

Electricity System and Conservation in Ontario

**Managing Residential Electricity Demand:
Learning from Experience
in the UK and Ontario**

**St Hugh's College, Oxford
May 21-23, 2008**

Energy – Quick Facts

- Population 12,800,000
- 40 percent of Canadian GDP; 52 percent of manufacturing shipments
- 40 percent of Canadian employment; high employment in resource extraction/processing, manufacturing, services
- Ontario still a leader in North American auto production – 14 assembly plants and over 400 parts manufacturers
- Merchandise exports US\$170 billion a year – 84 percent to US
- Ontario leads G-7 in exports as share of GDP (68.5 percent, compared to Germany's 41.5 percent and U.S.'s 10 percent)
- Energy a vital input; Ontario still relatively inexpensive



source:

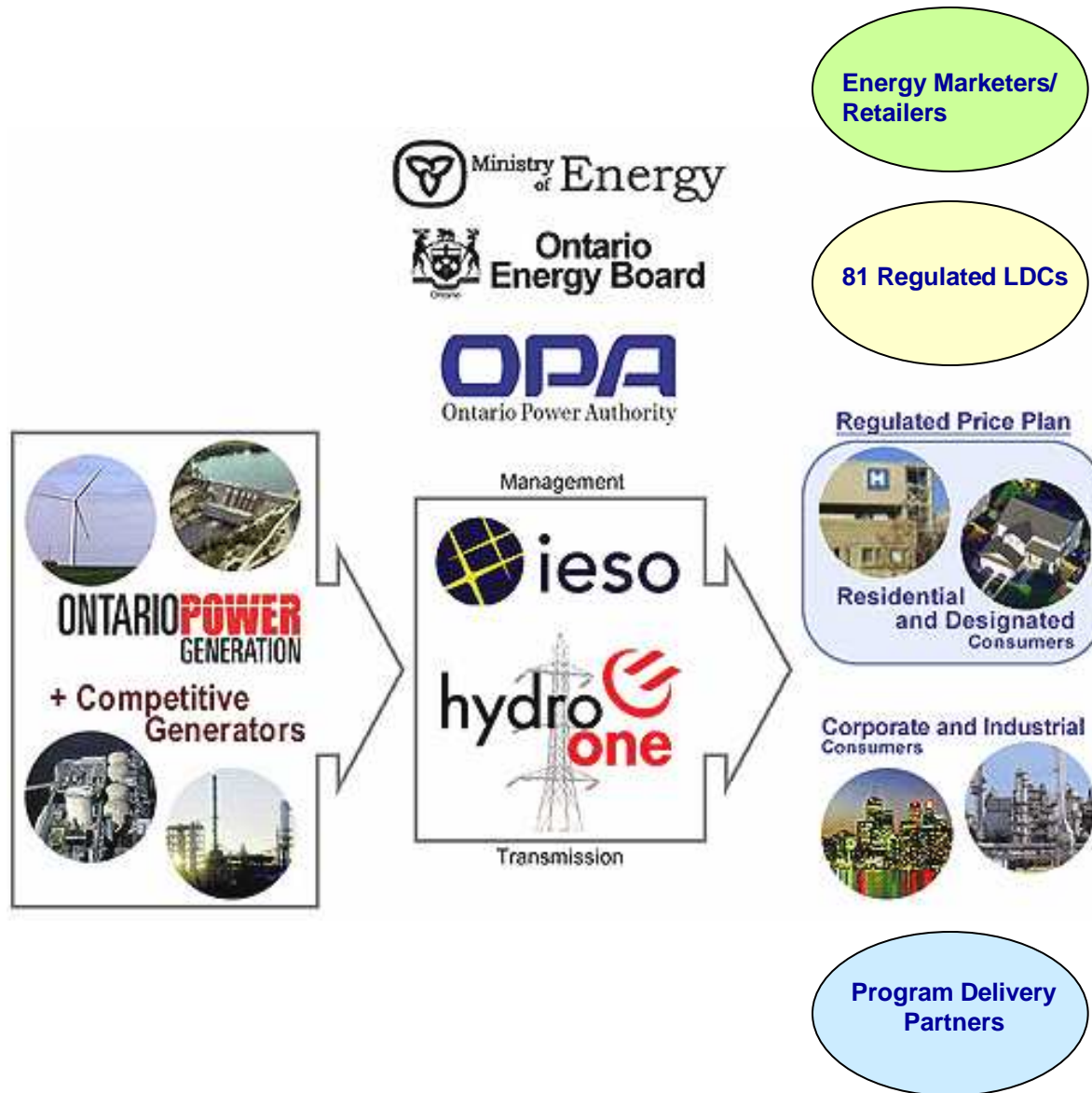
http://www.nationalgeographic.com/geographyaction/habitats/popup_state-international.html

Ontario's Electricity Sector

- Canadian constitution gives provincial government significant authority over natural resources including electricity resources
- Ontario is one of most energy-intensive jurisdictions in the world
- Total annual consumption of 156 terawatt hours (billion kWh) – valued at \$12 billion/year
 - Residential: 33 percent
 - Commercial/Institutional: 35 percent
 - Industrial: 31 percent
- Average homeowner uses ~ 900 to 1,000 kWh/month
- Bottom line: retail electricity price of 11.4 ¢/kWh
- All homes to have smart meters and time of use rates by 2010



Ontario's Electricity Sector



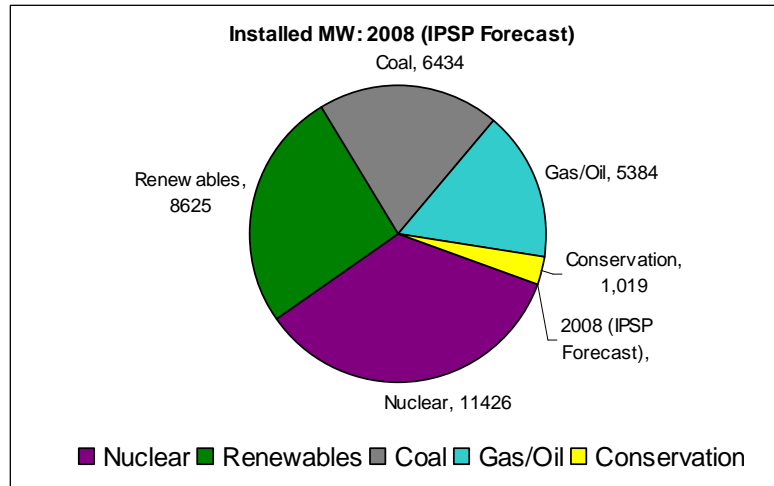
Integrated Power System Plan



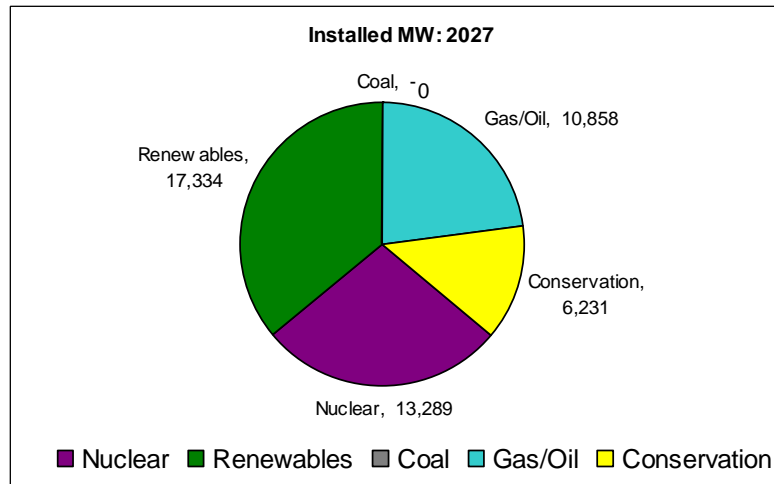
- A road map for reliable, competitive and sustainable electricity future
- Has a 20-year outlook, updated every three years
- **Four key results:**
 1. Growth in peak demand is reduced by 75 percent through conservation
 2. Coal is replaced in the supply mix with renewable energy and natural gas
 3. Nuclear power is restored through refurbishments and new builds
 4. Transmission is reinforced for reliable service and to connect renewable energy to population centres
- IPSP currently in interrogatories phase of regulatory review by Ontario Energy Board; issues list defined by Board in January 2008
- \$10 billion to be invested in conservation; \$1.2 billion over the next three years

Ontario's Present and Future Supply Mix

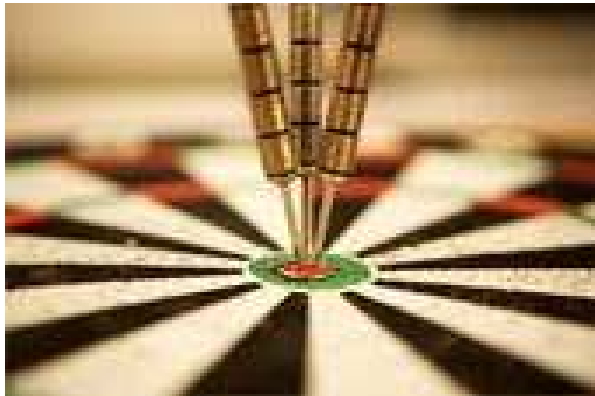
2008:



2027:



Conservation Targets

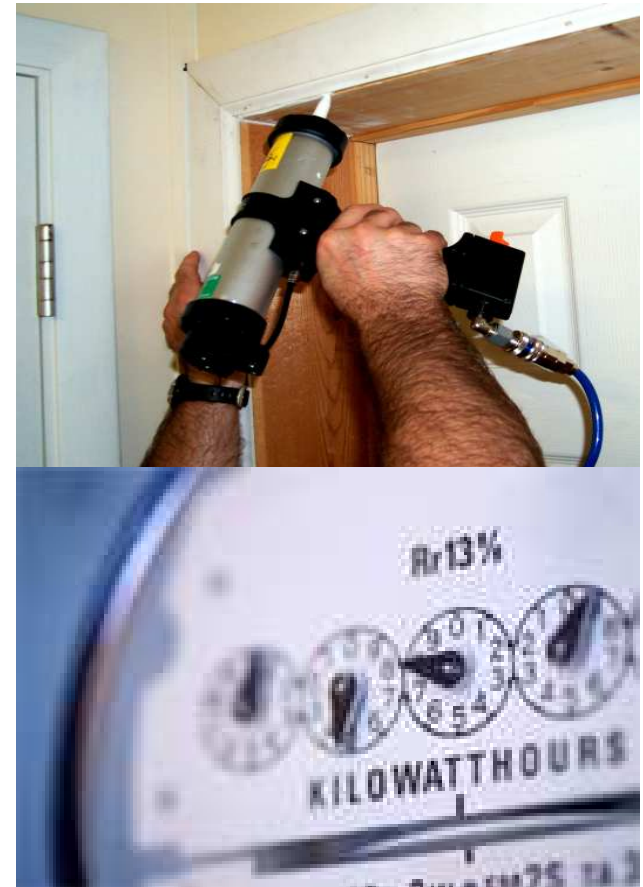


- 6,300 MW reduction in peak demand by 2025
- Interim targets of 1,350 MW by 2007 and another 1,350 MW by 2010
- 2007 results were 1,350 MW (currently being verified)
- OPA to lead, coordinate, facilitate and build conservation capability

Other Benefits of Conservation

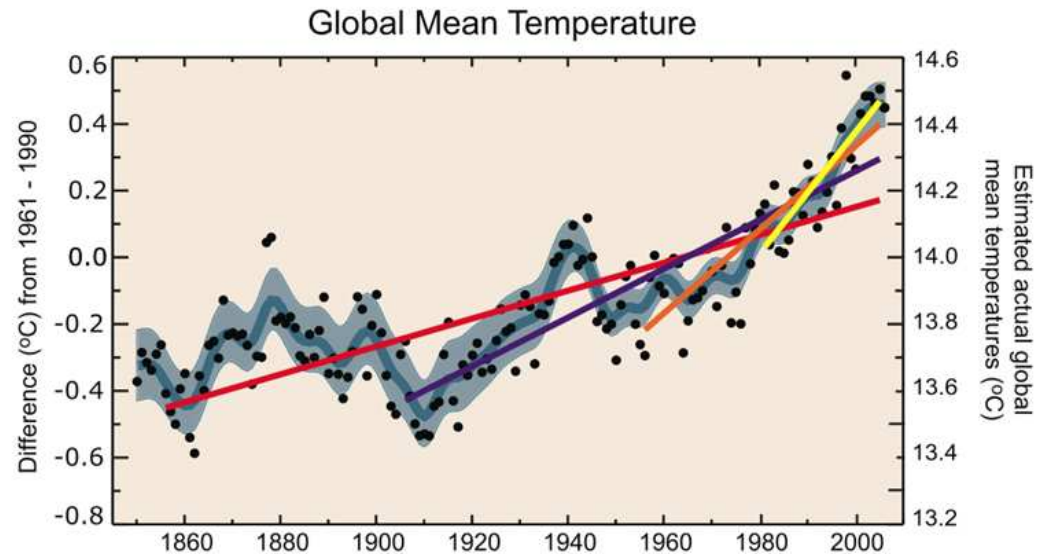
The Three Es:

- **Employment** benefits: labour-intensive, local jobs
- **Economic** benefits: efficiency is cost-effective for households and makes private sector more competitive
- **Environmental**/health benefits: reduced GHGs, acid rain, smog



Ontario's Electricity System, CO₂e and Climate Change

- In Canada, 82 percent of man-made greenhouse gas emissions come from the production and use of energy.
- In Ontario, 13 percent of CO₂e came from the production of electricity mainly from coal-fired plants in 2006.
- Implementation of the IPSP will reduce emissions from electricity sector from 25 Mt CO₂e in 2006 to 7 Mt in 2014.



Source: IPCC Fourth Assessment Report, Climate Change 2007 (AR4)

- Ontario targets are to reduce CO₂e to
 - 6 percent below 1990 levels by 2014,
 - 15 percent below these levels by 2020,
 - 80 percent below by 2050.
- Ontario recently appointed a new Climate Change Secretariat.
- Canada's targets are to reduce CO₂e by 20 percent from 2006 levels by 2020 and by 60-70 percent below 2006 levels by 2050.

Four Types of Conservation

1. Conservation/Demand Management

- Using less/using less during peak hours
- Deferring usage to off-peak hours

2. Energy Efficiency

- Using energy more efficiently

3. Fuel Switching

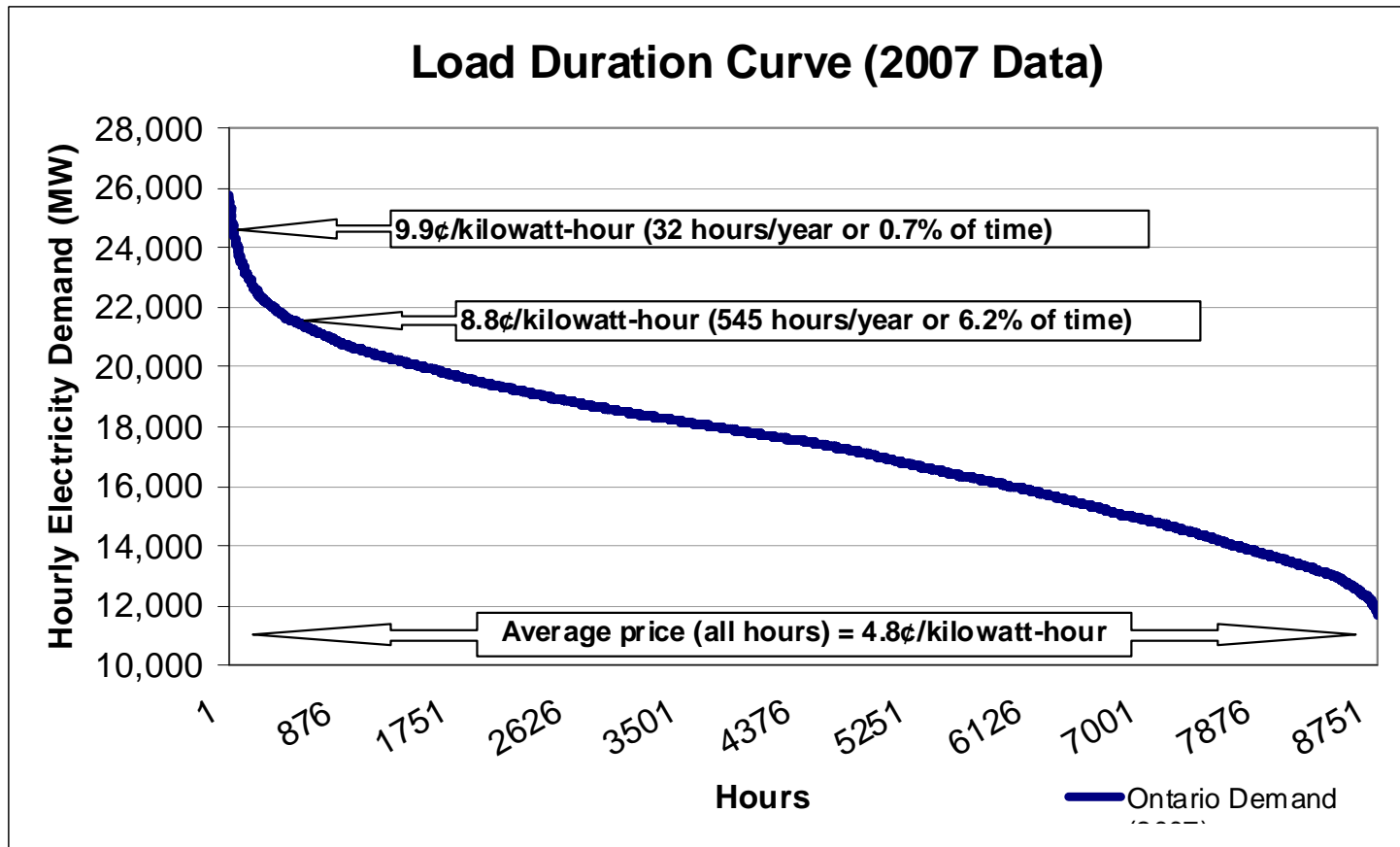
- Switching from electricity to another fuel

4. Self-generation/Co-generation

- Renewables < 500kW
- Clean energy < 10MW

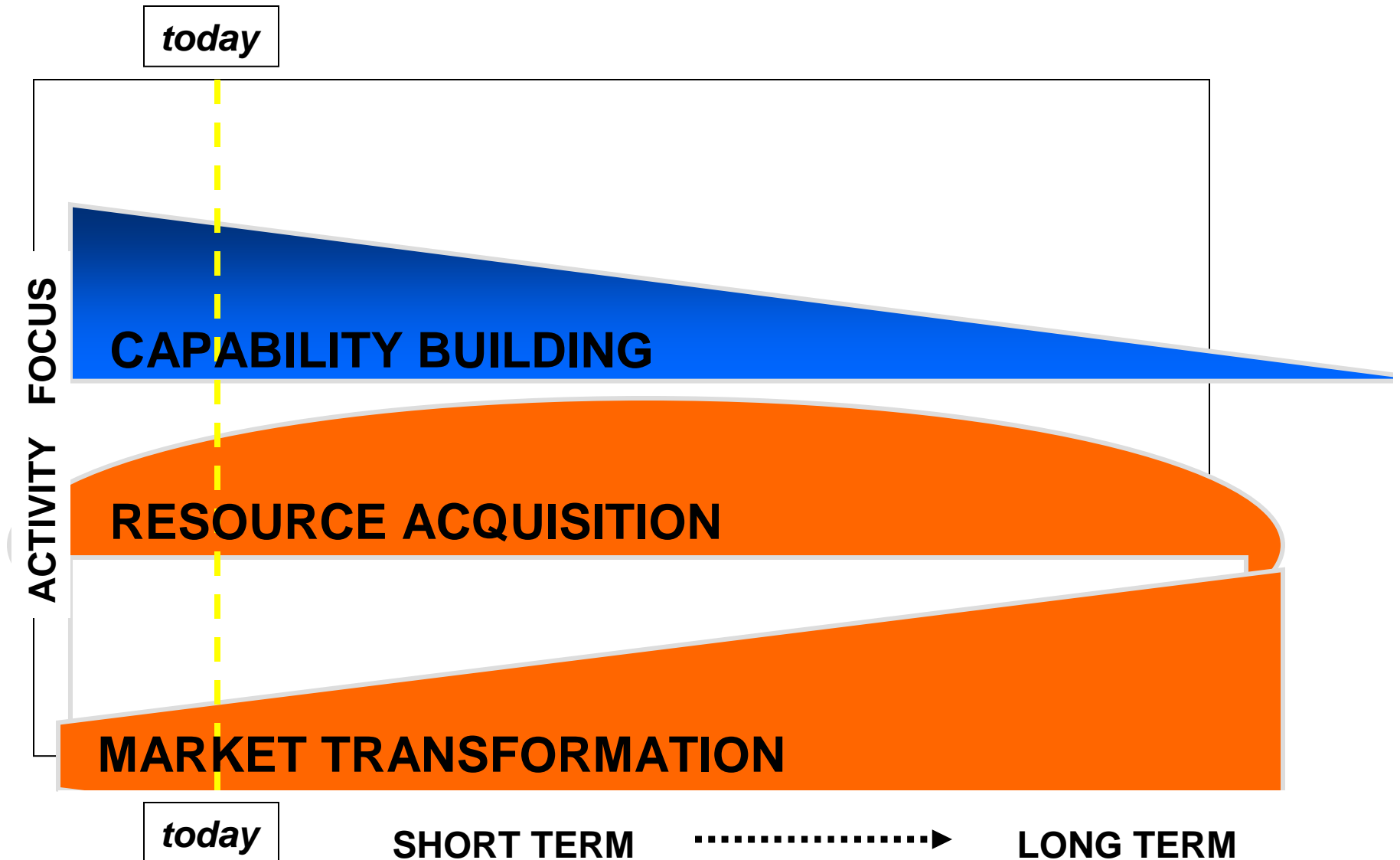


The Importance of Demand Management

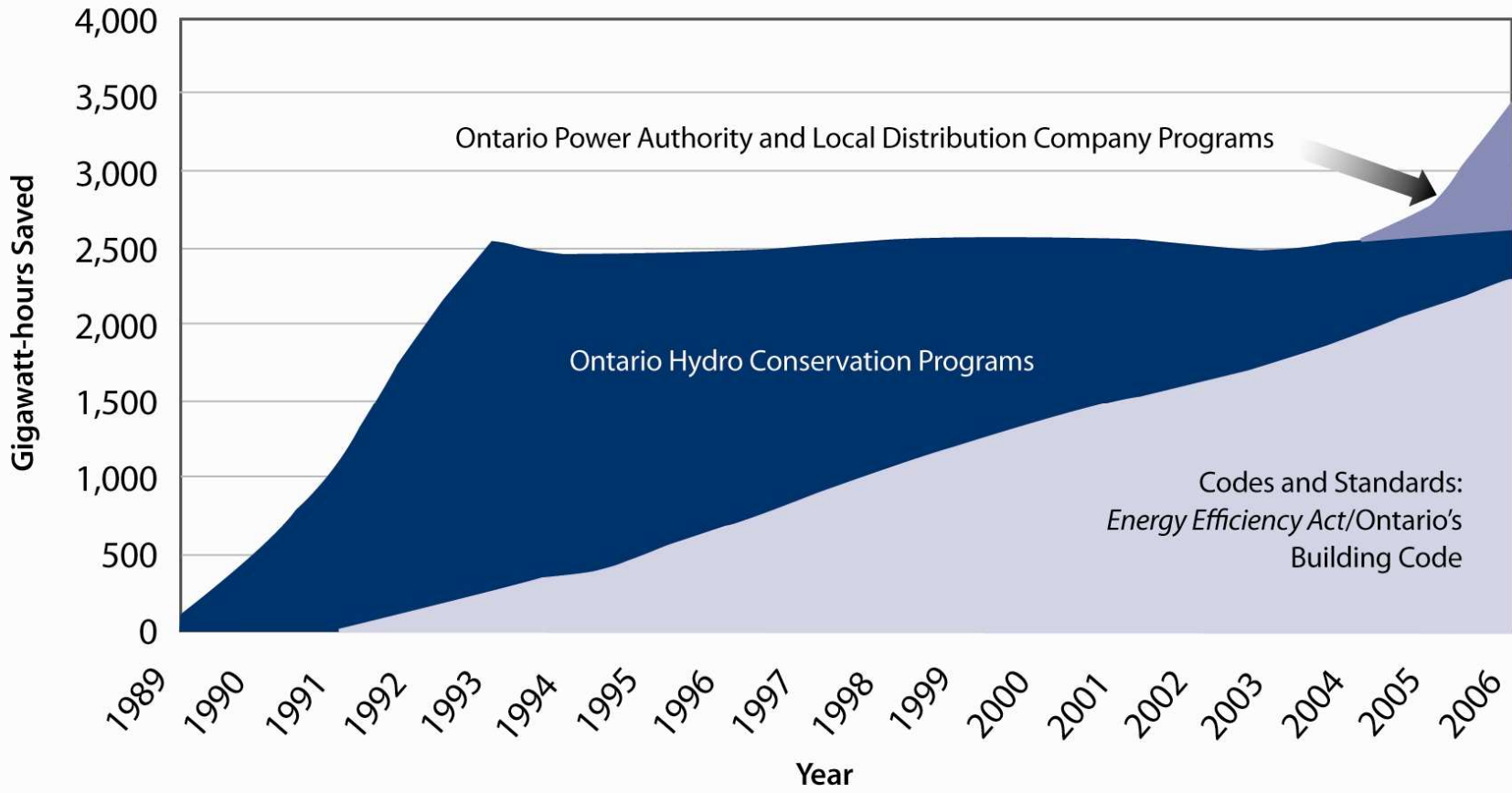


Source: IESO

Conceptual Approach to Delivering Conservation



Impact of Codes and Standards in Ontario



Source: Ontario Power Authority, 2007

Codes and Standards

- Codes, standards and pricing may account for up to 75 percent of conservation in the long term.
- Results are slow in coming as they rely on the turnover of capital stock in housing, machinery and appliances, but the effects are sustained.
- The most successful conservation programs use a combination of programs (pull) and changes to codes and standards (push).

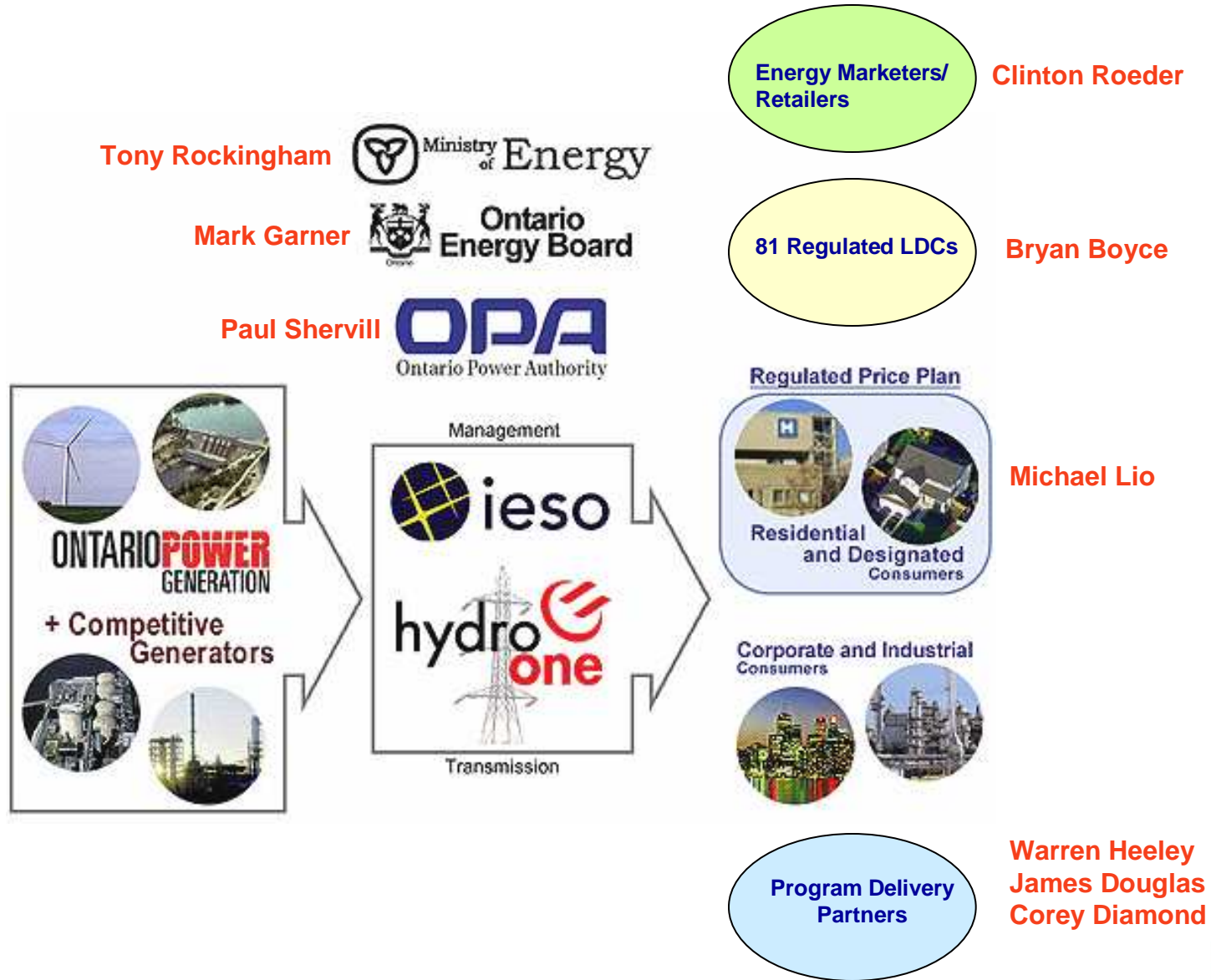


The Challenges of Electricity Conservation

- Electricity/Conservation is invisible – Call for **Think. Believe. Act.**
- Requires a Culture of Conservation.
- All sectors to participate.
- Role of pricing/elasticity of demand.
- How to move to a self-sustaining conservation market?



Ontario's Electricity Sector



Questions?

Take action!

Respond to the challenge and the opportunity of energy conservation

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