

Transmission-Distribution Coordination Considerations

Overview

- Introduction to Entegrus
- Review of coordination models
- The Distribution-Distribution interface
- Coordinating shared assets
- Impacts and limitations of distribution automation

Pulling heavily from concepts in the Jan 31, 2022
Presentation by Dr. Kristov.

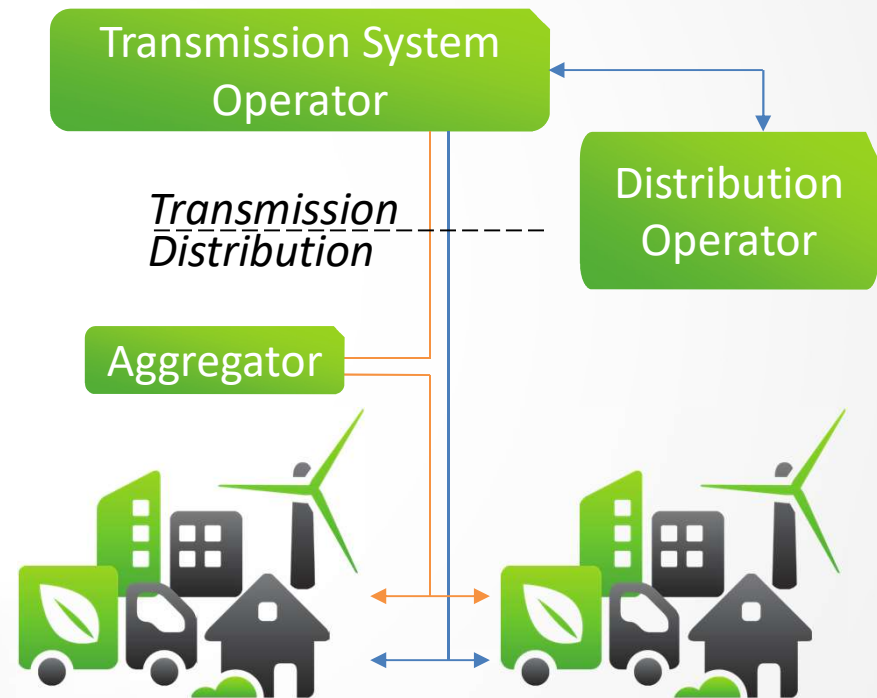
Entegrus Overview

- 60,000 customers, 17 communities
- ~140 sq/km service territory embedded within 5000 sq/km of southwestern Ontario.
- Mix of transmission and distribution connections



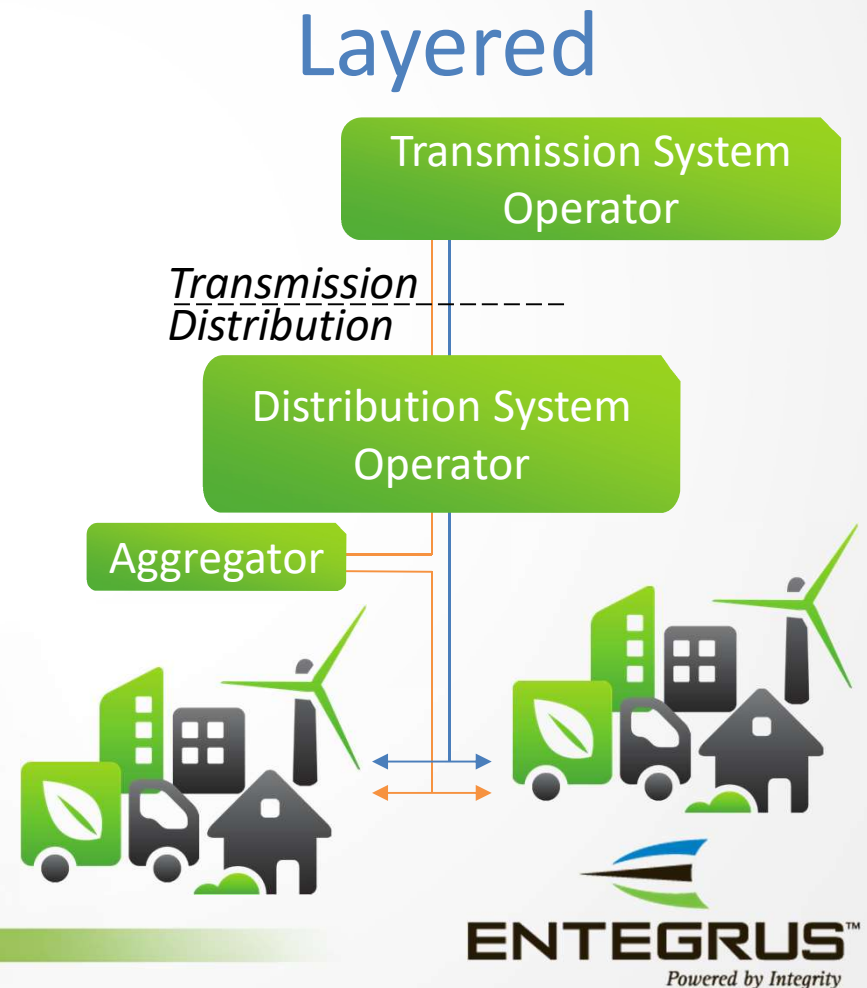
Centralized Framework

- Vertically integrated model drives decision making efficiency
- Significant central modeling complexity
- Concentrates systems and expertise
- Tier bypass issues

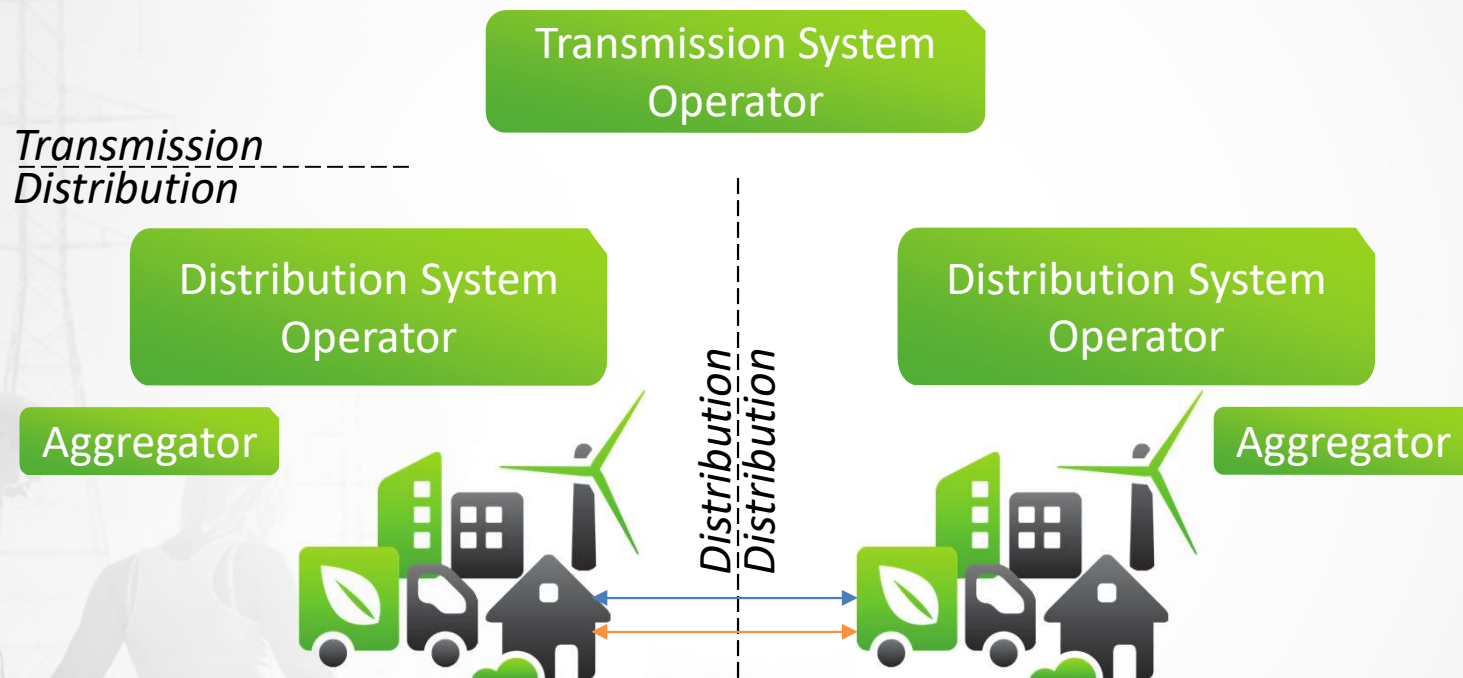


Layered Framework

- TSO only models to the distribution interface
- Localizes modeling and decision making
- Significant capabilities required at the DSO level



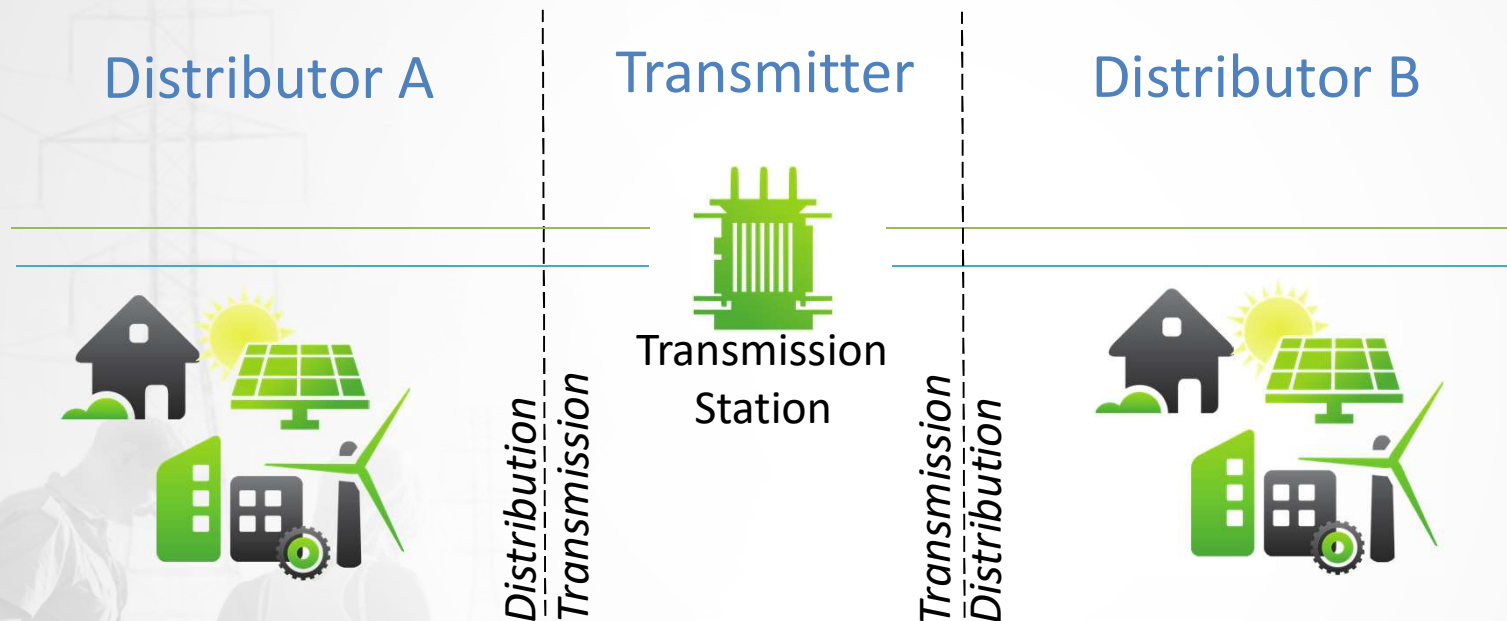
Distribution-Distribution Interface



- Approximately 60 Distributors (LDC's) serve Ontario's customers
- These LDC's range in customer count, service territory makeup & business systems
- Circuits and Station equipment are often shared between distributors^[1]

^[1] Hydro One acts as host distributor for 45 LDC's, and is embedded in 17
EB-2021-0110 Exhibit A, Tab 2, Schedule 3, Page 6

Shared Distribution Stations



- Multiple physical and structural distribution interfaces exist for a single transmission station with differing resources available on each
- Three-way coordination required to ensure optimal use of resources to meet local needs

Shared Distribution Feeders

Transmitter



Transmission
Station

Host Distributor



Embedded Distributor



Rural Community

- Aggregate Resources

Light Industrial

- DER Resources

- Dispatchable Load

Agricultural

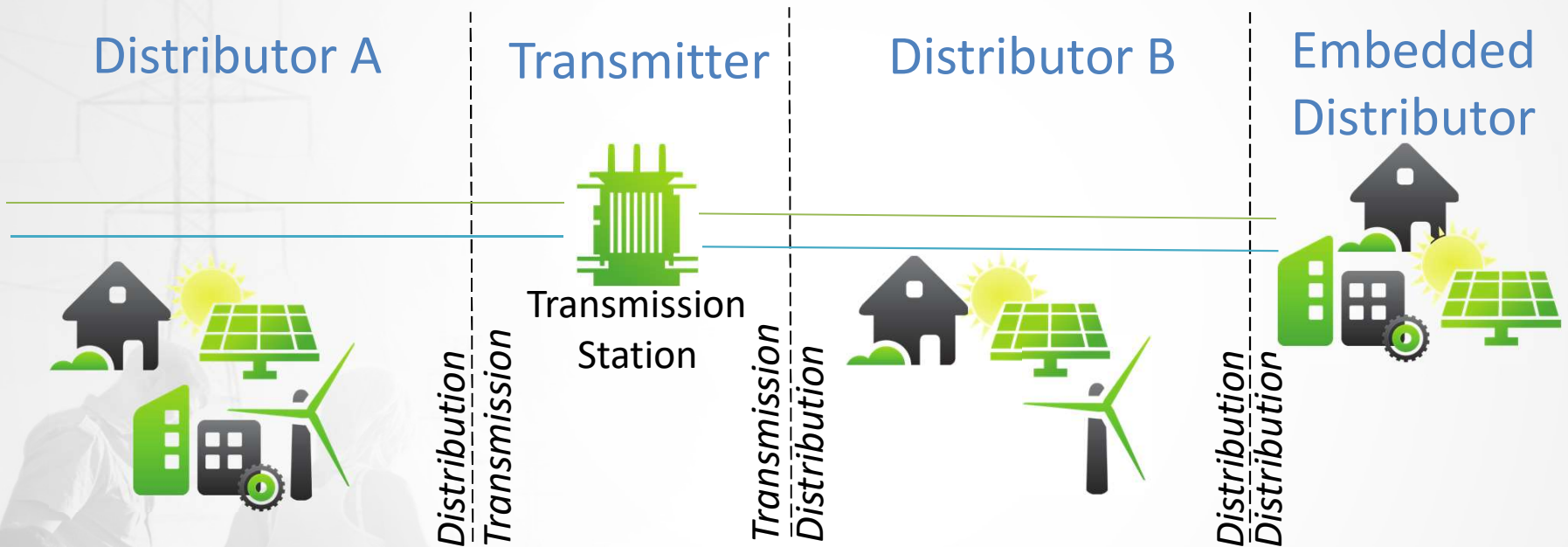
Transmission
Distribution

Distribution
Distribution

Coordination between distributors will be required to ensure that resources are being optimally used locally, while meeting transmission requirements.

- How do we ensure fair and equitable participation?
- How do we avoid or mitigate distribution level tier bypass?

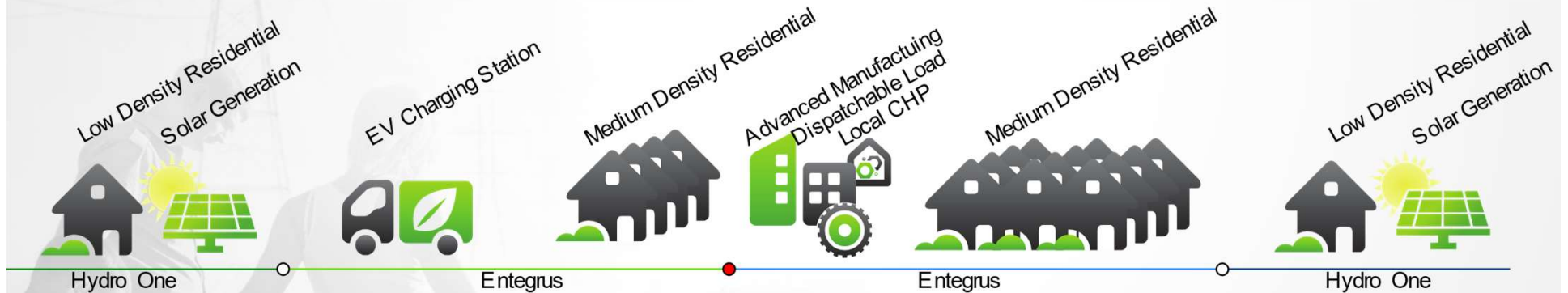
Highly Interconnected System



Both Situations considered previously do occur concurrently, and the proposed architecture must be robust enough to accommodate this complexity, without becoming too heavy to be able to respond quickly to system changes

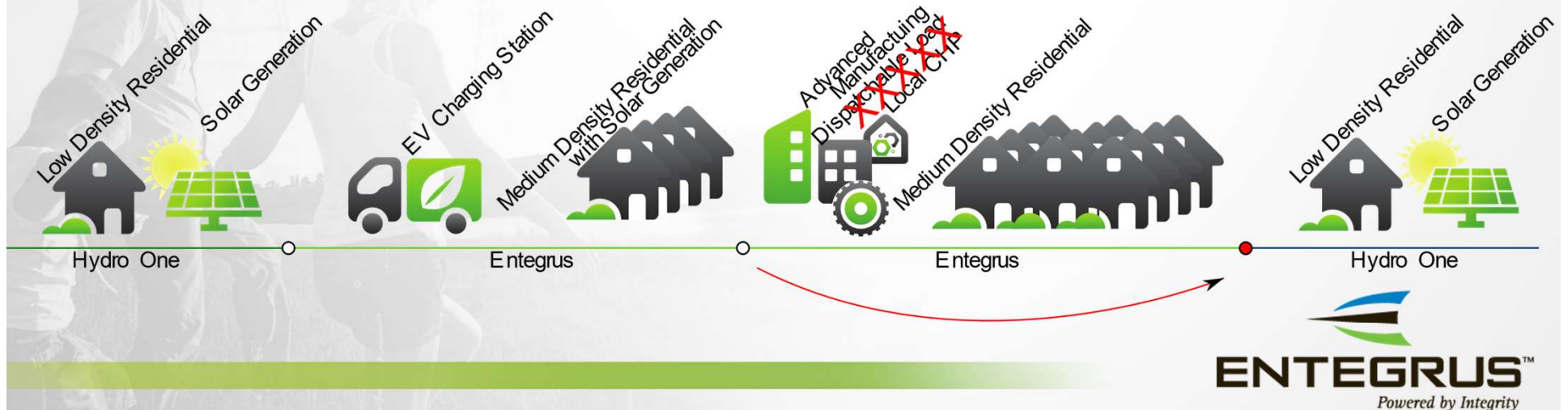
Distribution is a Dynamic System

- Distribution systems can be highly interconnected, with the ‘normal’ supply point changing over both short and long timeframes.
- Currently DER’s are considered only for a static system



Distribution Automation

- Allows the automated re-configuration of the distribution system in response to programmed stimuli
 - *Reliability, system loading, power quality or a dispatch signal*
- Improves system reliability and enables resource targeting
 - *Generation connections are currently only considered in a static fashion*



Needs & Opportunities

All models will require additional distributor expertise and capabilities, varying depending on the selected model.

- An effective treatment of the distribution-distribution interface
- Adequate resourcing requirements within distributors including time to build capacity as required

Questions?

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