

The Price Isn't Right: Electricity Pricing in Ontario

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Pricing Principles: Efficiency

- Consumer price should equal marginal cost (MC).
 - If we pay 5 cents for electricity that costs 10 cents to generate, we make ourselves worse off. We use too much.
 - If we pay 10 cents for electricity that costs 5 cents to generate, we make ourselves worse off. We use too little.
 - $P=MC$ maximizes our welfare/satisfaction.

Pricing Principles: Efficiency (2)

- Theory: charge short-run MC – cost of generating one more MWh at any time.
 - Over time SMC rises to attract new investment at long-run MC (LMC).
- Hard to apply to Ontario electricity:
 - Investment planned, not market;
 - Short-run MC < LMC now
 - HOEP applies to small % of power.
- How to use both SMC and LMC?
 - Peak load pricing to cover capital cost.

Pricing Principles (3)

- Revenues cover system costs
 - If $MC < \text{Average Cost (AC)}$ use Ramsey pricing.
- Fairness among customers
 - Each customer class should pay for the costs it imposes on the system.
- Simplicity and transparency
 - Customers only respond to what they understand.
 - Customers differ in comprehension
- The right price is not easy to identify.

Recent Ontario Prices

- RPP:
 - 2010 summer: 6.5 cents first 600 kWh, 7.5 cents.
- TOU:
 - 5.3 cents off-PK; 8 cents mid-PK; 9.9 cents peak.
- HOEP monthly average prices (cents/kWh):
 - 2010: 3.4 average Jan - May
 - 2009: Min 1.96; Max 5.48; Avg 3.16.
 - 2005: Min 5.05; Max 9.97; Avg 7.21.

Ontario price < green power cost

- Green Energy Act offers high FIT prices c/kWh:

Biogas < 500 kW	16.0
Waterpower > 10 MW	12.2
Landfill gas > 10 MW	10.3
Solar PV < 10 kW	80.2
Solar PV large rooftop	53.9
Solar PV ground	44.3
Wind Onshore	13.5
Wind Offshore	19.0

Ont. price < new generation cost

- New gas plants may cost 10 cents/kWh.
- New nuclear costs uncertain:
 - likely 10 cents/kWh or more.
- Quebec or Labrador power will cost at least the export price:
 - 9 cents/kWh or more.
- Conservation some times looks cheap:
 - but hidden costs are real.

Price ignores environmental harm

- Efficiency requires that we pay production costs **PLUS** pollution costs.
 - Coal-fired generation in Ontario may cause air pollution harm worth 3 cents/kWh.
 - What value do we put on CO2 emissions?
 - Canadian policy implies \$15/tonne.
 - Real reductions may cost \$50/tonne or more.
 - So we should add 4.5 to 8 cents to coal price.
- The price ignores these costs. Too low.

The price is too low.

- Conclusion - the current electricity price in Ontario is well below the true cost of:
 - generating clean electricity;
 - new non-coal base load generation;
 - coal generation cost plus environmental harm.
- We make ourselves worse off with this under-pricing.
 - Use too much.
 - Build too much.

The Coal Phase-out

- May eliminate coal-burning.
 - Postponed before, could postpone again.
- No incentive to reduce emissions.
 - Not an emission limit, just coal limit.
- No immediate price signal.
 - Coal-fired electricity is not more expensive now.
- But it implies a high cost of coal use.

Raise the price with carbon tax

- Carbon tax revenue can be revenue-neutral.
 - BC returns all revenue to taxpayers.
 - Return to individuals, corporations by simple tax formula not related to carbon tax payment.
- Carbon tax will re-shape economy.
 - Reduce fossil fuel consumption, emissions.
 - Reduce fossil-fuel intensive industry.
 - Stimulate rest of economy with tax cuts.

Role of the *Green Energy Act*

- Celebrated by environmental groups: we are building lots of green power.
- Is it really a success?
- Look at stated goals:
 - Create jobs
 - Build green economy
 - Reduce GHG emissions

Green Energy Act Job Creation?

- Spend \$1 million, workers are hired.
- Collect \$1 million from taxes or electricity bills:
 - reduce consumer spending by \$1 million
 - destroy jobs in food, clothing, retail, etc.
- Generally, government spending does not create jobs.
 - It moves jobs around in time and space.

GEA Build Green Economy?

- *GEA* chooses technologies and size.
 - Government record in picking technology winners is poor.
 - Decades of experience, not much success.
 - Why develop high cost technologies?
 - Who wants 80 cent or 44.3 cent electricity or technology?
 - Purchasing expensive systems wastes money.
- Wind - closest to economic, but competitive.
 - Can we compete on manufacturing?
 - Other jurisdictions have domestic content requirements.

Cost-Effective GHG reduction

- Focus on GHG reduction.
- Spend \$1m on CO₂ reduction.
 - At \$10/tonne, reduce 100,000 tonnes.
 - At \$50/tonne, reduce 20,000 tonnes.
- You maximize CO₂ reduction by choosing the least-cost policies.
- So focus on cost-effectiveness: policies with the lowest cost/tonne CO₂ reduced.

GEA Implied GHG Value

(Assuming 100% coal displacement)

Energy source	FIT (cents/kWh)	Cost per tonne CO2 (\$/t)
Biogas < 500 kW	16.0	110
Waterpower > 10 MW	12.2	72
Landfill gas > 10 MW	10.3	53
Solar PV < 10 kW	80.2	752
Solar PV large rooftop	53.9	489
Solar PV ground	44.3	393
Wind Onshore	13.5	85
Wind Offshore	19.0	140

GEA Fix?

- Don't specify technology.
- Invest in R&D for future technology.
- Adopt FIT at a reasonable premium over HOEP based on performance, not technology or size.
 - Maximize the CO2 reduction/\$.
 - The market chooses the technology winners.
- OR Abandon FIT and impose a carbon tax with dividend, revenue-neutral.
 - Eliminate waste of high cost generation.
 - Consumers get the money back in the dividend.

Perverse Pricing: GAM

- Some generators get fixed prices:
 - OPG baseload assets get regulated price.
 - New gas plants – OPA price
 - Green power generators (RESOP, *Green Energy Act*)
 - NUG contracts.
- If HOEP is low, spot price customers and customers of retailers pay GAM to make it up.
 - Price signals distorted by GAM.
 - Customers of retailers face high prices in months when HOEP is low and vice-versa.

Perverse Pricing: GAM (2)

- GAM conflicts with marginal cost pricing.
 - GAM mixes costs of old and new generators.
 - Nobody faces prices that represent SMC.
 - Nobody faces prices that represent LMC.
- Fails to create efficient incentives for generators or for customers.
 - No peak pricing.
 - No demand component.

Better pricing: Large Users

- Large users are close to real-time pricing.
- Modify GAM to provide better signals:
 - Shift some cost to peak periods.
 - Capacity costs (new generation) recovered more from peak usage.
 - When demand is low, GAM would be low as well.
- Goal: help pricing to reflect both SMC and LMC.

Better Pricing: Small Users

- Small customers easily confused.
 - Many consumers will not follow volatile spot price.
 - Consumers resist bill volatility from spot price
- Time-of-use pricing closer to MC than RPP.
 - Simple approximation to marginal cost pricing.
 - But can be far off true MC for months, years: recession.
 - Need large price ratio to shift load.
 - Not nearly as good as real-time pricing.
- Add critical peak pricing (CPP) to deal with occasional supply crunch.
 - Limited bill volatility.
 - Better incentive to conserve than TOU alone.

Dealing with Price Increases

- Significant price increases may cause hardship.
 - Compensate losers, but not by tempering the MC price.
- For individuals, compensate low income customers.
 - **NOT** tied to *e.g.* electric heat, or if tied, time limited.
- For businesses, provide transitional compensation only.
 - We are no longer a cheap electricity province.

Where are we?

- Ontario adopted a competitive market without a competitive market structure.
- Problems led to ad-hoc fixes.
 - Regulated retail price;
 - OPA power purchase;
 - Global Adjustment Mechanism for revenue needs;
 - FIT for green power.
- We have wandered into a swamp. Nobody would design what we have now.
- Our 'market' gives poor retail price signals.
- FIT purchases increase costs and prices.

Where do we go from here?

- Head for solid ground outside the swamp.
 - Visibility is poor, no paths to guide us, dangerous.
- Modify the FIT to focus on limited amounts of cost-effective green energy.
- Put more generation on market prices.
- Redesign GAM to provide better price signals.
 - Shift some cost to peak use, demand.
- Raise prices to reflect cost of ENV, new gen.
 - Carbon tax or cap-and-trade. Recycle revenue.
- Add CPP to TOU pricing for small consumers.