PlaNYC 2030

Provide cleaner, more reliable power for every New Yorker by upgrading our energy infrastructure
• Population and economic growth will strain the City’s energy infrastructure

• Three challenges must be overcome to improve the consequences of growth

• We’re recommending an aggressive, integrated plan that puts PlaNYC’s targets within reach

• This recommended plan requires significant effort, capital, and political will, but over the long-run, would provide significant and measurable City benefits
1. The case for action – improving the long-term consequences of NYC’s growth on power and heat infrastructure

2. Challenges the City faces in reforming energy supply and demand

3. Our plan for achieving PlaNYC energy goals
   - Improve energy planning
   - Reduce NYC’s energy consumption
   - Expand NYC’s clean power supply
   - Modernize electricity delivery infrastructure
As NYC grows, power and heating needs will increase substantially

New York City population forecast
Millions of residents

- 2005: 8.2
- 2030: 9.1

+11%

Increased use of appliances and air conditioning

Electrical capacity requirement forecast
Summer peak load, MW

- 2005: 11,400
- 2030: 14,700

+29%

Electrical consumption forecast
Millions of MWh per year

- 2005: 50
- 2030: 72

44%

Heating fuels demand forecast
Million MMBtu per year

- 2005: 422
- 2030: 480

+14%
NYC’S GROWTH LIKELY IMPLIES SUBSTANTIAL INCREASES IN CITY POWER AND HEAT EXPENDITURES BY 2030

ILLUSTRATIVE POWER EXAMPLE

NYC Power demand
Millions of MWh

Wholesale power prices
$/MWh (nominal) – assuming constant real gas price after 2009

Source: NYC City Hall – Population Planning department; ICF; KeySpan; ConEd; team analysis
...AND EMITTING MORE CO$_2$, EVEN WITH RGGI AND A NATIONAL CARBON TAX ON POWER

Assumptions
- Based on business as usual power and heating demand growth
- Includes impact of:
  - Changing Renewable Portfolio Standards (RPS)
  - RGGI ~$4/ton carbon tax around 2010
  - National carbon tax ~$10/ton by 2015

Note 1: Assumes hydro and nuclear generation remains the same (no closing of Indian Point, no new hydro facilities)

Note 2: Refers to the sum of CO$_2$ generated by New York City power plants plus all CO$_2$ related to power generated outside NYC then imported to NYC. CO$_2$ calculations were made based on reported plant-by-plant production, technology, heat rate and CO$_2$ efficiency statistics for 2004. Any CO$_2$ generated by plants located outside of NYC but dedicated to NYC (for UCAP purposes) were accounted 100% towards NYC's CO$_2$ power footprint. All other imports were accounted for by multiplying the imported power from PJM and Upstate NY by the weighted average CO$_2$ intensity of the non-NYC dedicated plants in those regions.

Source: ICF Consulting IPM Model; Energy Velocity; EPA eGrid; NYC City Hall Planning; EDC; Mayor’s Office of Operations; team analysis
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REDUCING POWER PRICES AND CO₂ REQUIRES DISPLACING HIGH COST, INEFFICIENT MARGINAL PLANTS…

### Average age, yrs**

<table>
<thead>
<tr>
<th></th>
<th>CCGT</th>
<th>Gas steam</th>
<th>Oil steam</th>
<th>Gas GT</th>
<th>Oil GT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average age, yrs**</td>
<td>7</td>
<td>43</td>
<td>39</td>
<td>24</td>
<td>37</td>
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</table>

### Total capacity, GW

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<tr>
<td>Total capacity, GW</td>
<td>2.4</td>
<td>2.8</td>
<td>2.0</td>
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### Capacity factor

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<tbody>
<tr>
<td>Capacity factor</td>
<td>76%</td>
<td>21%</td>
<td>29%</td>
<td>18%</td>
<td>5%</td>
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### Heat rate, Btu/kWh**

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</tr>
</thead>
<tbody>
<tr>
<td>Heat rate, Btu/kWh**</td>
<td>8,100</td>
<td>11,300</td>
<td>12,900</td>
<td>11,700</td>
<td>13,100</td>
</tr>
</tbody>
</table>

* In-city resources include Linden Cogeneration Technologies
** Weighted average of individual plants, averaged by estimated 2006 generation

Source: Energy Velocity; NYMEX; team analysis
CURRENT POWER PLANNING PROCESS INVOLVES A MAZE OF STATE AND FEDERAL ENTITIES...

- **New York Governor**
  - Nominates PSC Commissioners
  - Nominates NYPA and NYSERDA Board members

- **New York Power Authority (NYPAPA)**
  - Secures energy supply for government facilities through own assets or contracts with outside suppliers
  - With city, co-administers program to improve energy efficiency of city government buildings

- **New York State Energy Research and Development Authority (NYSERDA)**
  - Creates and implements demand-side management programs, funded through the Systems Benefit Charge (SBC)

- **Public Service Commission (PSC)**
  - Broad oversight over utilities
  - Authorizes increases in energy charges through "rate cases" brought by utilities
  - Based on NYISO assessment, directs Con Edison to secure supply when market fails to meet demand

- **Con Edison**
  - Delivers electricity and maintains grid
  - Collects electricity payments
  - Secures new supply when market fails to meet demand as directed by the PSC
  - Collects SBC from customers on behalf of NYSERDA

- **Federal Regulatory Commission (FERC)**
  - Regulates interstate gas pipelines and electric transmission
  - Oversees NYISO

- **New York Independent Systems Operator (NYISO)**
  - Manages New York State grid system
  - Administers wholesale electricity market
  - Assesses supply needs on a 10-year horizon

- **New York City Government**
  - Works with NYPA to incorporate city priorities into energy supply contracts
  - Advocates for the interests of city businesses, residents, and government through PSC rate cases
  - With NYPA, co-administers program to improve energy efficiency of city government buildings

- **New York City Customers**
  - Consumes electricity
  - Pays electricity bill, including the System Benefit Charge (SBC)

- **Power Plant Owners and Operators**
  - Develops, owns, and operates power plants
  - Sells power to NYISO or directly to utility (Con Edison or NYPA) or large customers

**Source:** Team analysis
<table>
<thead>
<tr>
<th>Barriers</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Split incentives</td>
<td>• Different parties “own” capital investments and savings</td>
<td>“I won’t fund new appliances, my tenants reap all the savings!”</td>
</tr>
<tr>
<td>Fragmentation of consumer base</td>
<td>• Consumers highly dispersed and partially hidden behind master-meters</td>
<td></td>
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<tr>
<td>Transaction costs/ Capital constraints</td>
<td>• Capital constraints on big-ticket investments</td>
<td>“Before I spend money on this, I need to keep my business running”</td>
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<tr>
<td></td>
<td>• Competing investment priorities</td>
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<tr>
<td>Consumer education</td>
<td>• Lack of information on energy efficiency programs</td>
<td>“Who knows how much I can save with retro-commissioning?”</td>
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<tr>
<td></td>
<td>• Low consumer awareness of CO₂ impact</td>
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<tr>
<td>Inconvenience</td>
<td>• Bureaucratic challenges with funding and contracting of work</td>
<td>“Dinner for two is more expensive than my monthly ConEd bill!”</td>
</tr>
<tr>
<td></td>
<td>• Energy efficiency products are often not the most convenient or readily accessible</td>
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</tr>
<tr>
<td>Generational equity</td>
<td>• Costs of climate change incurred by next generation</td>
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Source: Team analysis
THESE BARRIERS LIMIT CURRENT DSM EFFORTS, DESPITE THE CLEAR ECONOMIC, POLITICAL AND SOCIAL BENEFITS OF REDUCING DEMAND

Individual benefits

Sound investments

- Payback periods of 2-10 years, i.e. 10-50% rates of return
- Measures provide continuing returns after payback is reached

Strategic & Societal benefits

Economic growth

- Demand reduction often cheaper than new supply
- Reduction in energy demand can put downward pressure on electric prices
- New jobs from execution of energy-efficiency measures

Energy security

- Energy not consumed displaces energy imports from uncertain energy sources outside the US

Societal benefits

- US EPA estimates benefits of Clean Air Act above $1.2 trillion, primarily from reduced medical expenses and deaths;

Source: NRDC, David Goldstein, US Office of Management and Budget 2003
TOPICS FOR DISCUSSION

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THE PLAN: DRIVE INTEGRATED INITIATIVES TO REDUCE DEMAND, INCREASE SUPPLY AND UPGRADE ENERGY INFRASTRUCTURE

1. Improve Energy Planning – Establish a New York City Energy Planning Board
   - Reduce NYC’s energy consumption

2. Reduce energy consumption by City government

3. Strengthen energy building codes for NYC

4. Create an energy efficiency authority for NYC (NYCEEA)

5. Prioritize five key areas for targeted incentives

6. Expand peak load management

7. Launch an energy awareness and training campaign

8. Facilitate repowering, construct power plants and dedicated transmission lines

9. Expand Clean Distributed Generation

10. Support expansion of natural gas infrastructure

11. Foster the market for renewable energy

12. Modernize electricity delivery infrastructure
   - Accelerate reliability improvements to the city’s grid

13. Facilitate grid repairs through improved coordination and joint bidding

14. Support Con Edison’s efforts to modernize the grid

Key:  
- Orange: Energy Consumption  
- Blue: Energy Supply  
- Magenta: Energy Infrastructure
THE RESULT: COMBINED, THESE INITIATIVES COULD HELP TO SIGNIFICANTLY REDUCE CO2 EMISSIONS AND LOWER CITY ENERGY EXPENDITURES

- PlaNYC could result in
  - 10.8 million metric ton reduction due to a cleaner power supply
  - 16.7 million metric ton reduction due to cleaner and more efficient use of heating fuels

- City energy expenditures will be 20% less when compared to the business as usual (BAU) scenario by 2015
PlaNYC 2030

www.nyc.gov/planyyc2030