Distributed Intelligence:
Extracting value from a universe of untapped data

Modern Grid Technology & Leading Practices Workshop

May, 2017

DATA CREATION OUTSTRIPS ANALYSIS

50x growth of data creation between 2010 and 2020

1.7MB new data created for every person ***every second***

40% of data will be machine generated by 2020

0.5% of data is actually analyzed and produces a benefit

IDC Digital Universe Study, EMC, 2012

A typical smart meter is capable of taking …

30+ measurements **per second**

1,800 per minute

108,000 per hour

2.59M per day

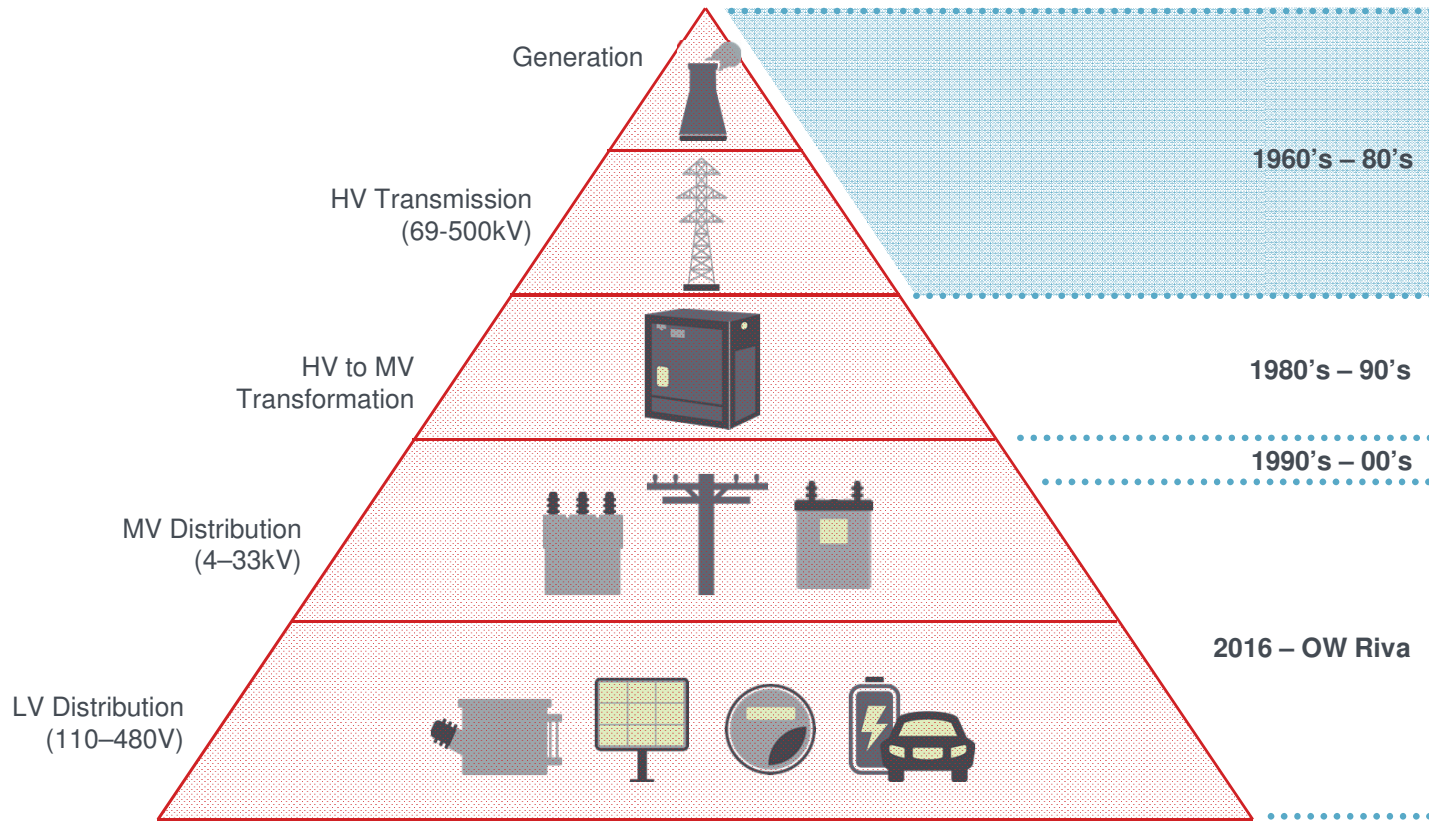*Most utilities and consumers collect and use only 24 of those 2.59M*

A SMART METER IS. . .

. . . A COMPUTER PLATFORM WHERE SMART METERING IS ONE OF THE MANY APPLICATIONS
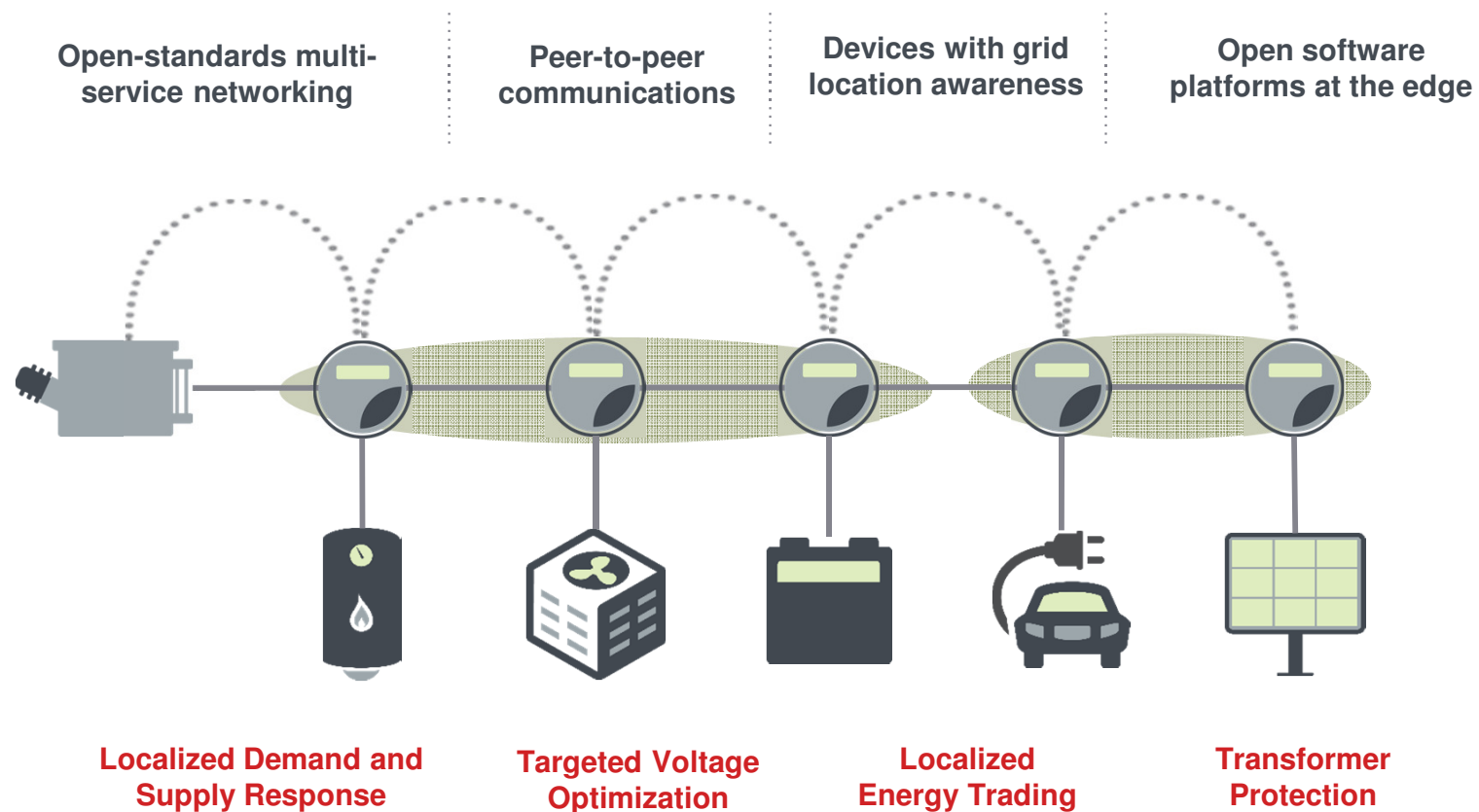

TRANSFORMER LOAD MANAGEMENT

CONSUMER SAFETY

OUTAGE

DEMAND RESPONSE

HIGH-IMPEDANCE DETECTION

METROLOGY/ COMMUNICATIONS

RENEWABLES

CVR

EV CHARGER

THE ACTIVE GRID

Operational awareness and action to the edge of the distribution grid

Generation

HV Transmission (69-500kV)

HV to MV Transformation

MV Distribution (4–33kV)

LV Distribution (110–480V)

1960's – 80's

1980's – 90's

1990's – 00's

2016 – OW Riva

NEW CAPABILITIES, NEW OUTCOMES

Open-standards multi-service networking

Peer-to-peer communications

Devices with grid location awareness

Open software platforms at the edge

Localized Demand and Supply Response

Targeted Voltage Optimization

Localized Energy Trading

Transformer Protection

DISTRIBUTED APPLICATION EXAMPLES

High-Impedance Detection

Accurate "hot spot" detection and location

Benefit: Proactively detect potentially dangerous conditions on lower-voltage network

Broken Neutral Detection

Detecting unbalanced load condition from a broken neutral connection between transformer and meters

Benefit: Earlier and more definitive detection of in-home safety issue

Load Disaggregation

Disaggregate individual loads and uses within the customer premise for new services.

Benefit:
Accurate load disaggregation, based on actual data rather than statistical modeling and no special equipment required.

Under-Frequency Load Shedding

Maintain power system stability by removing overload in selected areas

Benefit:
Respond surgically to under-frequency conditions while maintaining critical loads, e.g. hospitals, EMS, critical infrastructure

THANK YOU

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