



# Perspectives on Smart Grid Implementations

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# Outline

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Smart Grid Vision

State of the Industry

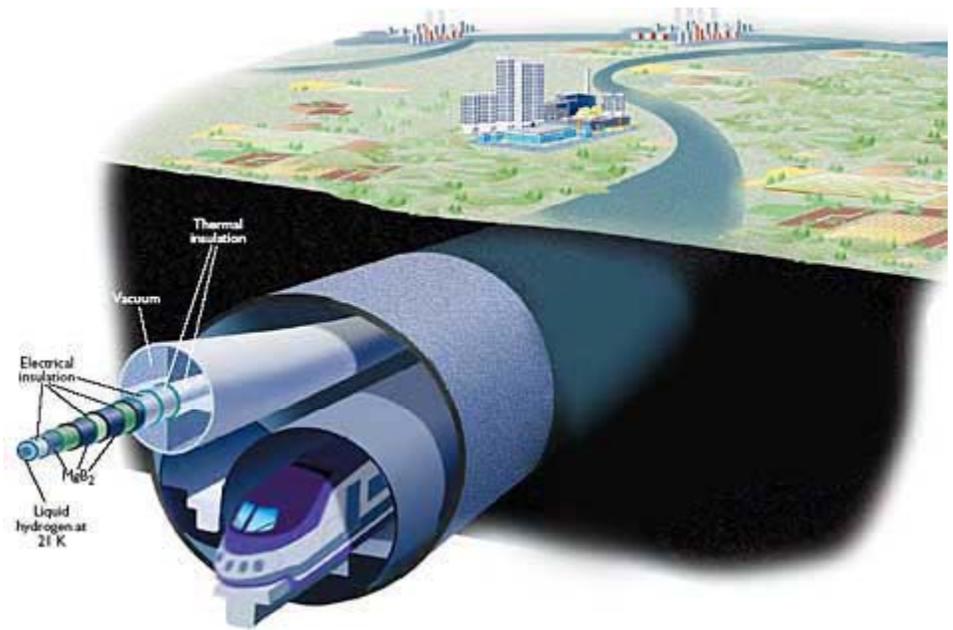
Industry Transformation is Needed

Our view : San Diego Gas & Electric, a Sempra Energy utility

# Vision

## Electric grid evolves

- Ubiquitous communications backbone
- Operational technologies
- Information technologies



# A smart, integrated grid

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Detects and fixes emerging problems

Incorporates measurement, diagnostics and feedback

Re-routes power flows

Enables loads and distributed resources

Uses modern tools

## Good for the Environment

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Enables renewable and clean energy

Enables Vehicle-to-Grid interface

Reduces spinning reserves

Supports customer choice



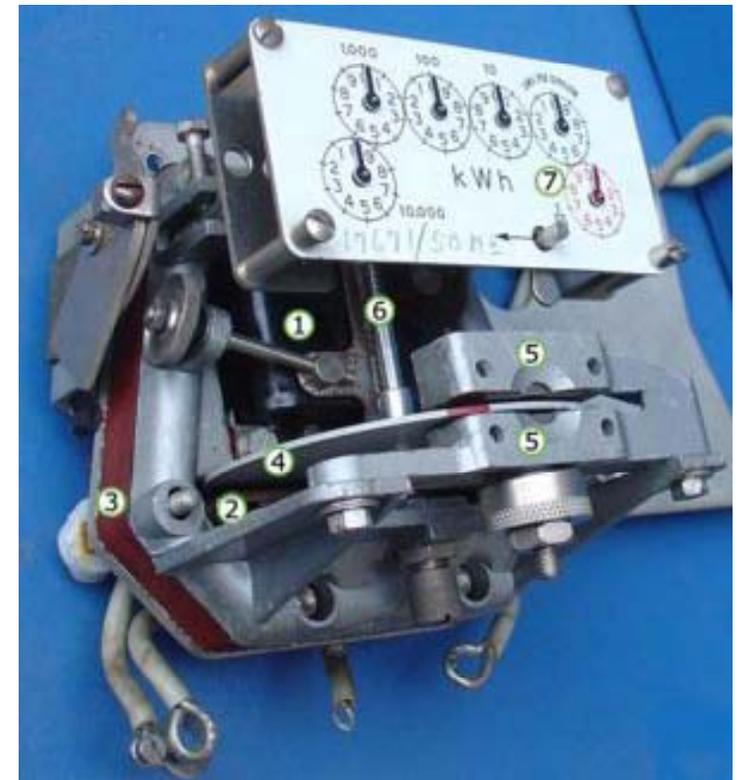
# Utility of Today

Electro-Mechanical

Heavy use of old radio technology

Few sensors

Limited automation



# Utility of the Future

Digital

Advanced communication

Self healing

Lots of sensors

Automated control

Smart Meters



# Three paths to starting a regional smart grid

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## Organic – business as usual

- Huge capital expenditures as assets retire
- New technologies lead to declining costs

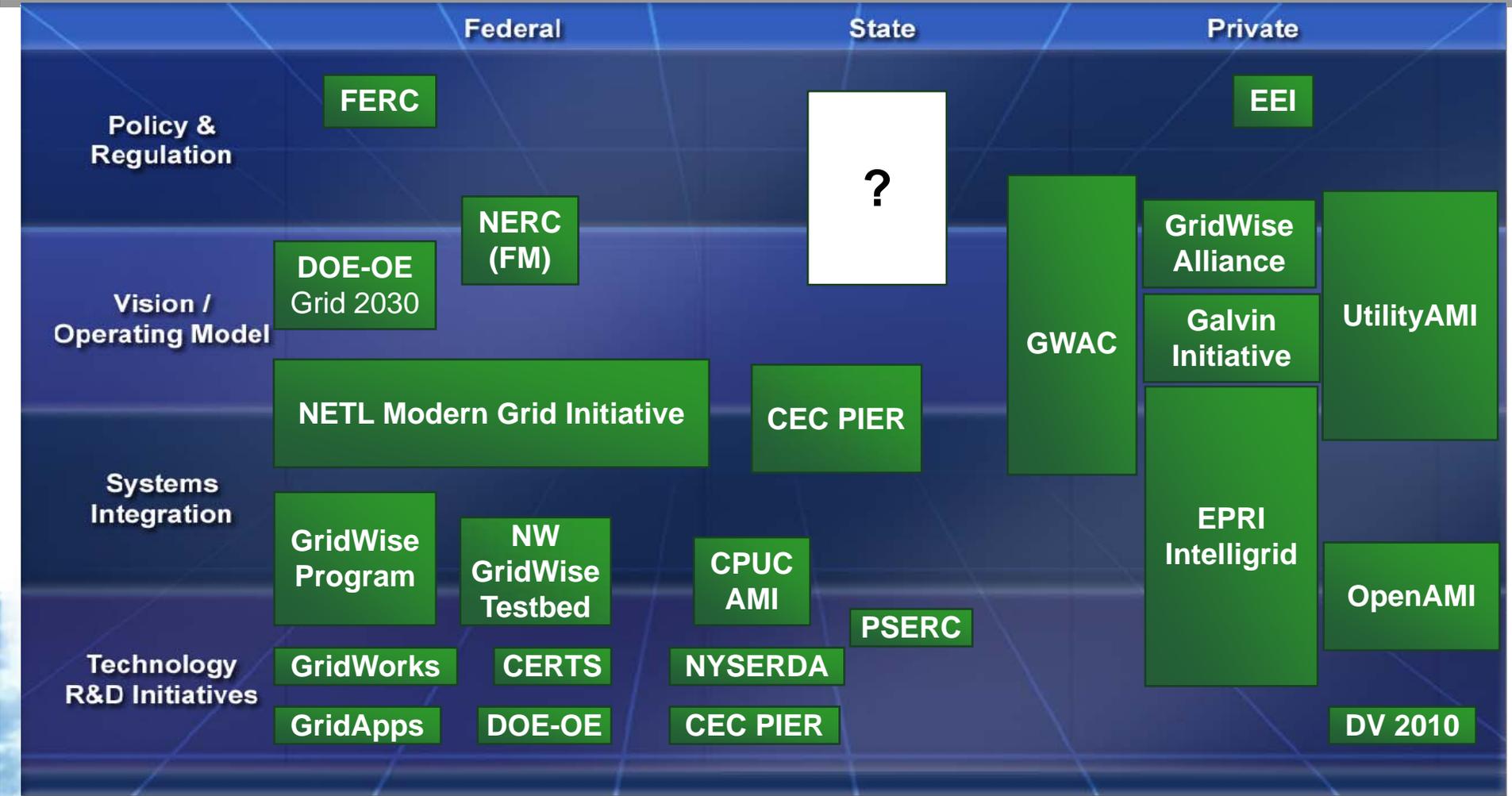
## Utility of the future

- Spread costs across several projects

## Smart Meter

- Communication infrastructure is key
- Digital electric meters are also sensors

# A National Agenda



# SDG&E Smart Grid Drivers / Challenges

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Aging Infrastructure

Maturing Workforce

Help Achieve / Integrate policy goals

- Energy Action Plan Loading Order
- Empower Consumers

Potential Challenges

- Regulatory Changes
- Cost
- Complexity
- Technology Advances

# SDG&E Smart Grid Major Initiatives

Advanced metering infrastructure

Technologies improve operations

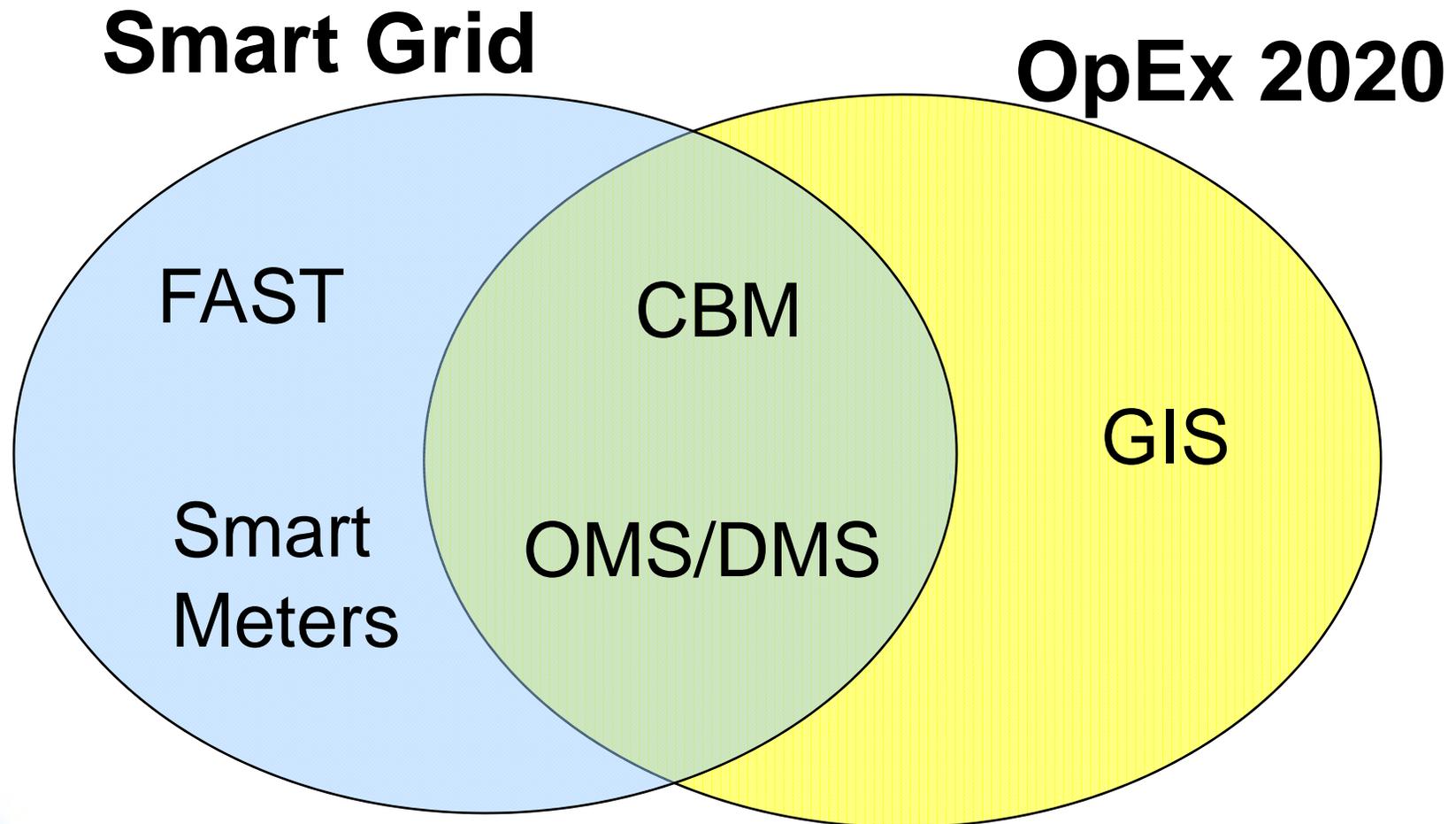
Distribution automation

Distributed generation

DOE and CEC funded Smart Grid Research



# Smart Grid and OpEx2020



# Integrated Timeline

## Asset Mgmt Initiatives

Asset Investment Support  
 GIS Platform  
 GIS Data Conversion  
 OMS / DMS  
 Condition Based Maintenance

## Field Force Initiatives

Supervisor Enablement  
 Forecasting & Scheduling  
 Dispatching & Mobile  
 Work Management  
 Electronic Design

## Customer Care Initiatives

Operation Insight Analytics  
 ICE Infrastructure & Channel  
 ICE Self Service  
 Care Rep of the Future  
 Single View of the Customer

## Network Infrastructure

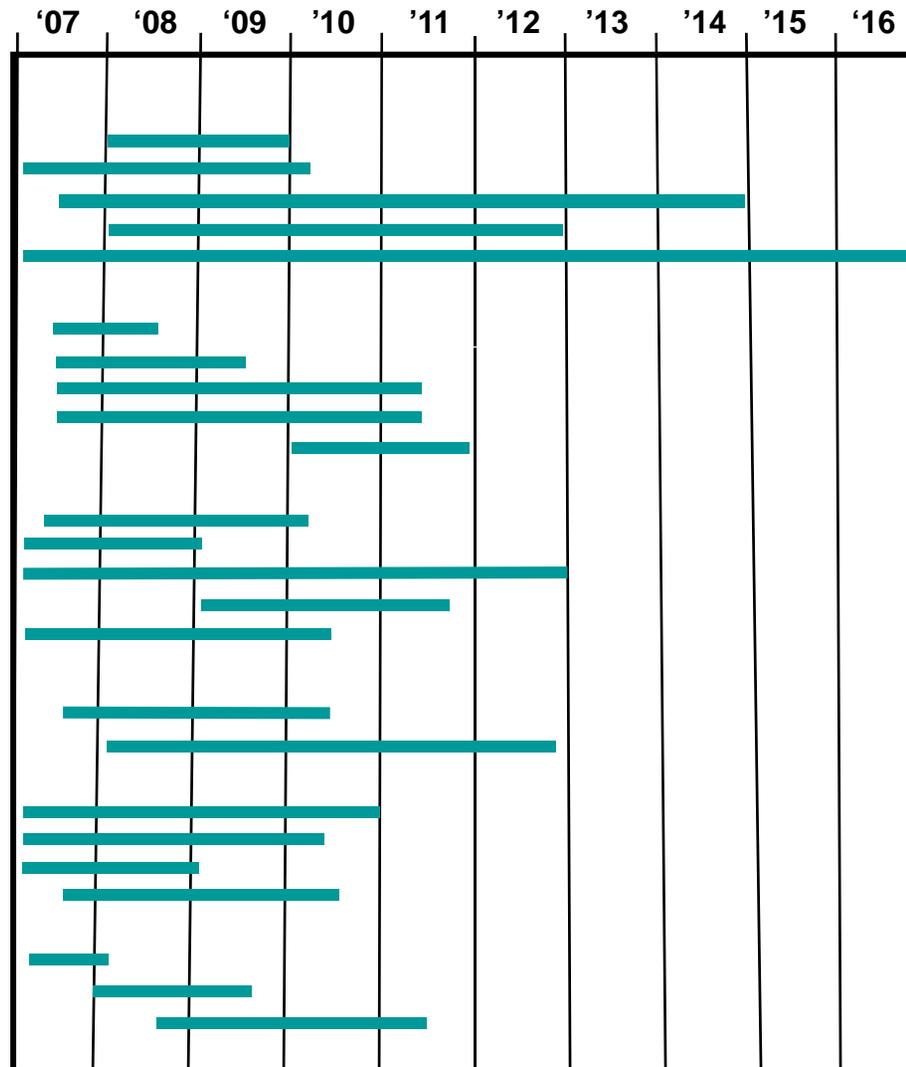
WAN  
 Mobile

## IT Infrastructure

SOA  
 Encryption & Authentication  
 Identity & Access Mgt  
 Enterprise Info. Analytics

## Smart Meter

Plan  
 Build  
 Deploy



## Drivers

- Capital efficiency
- Reliability

- O&M costs
- Workforce demographics

- Cost-to-serve
- Customer convenience

- Mobile workforce
- Sensors on assets

- Future flexibility
- Scalable platform
- Enterprise solutions

## Dependencies

Field and Smart Grid require GIS

Can be done now – but needs GIS down stream

Customer adoption

Timing is JIT based on Field Force (and Smart Grid)

Required by virtually every initiative



# Summary

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## **Industry knows what is needed**

- **Barriers exist – including risk, rates, standards, security**

## **Some steps are underway**

- **Federal legislation**
- **Few large projects**

## **Much work is needed**

- **More projects**
- **State regulatory**
- **Standards**

## **SDG&E making large strides**

- **Smart Meter – Smart Grid**
- **OpEx 20/20 – Smart Grid**
- **Partnerships with industry groups**
- **Collaboration with many utilities**

## **Active Standardization**

- **OpenAMI**
- **GridWise \*2**
- **AutoDR / Open-Enterprise / USB**
- **Utility Intelligent Network**

Thank You

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Sempra Energy utilities

