Decarbonizing Cities
Building Sector Policies by Local Governments

20191010 ICEF
Yuko Nishida, Senior Manager
Renewable Energy Institute
Cities & Climate Change: Necessity & Responsibility

Population and Emissions

<table>
<thead>
<tr>
<th>World Urban Population</th>
<th>Urban Energy Consumption in 2013</th>
<th>Urban CO\textsubscript{2} Emissions in 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>55%</td>
<td>2/3</td>
<td>70%</td>
</tr>
</tbody>
</table>

By 2050

<table>
<thead>
<tr>
<th>Urban activities</th>
<th>68%</th>
</tr>
</thead>
<tbody>
<tr>
<td>energy consumption, wastes, aerosols</td>
<td>70%</td>
</tr>
</tbody>
</table>

Urban GHG Emissions

<table>
<thead>
<tr>
<th>Land use related factors</th>
<th>70%</th>
</tr>
</thead>
<tbody>
<tr>
<td>deforestations, urban developments, filling wetlands, fragmented eco-system</td>
<td>70%</td>
</tr>
</tbody>
</table>

Source:
UN 2018, The Revision, World Urbanization Prospects
IEA 2016, Energy Technology Perspective
Cities & Climate Change: Capacity & Opportunity

- Various entities (Companies, Citizens, NGOs, Governments...)
- Scale of economy
- Innovation center
- Functions and experience of local governments

Many local government offices have urban planning/building/transport authority with their long practice.
Cities Ambitions

Achieving Net Zero by 2050

Deadline 2020
102 Cities with aim to limit warming to 1.5 degrees and meet the ambitions of the Paris Agreement.

Carbon Neutral Cities Alliance
19 cities; Cut GHG by 80 -100 % by 2050 or sooner

Under2 Coalition
10 Regions and States

The Net Zero Carbon Buildings Declaration
26 Cities; Reach Net Zero operating emissions in their portfolios by 2030, and to advocate for all buildings to be Net Zero in operation by 2050
Key Area of Cities Climate Policy
Building sector

High share in cities’ GHG emissions:
**Building and transport** sector

**GHG Emissions by Sector; NYC, Tokyo, London (CO₂ only)**

- **NYC 2017**
  - Residential: 32%
  - Commercial: 26%
  - Transport: 31%
  - Manufacturing: 8%

- **Tokyo 2017**
  - Residential: 26%
  - Commercial: 39%
  - Transport: 15%
  - Manufacturing: 7%

- **GLA 2016**
  - Residential: 41%
  - Commercial: 36%
  - Transport: 23%
  - Manufacturing: 8%

Source: NYC, TMG, GLA

*1: Recalculated by REI based on TMG data. 6 gases other than CO₂ are included in "other" category.

*2: London’s inventory covers CO₂ emissions (energy origin) only.
Building Energy Efficiency: Cities major policy area

Building Energy Efficiency Policy Categories

- Building energy code
- Energy/emission reporting/ Benchmarking
- Energy auditing/ Retro-commissioning
- Green building/ energy ratings/ Energy certifications
- Emission trading schemes/ Cap-and-trade program
- Financial/ Non-financial incentives
- Awareness rising programs
- Green Leasing
- Leadership programs
- Government leaderships

Policy Map of Cities

Building Energy Efficiency: Policy Trend

NEW CONSTRUCTION

Building energy conde introduction/tightening
  → To deal with vast new developments
  → To require net zero energy
  → To cover even existing buildings

EXISTING BUILDINGS

Expanding energy data disclosure and collection of each buildings
  → Reporting, Benchmarking, energy certification

Seeking effective measures
  Mandatory regulations ← Voluntary measures

Facilitating policy implementations
  → Financial scheme
  → Non-financial support (advisory, training, awareness rising…)
Leading Policies by Cities: New York City

**Climate Mobilization Act** (2019-)

- GHG emissions limits must be met from 2024 (>25000sf buildings)
  - The commitment to achieve reduction in GHG by 2050
  - Compliance term 10 years, tightening targets, serious penalty
  - Trading scheme is under consideration

- Energy grades to be posted (>25000sf buildings)
- New construction required to install solar PV/ green roofs or both (〃)
- Establish a sustainable loan program (ie. PACE)

NYC emissions: 51.7 MtCO$_2$e

By 2030, the Climate Mobilization Act will achieve:
- 6 million tons of CO$_2$e reduced
- 26,700+ jobs created
- 150 hospitalizations avoided per year
- 50 to 130 deaths prevented per year
Leading Policies by Cities:
Tokyo Metropolitan Government

Tokyo Cap and Trade Program
By Environmental Security Ordinance (2010 amend.)
- Mandate CO₂ emission reduction (>1500 kl crude oil eq.)
  The commitment to achieve reduction in GHG by 2050
  Compliance cycle 5 years, now in the 2nd period.
- Compliance target 8% in 1st, 17% in 2nd, 27% in 3rd period (planned)
- Trading scheme integrated
- Renewable electricity use are incentivized

27% reduction (compared to base year)
Leading Policies by Cities: **Washington DC**

### Clean Energy DC Omnibus Amendment Act of 2018

- Establish a mandate minimum threshold for energy performance
  - Building energy standard must be “at least” local median Energy Star score
  - 5-year compliance cycles (2021-)
  - Compliance path: performance or prescriptive

- Establish DC PACE, DC Green Bank program
- High Performance Building Hub
- Solar for All Program

**GOALS: 2032**

- Adapt to Climate Change
- Climate Ready Buildings
- Cut Energy Use 50%
- 50% Renewable Energy
- Net Zero New Buildings
- Net Zero Retrofits
- Cut GHG Emissions 50%

*Mayor Bowser Commitment to ZERO Carbon by 2050*
Leading Policies for Net Zero Energy

**London Zero Carbon Home regulation** (2016-)
- Require “zero carbon home” to new major development
- Mandate 35% more energy efficient houses than the national regulation
- Promoting renewable introduction & shifting to distributed energy system
- Offsetting option for “zero-carbon level”
- Enforced by borough governments

**California Zero Net Energy Code** (Enforcement 2020)
- Energy Efficiency Standard--30% energy reductions
- Mandate PV system installation in new residences
- Demand response compliance options
Pathway to Zero
Next steps

Measures in buildings

1. **Efficiency** First = Reduce energy consumption
   Improve envelopes, equipment, and management

2. **Renewables** Introduction
   - On site/community renewables
   - Grid renewable electricity
   - Renewable heat sources

3. **Electrification**
   Shifting residual energy/heat-use to renewable energy

4. Integrating **EVs** and **Storage** devices into building energy system
   to contribute to grid flexibility
   → Demand response, VPP

And **Scale up**
Collaborations for better policy making
Supporting networks/orgs

Effective collaborations among cities
Growing support for cities
Pathways: Cities Decarbonizing Buildings
September 27, 2019

Tokyo, NYC, Washington DC, Yokohama
Seminar in the Climate Week NYC, Sept 2019