

# Addressing New Challenges in Distribution Planning

**2018 CIGRÉ Grid of the Future™ Symposium**

Paper Session 1B - Distribution Technical Track:  
Distribution Modeling, Planning and Analytics Session

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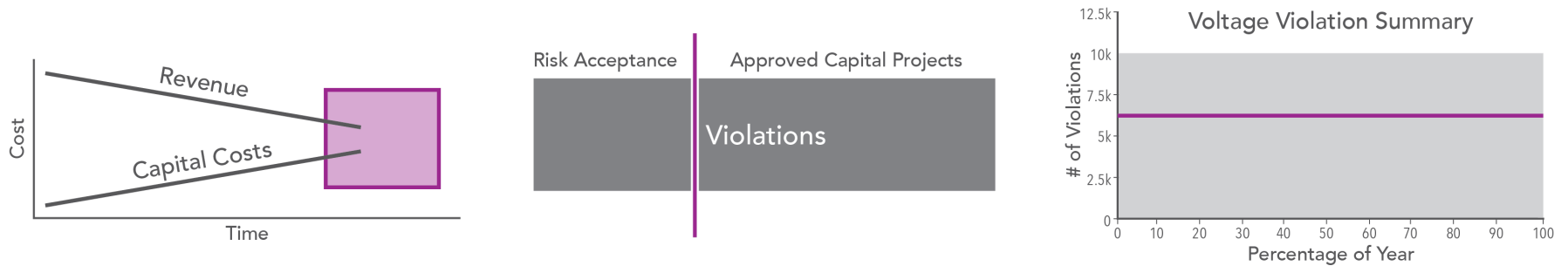
# Agenda

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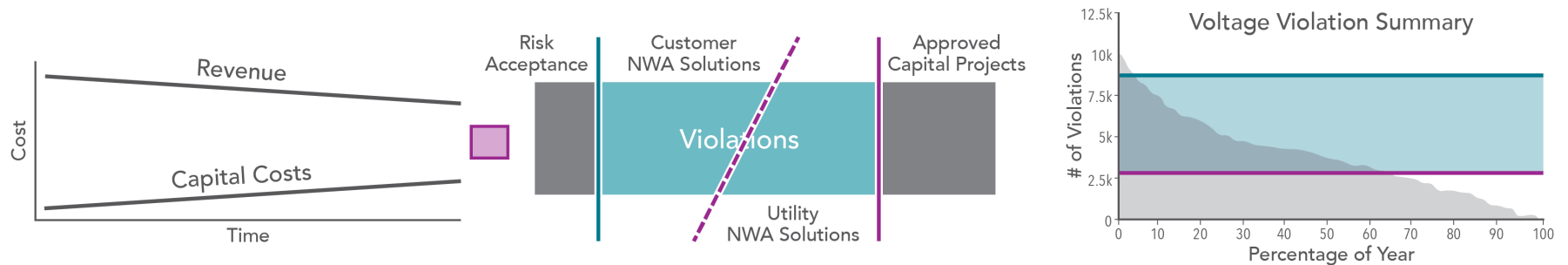
- > Traditional vs. Advanced Distribution System Planning
- > Advanced Planning to Enable Distribution System Transformation
- > Forecast Fidelity: What Burden is Worth the Effort?
- > Data Analytics Dimensions for Automation
- > Discussion

# Traditional vs. Advanced Distribution System Planning

## Traditional Planning



## Advanced System Planning




NWA: non-wires alternatives

# Advanced Planning to Enable Distribution System Transformation

## TRADITIONAL PLANNING

## ADVANCED PLANNING



Peak hour analysis	288-hour time series	1152-hour time series	8760-hour time series	Full automation of forecasting and load flow
Load history trended	Modernized planning criteria	Challenge criteria defined	Multiple forecast scenarios	Using machine learning and AI
Standard planning criteria	Automated load allocation	DER/EV penetration	Micro-locational value	Advanced visualization for QA and validation
Wires-only projects	Some non-wires alternatives	Locational value (macro) considered	IRP impact coordination	IRP integration and DER optimization
Capital project analysis	Frequency and duration	Economic benefits of DER	DER dispatch	

DER: distributed energy resources EV: electric vehicles MPV: market potential value IRP: integrated resource plan  
AI: artificial intelligence QA: quality assurance

# Forecast Fidelity: What Burden is Worth the Effort?

## TRADITIONAL PLANNING

## ADVANCED PLANNING

### PEAK HOUR

Location and amplitude, but insufficient clarity on frequency and duration.



### 288 HOUR

Location, amplitude, frequency, and duration. Duration fidelity good but not great.



### 1152 HOUR

Additional duration values to better approximate duration value for high-cost solutions.



### N HOUR

Where is the bend in the curve for high-cost assets?

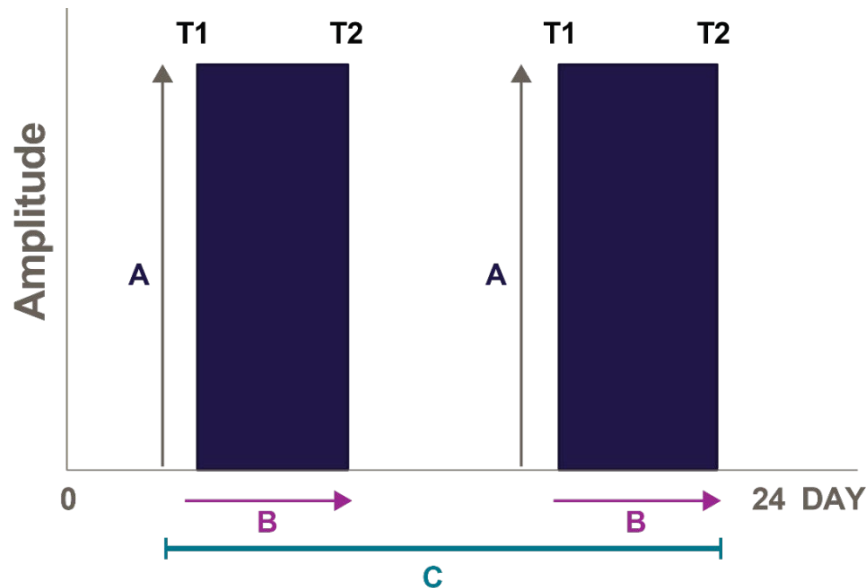


### 8760+ HOUR

High fidelity frequency and duration. Few reasons to accept burden as of yet.



# Data Analytics Dimensions for Automation



Dimension	Name	Description
A	Amplitude	Defines the maximum and standard deviation values related to the scale of the problem
B	Duration	Defines the number of consecutive hours the issue remains an issue
C	Frequency of Occurrence	Defines how often the issue occurs in a day (max.), month (max.), and year (max.)
D	Time of Day Reference	Defines how the issue aligns to sunlight/irradiance values (0 – noon, 12 – midnight)
E	Time of Year Reference	Defines how the issue aligns to sunlight/irradiance values (0 – max sun, 12 – min sun)
F	Location Reference	Defines how the location aligns with seasonal irradiance (0 – equator, 10 – planetary poles) Anchor on key device
G	Magnitude	Count of devices/line sections

# Discussion

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# Thank You

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**Should you have questions, please contact:**

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