Utility of the Future

ComEd Presentation

Working Group 5: Electricity Markets

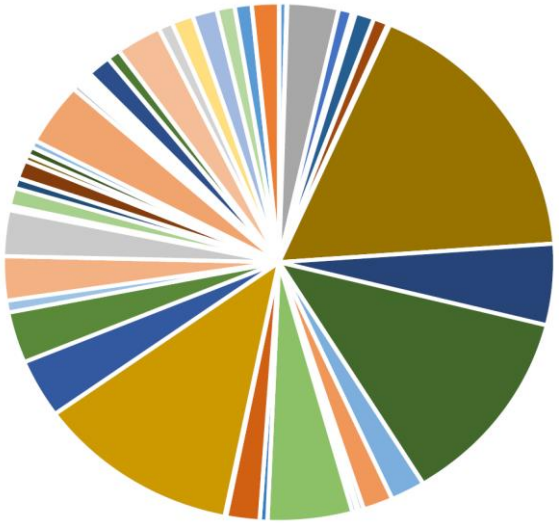
July 2018

ComEd
An Exelon Company

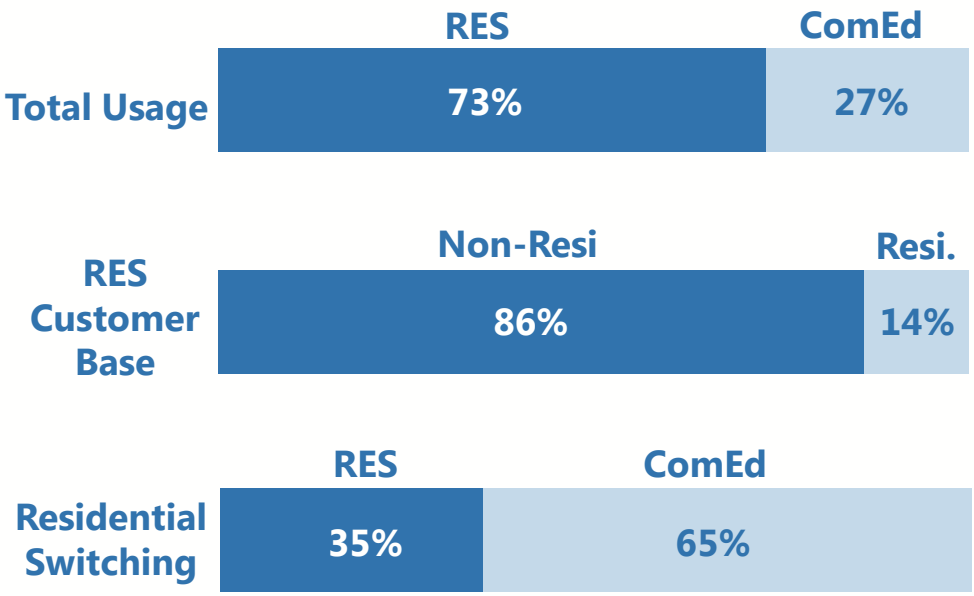
The ComEd territory retail market has active retail supplier participation, with moderate residential participation

Retail Supplier Participation

RES Market Share

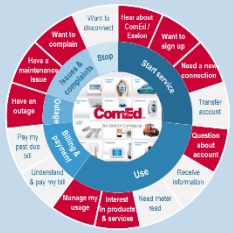
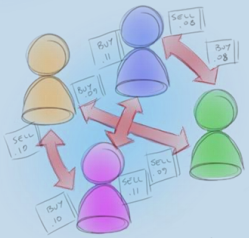
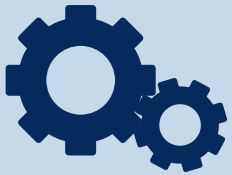
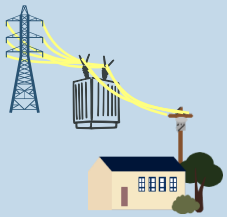
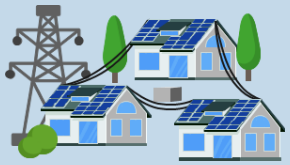


Customer Switching Stats

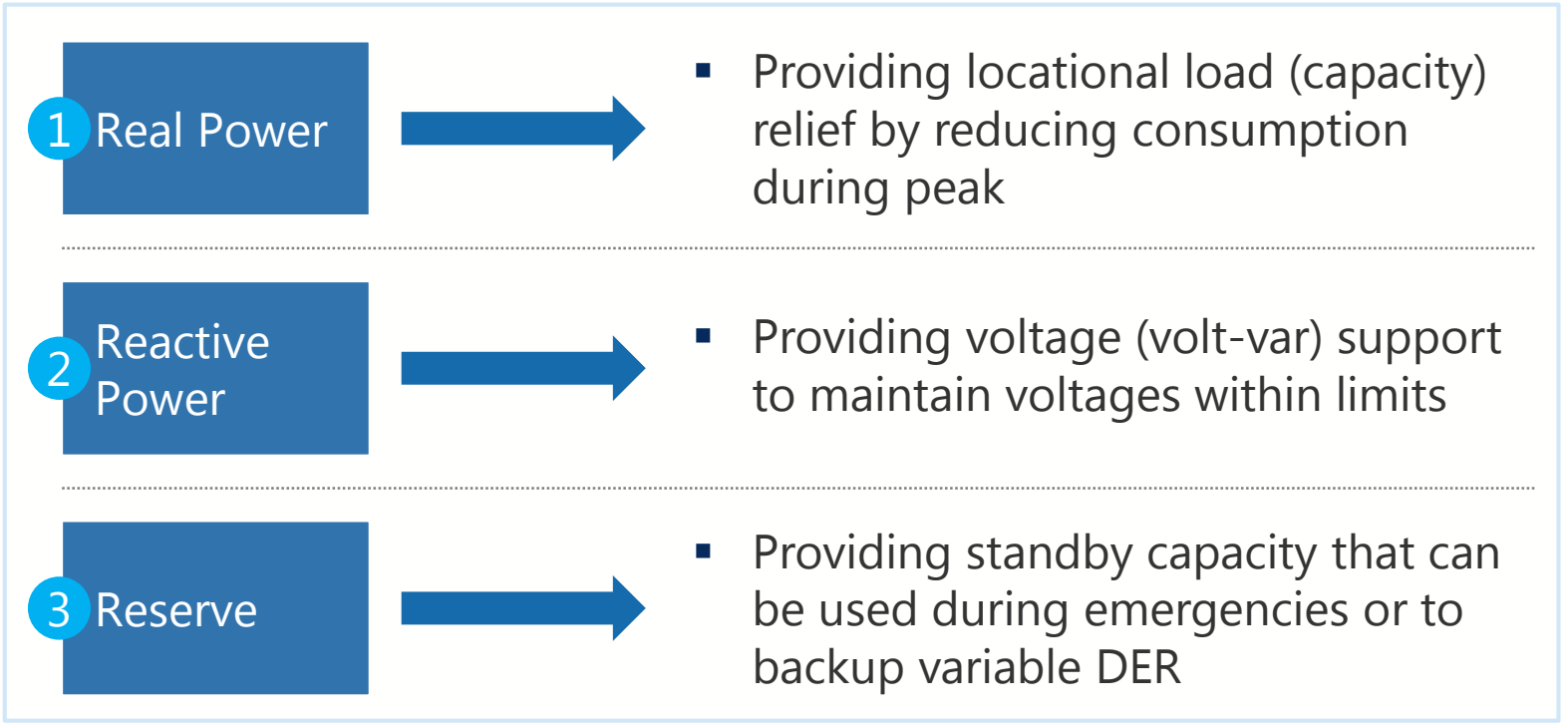


Diverse RES Community	• Statewide, 98 alternative retail electric suppliers are certified to serve retail customers in IL
Competitive Environment	• In ComEd's territory, 3 suppliers account for 42% of residential supply. That market is "unconcentrated" (HHI < 1500)
Major Players	• Largest suppliers by GWh sales are Constellation, Direct Energy, and Dynegy
Active Participation	• 84% of all non-residential load is provided by alternative retail suppliers in the ComEd territory; ~81% across Ameren zones
Aggregation Independent	• Only 39% of residential customers in the ComEd territory served by alternative retail suppliers are government aggregation customers
Market Concentration	• Ameren market more concentrated due in large part to a greater proportion of customers within government aggregation programs

Electricity markets can be a mechanism for accommodating increasing complexity of the power delivery ecosystem

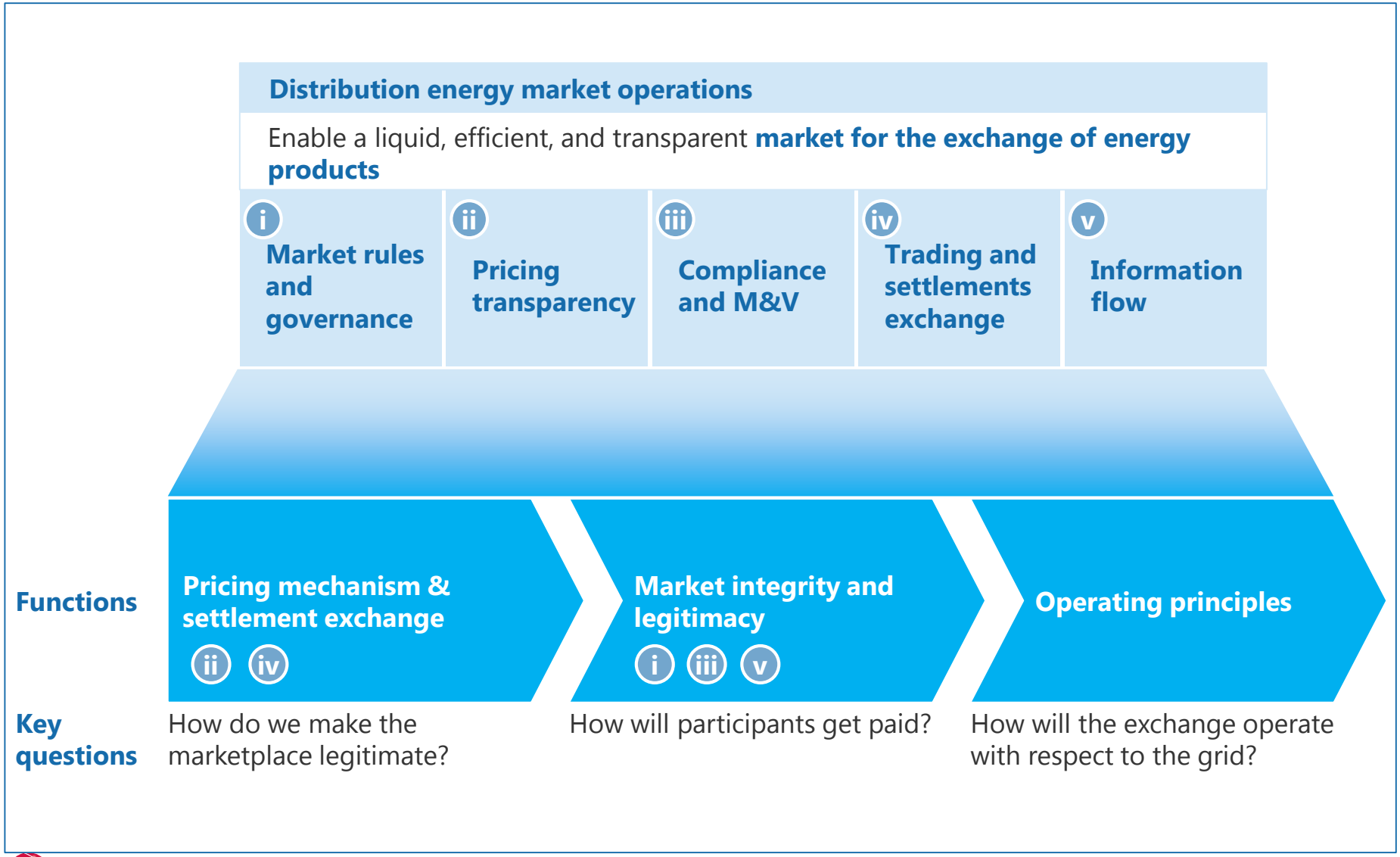
	FROM	TO
4 Services & solutions	 • Static web/mobile experience • Electric service support, program enrollment	 • Customer-side resources provide more choice/control • Customer resources support grid and are fairly compensated
3 Transactive commodity exchange	 • Flat tariff structure based on rate class • No sensitivity to location or temporal value of service • Only demand and consumption priced	 • Full real time exchanges (either bilateral or through a commodity exchange – e.g., D-LMP)
2 System operation and planning	 • Traditional planning to accommodate central station generation • Static long-term planning process	 • Real-time power quality assessment and reliability monitoring • Connected distributed architecture
1 Physical Asset Base	 • Traditional grid infrastructure • One-way power flows • AMI network	 • Mass market DER integration with traditional infra. • Two-way power flows • Fully transparent system

A distribution market would provide value through the following products with varying combinations



Markets are usually considered to include number of specific products. Distribution market products can be represented as one or more of the three R's.

There are a number of functions that must be considered to establish and sustain an effective market within our territory



Eight primary criteria will determine the value created by the market model; Any potential model will require tradeoffs between these criteria

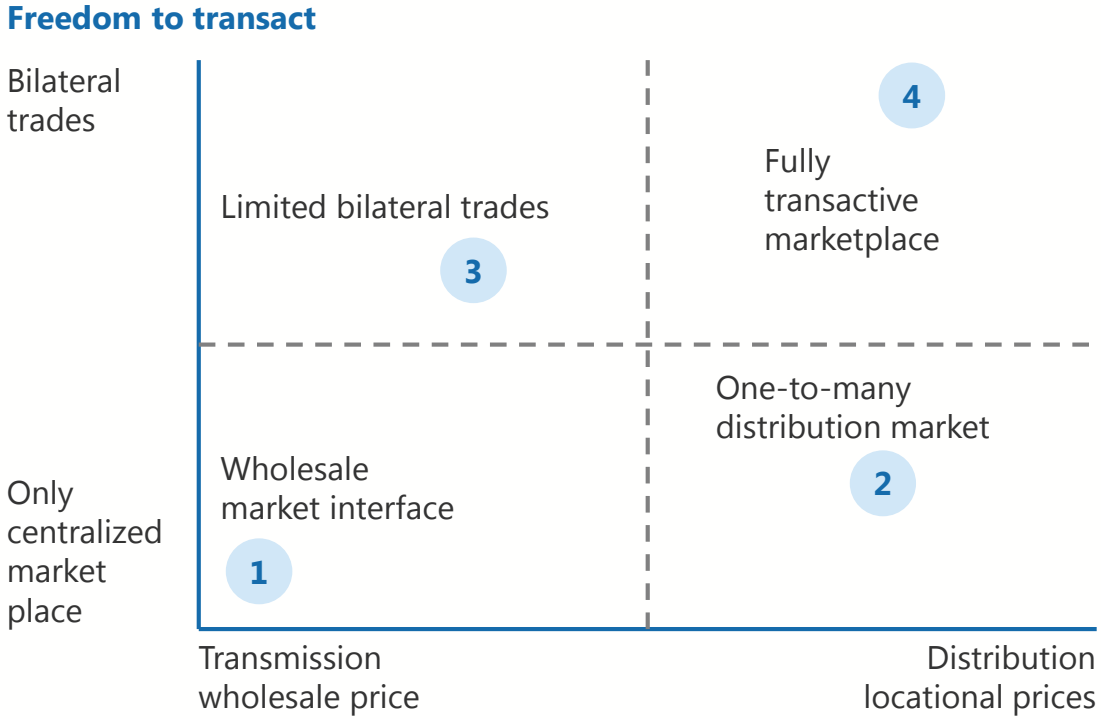
Investment efficiency	• Incentivize capital allocation to the most valuable investments on the distribution grid
Dynamic efficiency	• Provide price signals to encourage real time reactions to system reliability needs and demand/supply imbalances
Participant equity	• Ensure producer compensation and consumer rates reflects value of services rendered and avoid cross-subsidies; Ensure equal market access for all
Price stability	• Avoid volatility and risk in producer and consumer prices
Customer choice	• Enhance consumer freedom by providing access to all energy options available in the market
Simplicity & feasibility	• Ensure simple / convenient market designs that enhance access to the market and interpretability of market rules
Utility return stability	• Support low volatility returns that unlock access to affordable capital for grid investments
Impact to Grid Operations & Integrity	• Capture the impact on the integrity and reliability of the grid

Tradeoffs

- **No one model will yield maximum outcomes against all criteria.**
- **Tradeoffs must be considered** in designing the ultimate exchange, e.g.,
  - Real time transactive designs enable efficient pricing but increase volatility
  - Locational pricing enables equitable treatment but increases complexity

Source: Bonbright rate design criteria

There are several market design options for these products that can likely be deployed over time and eventually coexist



Capacity Markets
- Procure/ensure resource adequacy
- Solicit investment

Forward Markets
- Hedge the spot markets
- Reduce risk / incentivize investment

Spot Markets
- Physical and ensure balancing
- Maintain time reliability
- Interact with wholesale markets

Factors that determine movements across this landscape

- **Pricing mechanism:** Increased price specificity requires a sophisticated methodology for locational pricing (e.g., DLMP)
- **Type of participants:** Number of participants might shape the type of marketplace (full consumer access or limited access to aggregators)
- **Infrastructure:** High-end two-way communications and monitoring might be required as pricing complexity and volume of trades go up
- **Control of market power:** Regulating market power could be an important issue in a complex market structure