



# National Conference of State Legislatures

## Electricity Markets & State Challenges Workshop

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**June 27, 2018**

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# The Enel Group Worldwide

A multinational power company and leading integrated player in the world's power and gas markets



- #74 on Fortune 500 with \$84B in annual revenue
- Ranked 20th on Fortune's 2017 "Change the World" list
- More than 63,000 employees operating in 31 countries across 5 continents
- Global leader in renewable energy generation with 38 GW of installed capacity, with 4 GW of renewables resources in NA
- Acquired Demand Energy, EnerNOC and eMotorWerks in 2017 to serve as the foundation for EnelX, officially launched in November of 2017

# The Enel Group Worldwide

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#1 private **network** operator globally  
65 mn end users and 44 mn digital meters

+4.5 mn end users  
+8.4 mn smart meters<sup>3</sup>



~20 mn free **retail** customers  
#1 in Italy, Iberia and top 3 in Latam

+5 mn free customers  
+20% electricity sold in free market



#1 **renewable** operator  
~40GW managed capacity<sup>2</sup>

+6 GW  
+80%  
additional capacity

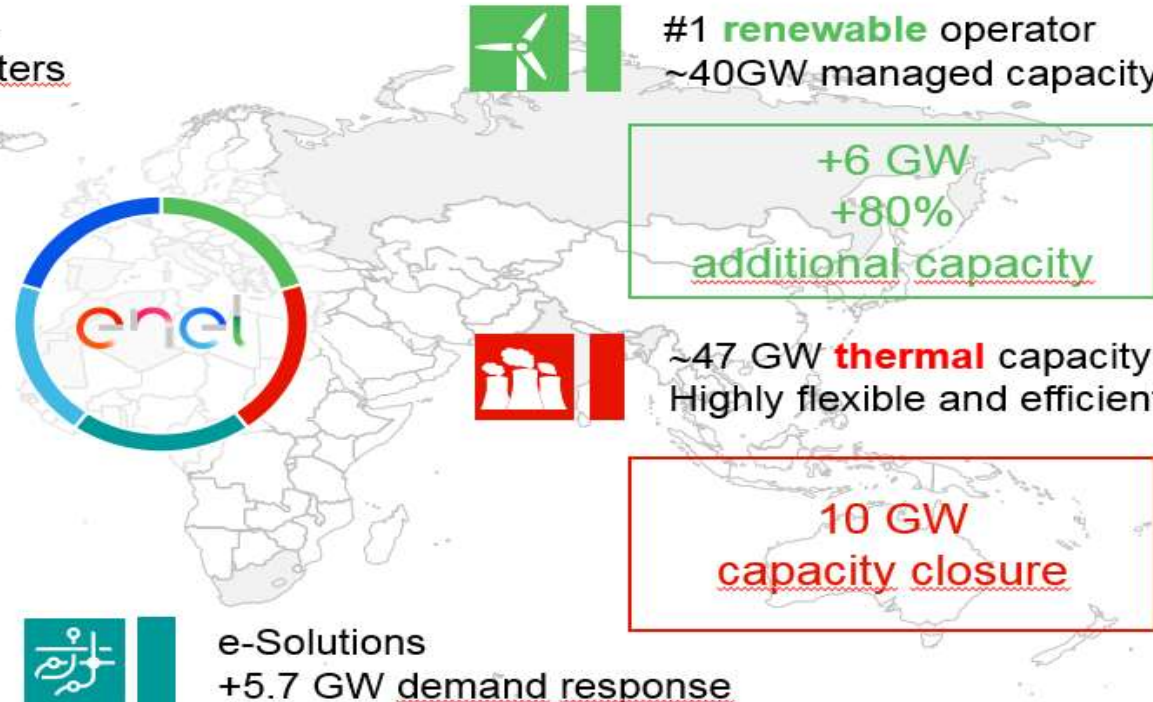


~47 GW **thermal** capacity  
Highly flexible and efficient assets

10 GW  
capacity closure



e-Solutions  
+5.7 GW demand response



□ Countries of presence<sup>4</sup>

# EnerNOC, an Enel Group Company

We are now organized into two groups

## Flexibility Solutions



Demand Response



Energy Storage/  
Micro Grids



EV Charging  
(eMotorWerks)

## Advisory Solutions



Energy  
Procurement  
Solutions



Energy  
Management  
Software

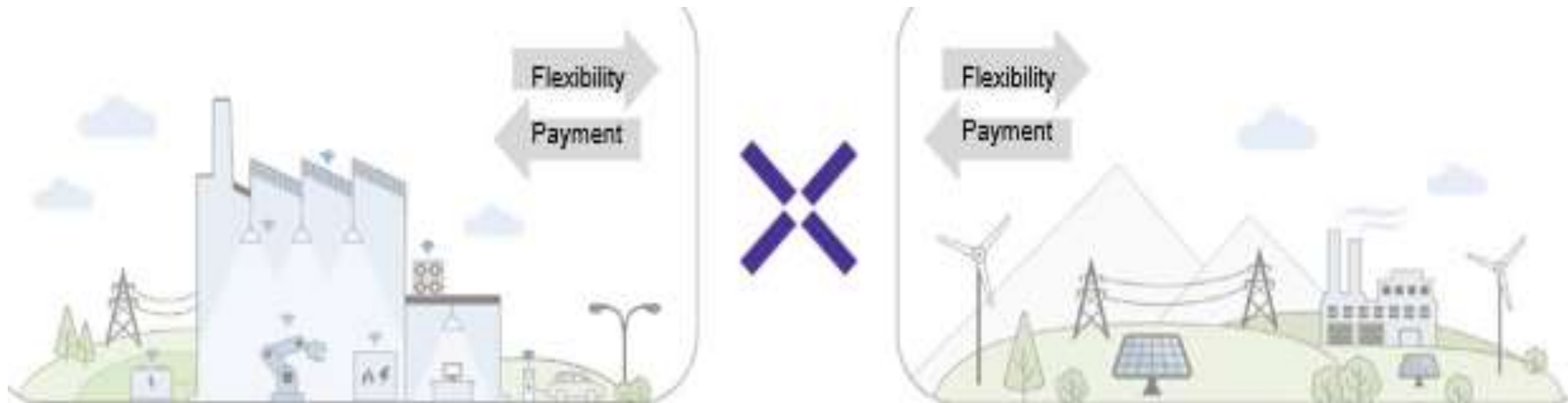


Utility Bill  
Management

# EnerNOC, an Enel Group Company

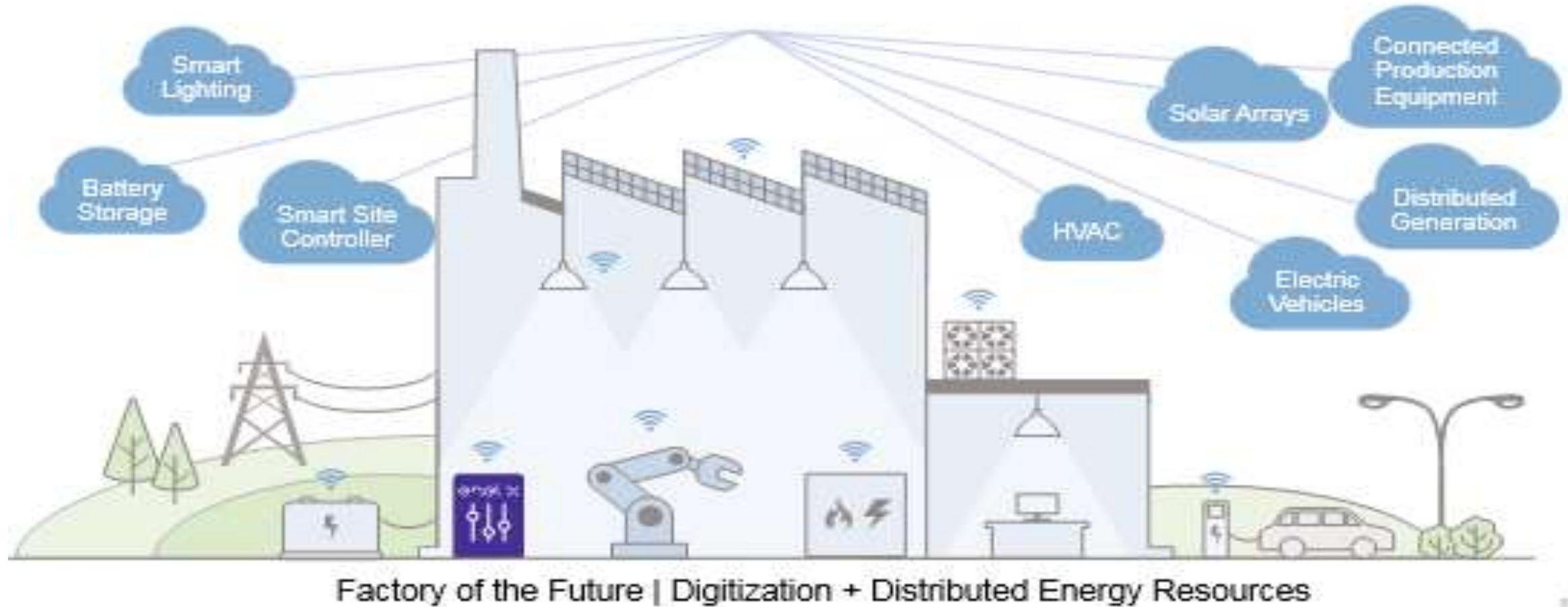
The market for Flexibility Solutions is expanding

*Digitization and distributed energy resources Increasing renewable penetration is increasing (DERs) are increasing customer-sited flexibility the need for flexible balancing resources*



Offer Aggregator Demand

# The Flexibility Customer of the Future





# How we will achieve our vision: Connect any asset to any product anywhere in the world

Connect all types of distributed energy assets...



DER Management System

... and optimize across all available grid and retail products



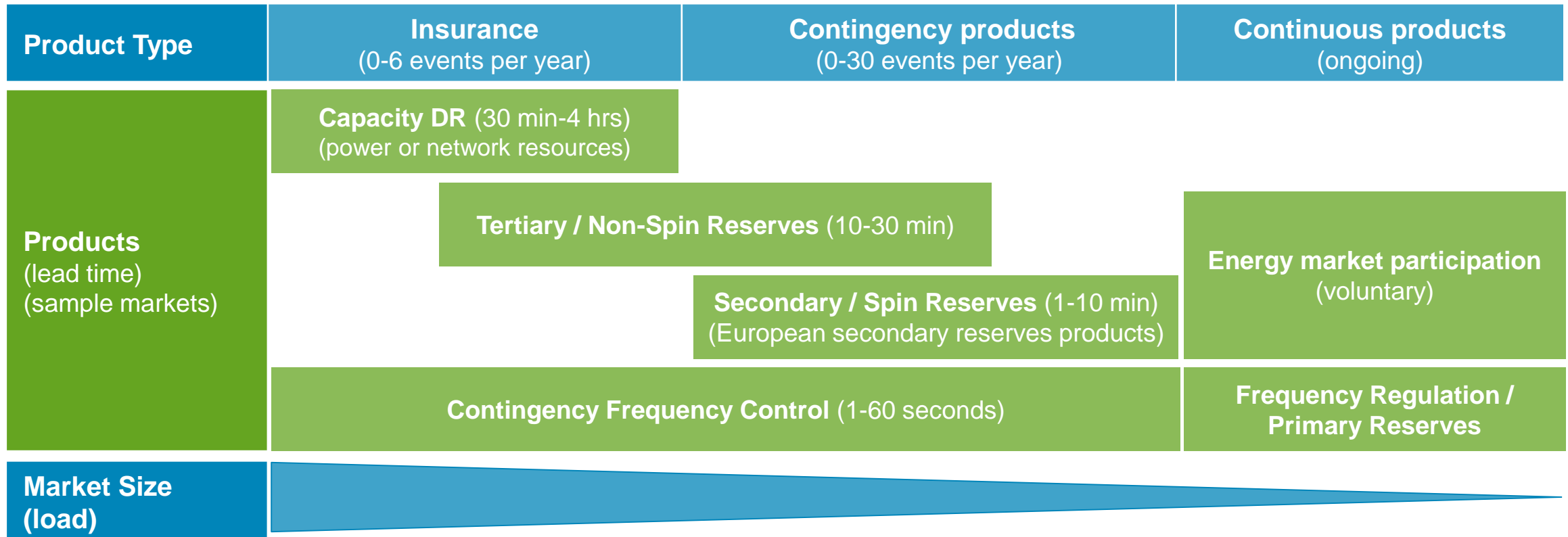
Virtual Power Plant Optimization

... using a flexible and scalable global technology platform



Cloud Based Architecture

# Demand-side flexibility plays a role across a spectrum of market use cases





# Case Study: Marcus Garvey Apartments

## Low Income Development in under served network in NYC

- Highest rate of brownouts/blackouts network in Con Ed territory

## Multiple development partners:

- Demand Energy – Storage + Microgrid + Advanced controls to manage all DER's on site with zero net export constraint
- Bloom Energy – Fuel Cells
- Bright Power - Solar

## Multiple value streams:

- Demand Charge Management - Optimized load management from the combined Solar + Fuel Cell + Building Load + Battery Operations
- BQDM Load Relief Compliance - Called when the day-ahead forecast is projected to 93% of the summer forecasted peak
- Market Participation - Day-ahead hourly pricing, NYISO winter DR, and Con Edison DLRP program

## Shared Savings Economics

Technologies: Load, Solar, Storage, Fuel Cell

Value Streams: 3 DR programs, Demand charge management, Energy arbitrage, Resiliency



Marcus Garvey Apartments is a 625-unit L+M property, spread across nine city blocks in Brooklyn.

**DEN** 

300 kW / 1.2 MWh Battery Storage System



**BRIGHT POWER:**

400 kW Distributed PV Power



**Bloomenergy**

400 kW Energy Server Fuel Cell



# Brooklyn Queens Demand Management Program

BQDM is REV in Action

Brooklyn and Queens Zone Map



- Significant load growth in a large area of Brooklyn-Queens expected to overwhelm current distribution infrastructure
- Instead of \$1 B traditional “wires” solution, Con Ed is procuring 52 MW of DER from vendors for \$200 M to defer the need
- EnerNOC and Demand Energy participating with DR and storage
- Con Edison can earn a return on BQDM spend, with performance incentives on ROE

# Case Study: Establishment Labs, Costa Rica

## Establishment Labs

Site San Jose, Costa Rica

Load Profile ~1.4 MW Peak load

Configuration Storage - 500 kW/1000 KWh  
Solar - 272 kW

Applications Multi-DER Aggregation  
Critical Load Backup Power  
TOU Energy Arbitrage  
TOU Demand Charge Reduction



- **Storage + Solar + Back Up Power/Microgrid for Critical Loads for this biomedical company**
- **Solar + Storage System designed to support Critical loads in the medical manufacturing clean room. Maintains all systems to ensure the room stays "clean" during an extended outage**

# Case Study: Establishment Labs, Costa Rica

**Performance During Blackout (July 2017) - 1.4M homes & businesses in Costa Rica without power for 5 hours**

## **Cause**

- **500 MW transmission overload in Panama which impacted the entire region**

## **Countries affected**

- **Costa Rica, Panama, Guatemala, Mexico, Honduras, El Salvador, Nicaragua**

## **DEN's Storage + Solar system**

- **Seamlessly transitioned to back-up power without interruption and provided full power to support the critical clean room for the entire duration of the blackout; saving Establishment Labs high-value work-in-process inventory**
- **Once grid power was re-established, the DEN system transitioned back to normal operation**
- **The combined solar + storage system was designed and could have operated for longer periods if needed**



# Case Study: Technical Park, Bucks County, PA



## Technologies

- Load
- Upgraded Back up Generation

## Multiple value streams to max. value

- PJM emergency demand response
- PECO demand response

# Legislative & Regulatory Considerations

- Cooperation and coordination between State and retail programs with wholesale markets and ISO/RTO systems
  - Dual participation in State and Wholesale markets
  - Interconnection processes
- Cooperation and coordination between State and Local Governments
  - Citing, permitting, fire ordinances
- Ownership – Third party and load access
  - Necessary for innovation in financing and shifting of risk
- Peak Reduction Policies implemented at State level
  - Peak Load Management, Clean Peak Management
  - Not an operational resource



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