# Modeling Overview & Concepts

## NYS Energy Planning Board
## December 11,2008

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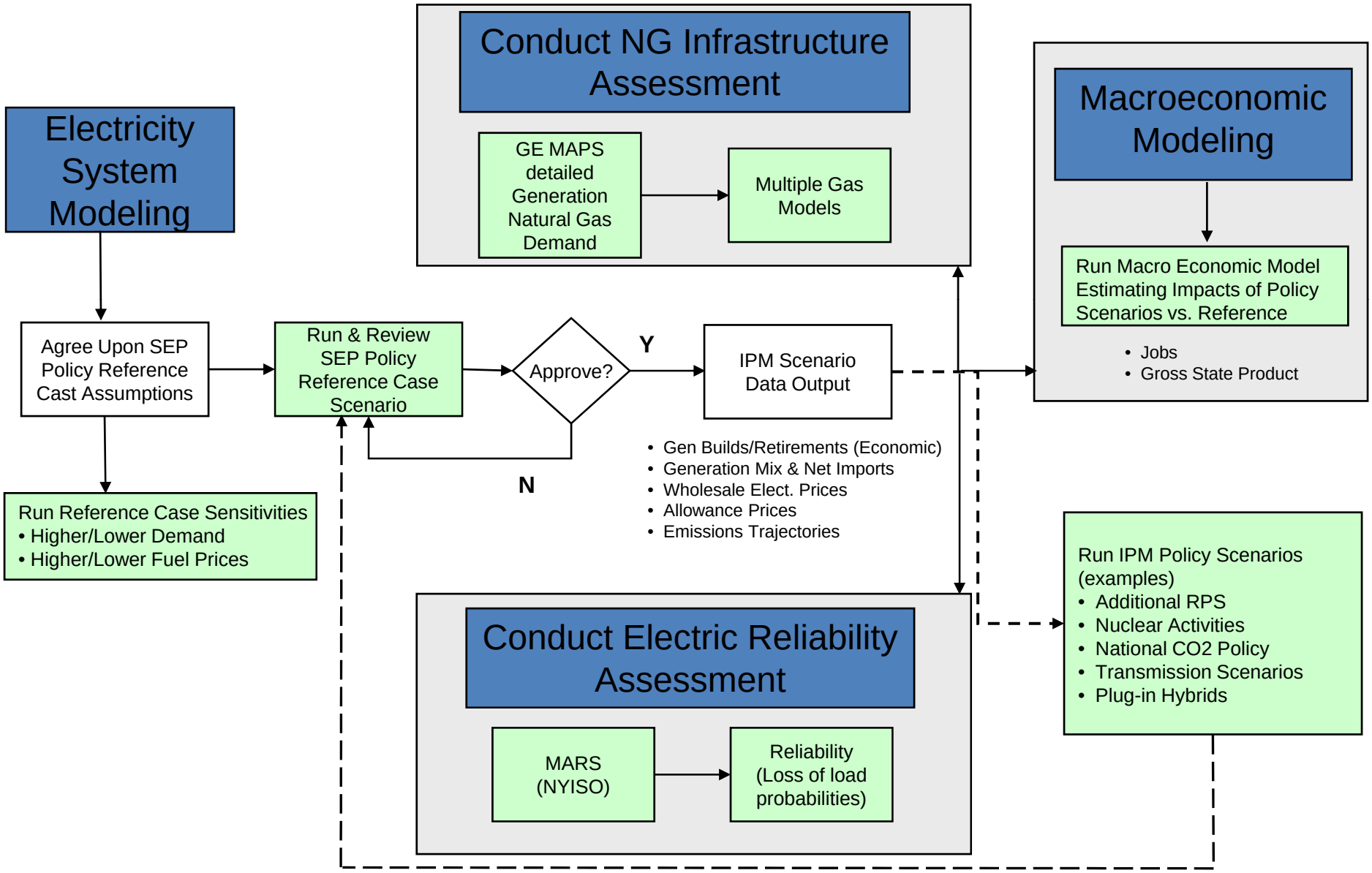
New York State Energy Research and Development Authority

# State Energy Plan Modeling Process



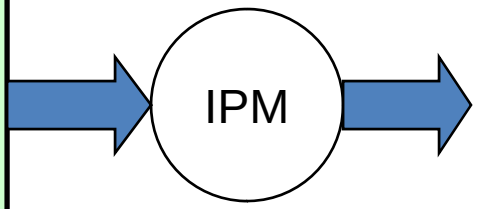
# Electricity Modeling

- Contracted with ICF Resources
- Utilize the Integrated Planning Model (IPM)
  - Economic Model
- Scope of Work includes:
  - Development of Assumptions with NYS agencies
  - Base Case Scenario Development
    - Run forecast of Energy Price, Capacity Price, Generation Mix, Generation Additions, Fuel Consumption, Emissions by Pollutants
  - Sensitivity Scenario and Policy Scenario Runs (up to 14 total)
    - Sensitivity: Gas price fluctuations, demand growth, etc.
    - Policy: National Greenhouse Gas Policy, Expanded RPS, PHEV roll-out, Transmission system, Nuclear activities, etc.
- Support for further modeling activities
  - ISO Electric Reliability model
  - Natural Gas modeling

# IPM Electricity Sector Model

## Inputs

- Demand Forecast (Energy and Peak)
- Load Shapes
- Reserve Margin
- Existing Plants
- Firm Builds/Retirements
- Fuel Prices
- O+M Costs
- Transmission Constraints
- Reliability Rules
- Environmental Regulations
- New Technology Costs/Specs



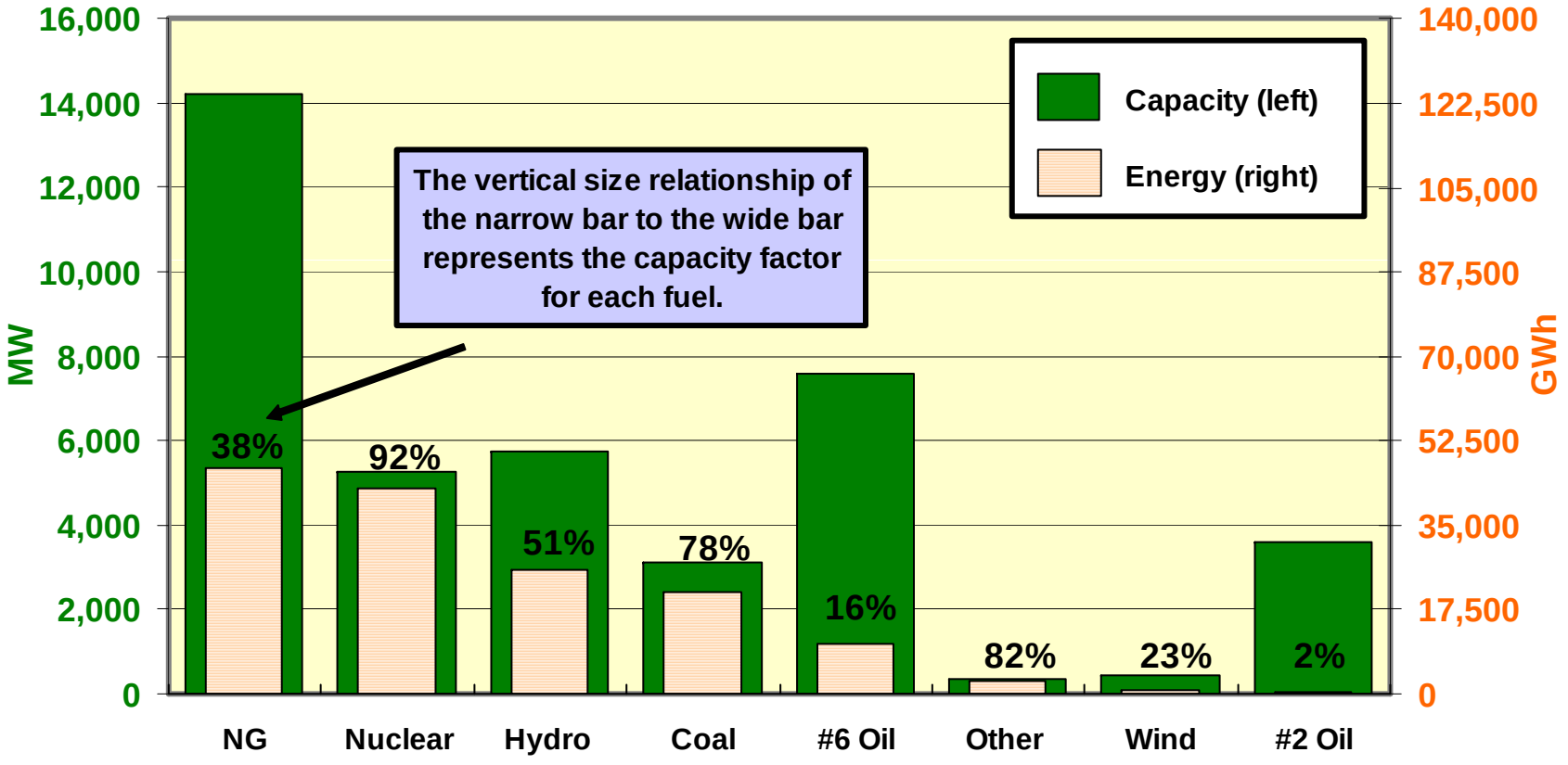

## Outputs

(2008 – 2026)

- Energy Prices
- Capacity Prices
- New Capacity (Economic)
- Retirements
- Fuel Mix
- Imports
- Allowance Prices
- Emissions

# Generation Capacity & Generation by Fuel Type (2007)*

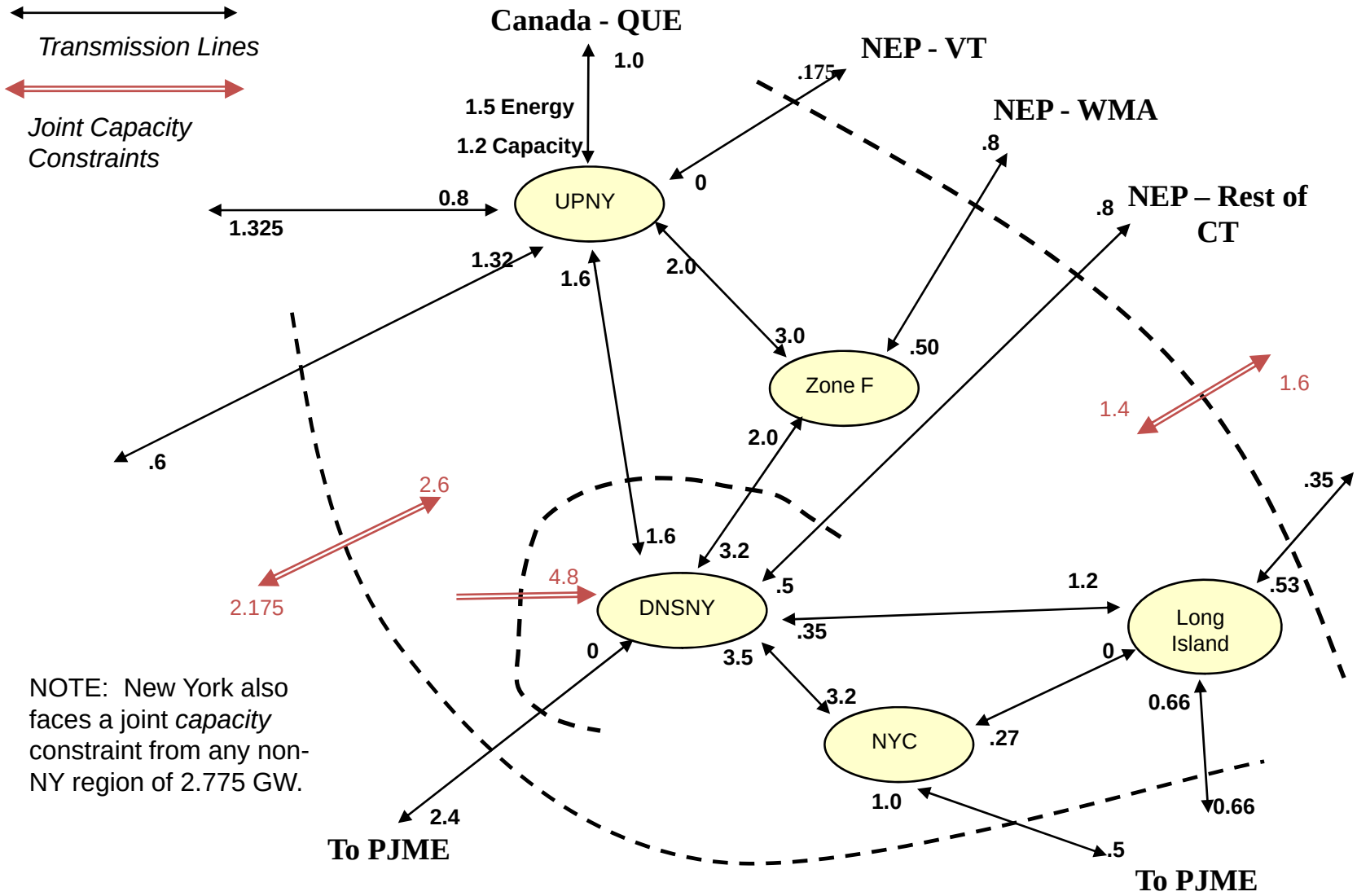
*New York State*




*Units classified according to their primary fuel from the 2008 NYISO "Gold Book".

*Nameplate ratings are used to measure capacity of wind units.

# Transfer Capability -- New York (GW)



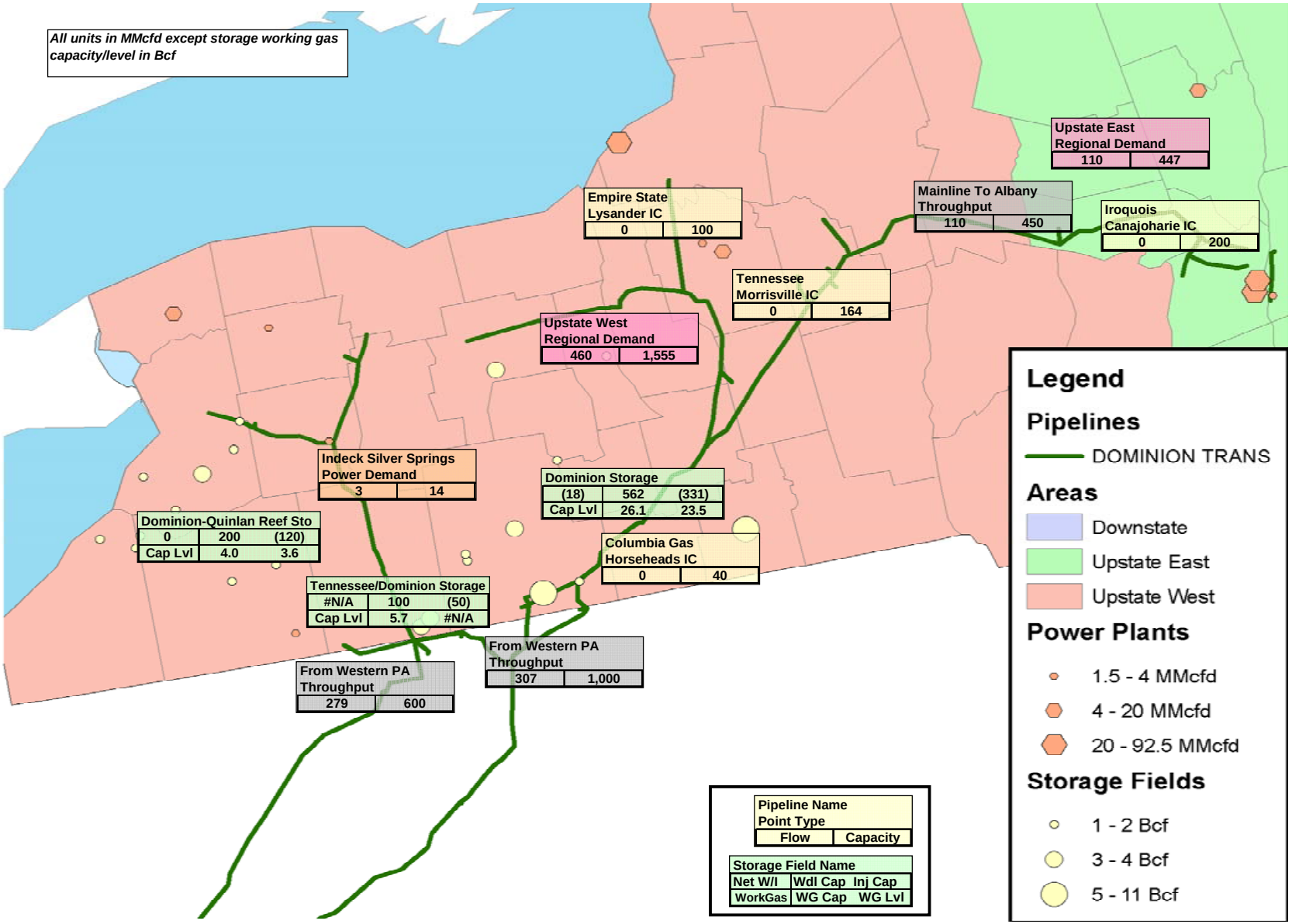

NOTE: New York also faces a joint *capacity* constraint from any non-NY region of 2.775 GW.

# Natural Gas Modeling

- Contracted with ICF Resources
- Utilize models to create:
  - Demand Forecasts (MAPS, Gas Market Model)
    - Upstate West, Upstate East, Downstate
  - System Capacity Forecasts (GMM, Gas Pipeline Competition Model)
  - Peak-day Gas Demand and Capacity
- Scope of Work
  - Assess/Quantify Existing and Future Gas Consumption
    - Electric Sector; Residential-Commercial-Industrial Sector
  - Assess/Quantify Existing and Future Pipeline Capacity and Flow
  - "What if…" Scenarios Development to Examine the Operation of Gas and Electric Systems: e.g. load growth, severe weather, power plant retirements, combination scenarios

# ICF Map Example – NY Regions

**Pipeline: Dominion** **NYSERDA Monthly Test 11** Oct-2008



# Macroeconomic Modeling

- No contracted services as yet
  - Est. Budget: $200,000
- Possible use of an Economic Impact Model
  - e.g. Regional Economic Models, Inc. (REMI)
  - Informs of future economic conditions given specific changes in the economy or regulatory action
  - For NYS SEP, apply policy scenario outputs onto New York demographic, labor, price, production cost, etc. data to produce economic impact
  - Possible Outputs: Jobs impacts; Gross State Product effects
- Scope: Build “What if…” Scenarios and Track the impact of scenario on the economy generally

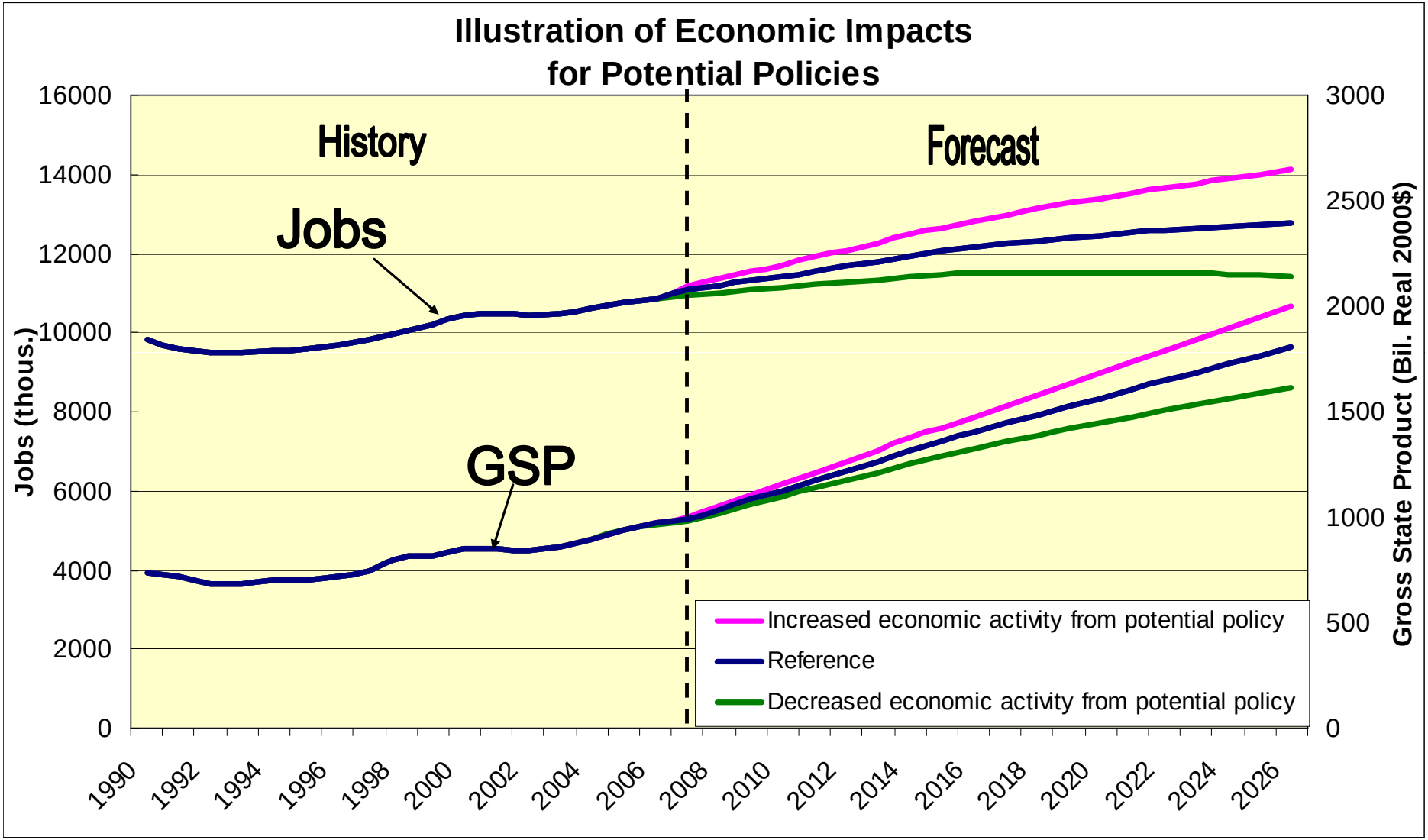


Illustration of Economic Impacts
for Potential Policies
History
Forecast
Jobs
GSP
Jobs (thous.)
Gross State Product (Bil. Real 2000$)
16000
14000
12000
10000
8000
6000
4000
2000
0
3000
2500
2000
1500
1000
500
0
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
Increased economic activity from potential policy
Reference
Decreased economic activity from potential policy