



**London Economics International LLC**

# **System and tariff impacts of increasing distributed resources**

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# DER system impact increases need for greater scrutiny of large scale investments that are justified with long time horizons



- ▶ Large centralized systems increase potential for stranded costs

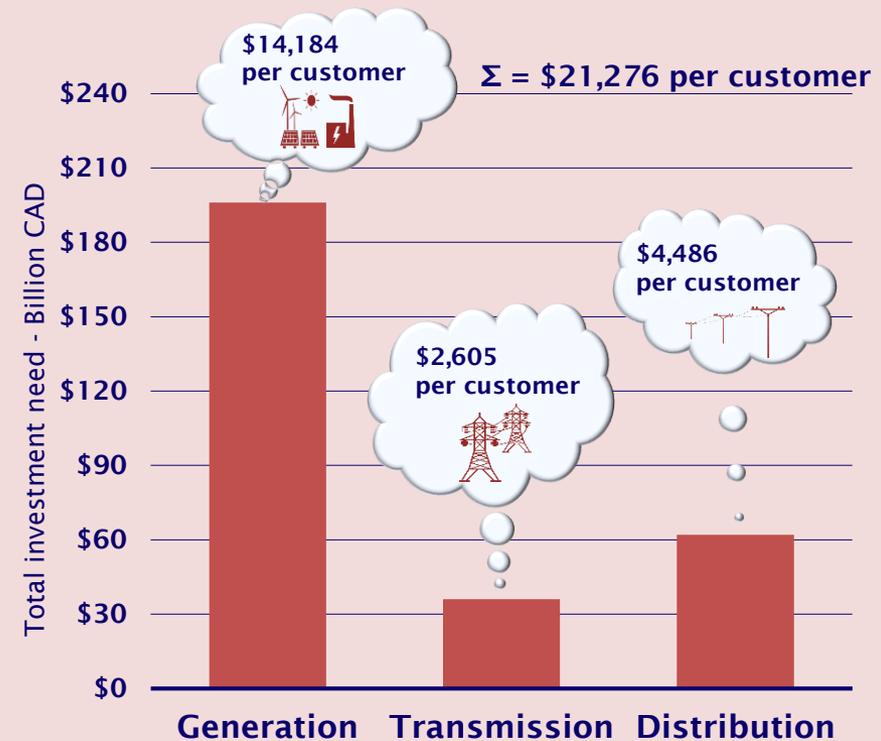


- ▶ Load forecasting abilities have been poor, and are getting worse
  - Some DERs are invisible to planners, especially at ISO level
  - Energy efficiency continues to reduce load growth
  - Demand response leads to more efficient grid utilization



- ▶ Aggregate customer demand for “reliability” is likely lower than is incorporated in current plans

## Estimated infrastructure investment needs in Canada - 2010 to 2030



Note: 2010 dollar figure. Per-customer investment calculated using an estimated Canadian utility customers figure of 13.8 million

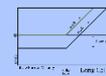
## Cost of service ratemaking needs to be replaced with value to customer pricing

- ▶ End of vertical demand curve may mean end of ability to pass through full historical cost of service
- ▶ More nimble utilities will derive value from their coordination role, rather than asset ownership
- ▶ High fixed rates to maintain connection will drive grid defection
- ▶ Concepts from options valuation can be used to develop more diverse backup offerings

### A network connection is a real option



Fixed charges represent an options **premium**



Volumetric charges are effectively the **strike price**



**Volatility** arises both through wholesale supply passthrough and operational characteristics of DER alternative

## Utility's role as "orchestra conductor" suggests different mode of pricing is necessary

- ▶ Utilities need not own assets to perform their function  
BUT  
they need to be appropriately compensated
- ▶ Fee structure added to service contract costs can put utilities in equivalent financial position to current CoS model
- ▶ Returns are a tiny portion of final consumer rates

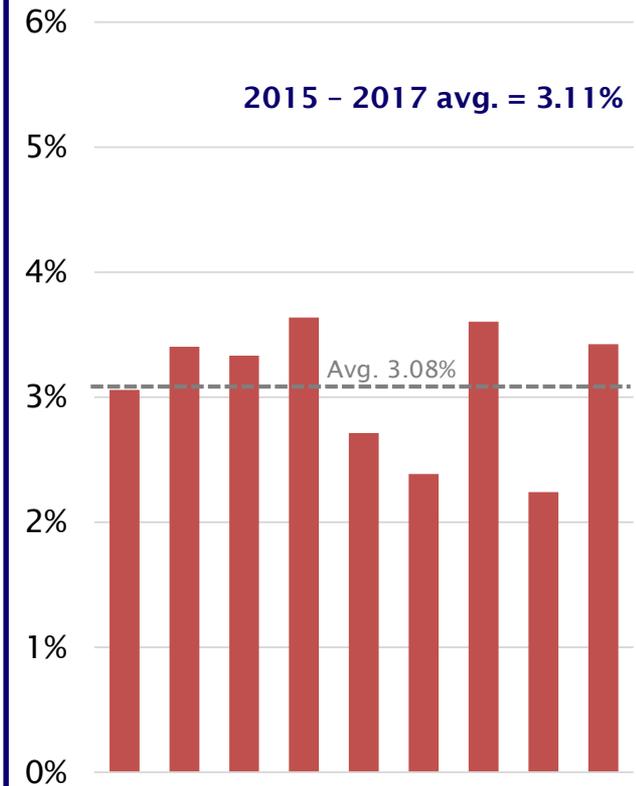


### California IOUs implement DER pilot with balancing account incentive for later recovery



- ▶ Utility payments are calculated annually on pre-tax basis:
  - 4% applied to the annual payment for the DER alternative; OR
  - 3% applied to the avoided cost of the traditional alternative
  - Incentive payments continue until deferral period ends
- ▶ Utilities record value of incentive in Energy Resource Recovery Account, only if deferral of traditional distribution expenditure was achieved

### Observed Return on Assets ("RoA") for FY2017

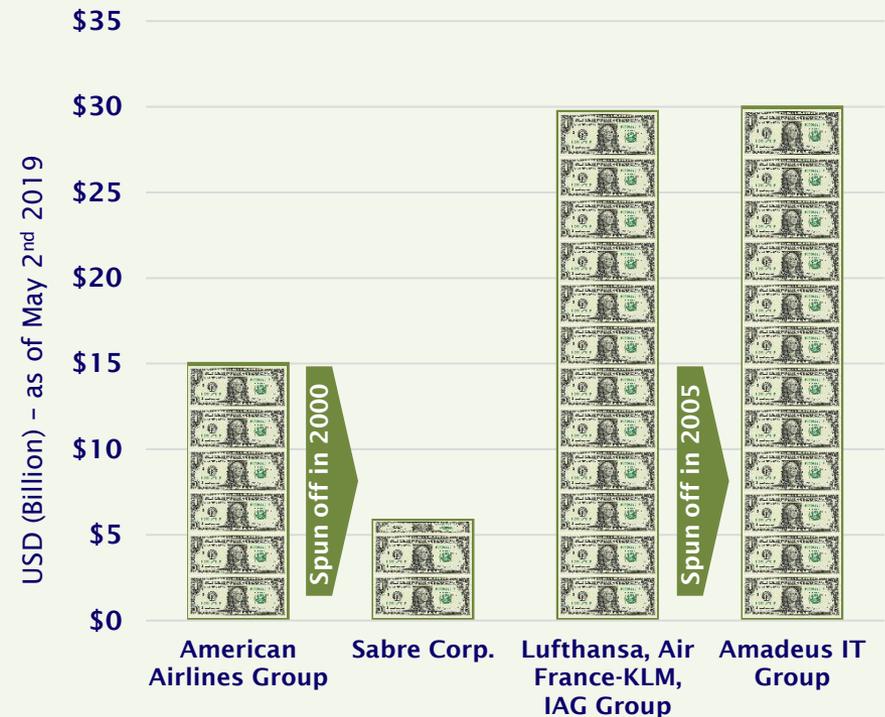


Note: sample consists of nine Alberta and Ontario regulated wires businesses

# Utilities may evolve towards attaining a greater proportion of revenues from data sales

- ▶ Regulators will need to consider how data can be standardized, anonymized, and disseminated
- ▶ Data will fall into three categories:
  - Paid for through rate base and made generally available
  - Paid for by shareholders and monetized at shareholder risk
  - On request and paid for by requestor
- ▶ Data may come to be seen as similar to items like pole revenues; as regulated asset earns additional revenues, these are shared according to rules set by regulators

## Market capitalization of airlines versus the reservation systems they spun off



Note: the Amadeus booking system was jointly formed by an alliance of airlines including Lufthansa, Air France (now Air France-KLM, and Iberia (now IAG group).

# Regulators are going to need to focus more on interconnection rules, studies, and costs

*What's really inside this big, black box?*



- ▶ **Interconnection studies are a source of rising frustration for developers**
  - Inconsistent across, and sometimes within, utilities
  - Little clear justification for costs
  - No “what if” analysis to aid in project reconfiguration
  - Not delivered timely
- ▶ **Regulators should consider the following remedies**
  - Clear standards
  - Rapid challenge or ombudsman process
  - Greater information available upfront on system loading and available capacity
  - Allow developer to use own contractors to perform work to utility standards
  - Require studies to suggest alternative, lower cost configurations
  - Fund proper resourcing of relevant department in rates
- ▶ **Developers should be viewed as customers instead of threats**

# While DERs should be facilitated, they should not be favored

## DER Benefits

- ⊕ Increase resiliency
- ⊕ Allow customers to choose desired level of reliability
- ⊕ Assist in deferral of system investment
- ⊕ May reduce line losses
- ⊕ Potential emissions reductions

## DER Costs

- ⊖ Force careful thinking regarding backup services
- ⊖ Grid benefits, are, if any, location specific, and potentially time-limited
- ⊖ Customers may return to grid suddenly
- ⊖ Create planning challenges

**Regulators should be cautious about allowing indiscriminate adders for DERs, but persistent in forcing distributors to identify areas of system stress and seek technology and ownership neutral solutions**

# Increasing DER potential leads to a number of “new rules” for the utility sector



Don't build big stuff



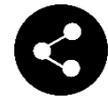
Shorten your time horizon



Don't assume you can raise rates



Reliability is overrated



Your data doesn't belong to you



You don't need to own it to make money

AND



Flexible, customer centric utilities (and regulators) are here to stay



# LEI has a comprehensive understanding of the issues faced by utilities and regulators alike



ASSET  
VALUATION,  
PRICE  
FORECASTING  
& MARKET  
ANALYSIS



REGULATORY  
ECONOMICS,  
PERFORMANCE  
-BASED  
RATEMAKING  
& MARKET  
DESIGN



EXPERT  
TESTIMONY  
&  
LITIGATION  
CONSULTING

- ▶ Exhaustive sector knowledge and a suite of state-of-the-art proprietary quantitative modeling tools
  - Wholesale electricity market models
  - Valuation and economic appraisal
  - Due diligence support
  - Cost of capital database
  - Contract configuration matrices

- ▶ Market design, market power and strategic behavior advisory services
  - Electricity   ▪ Natural Gas   ▪ Water
- ▶ Incentive ratemaking
  - Quantify current and achievable efficiency levels for regulated industries
  - Convert findings into efficiency targets mutually acceptable to utilities and regulators

- ▶ Reliable testimony backed by strong empirical evidence
- ▶ Expert witness service
  - Material adverse change
  - Materiality                   ▪ Cost of capital
  - Market power               ▪ Tax valuations
  - Contract frustration



TRANSMISSION



RENEWABLE  
ENERGY



PROCUREMENT

- ▶ Creating detailed market simulations to identify beneficiaries and quantify costs and benefits from proposed transmission lines
  - Valuing transmission
  - Transmission tariff design
  - Procurement process and contract design

- ▶ Renewable energy policy design, procurement, modeling, and asset valuation
  - Solar, wind, biomass, and small hydro
  - Demand response   ▪ Cogeneration
  - Energy efficiency   ▪ Micro-grids
  - Emissions credits trading
  - Energy storage technologies

- ▶ Designing, administering, monitoring, and evaluating competitive procurement processes
  - Auction theory and design
  - Process management
  - Document drafting and stakeholder management