WHITE PAPER

Why Is the Smart Grid So Dumb?

MISSING INCENTIVES IN REGULATORY POLICY FOR AN ACTIVE DEMAND SIDE IN THE ELECTRICITY SECTOR

By Travis Kavulla, NRG Energy

Advanced metering infrastructure was supposed to transform the retail customer experience, empowering demand to participate in a genuinely two-sided market across from supply. But as smart meters become ubiquitous, few retail customers see time-of-use prices related to the cost elements of electricity service that vary over time. Someone, somewhere must face clear incentives to actively manage demand in order for it to happen. Yet even the companies that serve retail customers too often lack meaningful exposure to these costs.

This paper examines the incentives facing two different types of retailers: utility monopolies and competitive retailers. It finds incomplete incentives to activate demand flexibility throughout their business models. Regulated utilities under modern amendments to traditional cost-of-service regulation are usually deadened to incentives altogether, or even perversely incentivized. Competitive retailers typically are faced with incentives around supply costs, but too often have no role billing for and intermediating other network charges. Reforms are proposed: time-of-use rates as the default retail product for regulated-utility customers, all retailers exposed to and responsible for billing all relevant grid costs, and public investment and standards for automated devices. Absent these reforms, transformation of electric grids—increasingly subject to intermittent supply, volatilely priced fuels, and rising demand—will be costlier and slower.

A White Paper from the Energy Systems Integration Group's Retail Pricing Task Force
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ESIG
ENERGY SYSTEMS INTEGRATION GROUP

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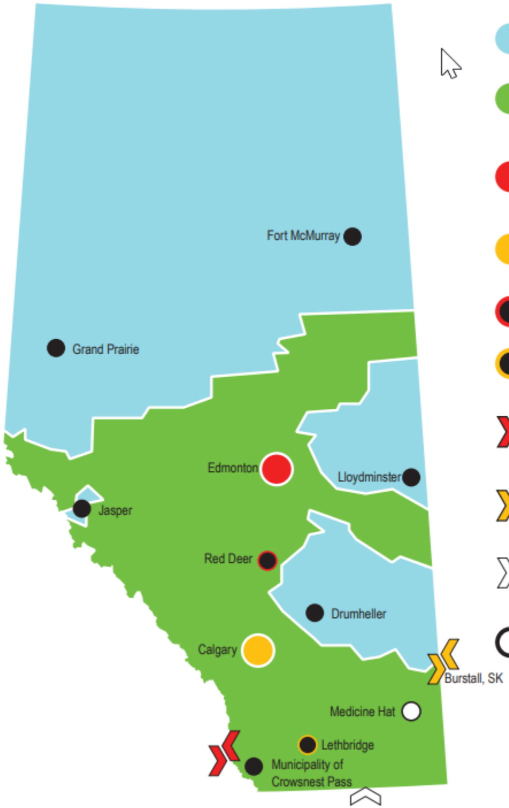
Travis Kavulla

Vice President of Regulatory Affairs, NRG

Electricity Camp in the Rockies; Banff, AB

May 25, 2023

Alberta's electric distribution territories



ATCO Electric transmission and distribution territory.

AltaLink transmission territory and FortisAlberta distribution territory.

Edmonton transmission and distribution provided by EPCOR Distribution & Transmission Inc.

Calgary transmission and distribution provided by ENMAX Power.

Red Deer distribution provided by City of Red Deer.

Lethbridge distribution provided by City of Lethbridge.

Intertie between Alberta and BC, owned and operated by AltaLink.

Intertie between Alberta and Saskatchewan, owned and operated by ATCO Electric.

Intertie between Alberta and Montana, owned and operated by Enbridge.

The City of Medicine Hat is not part of the Alberta Interconnected Electric System; they operate like an intertie and transmission and distribution are owned by the city.

AltaLink serves 85 per cent of Albertans.
Fortis Alberta serves over 200 communities.

Source: Electricity Distribution [Fact Sheet], Government of Alberta.

AMI is widely deployed, but rarely used for retail pricing

Developed from material from Power Grid International.

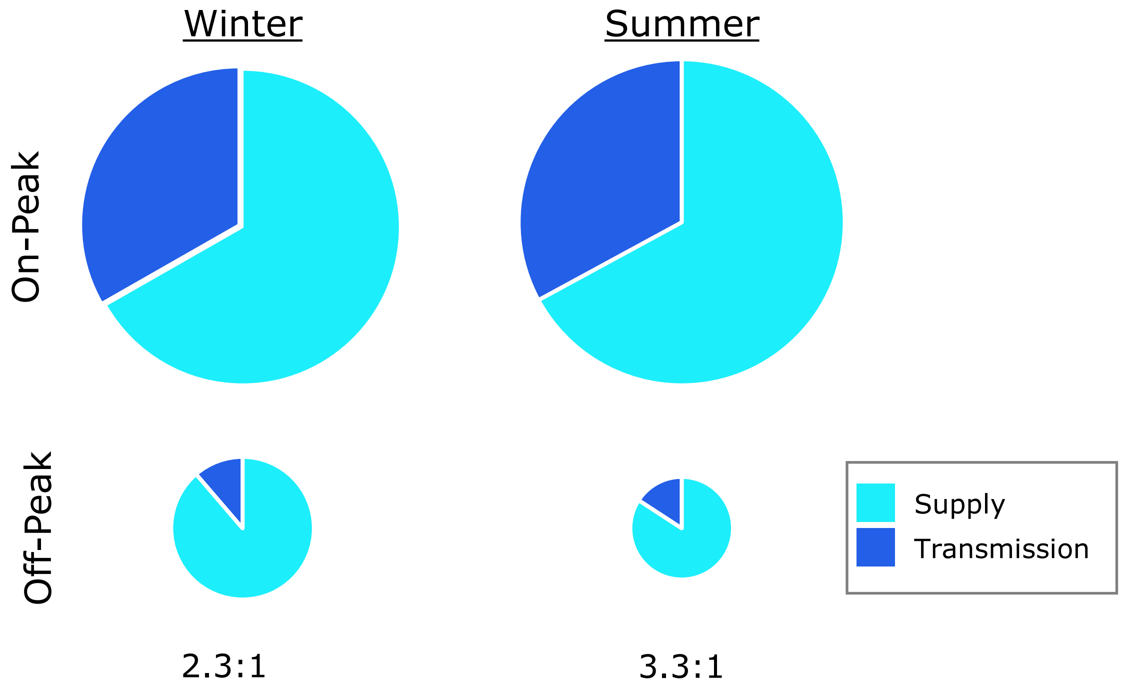
Direct Energy RRO and competitive offers
Fort McMurray

Residential RRO	
Month	**Variable Price**
May 2023	16.779 ¢
Apr 2023	20.134 ¢
Mar 2023	13.500 ¢
Feb 2023	13.500 ¢
Jan 2023	13.500 ¢
Dec 2022	21.768 ¢
Nov 2022	17.597 ¢
Oct 2022	18.190 ¢

Shopping Site Listings, 5/8/2023				
Retailer	**Term (Months)**	**Rate (¢/kWh)**	**Admin ($/Mth)**	**Est. Bill ($/Mth)**
Direct Energy RRO	-	16.779 ¢	$ 14.26	$ 246.66
ATCO Energy	12	15.990 ¢	$ 8.99	$ 236.91
Encor by ENCOR	60	12.790 ¢	$ 7.23	$ 217.95
Easymax by ENMAX	60	12.790 ¢	$ 8.50	$ 219.28

Price signals tell customers every kWh is the same…

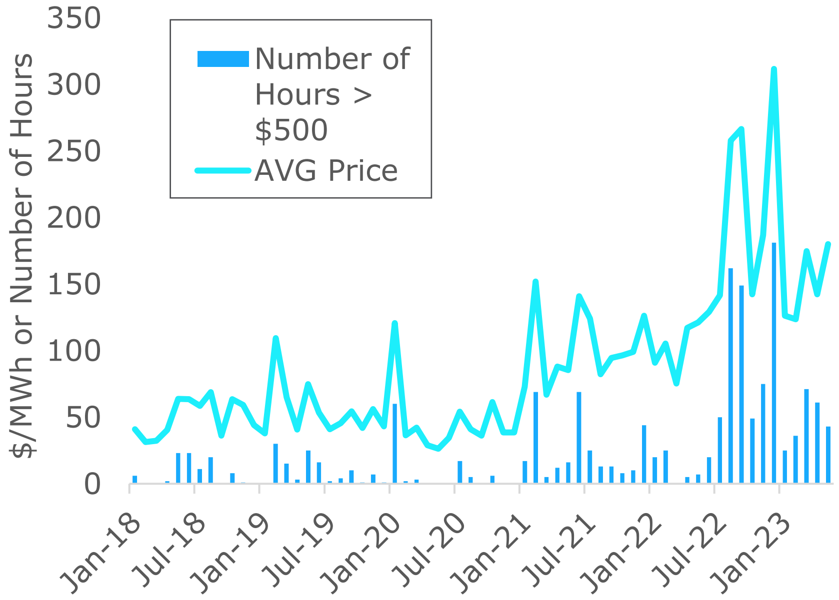
Alberta RRO could have a TOU supply price spread of 2x - 3x



- Four 3-month pricing seasons and on-peak hours 7am-11 pm.
- The supply prices shown based on hourly 7x16 and 8x16 AESO settlement prices, Jan-18 to Apr-23.
- There is no capacity cost element.
- Residential transmission rates modeled to mirror C&I allocation between energy and demand, with demand-related charges applied to on-peak and energy-related charges split between on-peak and off-peak. Assumes usage is 72.5% on-peak.

…And they don't respond to cost peaks

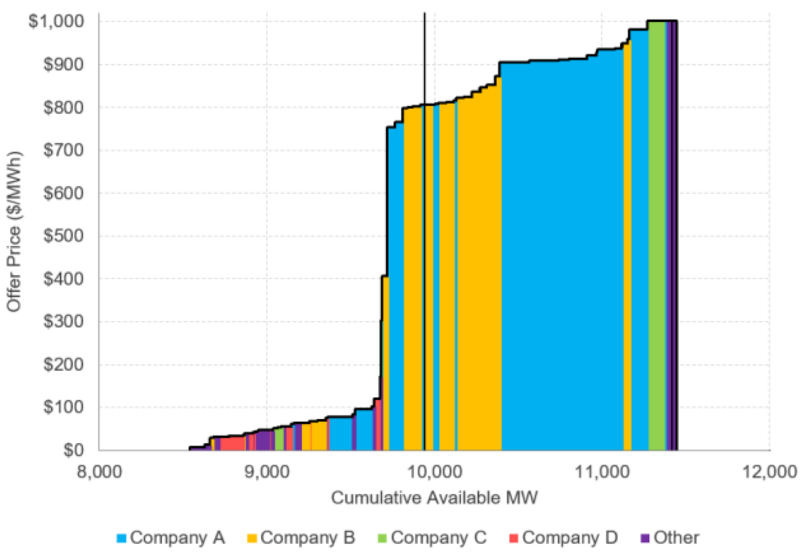
Alberta Monthly Pool Price



Source: AESO.

Clever Suppliers, Dumb Demand

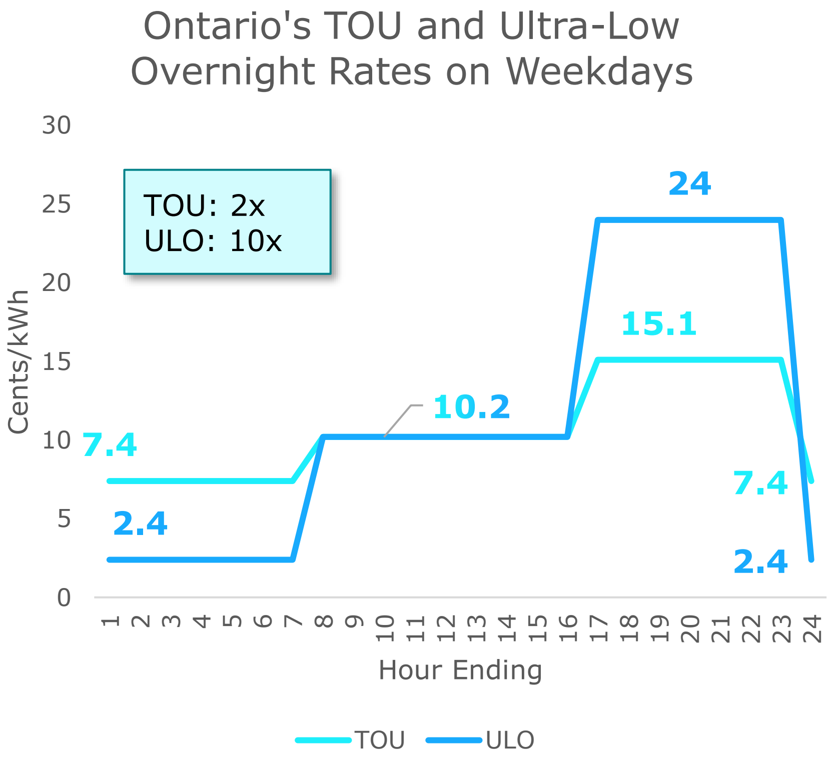
Figure 24: Illustrative Q3 2022 supply curve (August 10, 2022, HE15)



Source: Market Surveillance Administrator, [Quarterly Report for Q3, 2022: Selected Findings], Nov 15, 2022, slide 16.

Ontario's new, peakier TOU plan

- Time-of-use is the default plan for customers of a regulated utility in Ontario
- Beginning May 2023, utilities are allowed to offer a new, peakier TOU plan called Ultra-Low Overnight (ULO)
- Pilot programs have shown the peakier TOU evokes more demand response



Someone, somewhere, has to face a price signal for demand activation to happen

Default ‘opt-out’ rate should be Time-of-Use with substantial differentials between tiers + potential critical peak pricing feature

Retailers can be positioned to offer time-varying rates or incentive- or rebate-based DR, but only if they

- Get to manage not just energy supply costs, but all rate elements
- Get access to AMI data / have customers’ loads settled on AMI
- Present the customer bill

Public investment/standards for devices

Travis Kavulla

Vice President, Regulatory Affairs

(406) 788-3419

travis.kavulla@nrg.com