



# DER AND DISTRIBUTION PLANNING

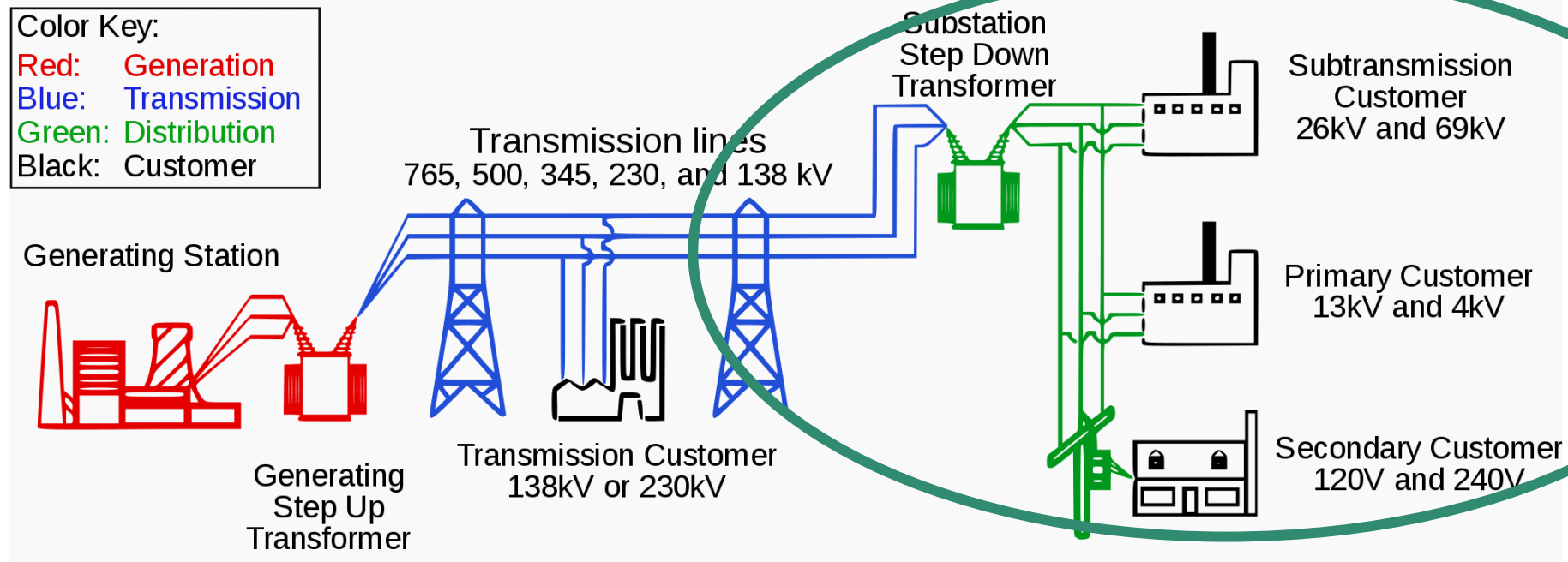
FEI WG

July 29, 2021

# DISTRIBUTION PLANNING

Planning determines what is needed to reliably and cost-effectively serve customers in the future.

Distribution planning drives the need for distribution facilities and transmission connection facilities that serve LDCs.



# HOW DER PROVIDE WIRE SERVICES

Wires services	CPUC WG definitions for DER provision of the wires service
Capacity	load-modifying or supply services that distributed energy resources provide via the dispatch of power output for generators or reduction in load that is capable of reliably and consistently reducing net loading on desired distribution infrastructure
Voltage support	substation and/or feeder-level dynamic voltage management services provided by an individual resource and/or aggregated resources capable of dynamically correcting excursions outside voltage limits as well as supporting conservation voltage reduction strategies in coordination with utility voltage/reactive power control systems
Reliability	load-modifying or supply services capable of improving local distribution reliability and/or resiliency. Specifically, this service provides a fast reconnection and availability of excess reserves to reduce demand when restoring customers during abnormal configurations
Resiliency	(microgrid) services are load-modifying or supply services capable of improving local distribution reliability and/or resiliency. This service provides a fast reconnection and availability of excess reserves to reduce demand when restoring customers during abnormal configurations.

# DER VALUE DEPENDS ON LOCATION

DERs do not have intrinsic value to ratepayers when they provide a wires service.

- For example, additional capacity has no value to ratepayers if the system already has enough capacity to reliably serve customers.

A DER's value will depend primarily on where it is connected to the distribution system and whether there is a need for a wires service.

DERs will only create value to ratepayers if there is a need and the DERs can satisfy the need based on their capability and location.

Each utility's planning processes will determine the value DERs could provide.

# OPPORTUNITIES & OBSTACLES TO DER WIRE SERVICES

## Opportunities:

1. Significant potential for DER development in Ontario
2. DER can be developed quicker and at a lower cost than wires
3. Small locational incentives are sufficient to drive DERs to the right places

## Obstacles:

1. Identifying locations with high distribution value
2. Unclear incentive/procurement mechanism
3. DERs are not perfect substitutes for wires – can DERs be relied on?



# FURTHER DETAIL AND REFERENCES

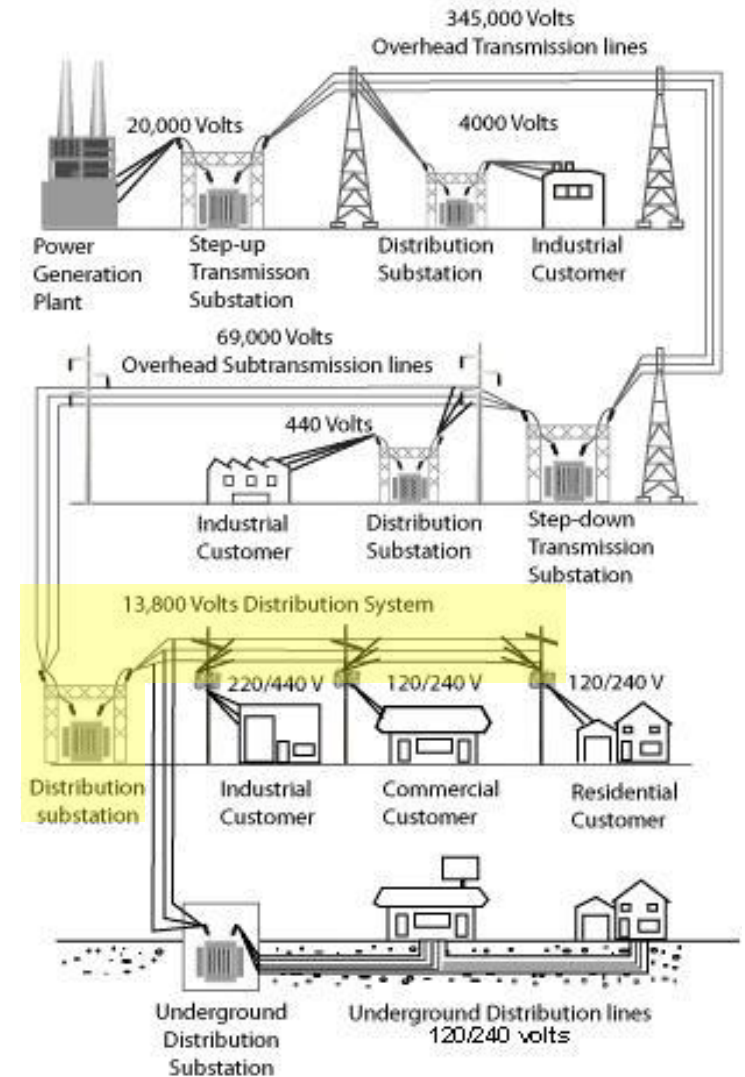
# DISTRIBUTION PLANNING EXAMPLE

This is a simple example of a capacity need.

In the next 5 years, the forecast summer peak demand is expected to exceed the capacity of a distribution substation and a distribution line. (highlighted yellow at right)

The utility's planners identify that the system needs additional capacity to reliably serve customers.

The utility considers its options and proposes to upgrade the substation and build a new distribution line.



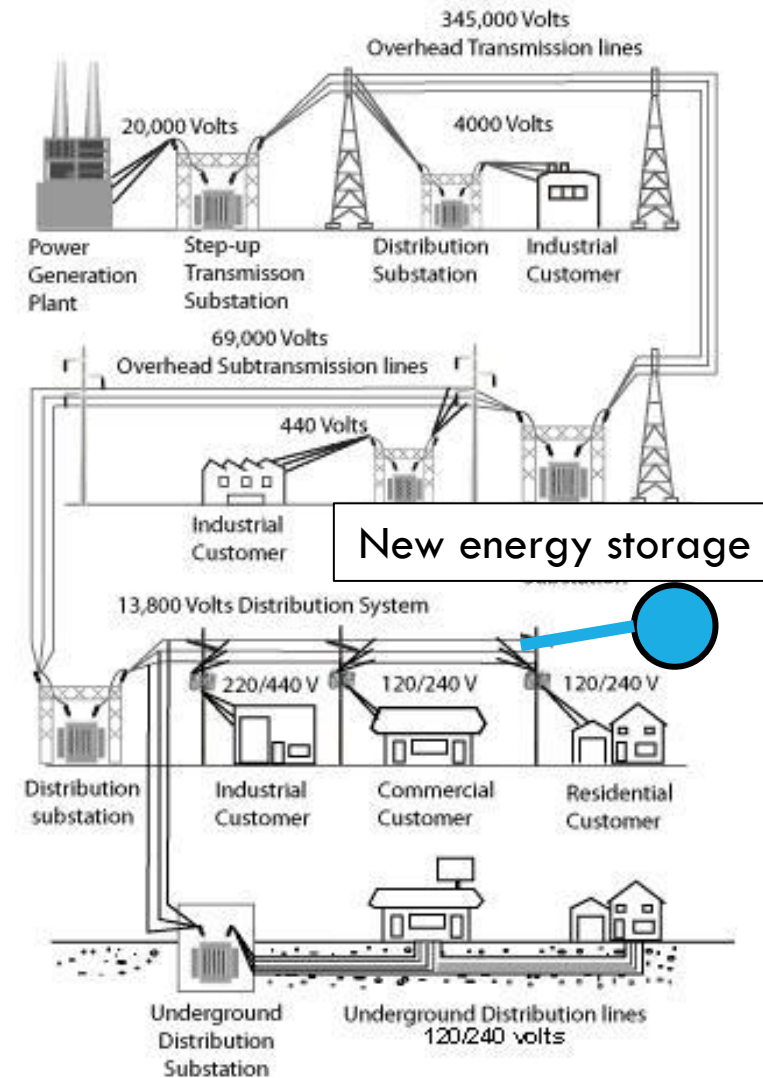
# DER PROVIDING CAPACITY EXAMPLE

A DER provider proposes an energy storage facility as an alternative to the utility's proposal.

The energy storage facility would be connected downstream of the substation and line with constraints. (shown right)

It would be worthwhile for ratepayers to develop the DER if the DER costs less than the wires proposal.

Ratepayers would only be willing to pay for the DER capacity needed to avoid building wires. Additional DER capacity has little incremental value to ratepayers.





# DER AS A SUBSTITUTE FOR WIRES

Wires are dedicated to providing wires services whereas DERs may not be dedicated to wires services.

Control and availability of DERs will affect whether utilities can rely on DERs to provide wires services.

- Example #1 – a small gas-fired generator participates in the IESO market and is called upon to provide a wires service. It has to violate its energy market dispatch of 0 MW to provide the wires service.
- Example #2 – an energy storage facility is participating in the IESO market and discharges to capture high energy price. It is no longer available later in the day to provide a wires service to the local utility.

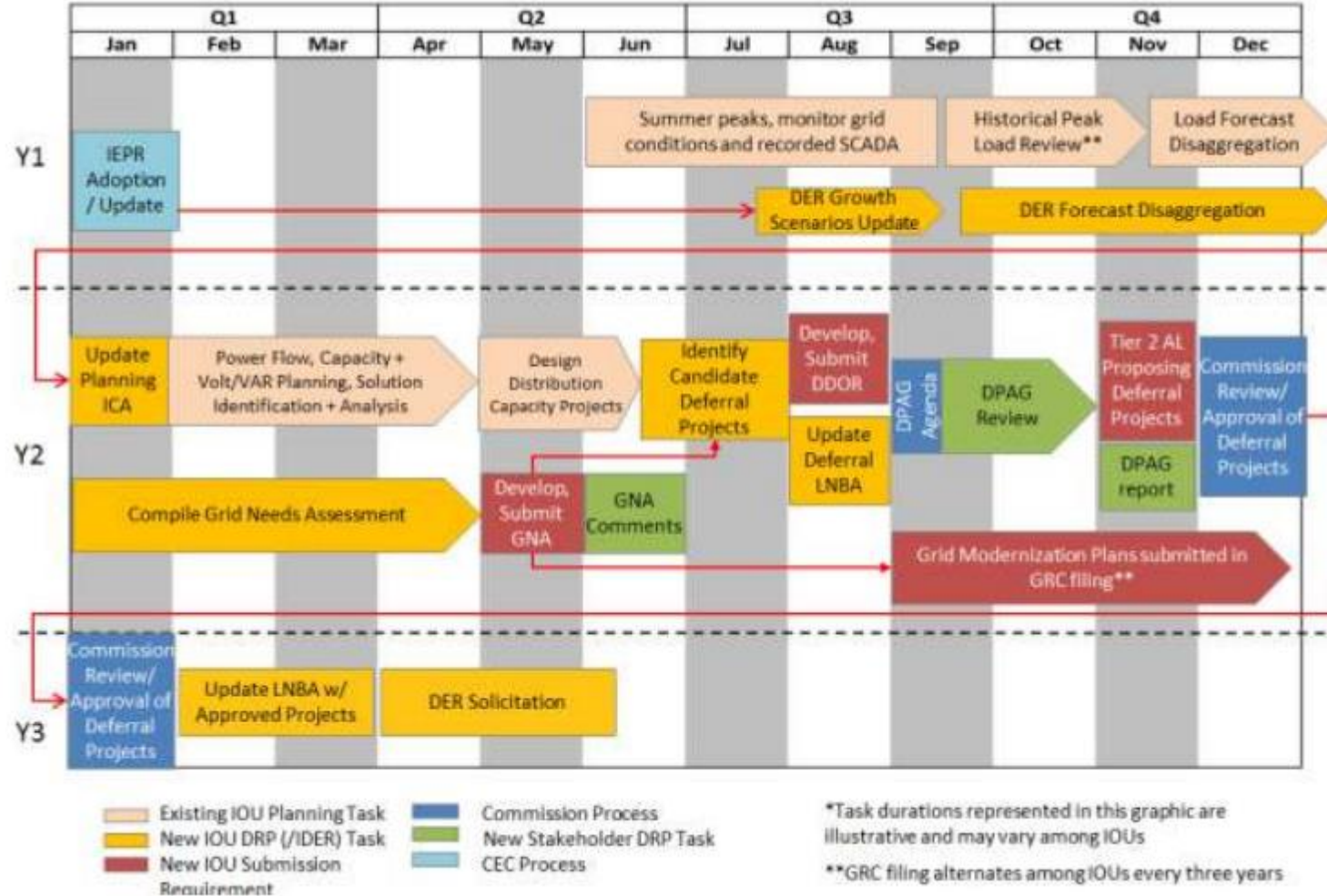
Key question: what requirements will utilities have for DERs to provide a wires service?

# CALIFORNIA DISTRIBUTION PLANNING

The CPUC and California IOUs have developed a process for identifying distribution needs that could be met by non-wires alternatives. The planning process has the following steps for DERs as NWAs:

1. Create load and DER forecasts
2. Calculate capacity available to connect new DERs
3. Assess grid needs
4. Identify grid needs that DERs could defer or avoid
5. File the grid needs for approval with the regulator
6. Issue a Request for Offers to DER providers to fulfill
7. Determine whether DERs are a lower cost solution to meet the grid needs

# CALIFORNIA DISTRIBUTION PLANNING

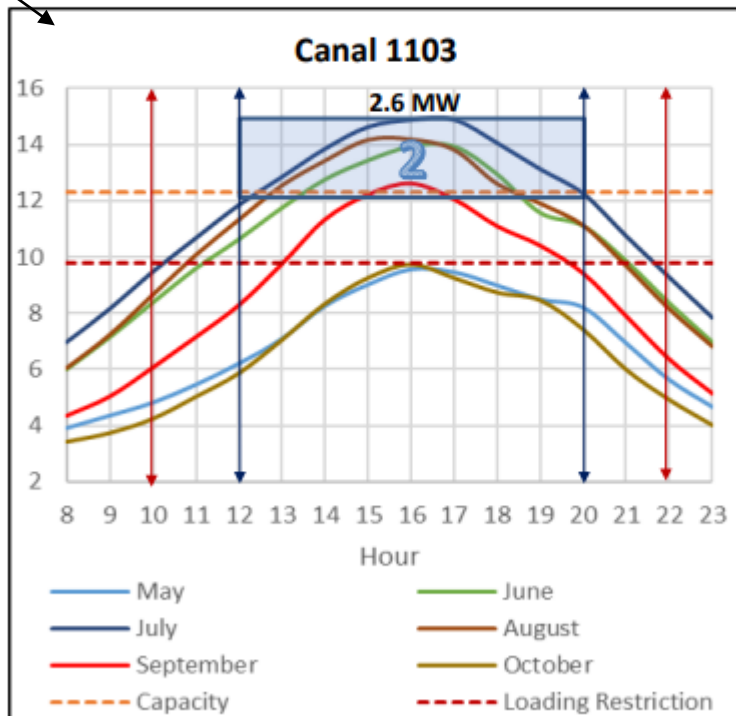


# INFORMATION SUPPORTING DER PROVIDERS

Load shape and likely timing of need facilitates value stacking

## Distribution Capacity Need: Canal 1103 Loading Forecast: Summer

DER requirements support developing a solution



Requirement	Offer Size (MW)	Delivery Months	Delivery Days	Delivery Hours	Hours Duration	Maximum # of Calls per year
2	1.3 or 2.6	Jun-Sep	Mon-Sun	12:00PM-4:00PM	4	82
2	1.3 or 2.6	Jun-Sep	Mon-Sun	4:00PM-8:00PM	4	82
2	1.3 or 2.6	Jun-Sep	Mon-Sun	12:00PM-8:00PM	8	82

# CALIFORNIA'S APPROACH TO MULTIPLE-USES

The CPUC has set out rules for how DERs would provide multiple services to address the dedicated service issue:

- A DER cannot enter into two or more reliability service obligations if the provision of one service affects another. (Rule 6)
  - Reliability services include resource adequacy, wholesale, transmission and distribution.
  - Generally, an increment of capacity would have to be dedicated to a single reliability service.
- Reliability services are priority and must be provided before other services. (Rule 5)
  - Customer services are not reliability services and would be a lower priority than distribution service.