The Financial Impacts of High-Resolution Telemetry on the Clean Energy Transition

April 4, 2023

NASPI Working Group Meeting – Tempe, AZ
Presented by Kevin D. Jones, Ph.D.

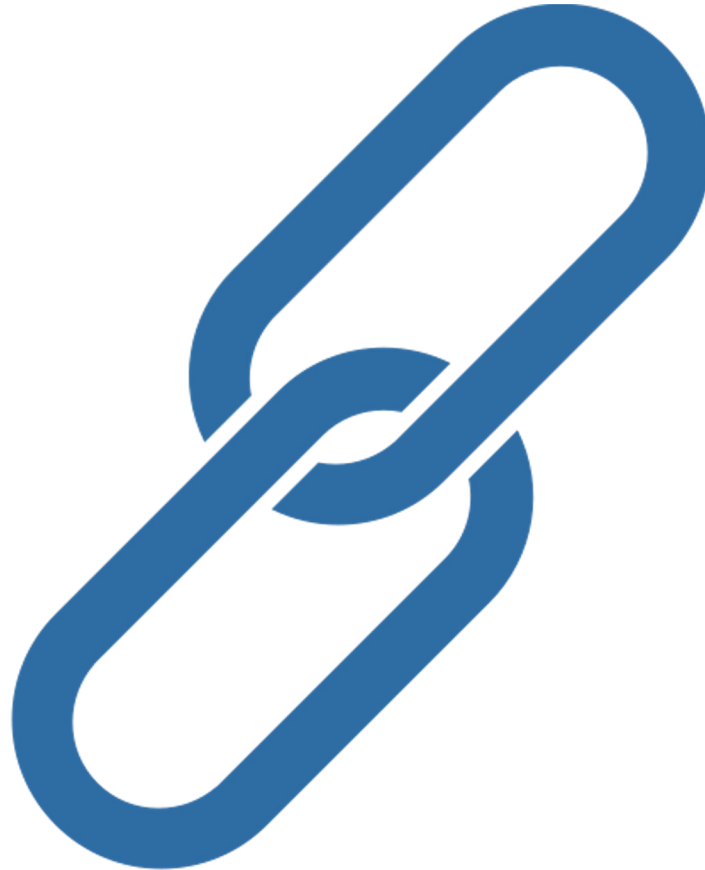**Dominion Energy**®

Roll the Credits!!

THE PRINCESS IS RESCUED!!!

A Direct, Indisputable Value Proposition

Clean Energy Transition

$10Ms - $100Ms for a ~22GW peak load service territory

High Resolution Telemetry

Dominion Energy®

How We Won The Game

"Cost" of Working with Data

Use of Data

Dominion Energy® + PingThings
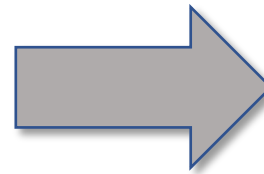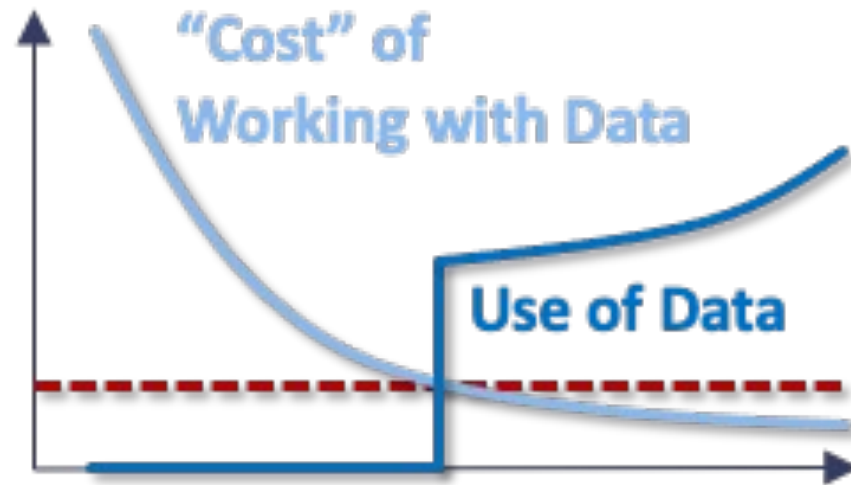
Dozens of Use Cases Evaluated

"Traditional" Use Cases

"Clean Energy" Use Cases

Core Competencies

Sunrise | Sunset | Sunrise | Sunset

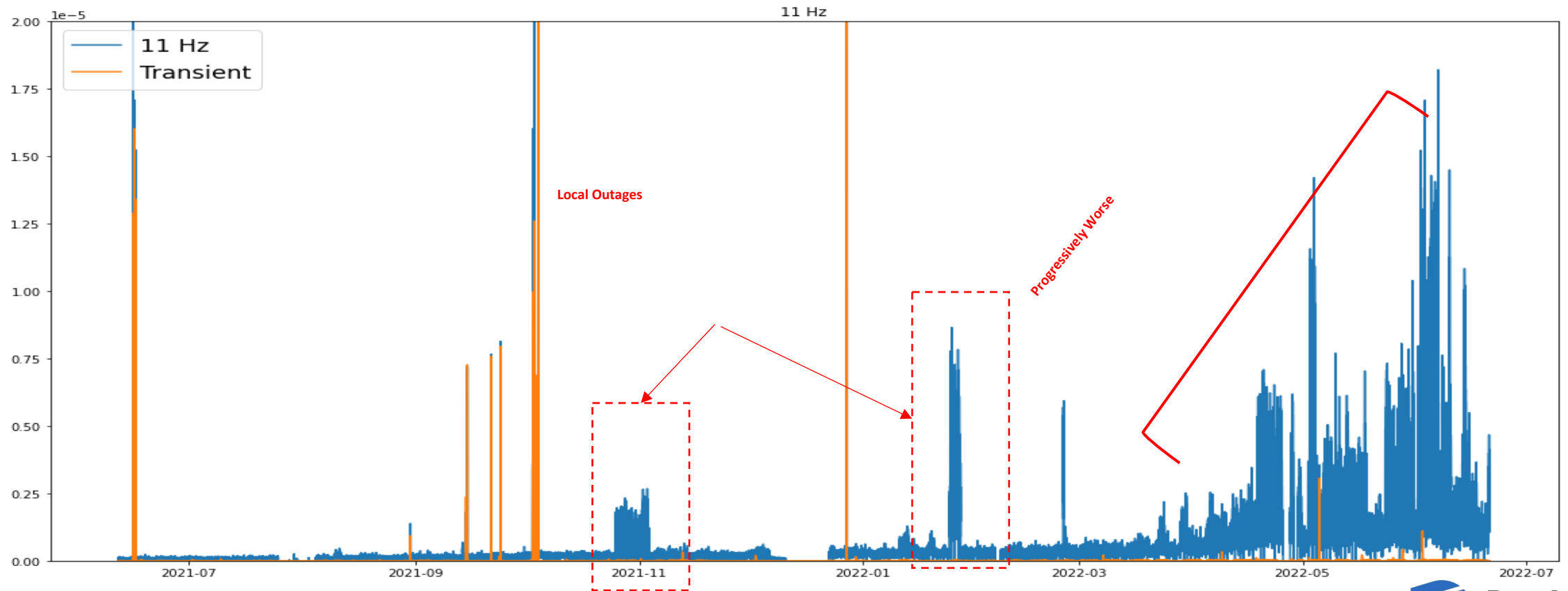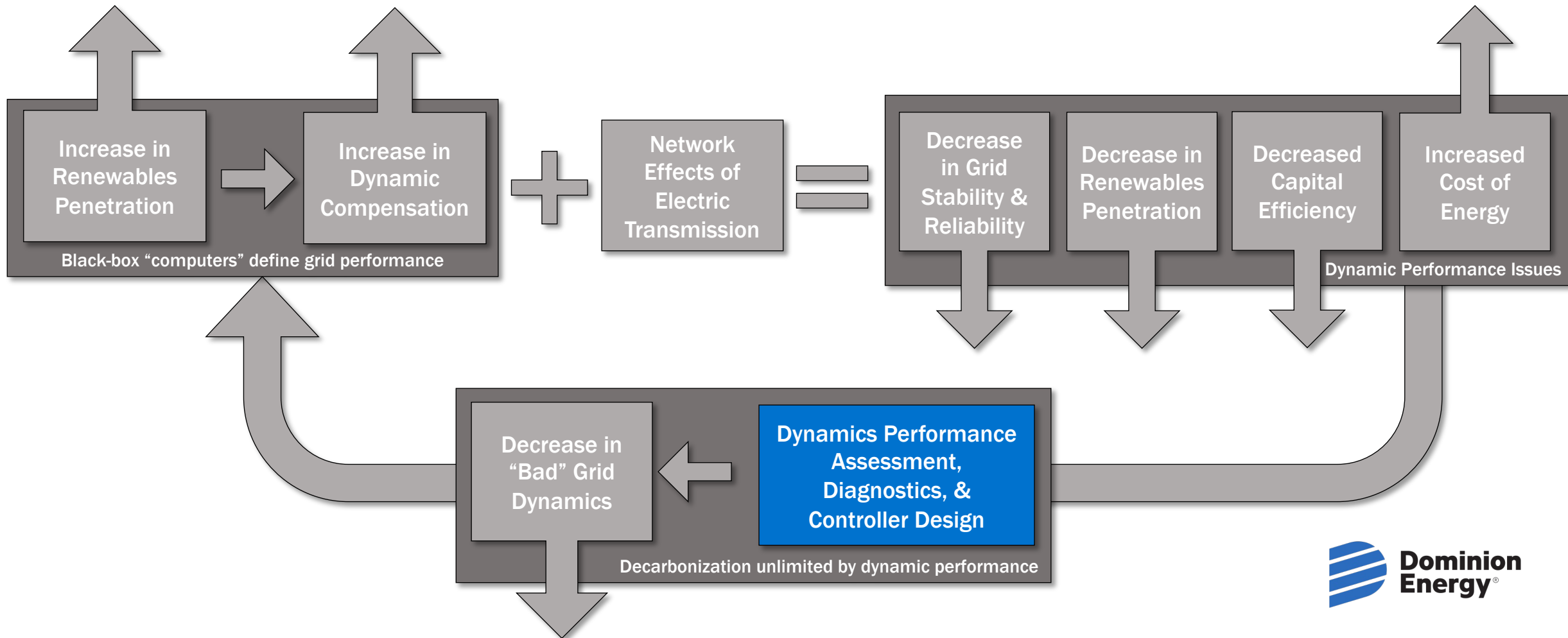Spectrogram of V mag. Lighter pixel color means more powerful frequency component.
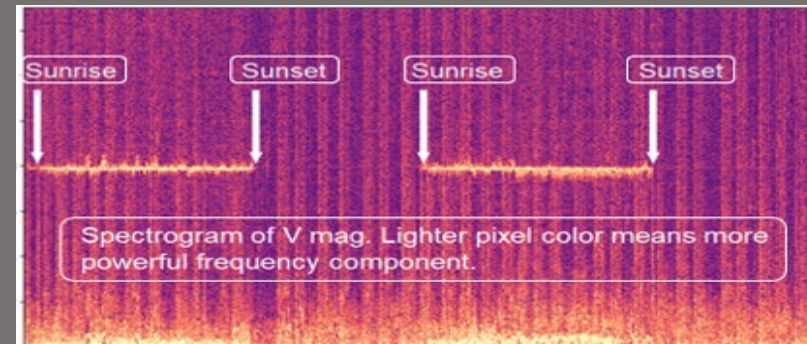
A New Paradigm for Grid Dynamics
IT'S A CHRONIC HEALTH PROBLEM

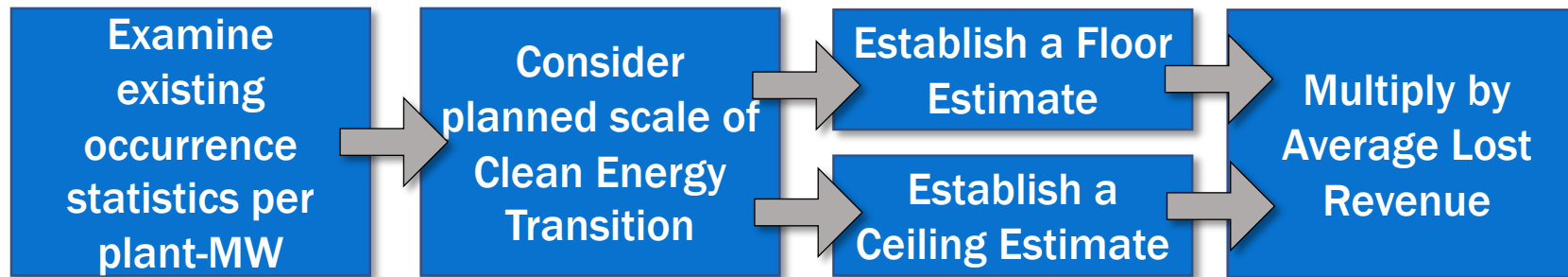# A Big, Relevant, Strategic, Financial Lever
RELIABILITY, CAPITAL EFFICIENCY & COST OF ENERGY

Clean Energy Use Case Per Annum $$ Values

Description	Annual $$
Unplanned Solar Plant Outages from Dynamic Performance Issues	$4M - $260M
Impacts of Solar Performance on Wide-Area Reliability & Stability	LPHC
STATCOM Oscillations & Live, On-site Testing	$6M
Wide-Area STATCOM Dynamic Interactions	LPHC

- Unplanned O&M Labor
- Capital Inefficiency
- Social Impact
- Operation of Dirty Peaking Units
- Environmental Impact
- Operational Inflexibility
- Wide-Area Instability & Risk of Blackouts

Examine existing occurrence statistics per plant-MW → **Consider planned scale of Clean Energy Transition** → **Establish a Floor Estimate** → **Multiply by Average Lost Revenue**

Consider planned scale of Clean Energy Transition → **Establish a Ceiling Estimate** → **Multiply by Average Lost Revenue**

Traditional Use Case Per Annum $$ Values

Description	Annual $$	Operational State
Post-Mortem Analysis	$1.2M	Operational
Event Reporting	$0.9M	Operational
Field Operations Support	Core Biz. Process	Operational
GMD/GIC Monitoring	$4M	Active Dev.
Model Validation & Calibration	$14M	POC
Multi-Factor Sensor Validation	Cyber Security	Active Dev.
Fuse / Switch / Jumper Health Monitoring	$7.5M	Active Dev.
Generator Rotor Health Monitoring	$1M	Active Dev.
Filter Bank Design Specification	$1M	Active Dev.
Copper Theft Detection & Grounding Monitoring	$1.5M	Active Dev.
Line Transposition Evaluation	$1.35M	Active Dev.
Regulated Generator Testing Support	$2.9M	Operational

~$35M

Structure of Traditional Use Case Value Prop

- Based on market-equivalent cost of service.

- Based on organizational/communication efficiency.

- Based on improved restoration times/processes.

- Based on offset capital investment.

- Based on improving accuracy of capital investment decisions.

- Based on eliminated operational impact.

- Based on plant value of affected equipment.

- Based on cost of compliance violations.

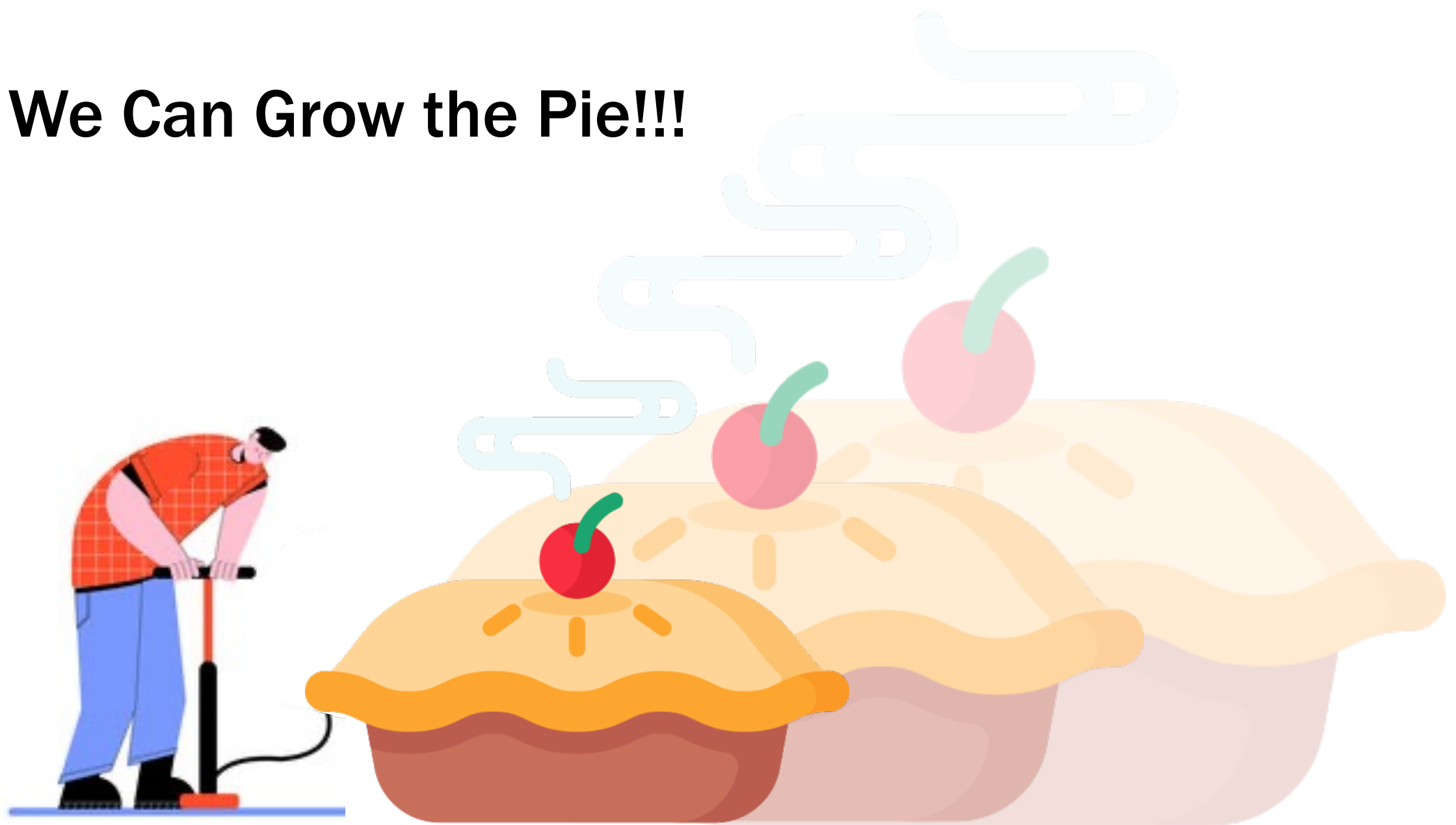Dominion Energy®

What About the Control Room??
WE'VE HAD IT BACKWARDS ALL ALONG

IIJA – Our Postgame
DATA–DRIVEN DYNAMIC PERFORMANCE MONITORING

	40107 (VA)	**40103(b) (NC)**
• Waveform Sensing	✓	✓

• Comm. Infrastructure
  • Substation
  • Front End
	✓ ✓	✓

• Platform Upgrades
  • Data Storage
  • Specialized Ingress
	✓ ✓	✓

• Data–as–a–Service	✓	✓
• Custom Apps for Oscillations	✓	

Dominion Energy®

We Can Grow the Pie!!!

Questions??

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