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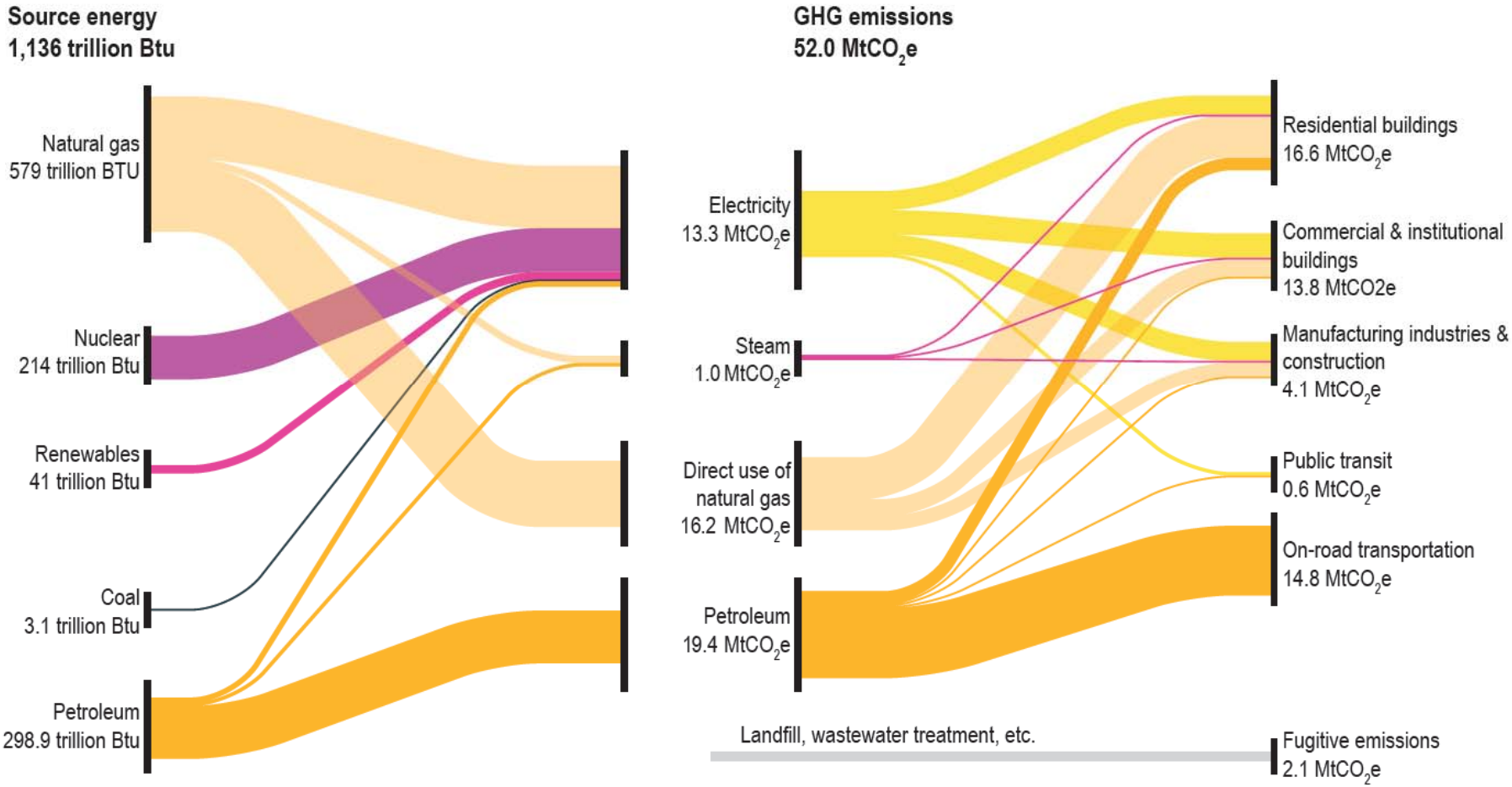
NEW YORK CITY'S ROADMAP TO 80 X 50



NYISO – Market Issues Working Group

September 25, 2017

Sources and Magnitude of NYC's GHG Emissions in 2015



Inventory of New York City Greenhouse Gas Emissions in 2015, April 2017

Our Growing, Thriving City

Our Just and Equitable City

Our Sustainable City

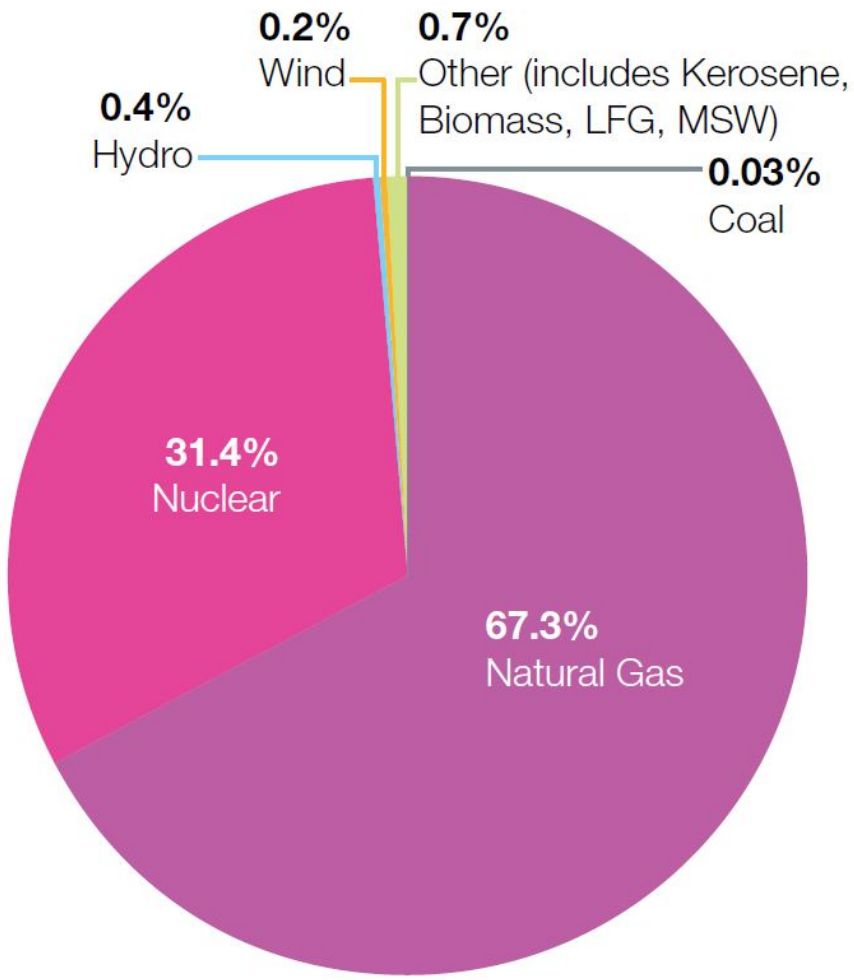
Our Resilient City

Co-Benefits

- Air Quality
- Job Development
- Quality of Life
- Access
- Equity
- Health and Well Being
- Affordability
- Resiliency
- Innovation

Achieving 80 x 50 requires a transition to a cleaner electric grid

NYC Electric Grid Fuel Mix



- 30% of citywide GHG emissions come from power plants that generate electricity within and outside the city
- 24 in-city plants serve NYC and are capable of meeting 80% of the city's peak demand
- On an annual basis the in-city plants provide ~50% of the electricity consumed in the city

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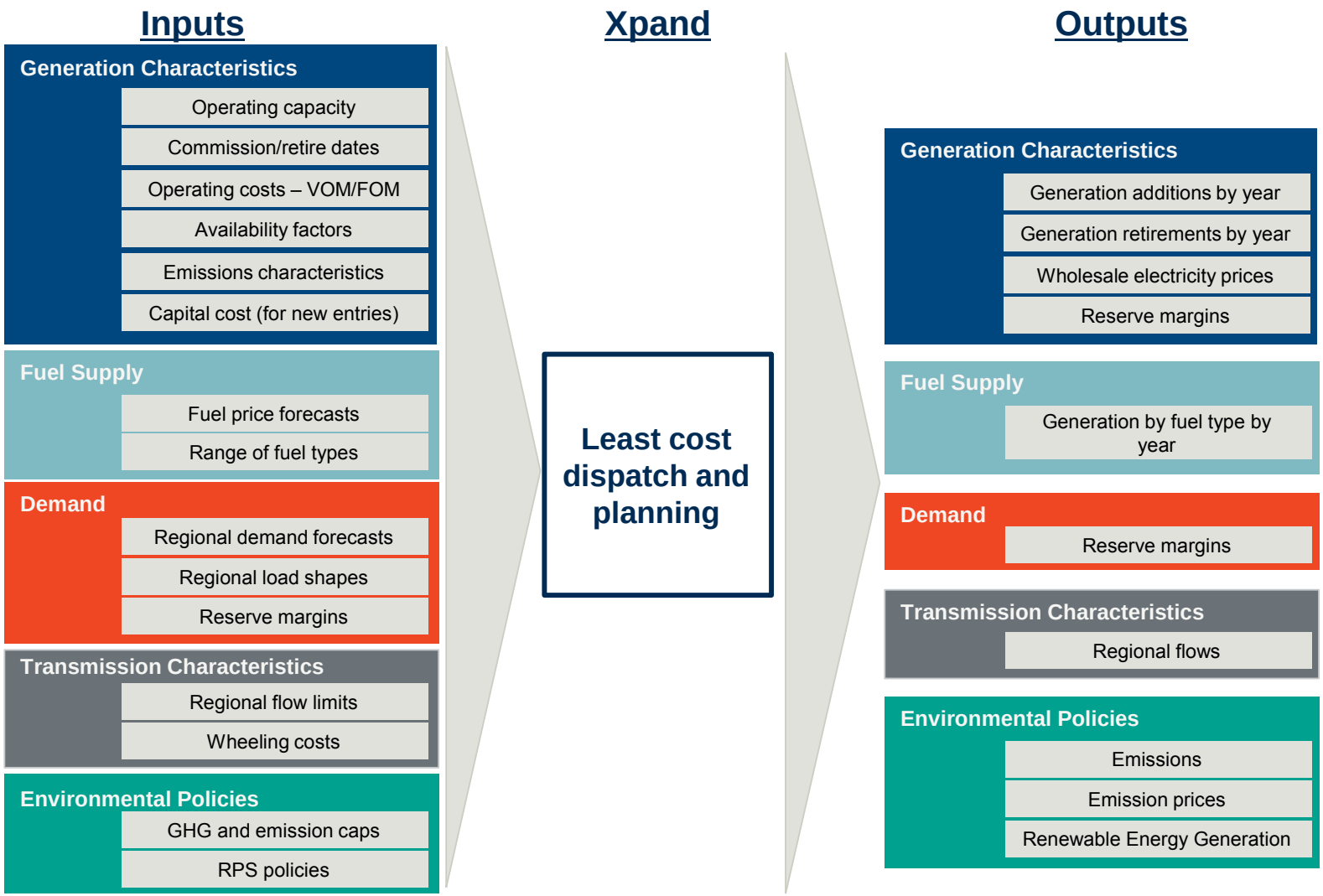
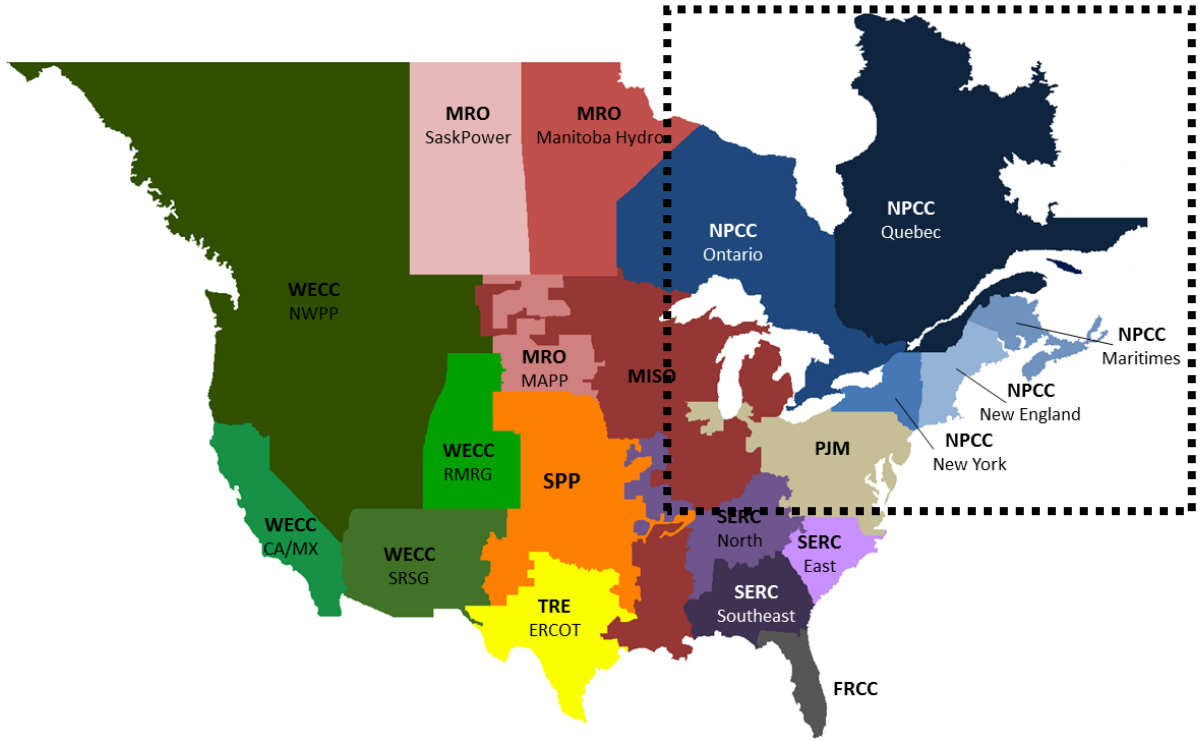
Model Structure



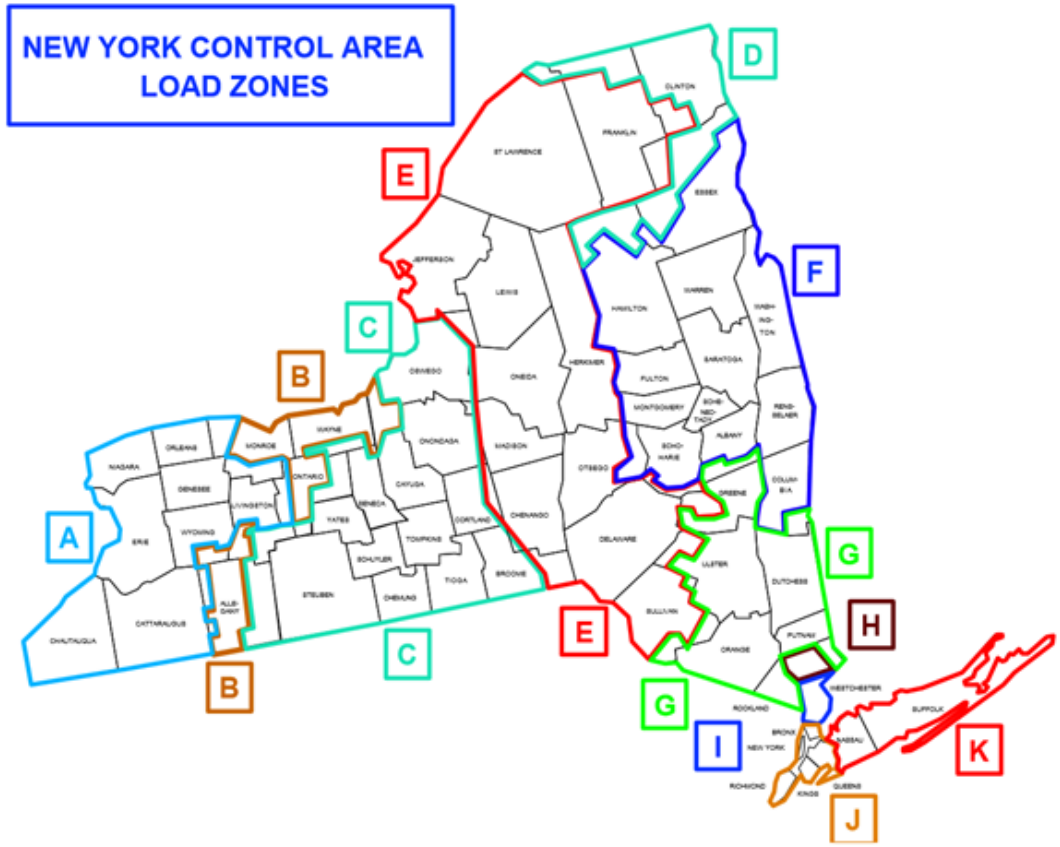
Modeled Geography

We modeled New York and surrounding regions to capture changes in generation capacities, imports, regional policies and emission profiles from City and imports. These regions include: New York, New England, PJM, Ontario and Quebec

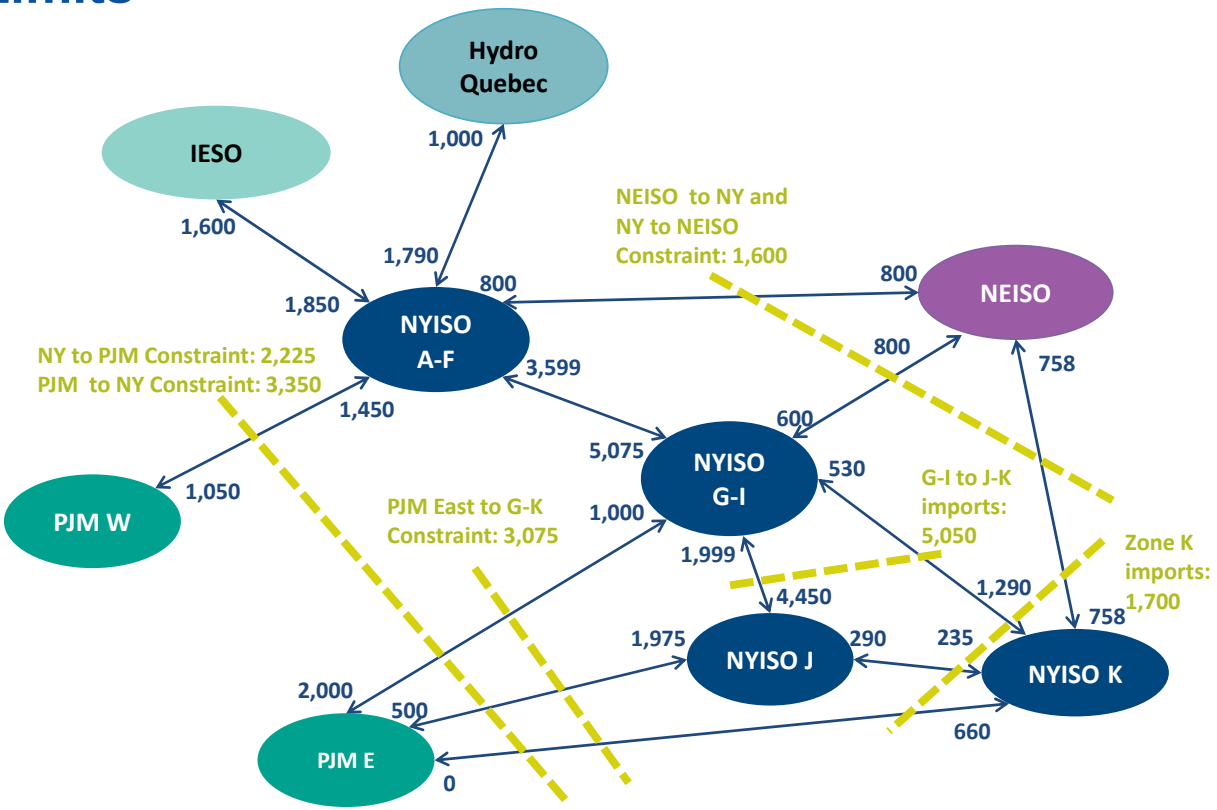


Modeled Geography

We modeled New York as four regions: Zones A-F, G-I, J and K.



Transfer Limits

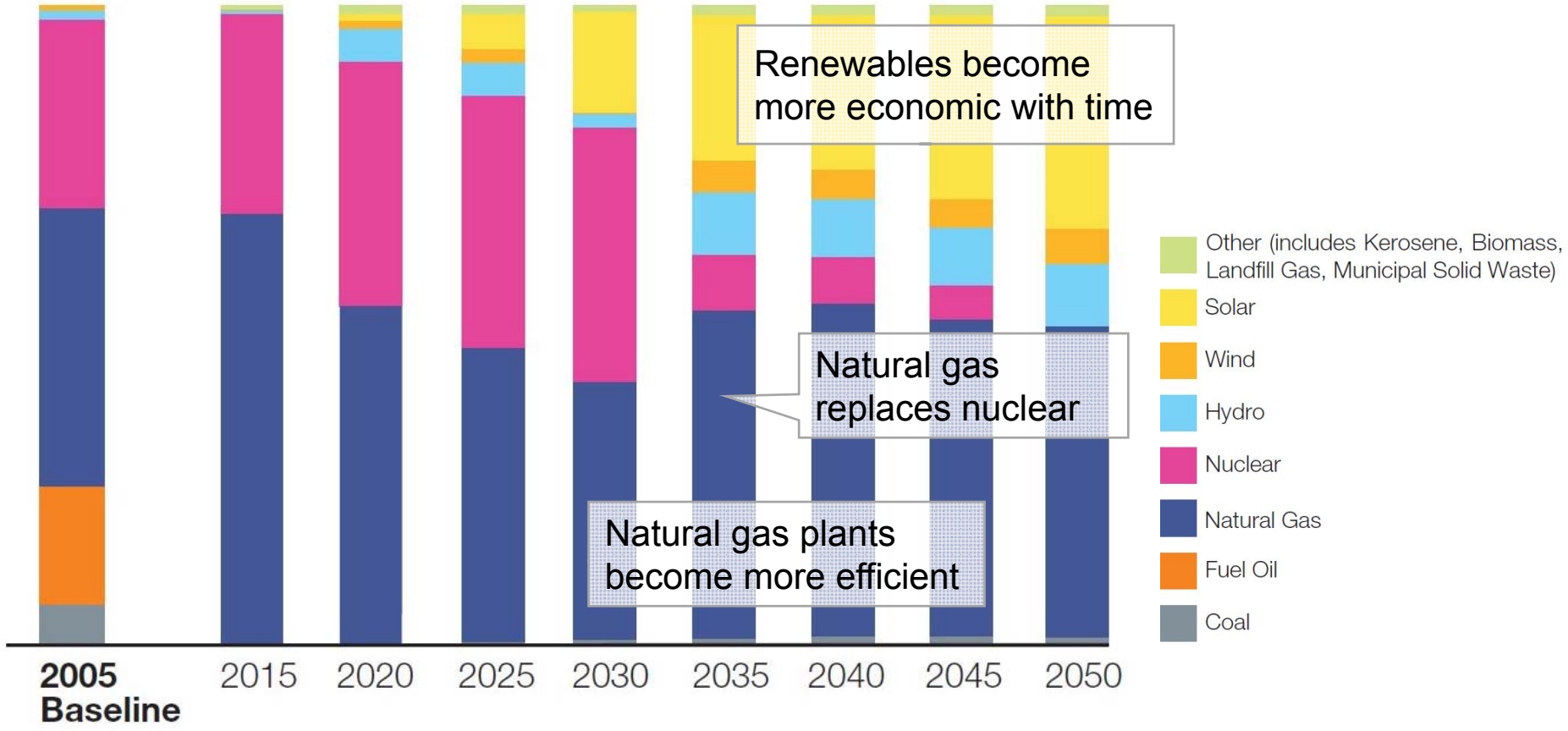


Model uses a "pipes and bubbles" constraint to limit transfer between regions

- All model runs include 1000 MW capacity AC Transmission project between NYISO A-F and G-I (not shown, 2019 in-service date)
- Assumptions for increased transmission in Alternate Reference Cases:
  - Additional capacity b/w Hydro Quebec and NYISO A-F
  - Additional capacity b/w NYISO G-I and J

Under business as usual, GHG reductions driven by changes to the makeup of the electric grid

NYC Electric Grid Mix (Business as Usual)



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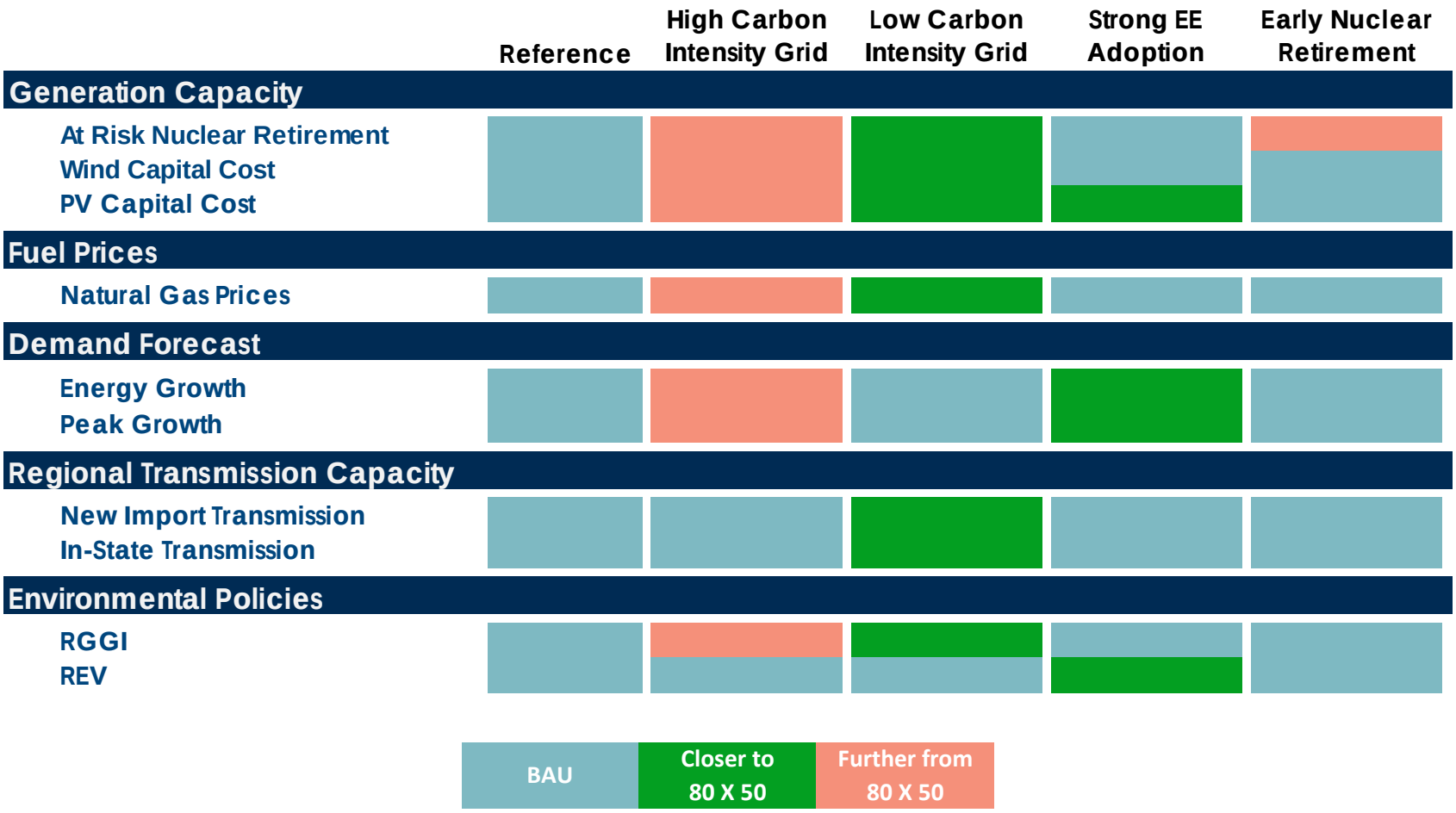
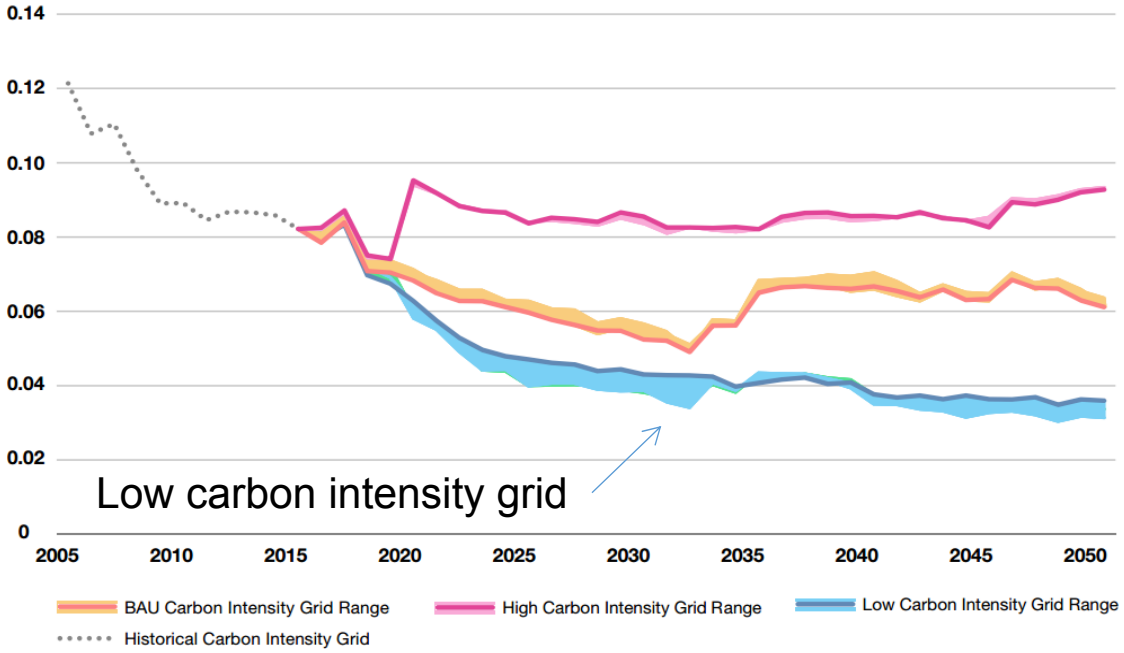
Electricity alternate reference cases

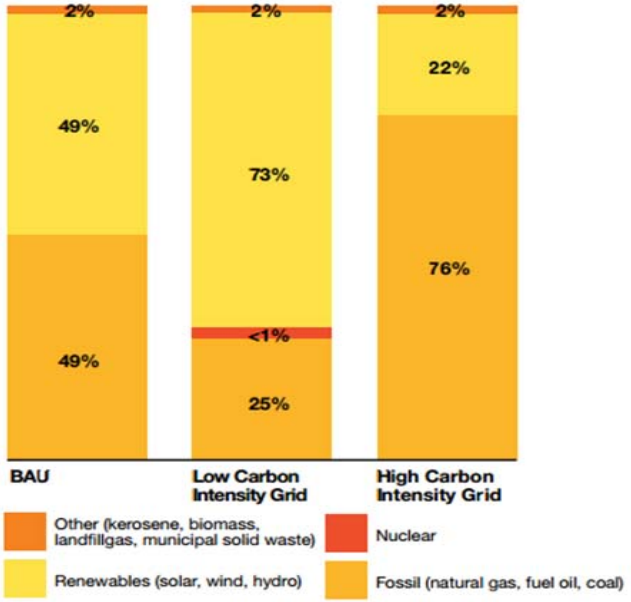


Other sectors will rely on a low-carbon grid to achieve 80 x 50

Future Carbon Intensity of the Electric Grid



2050 Electric Grid Fuel Mix by Scenario



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Key Low Carbon Intensity Grid Assumptions

- New renewables are more economic than natural gas generation
- Increased transmission within NYCA and between NYISO A-F and Canada
- Indian Point remains active through 2050

OSW was available but was not selected in any of the Alternate Reference Case runs

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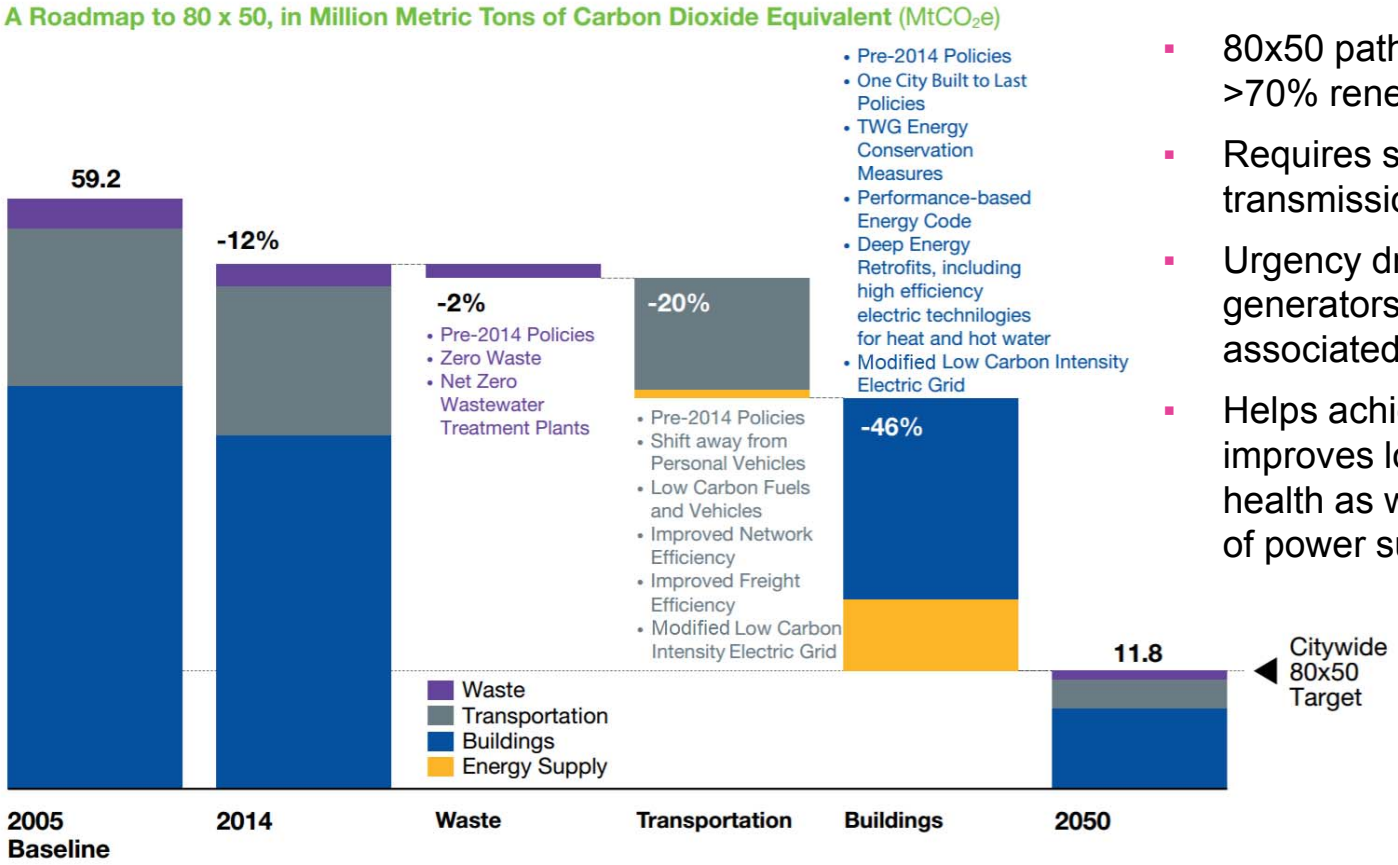
80 x 50 will require aggressive action across sectors



*All percent reductions are relative to the 2005 citywide baseline

- 80x50 path relies upon a grid with >70% renewable content
- Requires significant increase in transmission capacity to Zone J
- Urgency driven by age of in-city generators and the lead-times associated with transmission projects
- Helps achieve GHG goals but also improves local air quality and public health as well as reliability/resiliency of power supply

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80x50 Path

- Modified Low-Carbon Intensity Grid + 1000 MW hydro by 2020 + 1700 MW OSW by 2050 + Deep Energy Retrofits (40-60% reductions) + 50-60% electrification of heating/hot water systems + 7 GW in-city solar PV

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