

New York State Renewable Electric Supply Potential

Preliminary Study Results:
Technical and Economic Potential

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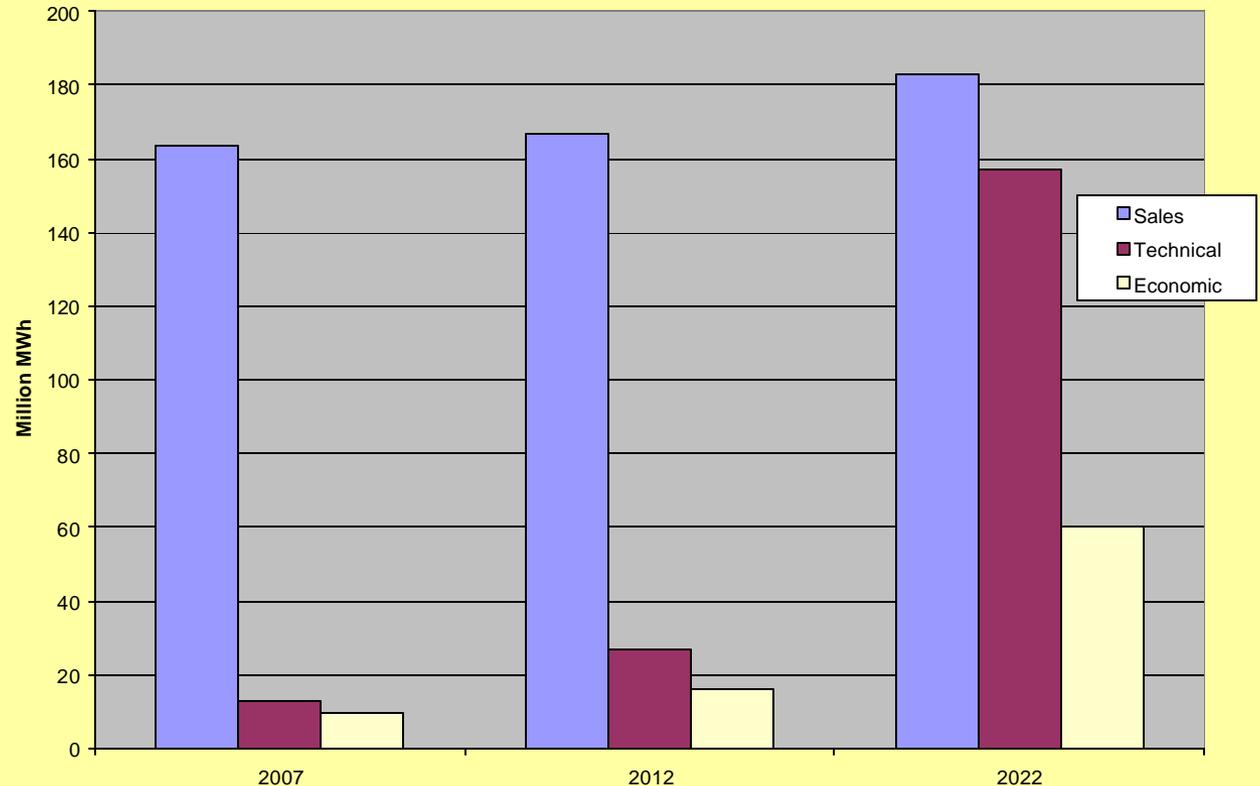
Objective: Provide a broad perspective on the statewide and zonal electric supply potential for eight resources.

- Biomass
- Fuel Cells
- Hydropower
- Landfill Gas
- Municipal Solid Waste
- Photovoltaics
- Solar Thermal
- Wind

The Answer...

- **The renewable resource base can technically provide a large share of NY's electric power supply within the next two decades**
- **A significant share of this supply potential passes economic screening**

New York State Renewable Potential



Background...

- Team of renewable resource experts
- Identify technology and scale combinations
- “Bounded” technical potential
- Economic potential identifies the portion of technical potential that is less expensive than the electric supply it would avoid
- Twenty year horizon

Renewable Energy Team...

- David Hill, VEIC & Christine Donovan, C.T Donovan Associates: Co-Leaders
- Antares Group, Inc.: Biomass
- ACEEE: Fuel Cells
- Mainstream Associates: Hydropower
- SCS Engineers, PC: Landfill Gas and MSW
- Stella Group, Richard Perez, Andy Shapiro: Photovoltaics and Solar Thermal
- OEM Development Corporation: Wind

Technology and Scale Selection

- The thirty technology & scale combinations selected are expected to have the greatest potential for delivering new renewable electric supply in New York during the next twenty years.
- Not all renewable technologies or resources are represented. Therefore, the study results represent a sub-set of the total renewable potential.

Resources and Technologies

Biopower

Biomass Cofiring w/ Coal
Biomass Gasification
Biomass CHP

Fuel Cells

Fuel Cell PEM
Fuel Cell PAFC
Fuel Cell SOFC
Fuel Cell MCFC

Hydro Power

Hydro Relicense
Hydro Repower
Hydro Ex Capacity Ex Dam
Hydro New Capacity Ex Dam
Hydro New Dam sites

Landfill Gas

LFG Large Systems
LFG Engines
LFG Microturbines

Municipal Solid Waste

WTE Large
WTE Small
Solid Waste Digestion

Photovoltaics

PV Residential
PV C&I
PV BIPV

Solar Thermal

Res DHW
Com DHW
C&I Vent Pre Heat
Solar Absorp Cool

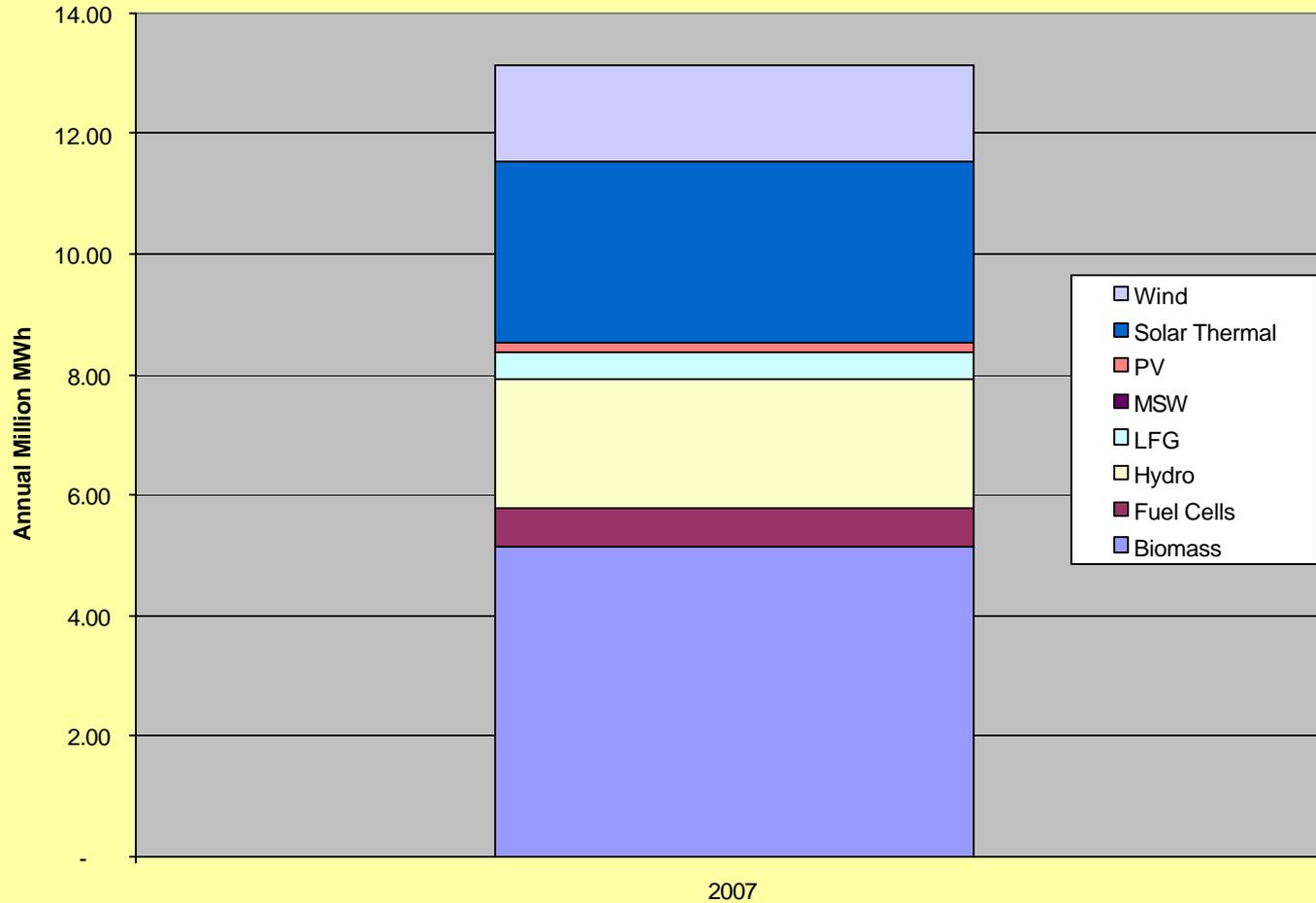
Wind

Wind Farm Installations
Cluster Installations
Small Wind Installations
Offshore Wind Installations

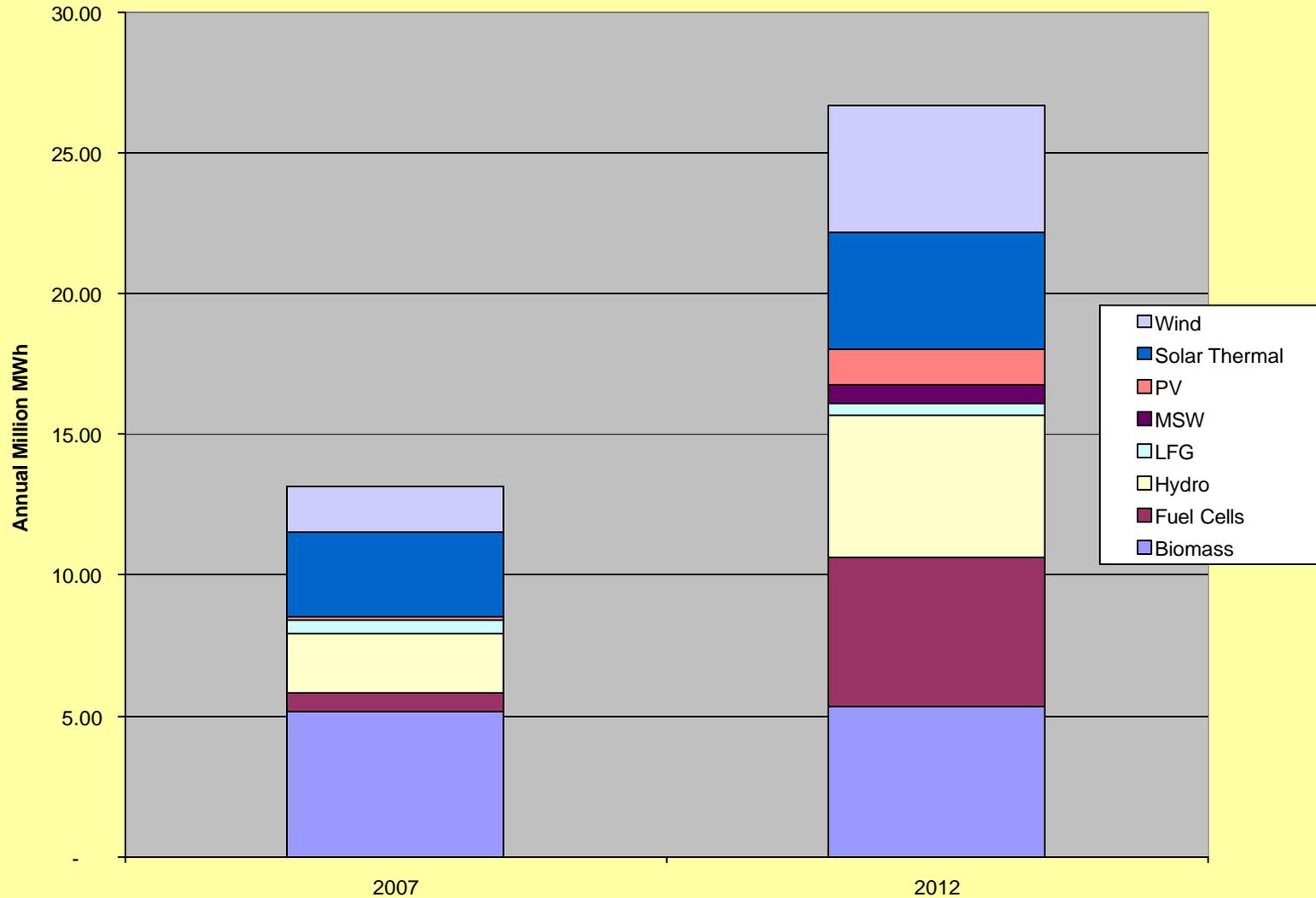
Technical Potential

- Represents new generation from renewables
- Not “Instantaneous”
- Accounts for renewable resource and development of the manufacturing / infrastructure capacity to meet demand
- For hydro, includes re-licensed generation
- Biopower technical potential is a resource subset based on technology/feedstock matching
- Solar thermal and fuel cell potential based on applicable off-set electric loads

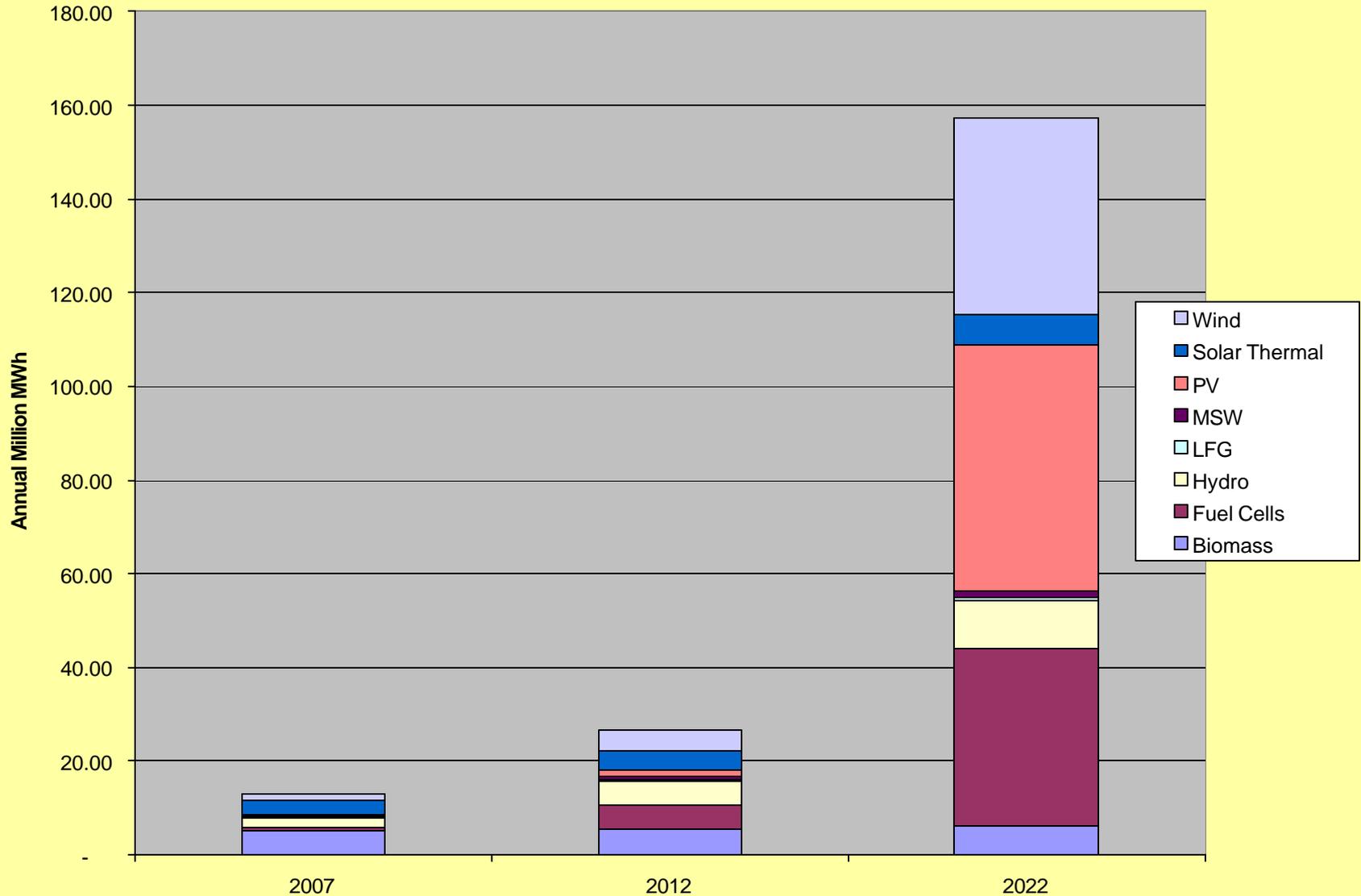
Technical Potential 2007



Technical Potential 2012

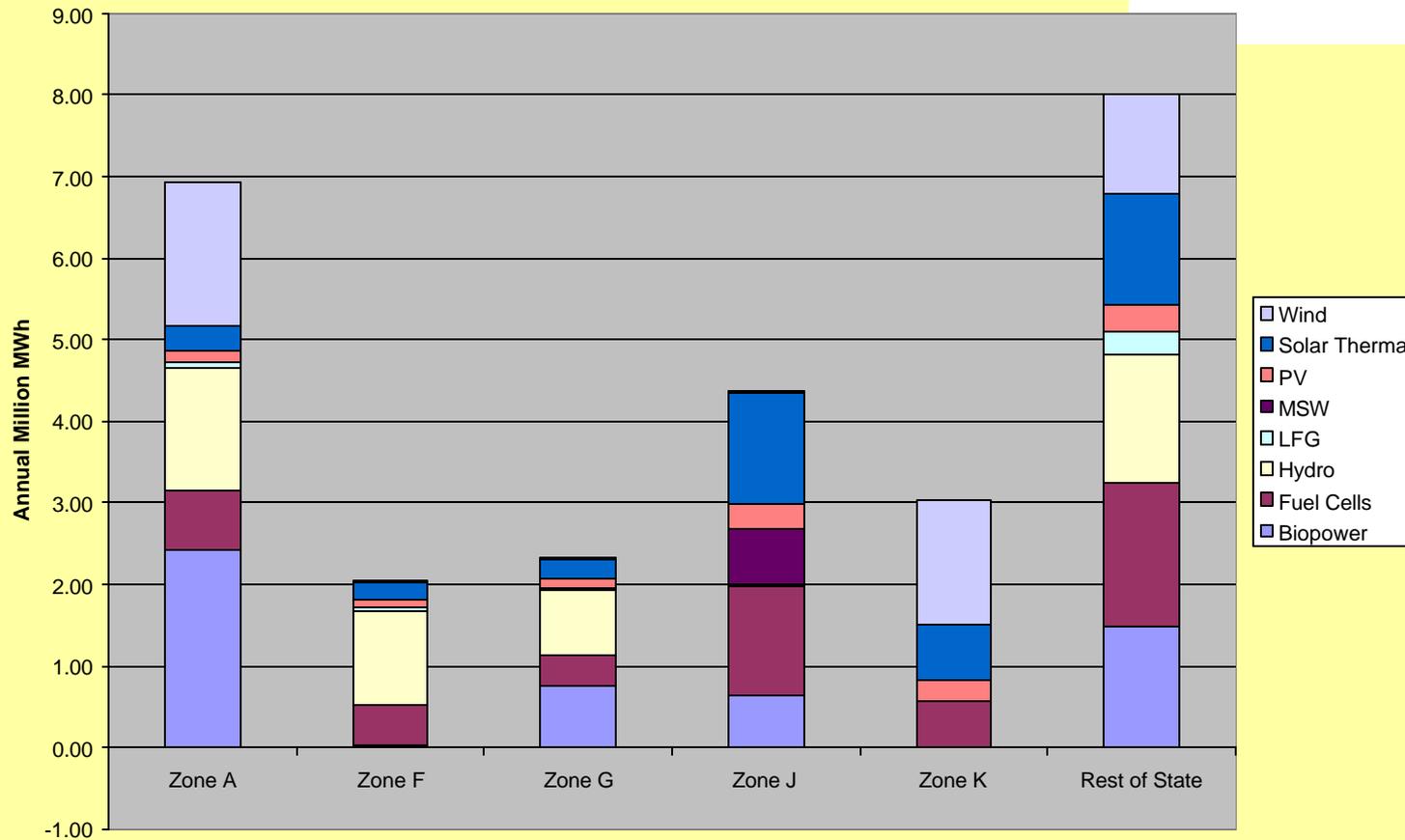


Technical Potential 2022



Zonal Variation in 2012 Technical Potential

Renewable Technical Potential 2012



Economic Potential

- New renewable resources costing less than the electric supply they would avoid, based on forecast long-run avoided costs
- May require RPS and/or other policy and program supports - Not necessarily “business as usual”
- Indicates that the environmental, security and fuel diversity benefits associated with significant new renewable resources can be attained without threat of undue rate impacts

Renewable Potentials As % of Sales

	Million MWh		
	<u>2007</u>	<u>2012</u>	<u>2022</u>
Forecast Total Electric Sales	164	167	183
Technical	13.1	26.7	157.3
Economic	9.4	16	60.4

	<u>2007</u>	<u>2012</u>	<u>2022</u>
Forecast Total Electric Sales	100%	100%	100%
Technical	8%	16%	86%
Economic	6%	10%	33%

Moving Forward...

- RPS design & development will help NY take advantage of significant renewable energy resources
- High shares of new renewable supply are attainable
- Regional markets and resource development are important to consider
- The RPS, by itself, may not support the growth of all renewable technologies