from solar in all new buildings and major renovations; was subsequently copied by 70 other municipalities throughout Spain
Boulder CO, US	No-shade building ordinance entitles all structures to sunshine
San Francisco	Requires all new buildings over 100,000 ft2 to supply 5% of building energy use from on-site solar
Tuscon AZ, US	New single-family homes must include solar hot water or stub-out for later installation.
Tokyo	Requires property developers to assess possibilities for solar hot□water and other renewables and report assessments to owners; establishes green-heatcertificates based on solar hot water
Rizhao, China	Requires solar hot water in selected types of new buildings
Vancouver, BC	All new buildings should be carbon-neutral by 2030
Wuhan, China	Requires solar hot water in certain residential and public buildings

Policy Examples

Tax Credits, Subsidies, and Loans	
Austin TX, USA	Subsidies for solar PV and solar hot water in homes and businesses, and low-interest loans for solar PV
Beijing	Subsidies for ground-source heat pumps (50 RMB/m2)
Kanagawa, Japan	Loans to households for solar PV, solar hot water, and wind
New York	Property tax abatement for solar PV (35% first three years; 20% years four and five)
Orlando FL, USA	Subsidy for solar PV in commercial buildings
Taipai City, Taiwan	Subsidies for solar hot water
Tianjin, China	Subsidies, discounted loans, and tax rebates
Biofuels Policies	
Ann Arbor MI, USA	Subsidies for public-access biofuels stations
Betim, Brazil	Biofuels in public transport and municipal vehicles
Portland OR, USA	Mandate for biofuels blending B5 and E10; biofuels investment fund to enhance production, storage, distribution; biofuels infrastructure grants for conversion of fueling stations
Stockholm	Biofuels in public transport

Policy Examples

Urban Planning	
Gothenberg, Sweden	Planning towards being substantially fossil-fuel-free by 2050
Salt Lake City	"Salt Lake City Green" environmental plan includes wind power purchases
Yokohama	"Yokohama Energy Vision" (see case study)
Government Funds and Investments	
Beijing, China	13 billion RMB ($2 billion) investment to achieve 4% energy target
Kunming, China	Fund for solar PV industry development and solar PV projects
San Francisco	Solar Energy Bond issue of $100 million
Toronto	$20 million Green Energy Fund to support renewable energy investments
Support for Community Initiative	
Milagro, Spain	Citizen-owned 10-MW solar PV power plant, contributing 60% of Navarra's electricity supply (750 citizen-owners)
Iida City, Japan	Community-directed investment fund for solar PV of $2 million equivalent

Global and National Associations and Programs for Local Renewables

- Australia Solar Cities Program
- C40 Cities Climate Leadership Group
- Europe Covenant of Mayors
- European Solar Cities Initiative
- ICLEI Cities for Climate Protection Campaign
- ICLEI Local Renewables Model Communities Initiative
- India Solar Cities Program (60 cities)
- International Solar Cities Initiative
- Japan Regional New Energy Vision
- U.S. Mayors' Climate Protection Agreement
- U.S. Solar America Cities Initiative
- World Mayors Council on Climate Change

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