

ONTARIO POWER AUTHORITY



Setting the Stage for Renewable Energy in Ontario: the Renewable Energy Standard Offer Program (RESOP) and other OPA Initiatives

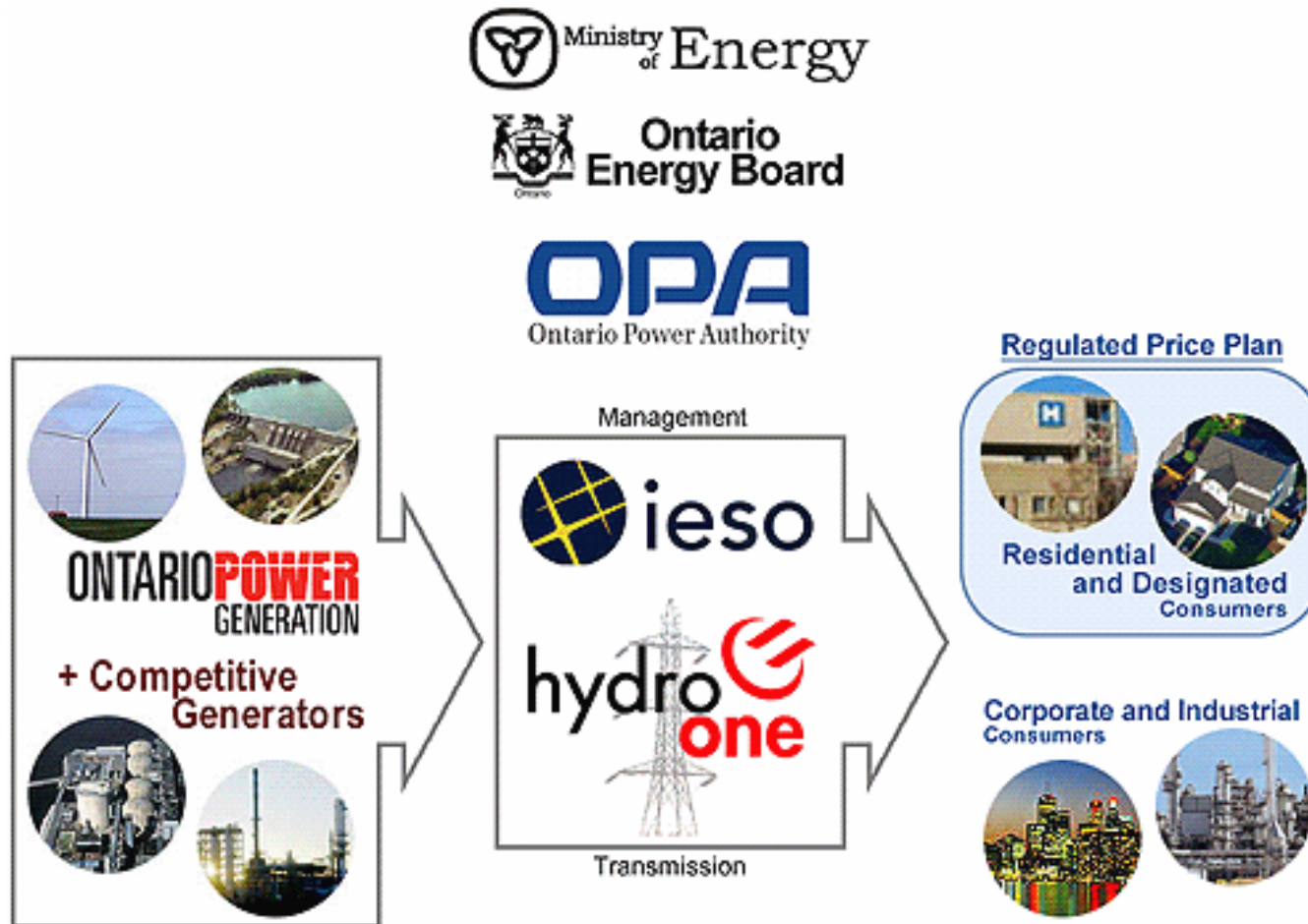
For “Sustainable Development in Communities” (Nov. 26/07)
By Kevin Devitt, Senior Analyst

Presentation Outline

- **Background on OPA**
- **Review of RESOP**
- **OPA's Integrated Power System Plan (IPSP)**
- **Renewable Energy Supply (RES) RFP**
- **Questions**



Background: Ontario's Electricity System



About the OPA

- Not-for-profit corporation without share capital; governed by an independent Board of Directors
- Established in late 2004 under the *Electricity Restructuring Act, 2004* (Bill 100)
- Reports to the Ontario Legislative Assembly through the Minister of Energy
- Licensed and regulated by the Ontario Energy Board (OEB)
- OPA performs four key functions:
 - Power System Planning – Integrated Power System Plan (IPSP)
 - Generation Development – procuring and contracting for new supply and demand resources
 - Conservation – developing and facilitating the management of conservation programs
 - Electricity Sector Development – market evolution

Renewable Energy Standard Offer Program

- **Objective**
 - Design and implement a standard offer approach in order to utilize Ontario’s renewable resources through small projects
- **Guiding Principles**
 - Keep it simple
 - Focus on removing barriers to smaller renewable developers
 - Maintain a balance between assisting with government policy and getting good value for Ontario ratepayers



RESOP - Eligibility

- **Technology Types**
 - Renewable energy sources: wind, solar photovoltaic (PV), thermal-electric solar, renewable biomass, bio-gas, bio-fuel, landfill gas, or waterpower
- **Capacity Requirements**
 - Installed generating capacity of no more than 10 MW (i.e. $\leq 10,000$ kW)
 - no minimum project size



RESOP – Contract Application Requirements

- Copy of completed Connection Impact Assessment (CIA)
 - CIA not required for ≤ 10 kW, though micro-generator (Gx) must still meet LDC connection requirements
 - Expedited connection process for ≤ 10 kW as per process established by Electrical Safety Authority (ESA)
- Environmental Assessment commenced (if required by regulation)
 - EA n/a for renewable Gx of ≤ 10 kW)
- Demonstrated site access
 - proof of ownership; Letter of Intent; Memorandum of Understanding
- Letter authorizing the LDC to release information relating to the Applicant to the OPA
 - i.e. “Exhibit B” posted on OPA’s RESOP website
- Gx must still obtain all necessary permits, licenses, etc.

RESOP Connection and Metering Requirements

- Generator must connect to an ***eligible*** distribution system, via a single connection, at a voltage of 50 kilovolts (kV) or less. Main implications:
 - RESOP not for off-grid generators
 - LDC must be connected to the Province's IESO-Controlled Grid
- Gx will be solely responsible for costs associated with connection, metering, & ongoing LDC account settlement
- In general, micro-scale generation will not require interval meters... ***if*** connecting directly to LDC feeder
- If micro-generator locates behind the meter of a load customer, then both the Gx ***and*** the load customer will require interval meters (to I.D. which kWh consumed)

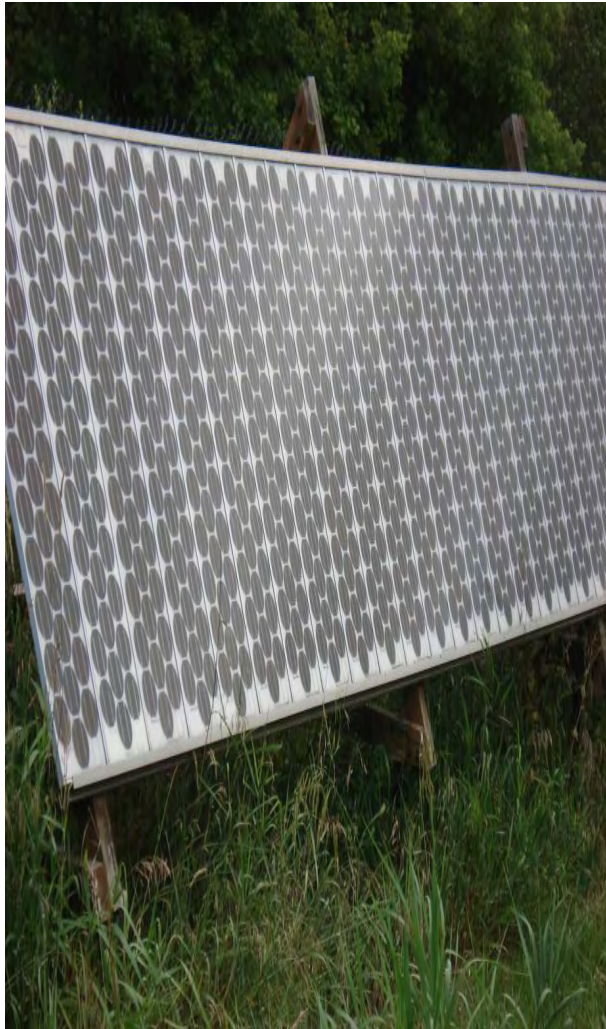
RESOP – Transmission Constraints

- In some areas, the transmission system has limited or no ability to accept new generation
- New RESOP generation in such areas would result in curtailment payments to pre-existing generators (i.e. ratepayers pay twice for incremental new generation)
- Currently, only one restricted area (“Orange Zone”) in SW Ontario – Bruce and Huron Counties – where generators cannot obtain Contract
- Orange Zone map is posted on RESOP website, showing functional impacts; map is not strictly geographic
- Some exemptions to sub-zone contract issuance restrictions for Farm-based Projects (≤ 250 kW) & for micro-generators (≤ 10 kW)

RESOP: Opportunity for Secure Contract

- Any future changes to Program, including per kWh rate changes \uparrow **or** \downarrow , will not affect Projects with executed contracts, so long as Gx is able to achieve Commercial Operation within 3 years of executing contract
- Third Anniversary Requirements
 - Waterpower facilities: projects must obtain location approval / priority permit
 - Other facilities: projects must achieve Commercial Operation 3 years after executing SOC
- Contract Term
 - Payment for up to 20 years after achieving Commercial Operation
- This provides financial certainty while protecting ratepayer

RESOP: Opportunities Via Program Flexibility



- Projects can be completed in two or more phases
- All phases of project must be in-service within 3 years of receipt of SOC (waterpower exceptions)
- Incremental Projects are eligible:
 - Total project (original non-RESOP plus new RESOP) must not exceed 10,000 kW.
 - Only nameplate capacity increase (% increment) eligible for contract

RESOP Contract Rates

- All except for Solar PV:
 - 11.04¢ / kWh (increased from 11¢ / kWh at Nov. 22/06 launch)
 - On-Peak performance 3.52¢ / kWh (for eligible generator types only)
 - Escalation on May 1st annually for Inflation 20% of Base Rate indexed at CPI
- Solar PV:
 - 42¢ / kWh
 - Not eligible for inflation increases or peak performance
- Payment is made up of 2 components
 - LDC pays HOEP (Hourly Ontario Electricity Price)
 - OPA pays (contract price – HOEP) via the LDC through the IESO (Independent Electricity System Operator)

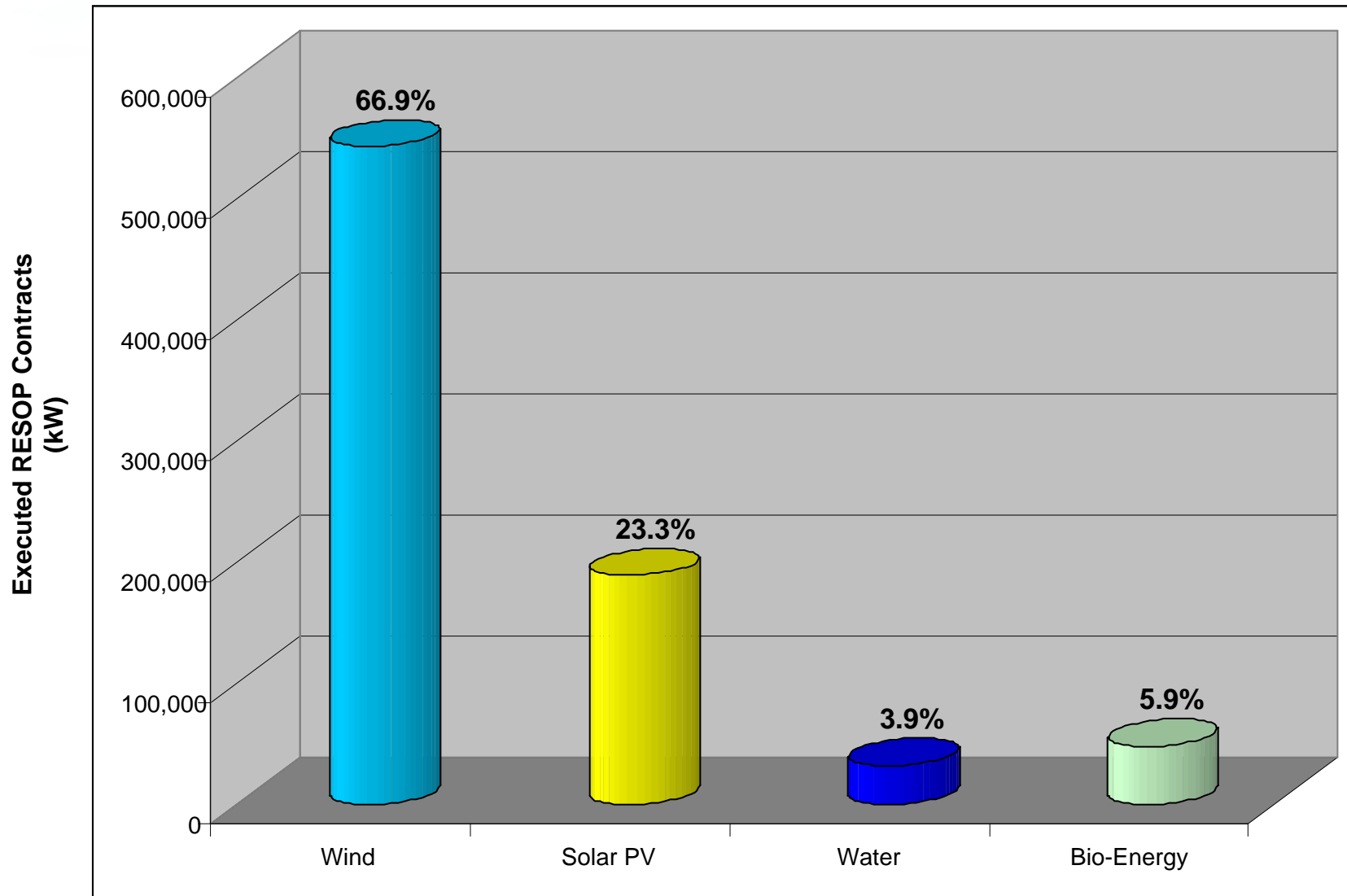
Contract Payment & GST Treatment by LDC's

- A generator with a RESOP Contract may be required to register, collect and remit GST applicable to Contract Payments
- It is the **sole** responsibility of the generator to determine their GST status and to complete any relevant submissions
- It is recommended that all generators obtain independent GST, tax and legal advice pertaining to the RESOP Contract

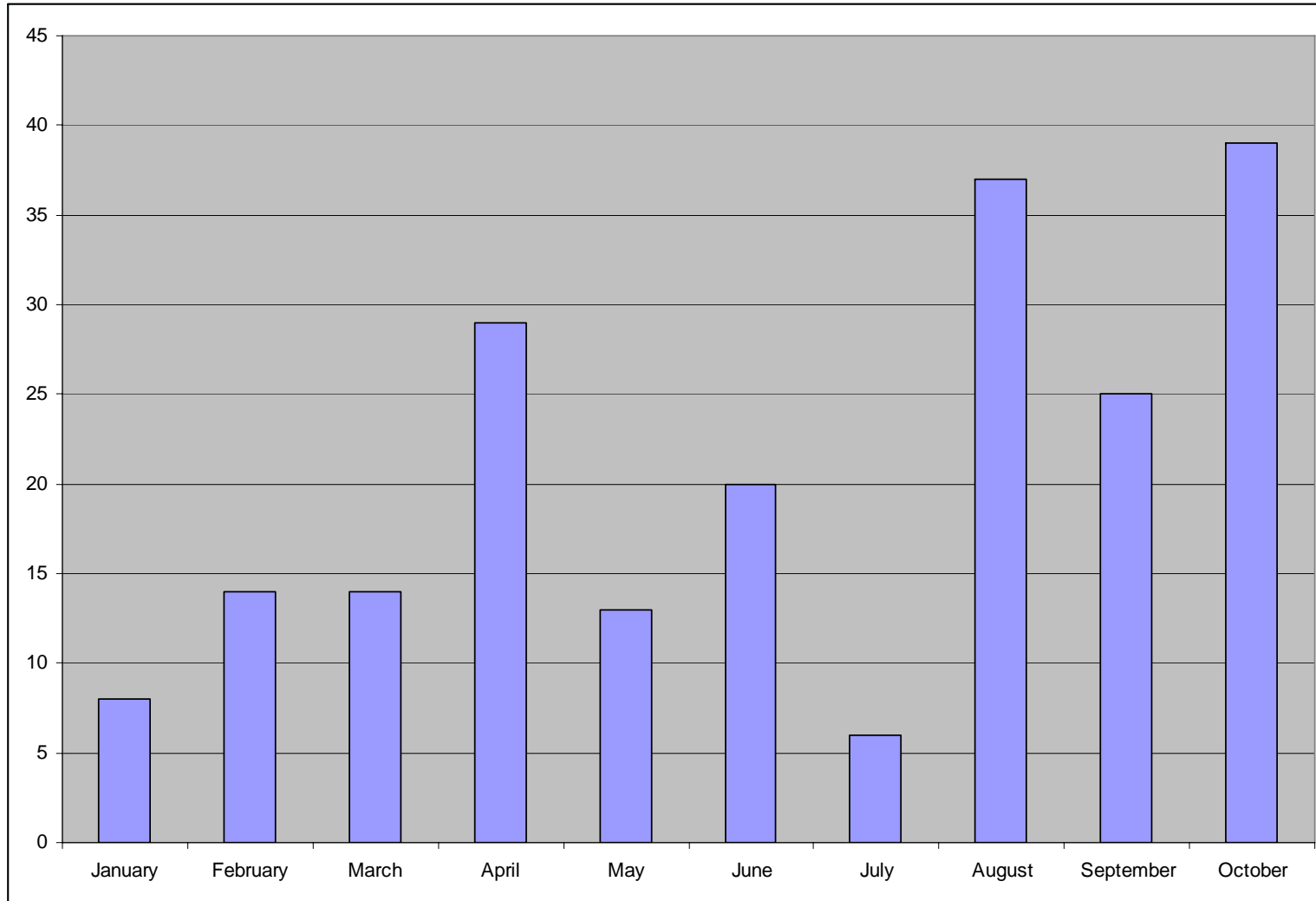
RESOP Update – as of Oct. 31, 2007

- Over 300 on-line applications submitted to-date
- Approx. 97 applications in process
- Executed 204 Contracts
- Over 811 MW of renewable supply contracted
- Monthly updates posted on micro-site within week after month end
- <http://www.powerauthority.on.ca/SOP> - under “Progress Reports”

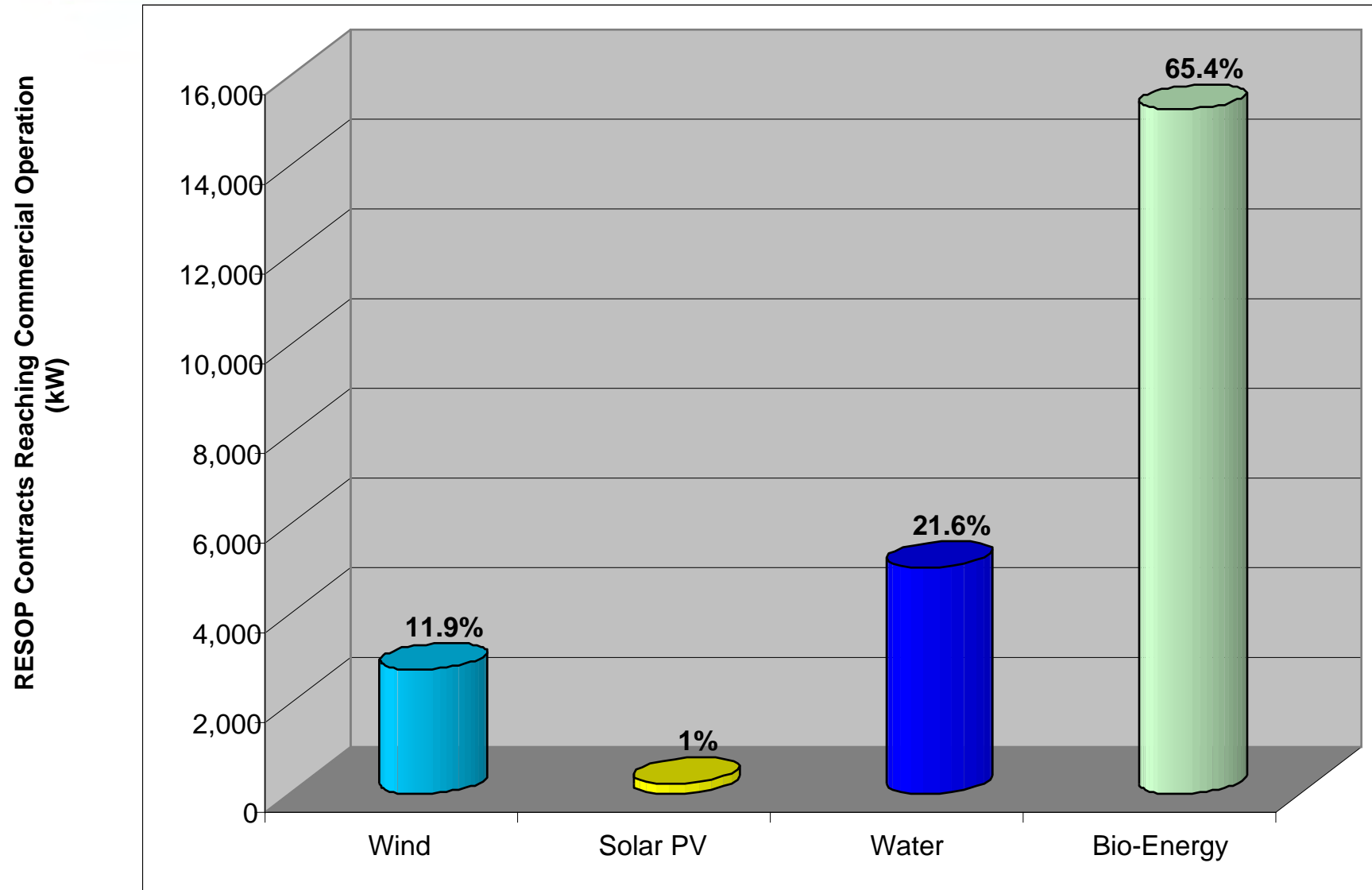
Total Contracted Capacity of RESOP Contracts per Fuel Source (Year to Date) & Percentages by Contracted Capacity



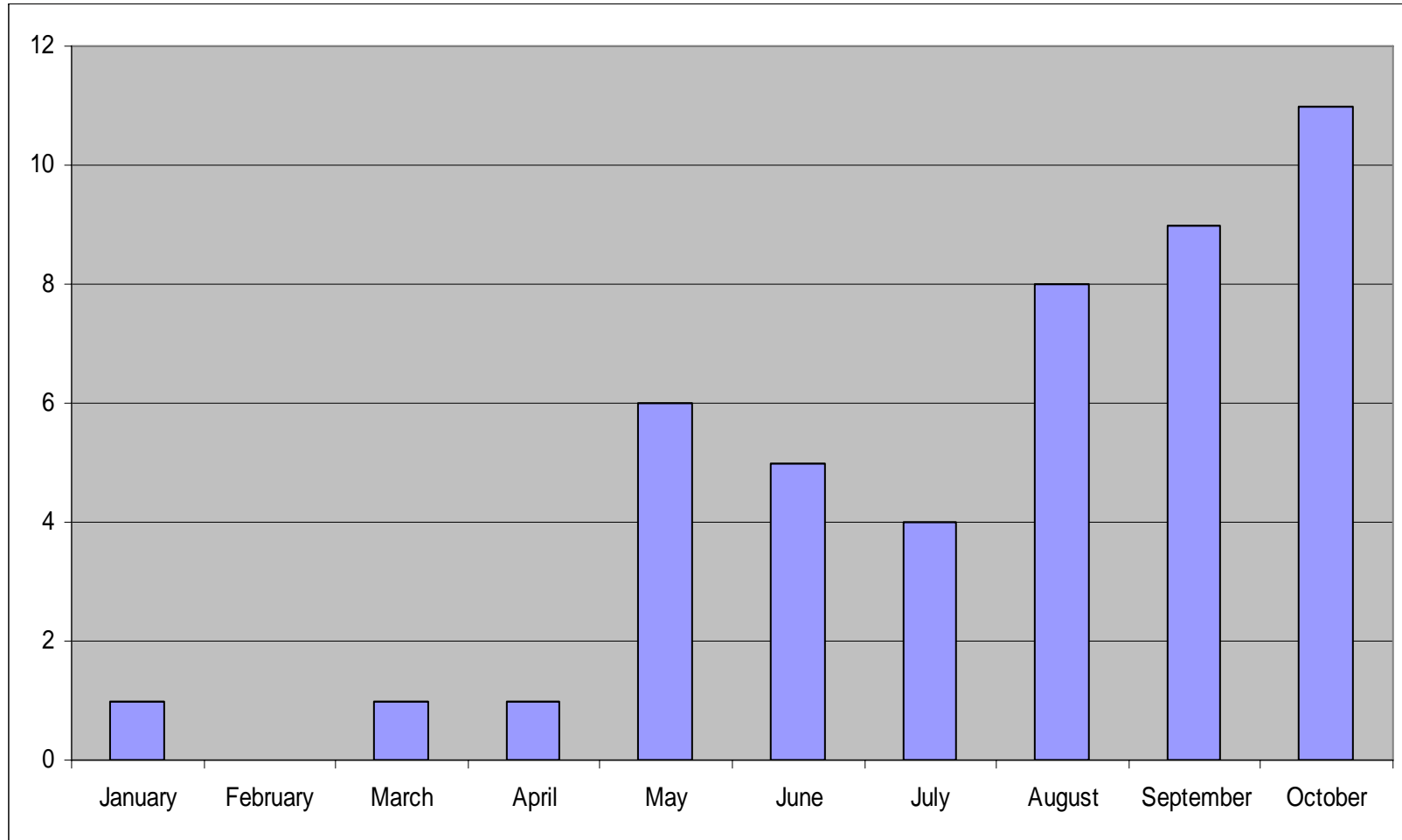
Total Number of Contracts Executed by Month



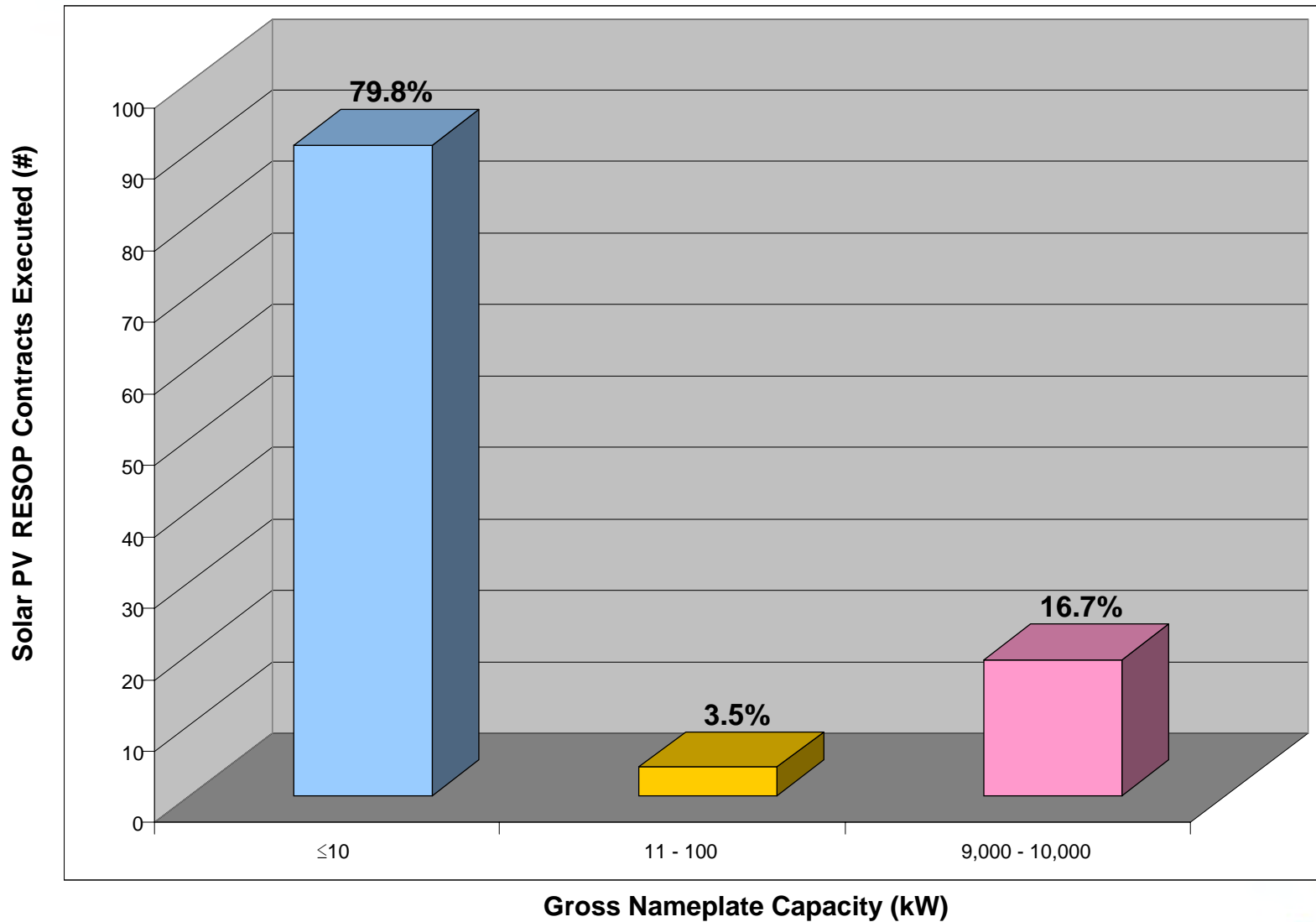
Total Capacity of RESOP Contracts in Commercial Operation per Fuel Source (Year to Date)



Total # of RESOP Contracts in Commercial Operation by Month



Breakdown of Solar PV Projects Executed



PV Contracts: Relative Scales

- 80% Residential Scale
 - Mainly “early adopters”
- 3.5% Commercial Scale
 - Unknown motivations, possibly CSR-driven
- 17% Utility Solar Farm Scale
 - Recognize advantage of unique price

After RESOP Contract is Executed

- Applicant should be aware connection costs may differ from initial quote pending review of transmission connection
- Applicant must declare Commercial Operation with OPA, after all necessary permits, testing, metering and connection reviews are completed
- LDC should not pay at Contract Price until notified by OPA of Commercial Operation Date

RESOP Issues

- Fundamental misunderstanding among some stakeholders and generators
- SOP is not a Feed-In-Tariff (cost “plus”)
- The RESOP offers reasonable, market-derived prices to developers at rates that protect the interests of rate-payers
- This has led to ~811 MW contracted in 11 months
- Not all projects will be viable - the “solution” is NOT for the OPA to increase prices

RESOP Issues – Micro-generators

- If micro-generator (≤ 10 kW) chooses to locate behind meter of load customer, payments are reduced by HOEP (for those kWh consumed by load customer)
- Requirement for interval data for micro-generators (≤ 10 kW) that are embedded (“series connected”) creating connection and settlement cost and barriers
- OPA working with distributors and OEB to assess impact of eliminating this requirement for hourly data
- Any change would result in Rule and Contract amendments

RESOP – some complimentary programs

- Ontario Ministry of Agriculture, Food & Rural Affairs: launched “Ontario Biogas Systems Financial Assistance Program” (Sept. '07), to help farmers and rural businesses carry out feasibility studies for installation of biogas systems, and cover a proportion of construction and implementation costs
- Ontario Ministry of Northern Development & Mines: “Northern Ontario Heritage Fund Corporation” (NOHFC) works with the private sector and other levels of government to diversify and grow the northern economy and stimulate jobs. Eligible applicants may incl. private/public partnerships, federal government and other government related agencies, municipalities, First Nations, Local Service Boards and not-for-profit corporations. Projects must, to the fullest extent possible, be located in Northern Ontario
- Ontario Ministry of Energy: funded “Community Power Fund”, which launched a new fund (Sept. '07) to support community-owned renewable energy projects in Ontario. This fund is the first of its kind in Canada. Incorporated groups, including farmers, First Nations and community groups, can apply. Two streams: a Small Grant Program for feasibility studies and strategic opportunity exploration; and a Large Grant Program to support project development

SOP Issues for OPA, others – System Operation

- Significant interest and uptake in RESOP exceeding OPA expectations
- Amount of distributed generation needs to integrate with system operations at distribution and transmission levels
- Multiple, simultaneous procurements require better coordination (RESOP, RES, CESOP, CHP II)
- OPA working with IESO, distributors and other stakeholders to identify any issues proactively

Market Initiatives

- OPA submitted Integrated Power System Plan
- Government directs “supply mix” for Plan; OPA develops Plan for regulatory review and approval
- Plan sees doubling of renewable capacity from ~8000 MW to ~16,000 MW by 2027
- Increase mainly coming from wind and large water power

The Integrated Power System Plan

- IPSP is a 20-year plan that is the basis for developing the infrastructure required for a sustainable electricity service in Ontario
 - Provide the basis to implement choices in the near-term
 - Develop specific options for the medium-term
 - Explore broad options and opportunities and assess “big-picture” scenarios for the long-term
- IPSP, together with the Procurement Process, was filed with the OEB on August 29, 2007. Highlights:
 - Maximize feasible, cost-effective contribution Conservation resources
 - Maximize feasible, cost-effective contribution from renewable resources
 - Meet remaining baseload requirements with nuclear power
 - Replace coal-fired generation by 2014
 - New gas-fired generation facilities are planned for Northern York Region, Kitchener-Waterloo-Cambridge-Guelph, and the GTA
- Until the OEB approves the IPSP and Procurement Process, the OPA can only execute procurement contracts *via Ministerial Directives*
- IPSP will be updated every 3 years and filed with the OEB for decision

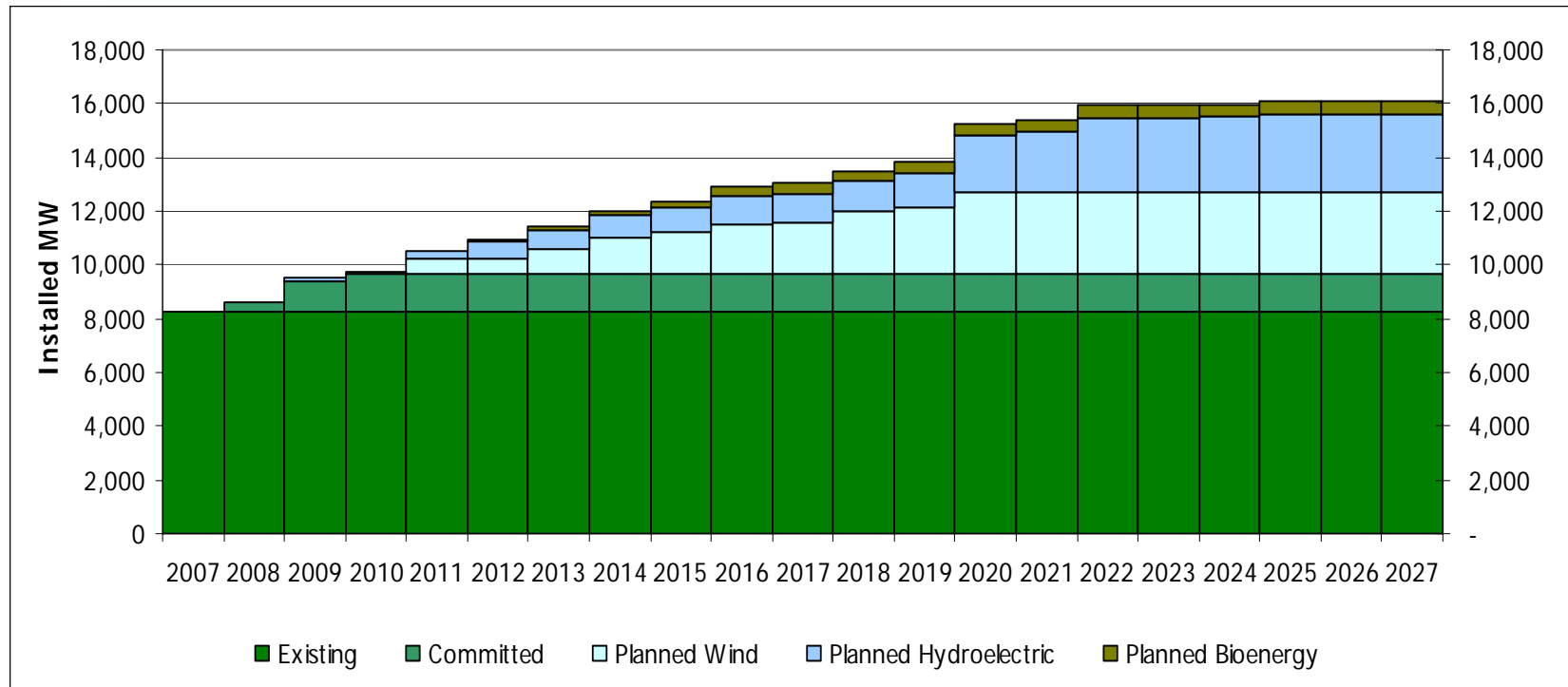
Renewable Resources in the IPSP

- Two key elements in implementing the renewable goals:
 - the acquisition of renewable supply; and
 - the transmission enhancements that are necessary to facilitate the supply
- The 2025 goal of 15,700 MW of renewable resources will be implemented in order of feasibility in light of transmission availability
- The OPA's approach to determining the contribution of feasible and economic renewable supply is as follows:
 - All feasible hydroelectric resources;
 - Bioenergy, wind (small sites) and solar resources were included as part of the standard offer programs
 - Large wind sites to provide the remaining resources needed to meet the goal

What are the renewable resources included in the Plan?

	MW
Hydroelectric	10,771
Existing	7,788
Committed	62
Planned	2,921
Wind Power	4,685
Existing	395
Committed	1,251
Planned	3,039
Bioenergy	539
Existing	75
Committed	14
Planned	450
Solar	88
Existing (*)	-
Committed/Planned	88
Total Renewable Resources (by 2027)	16,083

Committed & Planned Renewable Resources

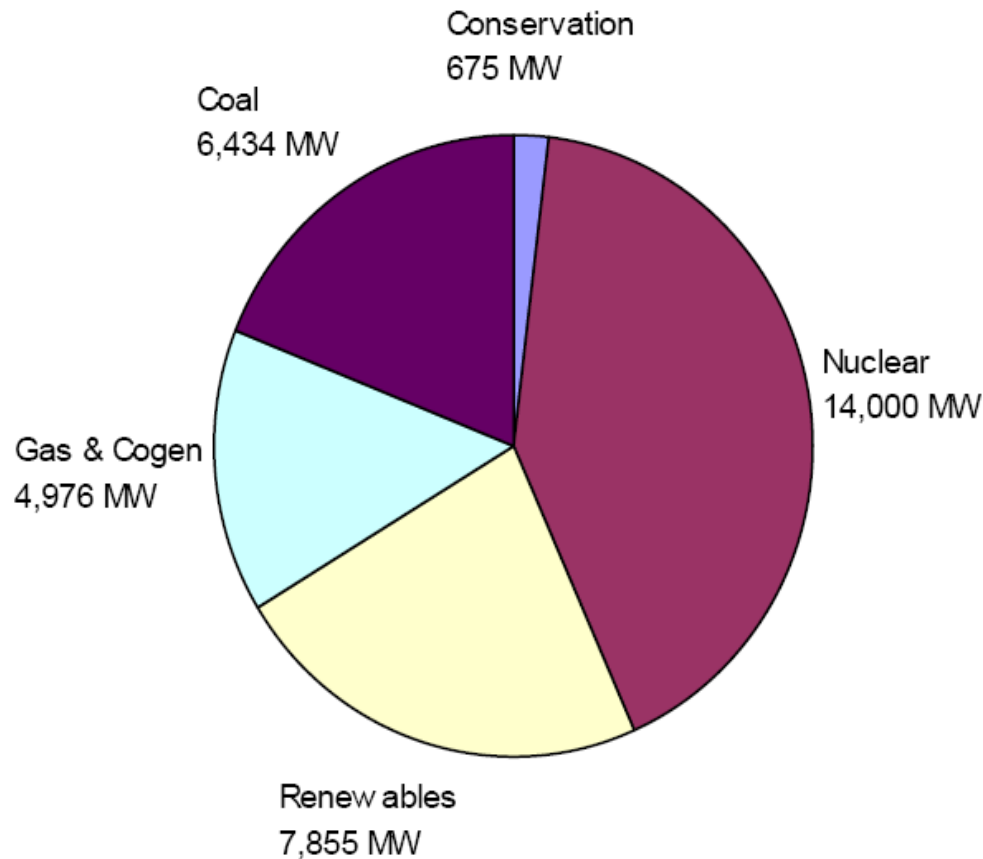


- **Planned renewables consist of:**

- ~3, 000 MW water
- ~3, 000 MW wind
- ~500 MW bioenergy

Ontario's Renewable Energy Policy Targets

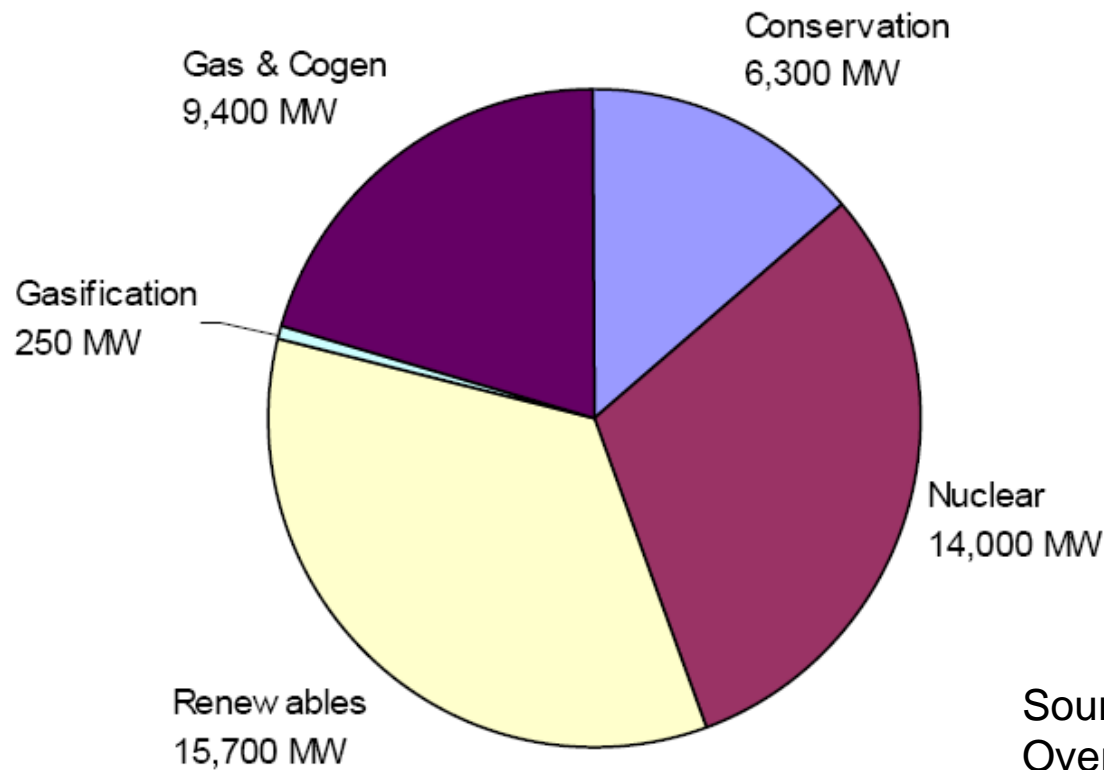
Ontario's Current Electricity Supply Mix (2005)



Source: OPA's IPSP
Scope and Overview,
June 29, 2006

Ontario's Renewable Energy Policy Targets (cont'd)

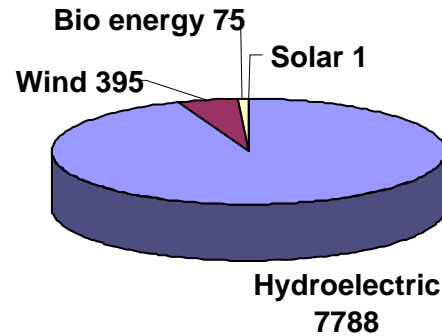
Government Plan for 2025 Supply Mix



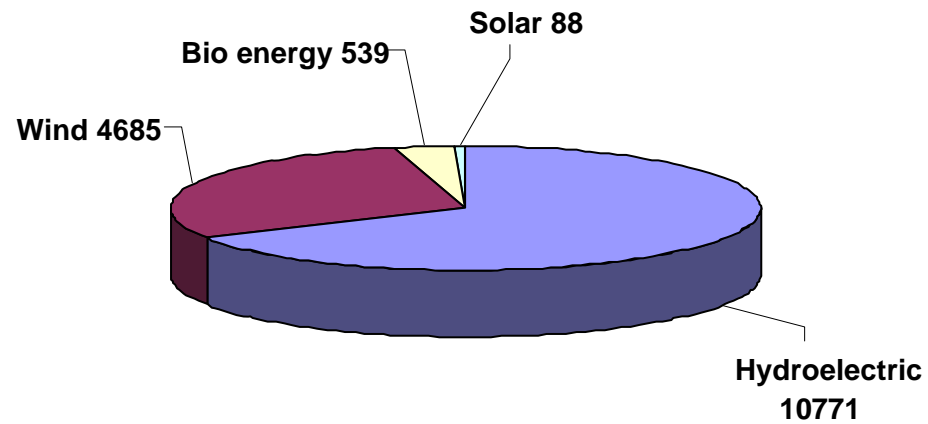
Source: OPA's IPSP Scope & Overview, June 29, 2006

Renewables Targets (by Government)

Renewable Resources in 2007 (MW)



Renewable Resources in 2027 (MW)



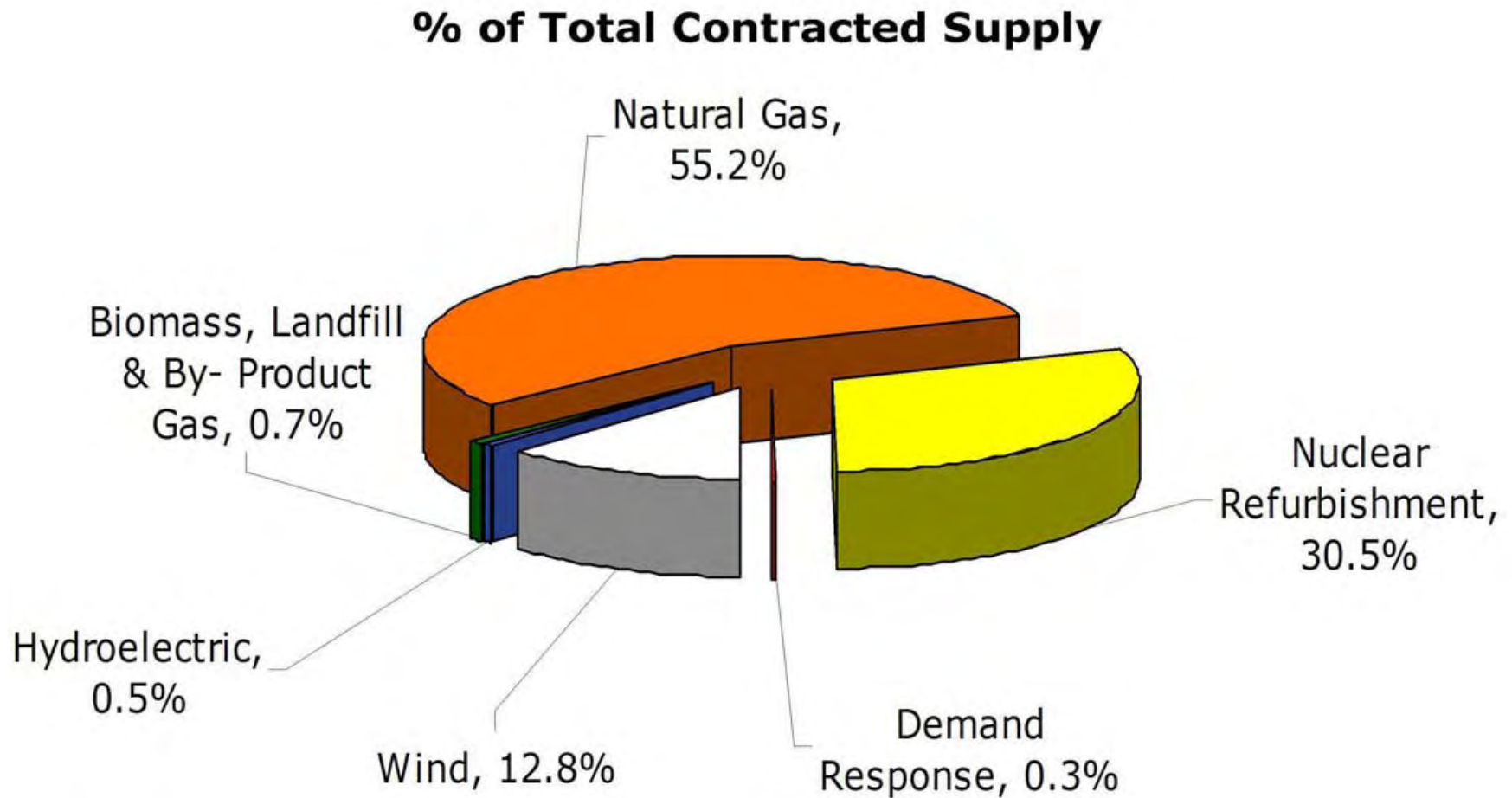
Breakdown of Existing Generation Contracts

<u>Fuel/Program</u>	<u>Number of Contracts</u>	<u>Total MW</u>
Wind	11	1,261
Hydroelectric	3	51
Biomass and Landfill Gas*	4	72
Natural Gas**	17	5,440
Nuclear (Bruce A Refurbishment)	1	3,000
RESOP	204	811
TOTAL	240	10,635

** Includes capacity from Algoma by-product CHP*

*** Includes capacity from natural gas fired CHP projects and Early Movers*

Breakdown of Generation Contracts

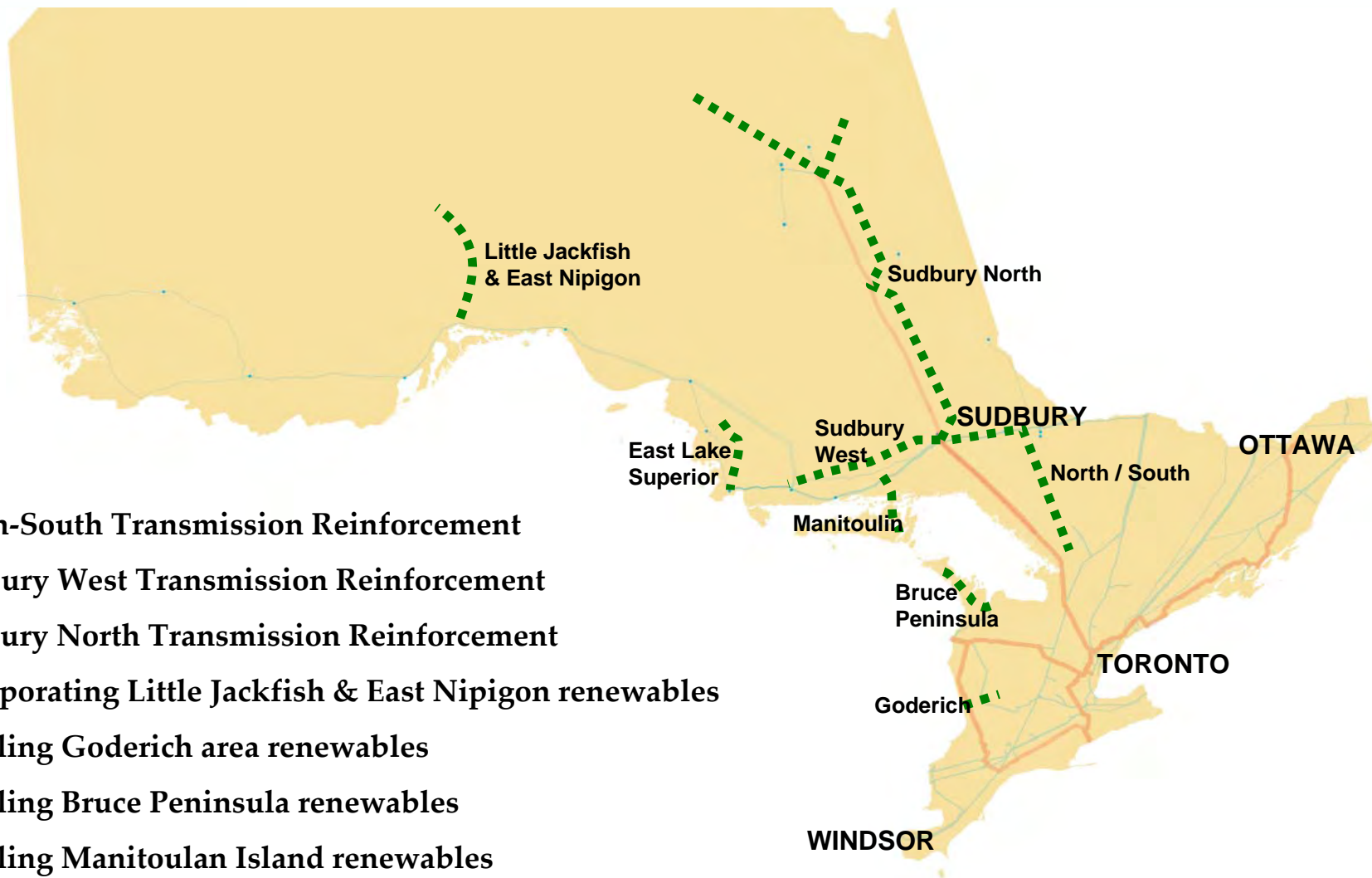


Challenges posed by RE targets

Significant planning and procurement challenges to develop new hydroelectric, wind and biomass resources to meet planning & policy targets:

- Mostly located in northern and rural southern Ontario
- Far from growing population / load centres
- Far from existing transmission corridors and/or existing transmission system at capacity
- Above 5,000 MW of wind, operational impacts expected to be more pronounced

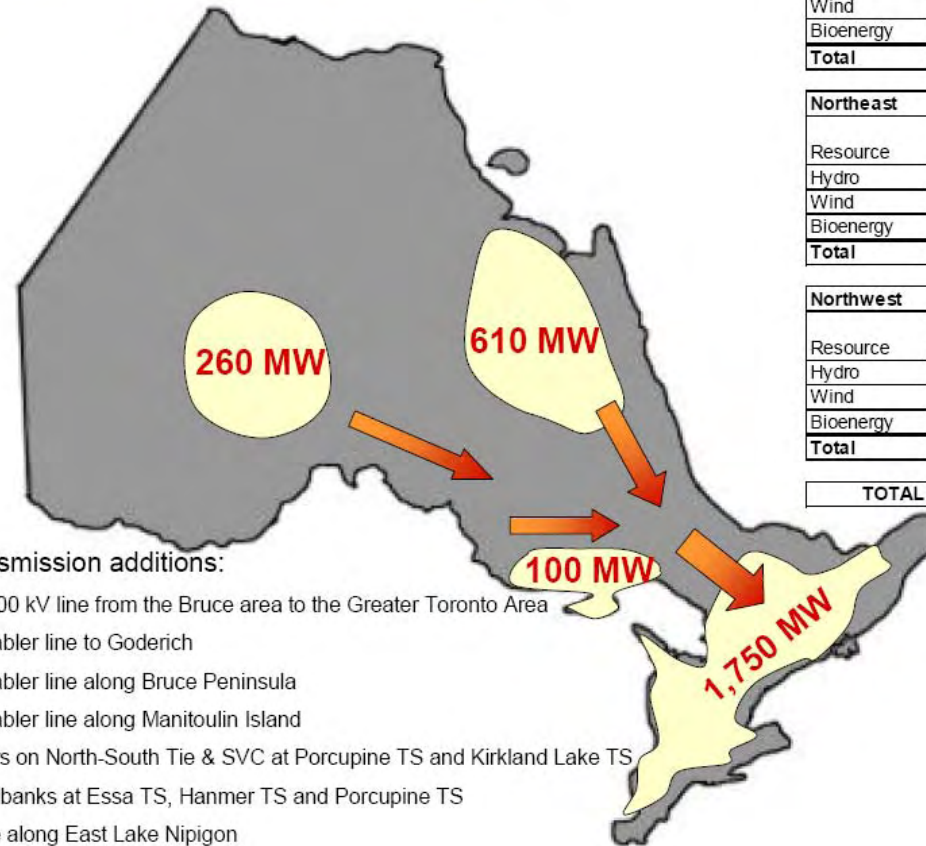
Connecting Renewables: Recommended Developments



- North-South Transmission Reinforcement
- Sudbury West Transmission Reinforcement
- Sudbury North Transmission Reinforcement
- Incorporating Little Jackfish & East Nipigon renewables
- Enabling Goderich area renewables
- Enabling Bruce Peninsula renewables
- Enabling Manitoulan Island renewables
- East Lake Superior transmission reinforcement

Connecting Renewables: Stage 1

Stage 1 – 2010-2015
Total: 2,720 MW of Renewable Generation



Required transmission additions:

- Completion of 500 kV line from the Bruce area to the Greater Toronto Area
- New 230 kV enabler line to Goderich
- New 230 kV enabler line along Bruce Peninsula
- New 230 kV enabler line along Manitoulin Island
- Series capacitors on North-South Tie & SVC at Porcupine TS and Kirkland Lake TS
- Shunt capacitor banks at Essa TS, Hanmer TS and Porcupine TS
- New 230 kV line along East Lake Nipigon

Planned Developments:

South	
Resource	Capacity (MW)
Hydro	150
Wind	1,500
Bioenergy	100
Total	1,750

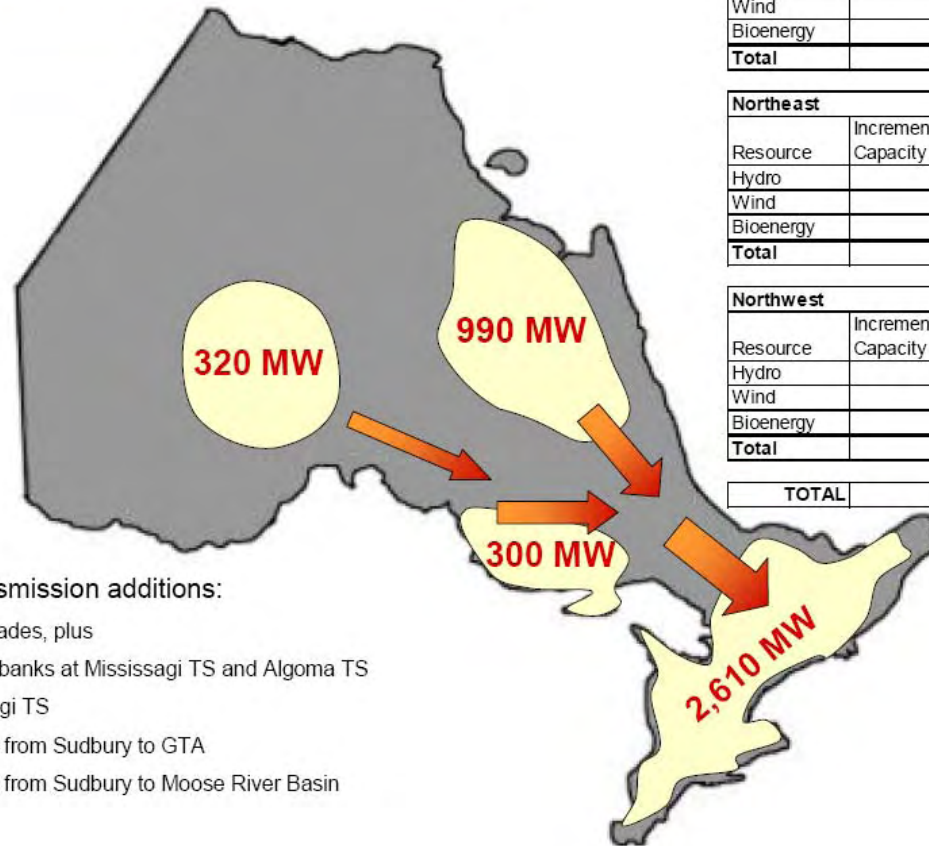
Northeast	
Resource	Capacity (MW)
Hydro	550
Wind	100
Bioenergy	60
Total	710

Northwest	
Resource	Capacity (MW)
Hydro	200
Wind	10
Bioenergy	50
Total	260

TOTAL	2,720
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Connecting Renewables: Stage 2

Stage 2 – 2016-2019
Total: 4,220 MW of Renewable Generation



Required transmission additions:

- All Stage 1 upgrades, plus
- Shunt capacitor banks at Mississagi TS and Algoma TS
- SVC at Mississagi TS
- New 500 kV line from Sudbury to GTA
- New 500 kV line from Sudbury to Moose River Basin

Planned Developments, in addition to Stage 1:

South		
Resource	Incremental Capacity (MW)	Cumulative Capacity (MW)
Hydro	0	150
Wind	700	2,200
Bioenergy	160	260
Total	860	2,610

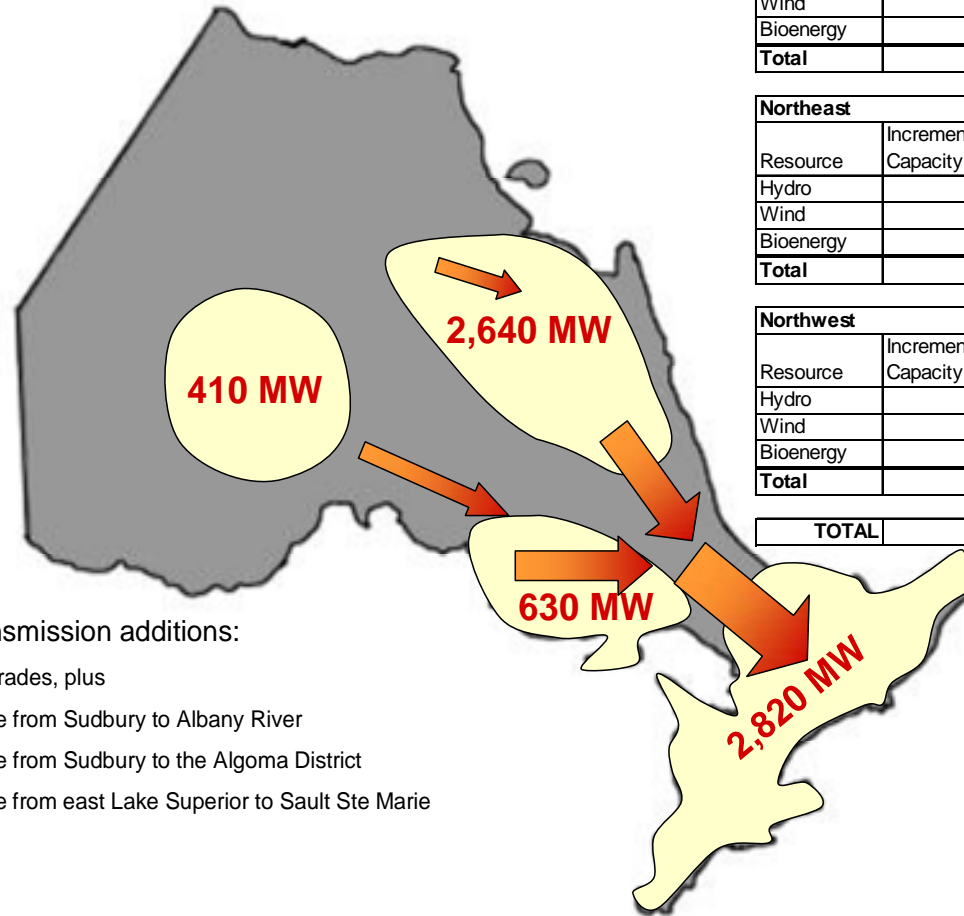
Northeast		
Resource	Incremental Capacity (MW)	Cumulative Capacity (MW)
Hydro	350	900
Wind	200	300
Bioenergy	30	90
Total	580	1,290

Northwest		
Resource	Incremental Capacity (MW)	Cumulative Capacity (MW)
Hydro	40	240
Wind	10	20
Bioenergy	10	60
Total	60	320

TOTAL	1,500	4,220
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Connecting Renewables: Stage 3

Stage 3 – 2020 and beyond
Total: 6,500 MW of Renewable Generation



Required transmission additions:

- All Stage 2 upgrades, plus
- New 500 kV line from Sudbury to Albany River
- New 500 kV line from Sudbury to the Algoma District
- New 230 kV line from east Lake Superior to Sault Ste Marie

Planned Developments, in addition to Stage 2:

South		
Resource	Incremental Capacity (MW)	Cumulative Capacity (MW)
Hydro	0	150
Wind	210	2,410
Bioenergy	0	260
Total	210	2,820

Northeast		
Resource	Incremental Capacity (MW)	Cumulative Capacity (MW)
Hydro	1,600	2,500
Wind	330	630
Bioenergy	50	140
Total	1,980	3,270

Northwest		
Resource	Incremental Capacity (MW)	Cumulative Capacity (MW)
Hydro	60	300
Wind	30	50
Bioenergy	0	60
Total	90	410

TOTAL	2,280	6,500
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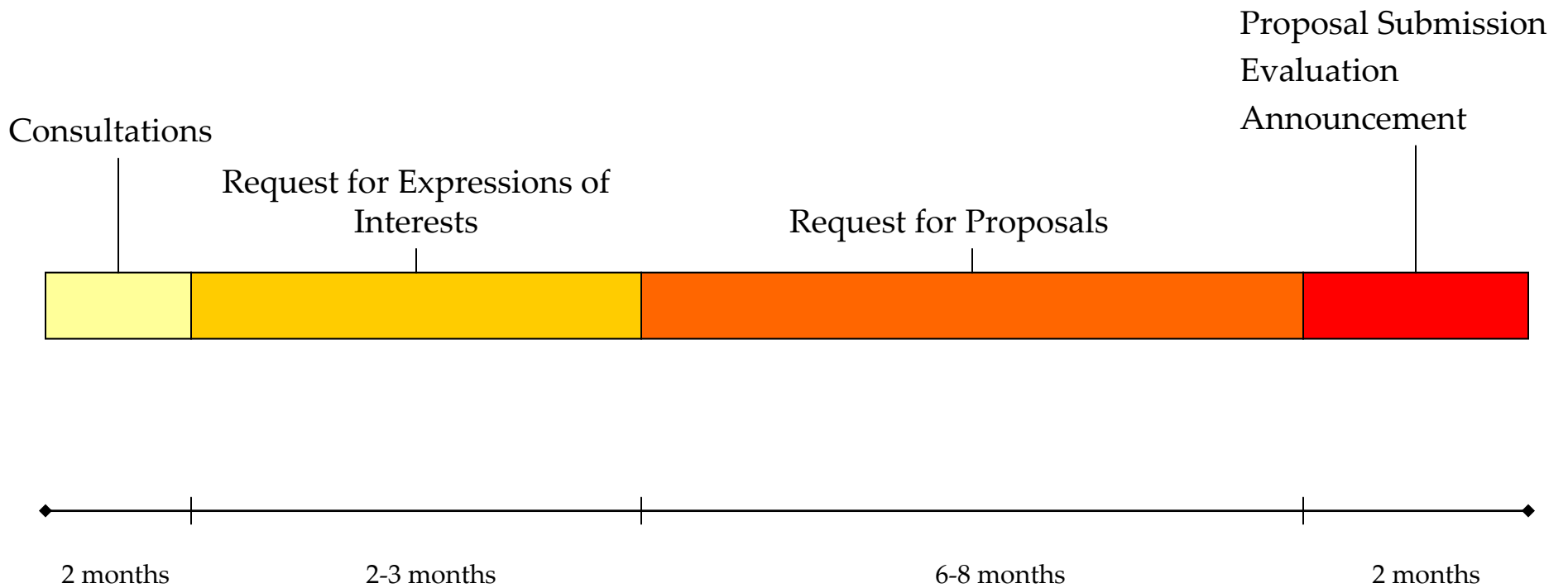
Latest Renewables Directive

- On August 27, 2007, the Minister of Energy directed the OPA to procure up to 2,000 megawatts (MW) of renewable energy supply (RES)
 - Projects greater than 10 MW
 - In-service dates of 2015 or earlier
 - Procurement to occur by 2011
 - Develop process for First Nations and Métis consultation
- OPA expects to roll out procurement in multiple phases
 - Consultations on the design of the first procurement for approx. 500 MW of renewable energy supply to begin by end of 2007
- Use IPSP assumptions and feedback from proponents as basis for approach

RES III Procurement – timeline/process

- Consultations ongoing throughout procurement
- Request for Expressions of Interest stage:
 - Released Nov. 20, 2007
 - Non-binding
 - Information-gathering wrt
 - Location and Connection
 - Project status/maturity/feasibility
 - Q&A period for registrants ends Dec. 04th
 - RFEI submission deadline Dec. 13/07 at 3:00:00 p.m. (EST)
- Request for Proposals (RFPs) stage:
 - Q1 2008
 - Proposals Due Q4 - 2008
 - Contract Award Q4 - 2008

Timing of Procurement Process (Typical RFP)



Preview of RES III RFP

- RES III RFP will be based on RES I and RES II RFPs as well as other OPA supply procurements
 - Mandatory requirements (Pass/Fail)
 - Technical Criteria
 - Financial Requirements
 - Proposal Security
 - Rated Evaluation Criteria
 - Assess the feasibility and maturity of a project
 - Pricing

- Contract will be based on RES I and RES II PPAs

For Further Information

- IPSP Website: www.powerauthority.on.ca/IPSP
 - Q&A for IPSP: ipspinfo@powerauthority.on.ca
- Procurement Website (RES III etc): www.powerauthority.on.ca/GP
 - Q&A for RES III: renewables@powerauthority.on.ca
- RESOP Website: www.powerauthority.on.ca/SOP
 - Q&A for RESOP: standardoffer@powerauthority.on.ca
- Register to receive issue-specific email alerts & updates from OPA
- Ontario Ministry of Energy’s “Renewable Energy Development in Ontario” (REDO) document:
<http://www.energy.gov.on.ca/index.cfm?fuseaction=renewable.developers>
- OEB “Information for Generators” site:
www.oeb.gov.on.ca/html/en/industryrelations/smallgenerators.htm

Questions?