



# Why the Moment is Now for Virtual Power Plants

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October 23, 2024

# About RMI

DECARBONIZING

## Key Sectors



Electricity



Buildings



Transportation



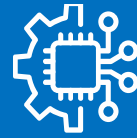
Industry

USING

## Powerful Market Catalysts



Market-enabling  
Policy



Technology



Climate  
Aligned  
Finance



Climate  
Intelligence



Education  
& Capacity  
Building



Strategic  
Communications

TO

# Drive Energy Transitions Around the World



RMI works with VPP companies as well as utilities, regulators, policymakers, and other partners to scale the VPP market

Virtual Power Plant Partnership members, October 2024

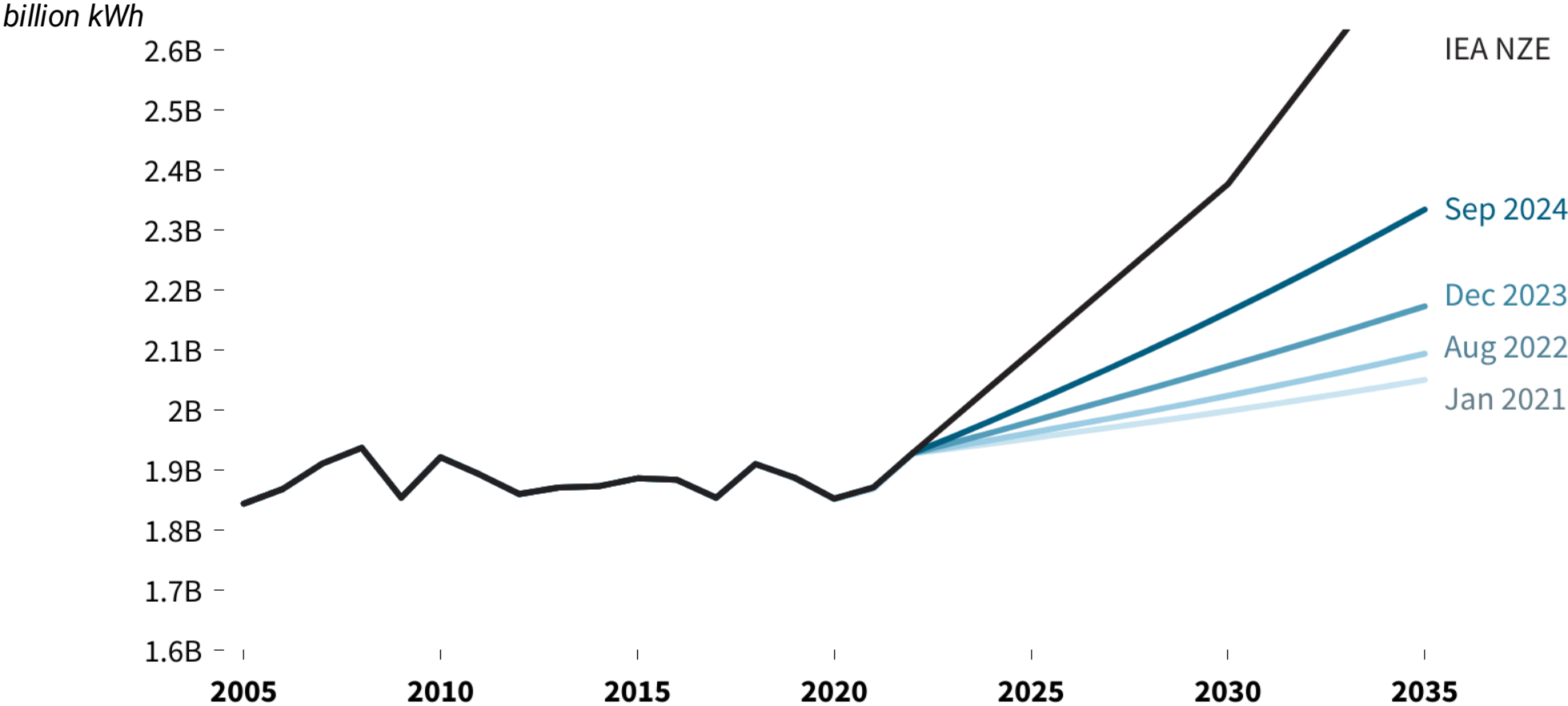


## Why the moment is now for VPPs, in three acts:

1. **Why:** Context and trends driving the need for VPPs
2. **What:** Demonstrated value of VPPs in recent years
3. **How:** Opportunities to scale VPPs to support affordable, reliable, and clean electricity

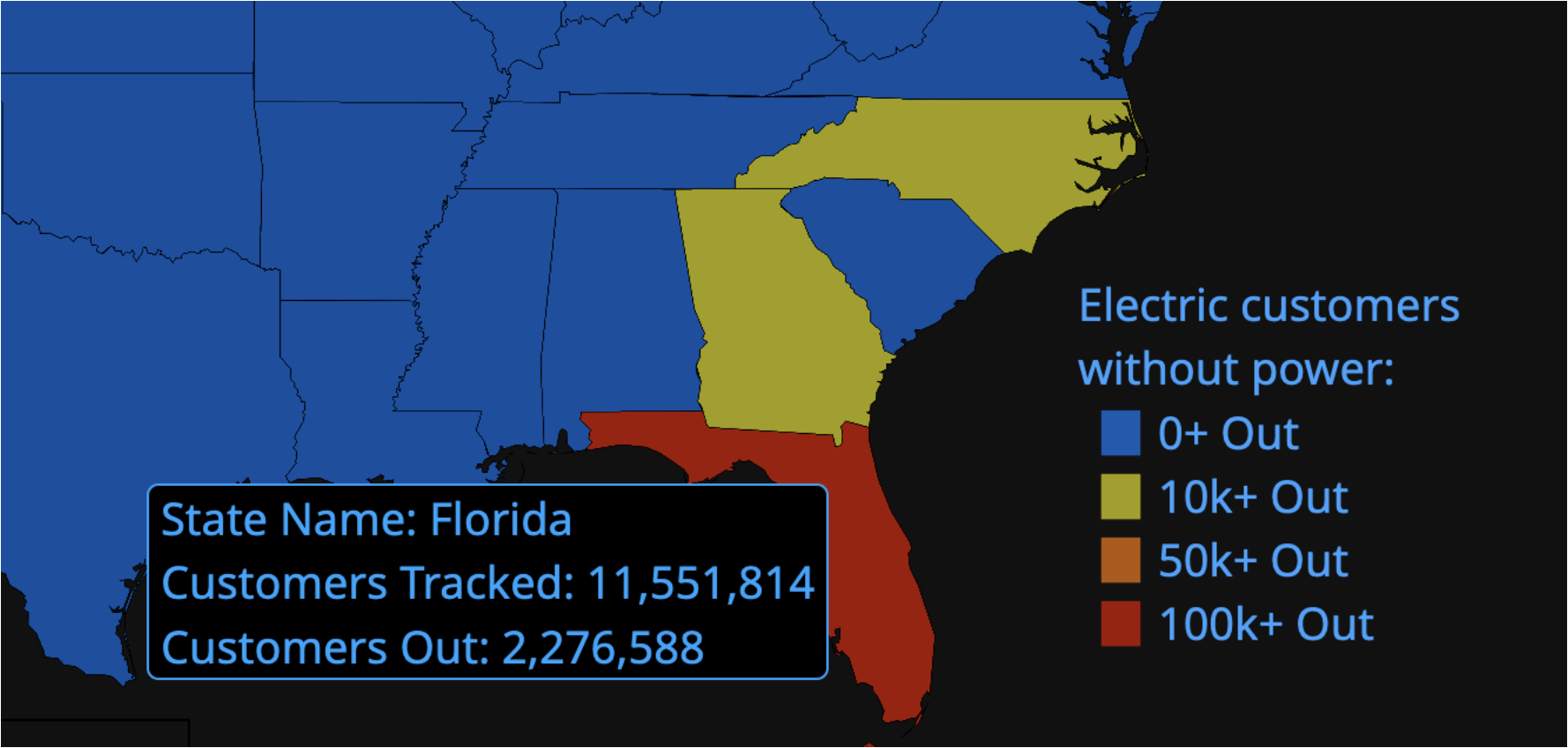
# Utilities are forecasting rising electricity demand

## Utility electricity demand forecasts, January 2021 through September 2024



# Grid resilience is a growing challenge

## Customers without power 48 hours after Hurricane Milton landfall



# VPPs are proving their potential

## Support resilience

- GMP
- HCE Power+
- Duke + Ford
- PG&E + GM

## Fast to deploy

- IESO + EnergyHub
- CA DSGS
- Texas ADER

## Use existing assets

- PG&E & Sunrun
- APS + thermostats

## Adaptable & flexible

- RMP + sonnen
- PSE + Uplight
- ConnectedSolutions



## Meeting Summer Peaks: The Need for Virtual Power Plants

Authors: Kevin Brehm, Matthew Land, Avery McEvoy, Lauren Shwisberg, Alan Weschler

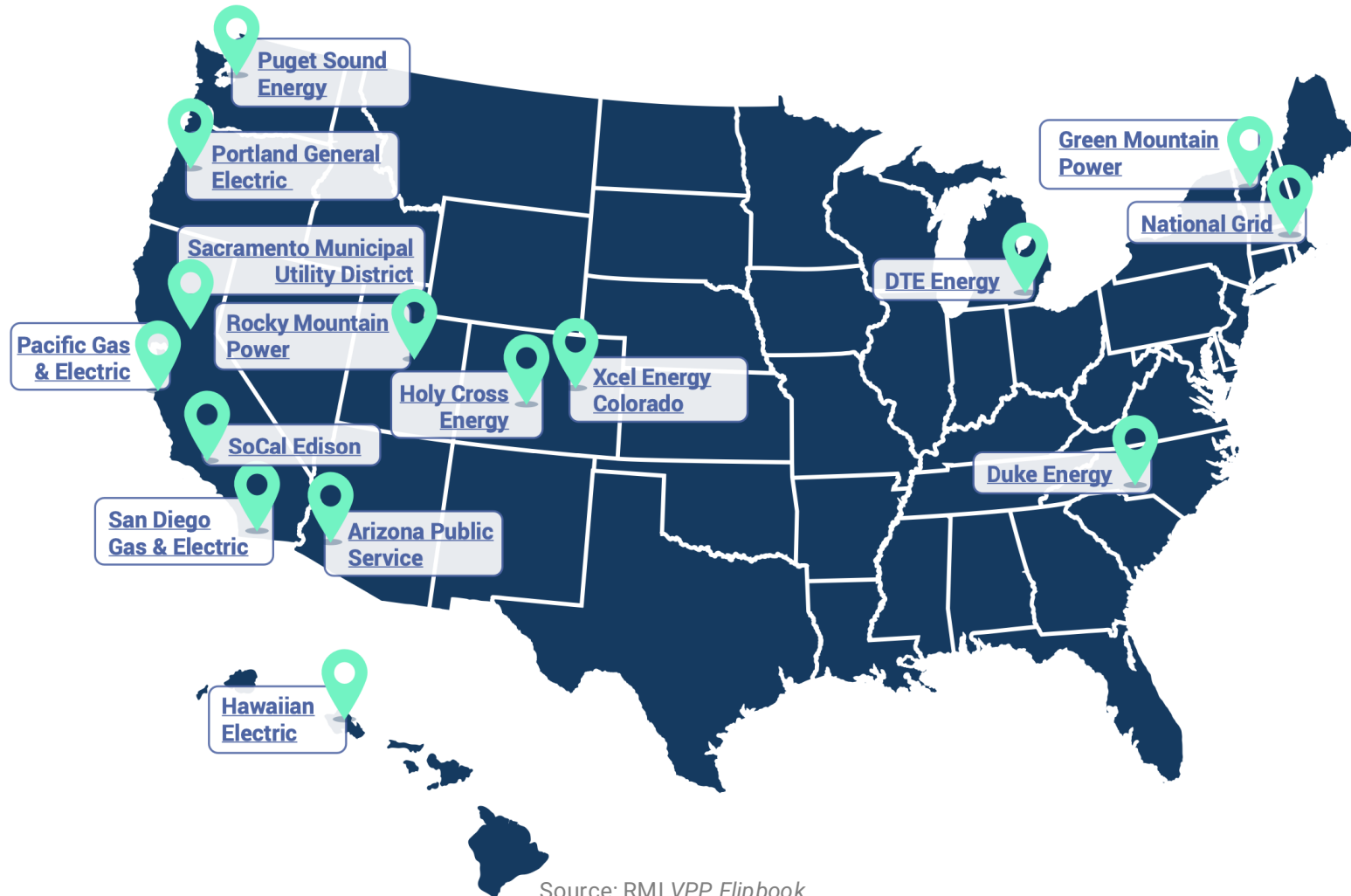
July 2024

### HIGHLIGHTS

- The possibility of extreme and wide-spread heat waves puts large swaths of the country at elevated risk for insufficient electricity generation to meet demand this summer.<sup>1</sup> This risk is likely to grow if utility projections of 38 GW of new peak load through 2028 materialize.<sup>2</sup>
- Virtual power plants (VPPs), aggregations of distributed energy resources that provide utility-scale and utility-grade grid services, can support utilities to affordably and reliably meet summer grid needs.<sup>3</sup>
- VPPs are rapidly deployable, affordably leverage existing assets, are configurable and adaptable, and enhance community resilience.
- Already-deployed VPPs will be dispatched to meet the peak this summer. New VPPs can be deployed in as little as 6-12 months — much faster than traditional transmission and generation — to manage peak as soon as 2025.
- Regulators and policymakers can leverage three key [VPP policy principles](#) to enable utilities and other load-serving entities to efficiently deploy VPPs by next summer:<sup>4</sup>
  1. **Advance policies to expand adoption of distributed energy resources (DERs) by diverse end-users** and ensure there is a sufficient asset base available for VPP enrollment.
  2. **Fairly compensate VPPs for services delivered** to enable customer participation and allow VPPs to fairly compete.
  3. **Enable value stacking to maximize benefits** to the grid while maintaining customer buy-in and support.
- More than 500 VPPs are currently operating nationwide. Utilities and regulators do not need to engage in lengthy design, regulatory, or pilot processes to deploy VPPs to meet summer reliability needs. Instead, decision makers should reference [leading approaches](#) from other jurisdictions.<sup>5</sup>

# VPPs are scaling nationwide

VPP programs profiled in RMI's *VPP Flipbook*



- **15+ programs** (out of ~500)
- **1,500 MW of capacity**
- **3.9 million customers**
- **Multiple benefits & use cases**



# VPPs are gaining allies



THE WHITE HOUSE  
WASHINGTON

*“The **VPP Accelerator for Federal Buildings** will fast-track greenhouse emissions reductions and cost savings in the building and electricity sector by aggregating federal buildings as VPPs.”*

OPINION

## Unfinished business: The bipartisan appeal of distributed power plants

By leveraging existing regulatory authorizations to make better use of our existing assets and infrastructure, policymakers can best address the grid’s problems.

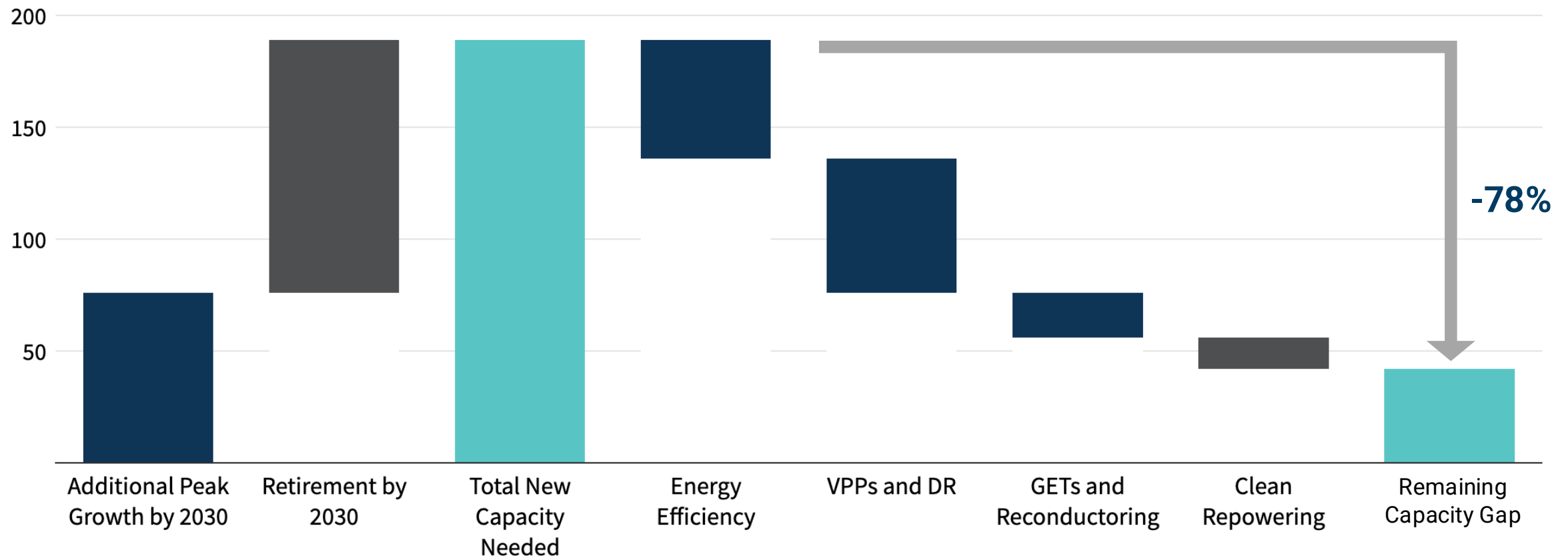
Published Oct. 10, 2024

By Jon Wellinghoff and Neil Chatterjee



# VPPs are one of the biggest levers to address grid capacity challenges by 2030

Potential for clean energy to meet rising US electricity demand in 2030 [GW]



# Are VPPs in 2024 where renewables were in 2008?

## Background: Operating Impacts of Wind Generation

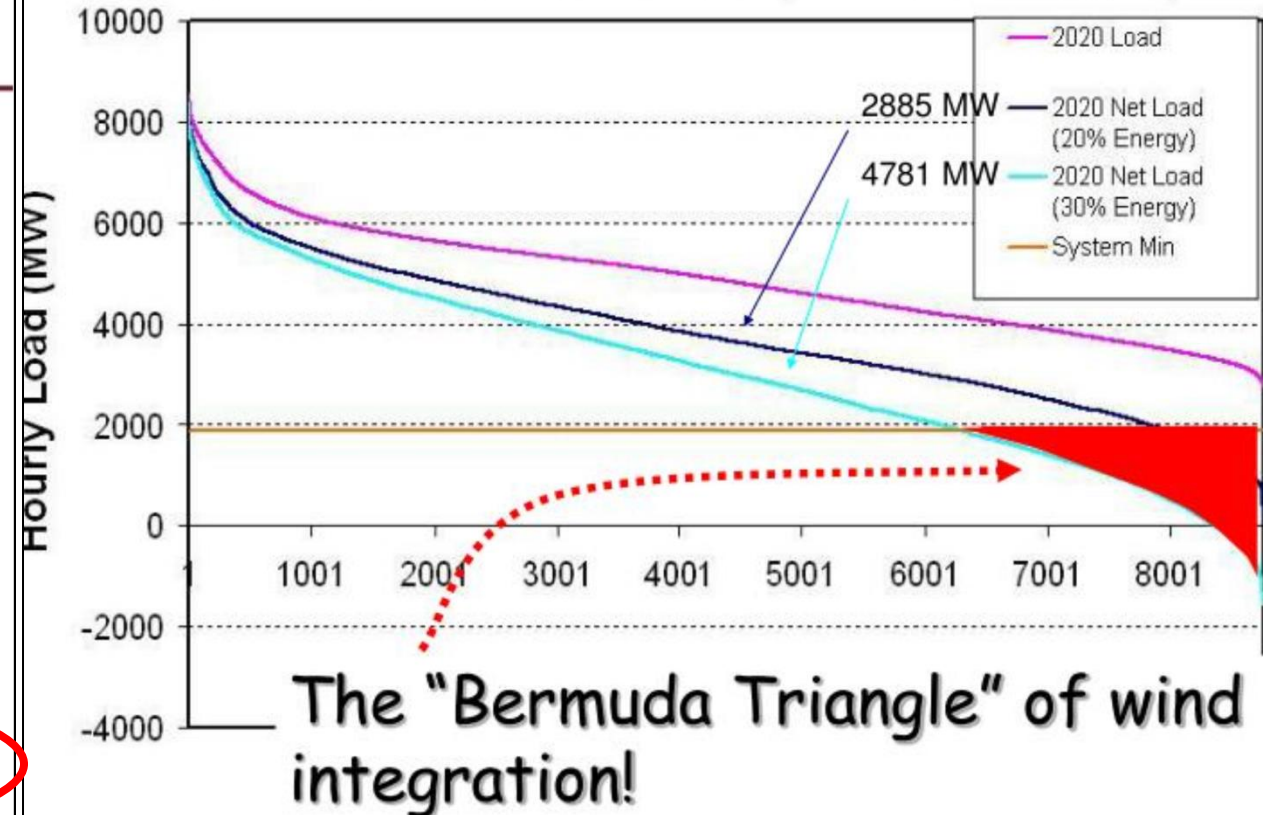
### ■ General experience (% annual by energy):

- At 0-5% penetration: amounts are within existing utility methods to manage variable conditions without significant impact
- At 5-9% penetration: we see increased ramping requirements and some increased old-style unit shutdowns during minimum load conditions
- At 9-20% penetration: we anticipate larger ramping impacts and “bottoming-out” of old-style generators during minimum load conditions
- At >20%: More research needed on potential new tools such as storage, plug-in hybrids, smart grid etc...

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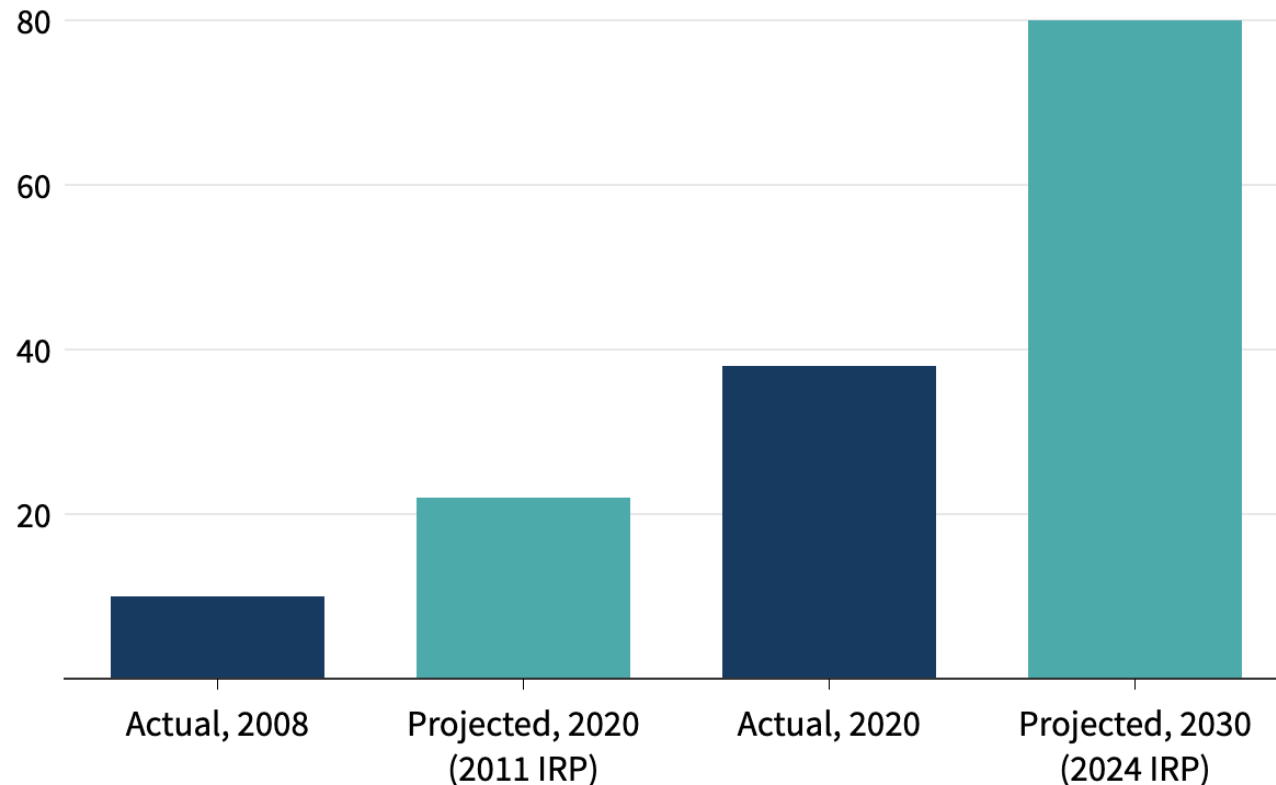


## System Example: Net Load (Load Less Wind)



# The 'Bermuda Triangle' of renewables proved to be a solvable problem

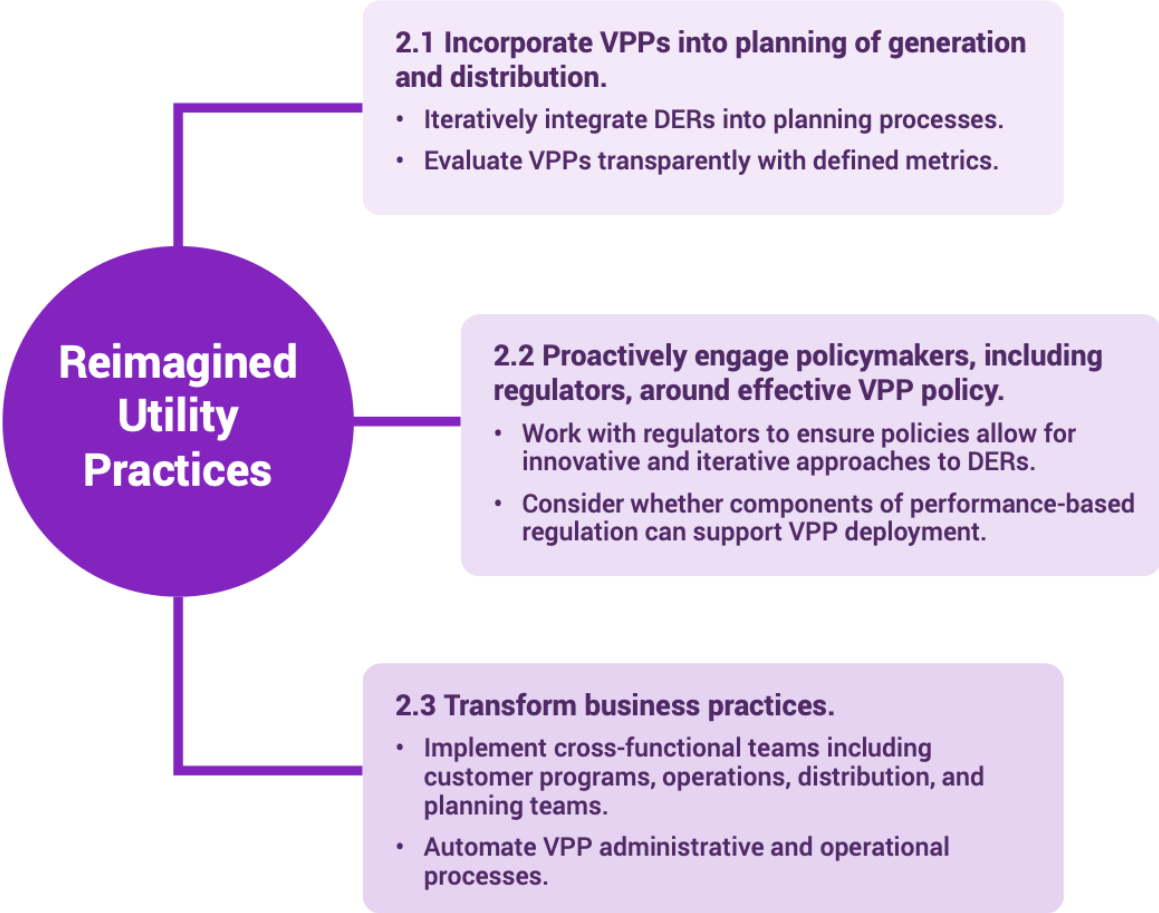
## Xcel Energy Colorado - Renewable Energy Share [%]



- **Falling costs**
- **Better forecasting**
- **Aligned business models**
- **Supportive policy**

# Successful VPP Implementation Requires Not Only Effective Program Design, But Also Reimagined Utility Practices

## Leading Practice for VPP Design and Implementation





**Thank you**

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[www.vp3.io](http://www.vp3.io)