

PLUG 2019

PowerLogic Users Group Conference



Life Is On



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Presentation Outline

- Introduction
- Customer Drivers
 - Price and Reliability – a fine balance
- Market Drivers – Change is Constant
- Industry Stakeholders
 - How are they adapting?
 - Barriers to change?
- Emerging Business Models – Which direction to follow?
- Conclusions and takeaways
- Q & A



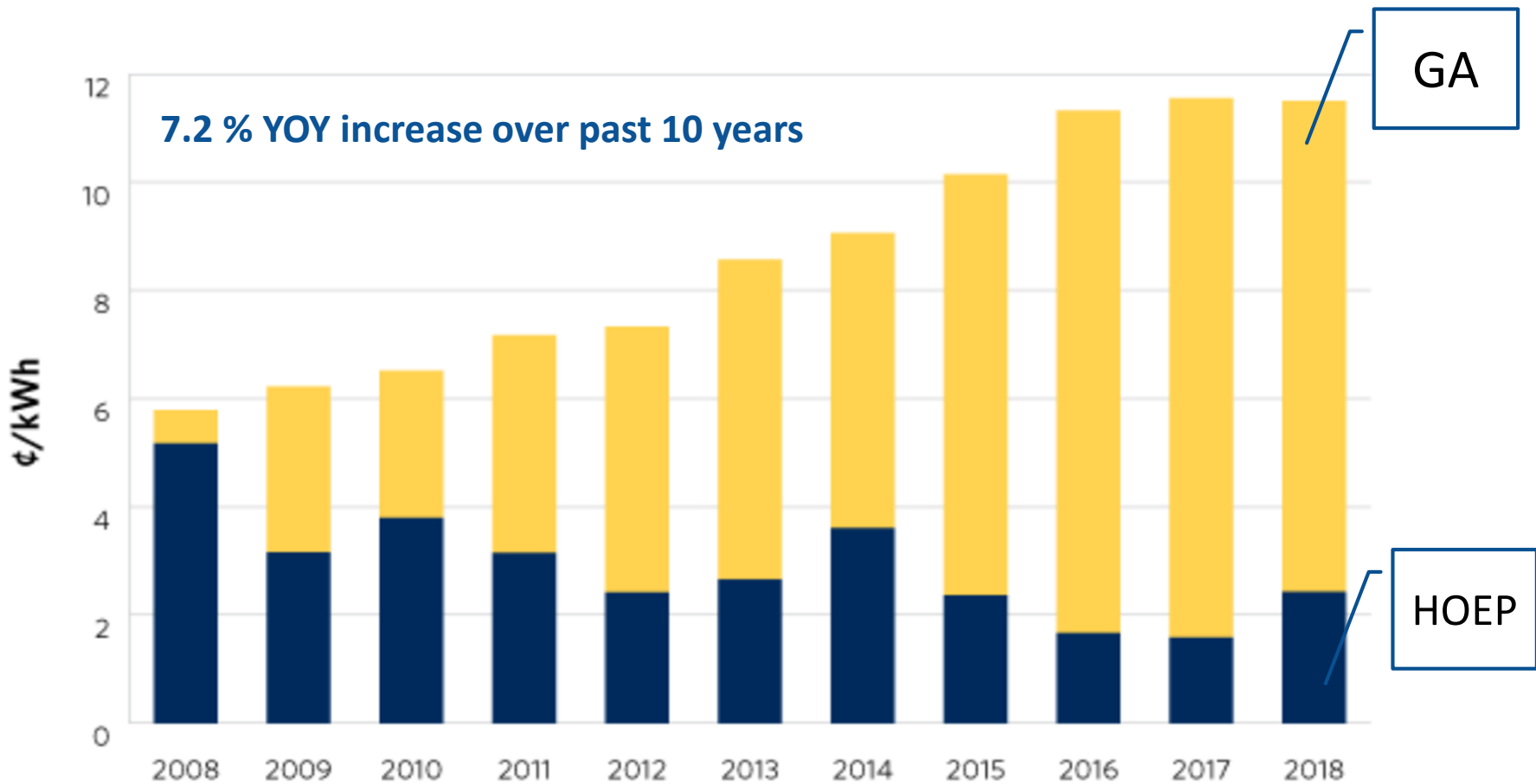
Customer Drivers – a fine balance

- ▶ Price
- ▶ Reliability & Power Quality
- ▶ Service



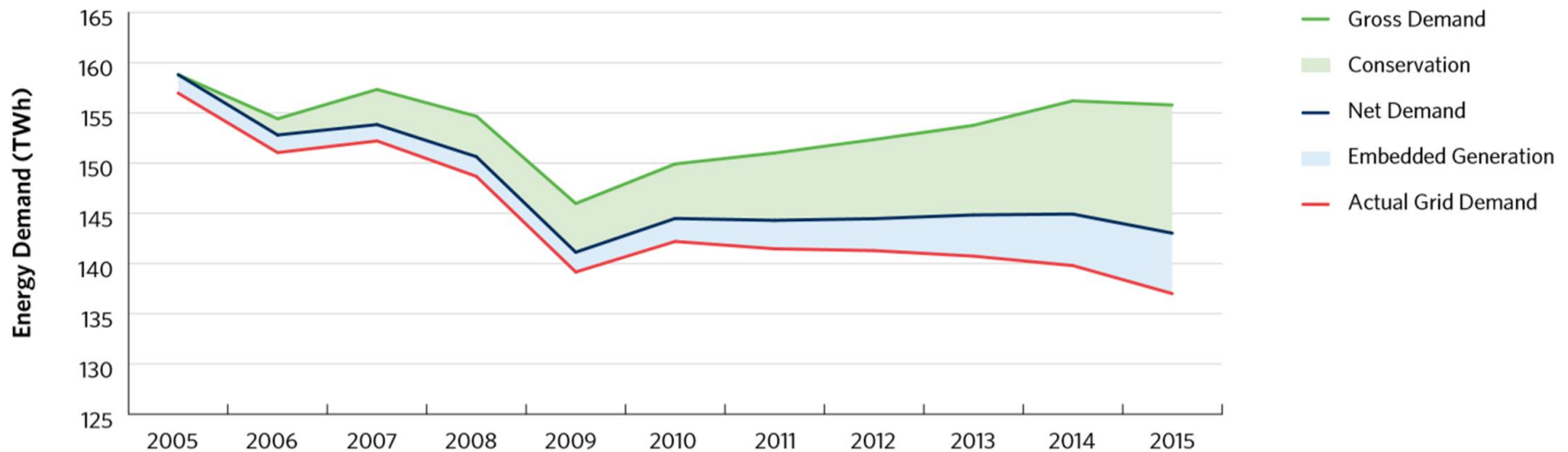
Customer Drivers – Price

Average HOEP plus Average GA



Customer Drivers – Consumption

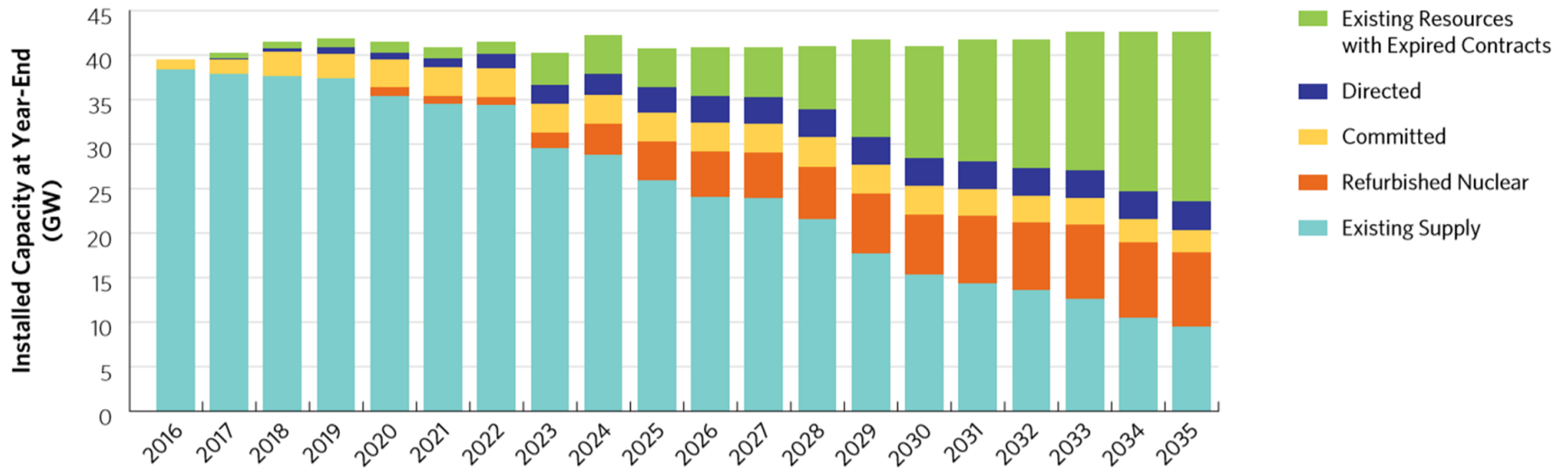
Figure 3: Historical Ontario Energy Demand³



- Despite YOY growth, consumption and demand has decreased.
- Conservation is one of the largest contributors to decrease.
- Technology and change in customer mix also large contributor.
- Expected to remain flat for foreseeable future.

Customer Drivers – Supply Outlook

Figure 12: Outlook for Installed Capacity to 2035



- IESO uses various scenario's to analyze supply needs.
- Flat to modest growth over next 15 years.
- Decision needed to re-contract existing resources.
- Less reliant on renewables.
- Price stability???

Customer Drivers – Reliability Investments



Infrastructure Renewal

.....a major cost over a long period of time.

Customer Drivers – Reliability & PQ

- Infrastructure renewal working and SAIDI and SAIFI improving.
- PQ becoming greater issue.
- Possible power quality events.
 - Voltage variation (sag/swell)
 - Voltage transient events
 - Harmonics
- System design standards lagging customer needs.
- PQ data needed – starts with PQ metering and sharing of information to overcome challenges.



Ideal Waveform



Transients

Sags/Dips



Harmonics

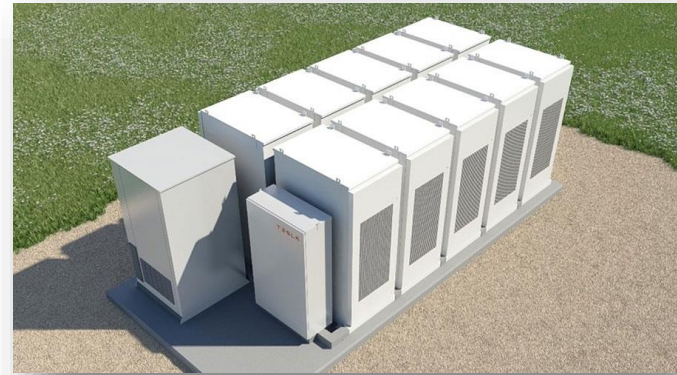


Industry Market Drivers

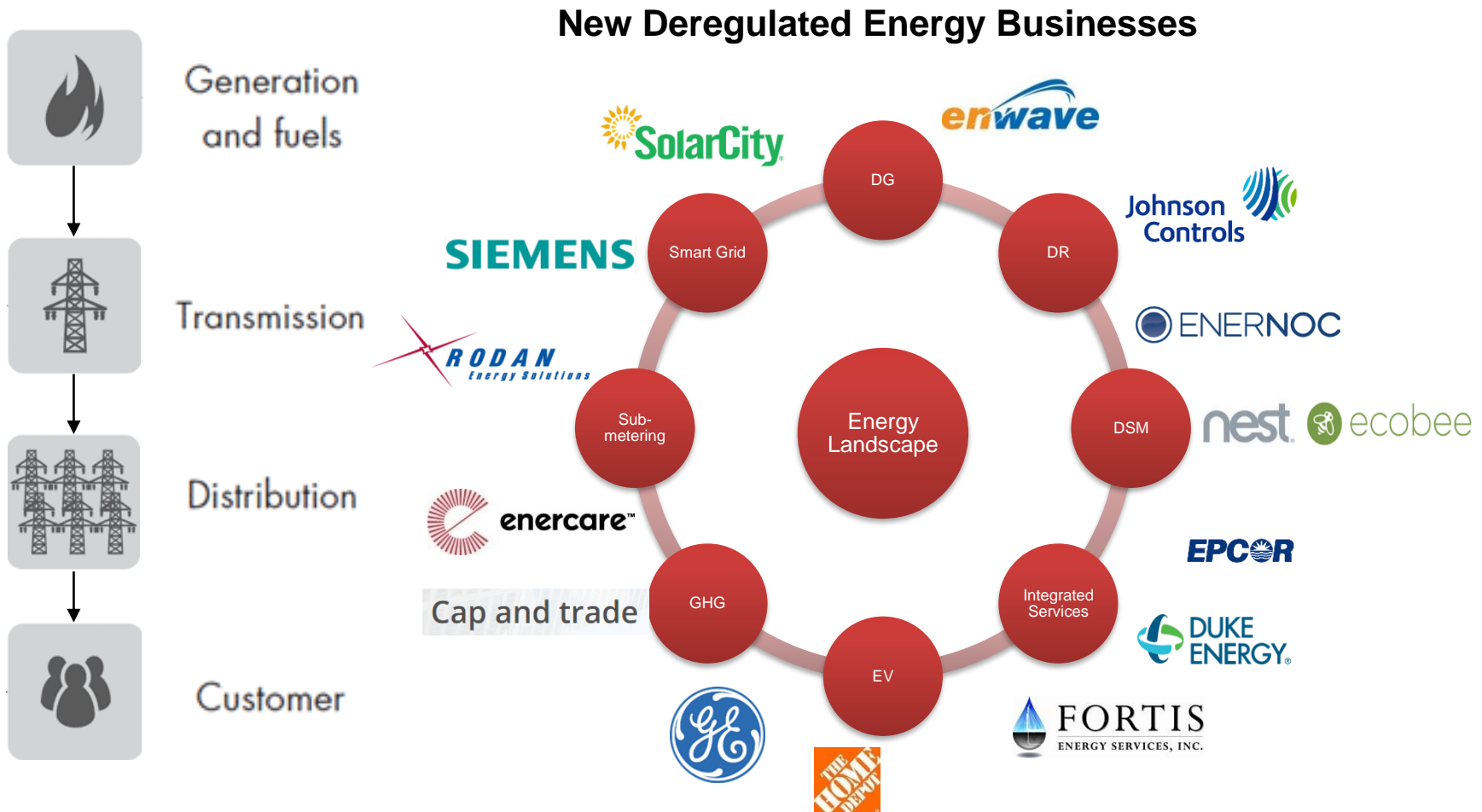


Disruptive Technologies

- Costs are decreasing as scale, penetration efficiency and volume increase. Many becoming investment grade applications without incentives.



Utility Landscape



Growing competitive threat to the traditional business model.
Decreasing loyalty – If you don't provide it, someone else will!

Utility / Industry Adaptation

▶ Inflection Point – Adapt or Die!

- Regulated or unregulated business model?
- How much risk appetite do they have?
- Can they put the regulated side of the business at risk?
- What's synergistic to their core business?
- Will they be a market maker or market follower?
- Do they have shareholder support / direction?
- Can they be competitive?

▶ Barriers

- Motivation – Monopoly and regulated rate of return – low risk.
- Financial strength and/or restrictions.
- Regulatory framework lagging.
- Shareholder commitment, risk appetite and support.
- Culture – 100+ years of traditional utility.

Emerging Business Models and Integrated Grid



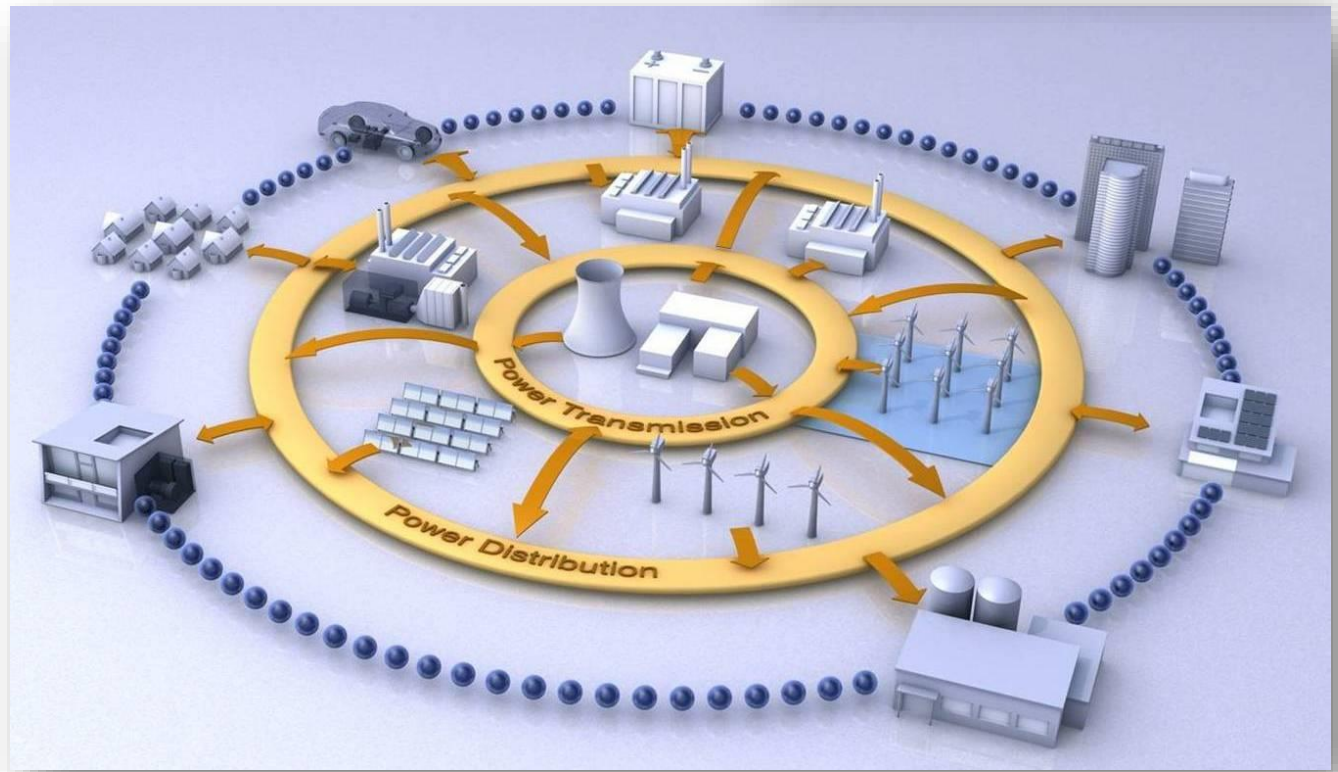
Mobile Customers

Intelligent

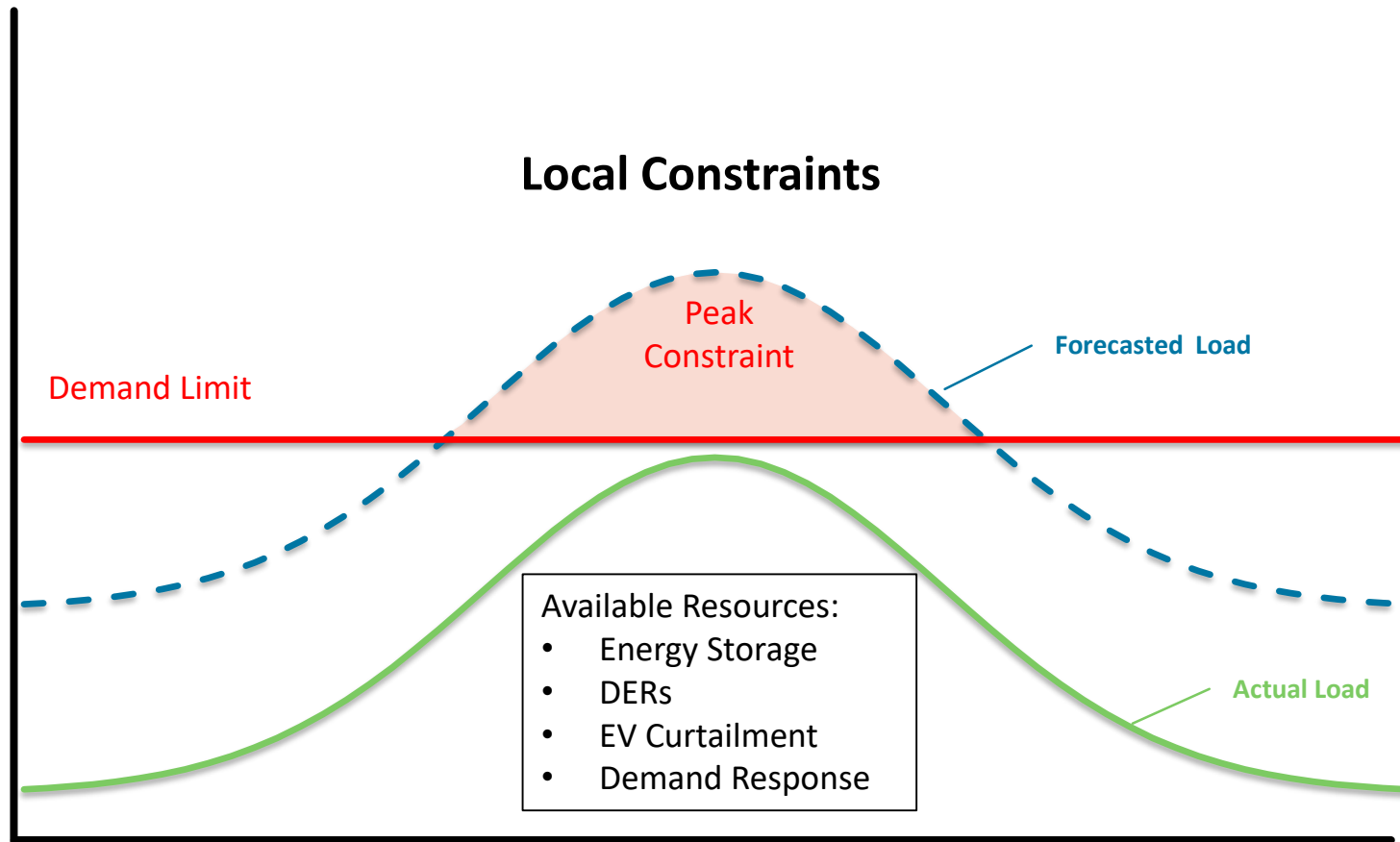
Distributed Generation

Energy Storage

Transactional



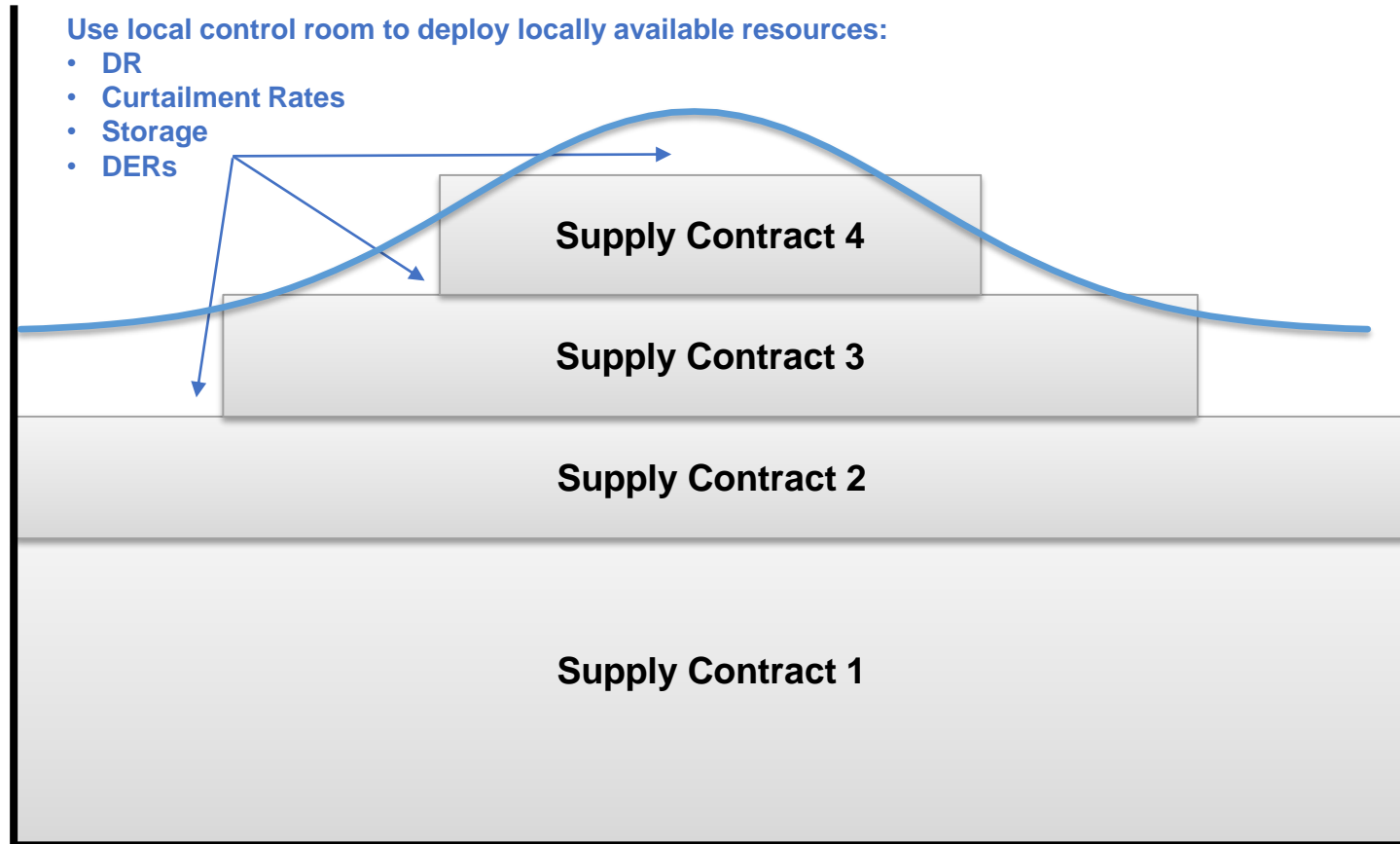
Integrated Grid and Non-Wires Solutions



Load Serving Entity (LSE)

- **LSE Definition:** An entity responsible for securing electricity resources to meet the needs of its customers.
- Different models across jurisdictions.
 - Vertically integrated (i.e. PGE).
 - Competitively procures supply (i.e. Con Ed).
- LSE role in Ontario defaults to the IESO.

Utility of the Future



LSE – Potential Benefits

- **Potential Benefits**
 - Improves planning – integrates DER, reliability and resource adequacy.
 - Enables more efficient decision-making regarding resource mix e.g. system needs, customer perspective, technology options, reliability and resiliency.
 - Allows government to set policy objectives, leaving planning and procurement with LDCs as decentralized integrated utility model.
 - Increases regulatory oversight to better ensure effective resource investment decisions and cost effectiveness.
 - Improves price signals and can lower costs (Rates).
 - Efficient risk allocation.
 - Enhances buy side participating.

Conclusions and Takeaways



- Change is a constant – The challenge is to determine the most likely direction?
- Waiting for a clear direction will be too late.
- Decide your role and where you can win with manageable risk.
- Be prepared to invest in foundational elements of the most likely direction and develop the tools, experience and resources to capitalize on the ensuing opportunities.
- **Adapt or Die** – The industry changes have their own momentum and they are going to happen whether you like it or not. **Remember**, if you don't provide what customers want, they will get it from someone else.

Thank You

