# METERING AMERICA

# BILLING/CIS AMERICA

THE metering and customer management MEGA-EVENT
for SMART electricity, water and gas utilities!

10th ANNIVERSARY 2000 - 2009
Produced by spintelligent

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Horizon Energy Group

MODERN GRID STRATEGY

NETL

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# Leveraging the Data to Achieve Customer Satisfaction

Managing the Data Storm

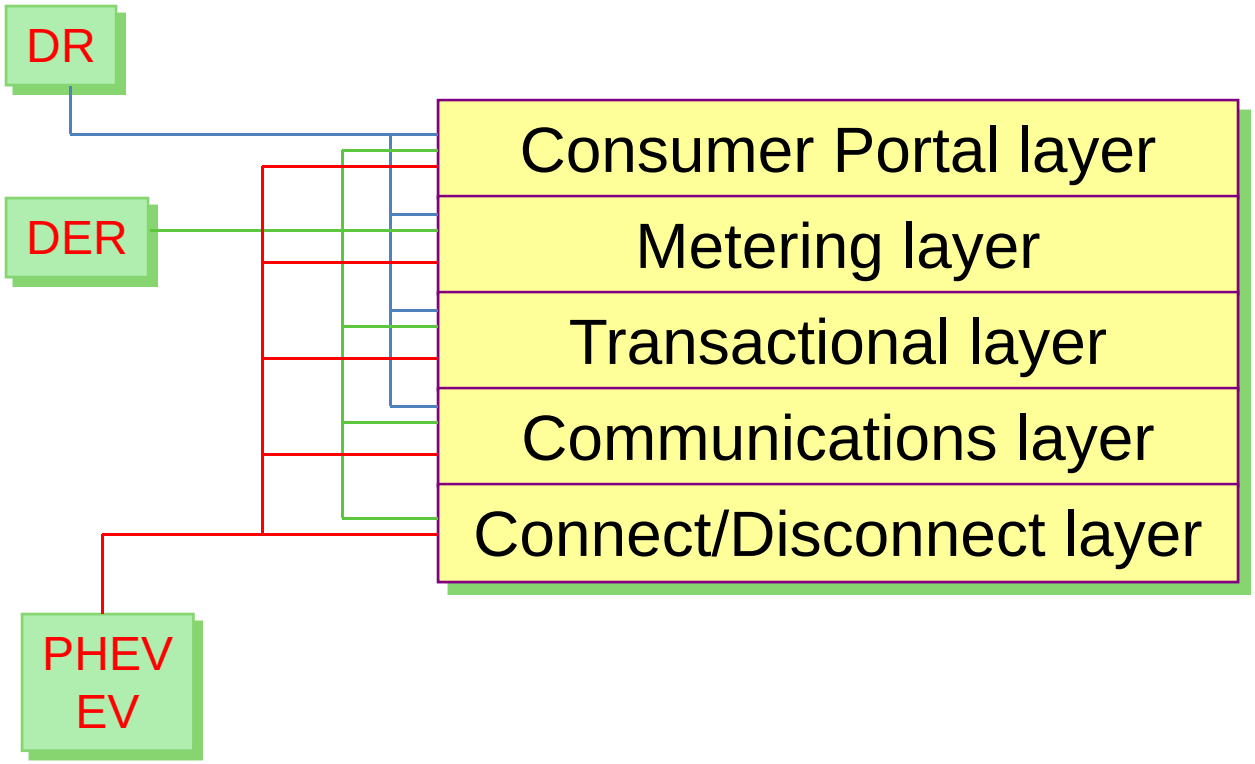
# A Changing Consumer

- More green
- More technology savvy ( nearly half of the average residential and commercial load is digital-based)
- More willing to seek their own solution to provide more control and independence
- Grid divorce is real: it has increased 33% per year for 10 years.  Families and companies off-grid could reach 3 million by 2016, and 55 million by 2026.

# What Do Customers Want?

| Critical Success Factors | Today | Tomorrow |
|---|---|---|
| Reliability | Convenience and business continuity | Greater emphasis on business continuity |
| Security | | Resilience |
| Safety | Do no harm | Do no harm |
| Efficiency | Low rates | Conservation & energy efficiency |
| Economics | Low rates | Access / take advantage of markets |
| Environmental Stewardship | Clean tech – not a challenge to rates | Accept higher rates for clean tech |

# Advanced Metering Infrastructure




- Energy time of use
- Supplier management
- Other services

- Traditional meter
- Load research / profile
- Storage of data / events

- Price signal from source
- DR account
- PHEV charge / use account
- DER account

- Meter function
- Connect / disconnect
- DA control
- Signals and sensors

- Physical disconnect
- Soft disconnect

***Part of a larger Smart Grid strategy***

# Keeping the “End in Mind”

| *Smart Grid Characteristic* | *AMI* | *ADO* | *ATO* | *AAM* |
|---|---|---|---|---|
| Enables Active Consumer Participation | ✓ | ✓ | | |
| Accommodates All Generation & Storage Options | ✓ | ✓ | ✓ | |
| Enables New Products, Services and Markets | ✓ | ✓ | ✓ | |
| Provides PQ for Digital Economy | ✓ | ✓ | ✓ | ✓ |
| Optimizes Assets & Operates Efficiently | ✓ | ✓ | ✓ | ✓ |
| Anticipates and Responds to System Disturbances | ✓ | ✓ | ✓ | ✓ |
| Operates Resiliently Against Attack and Natural Disaster | ✓ | ✓ | ✓ | |

AMI=advanced metering infrastructure; ADO=advanced distribution operations; ATO=advanced transmission operations; AAM=advanced asset management

# Tomorrow's Consumer Options

| *Smart Grid Characteristic* | *AMI* | *New Data Options* |
|---|---|---|
| Enables Active Consumer Participation | ✓ | TOU, CPP; DR |
| Accommodates All Generation & Storage Options | ✓ | Consumer owned DER for consumption and sale |
| Enables New Products, Services and Markets | ✓ | Energy data services; use assets for grid services |
| Provides PQ for Digital Economy | ✓ | Monitor in real-time; anticipate problems |
| Optimizes Assets & Operates Efficiently | ✓ | More complete understanding of energy & capacity patterns |
| Anticipates and Responds to System Disturbances | ✓ | Monitor (knowledge) and isolate outages; reconfiguration |
| Operates Resiliently Against Attack and Natural Disaster | ✓ | Knowledge to rapidly respond and limit damage |

# How Smart Metering Helps

| *New Data Options* | *New Functionality* |
|---|---|
| TOU, CPP; DR | Meter on 5 to 15 min intervals; receives real-time prices from utility/RTO; supplies data to DR controls |
| Consumer owned DER for consumption and sale | Real-time communications to link solar, generator, and storage units data and controls |
| Energy data services; use assets for grid services | Portal to analyze usage and options; consumer choice for in-premise use and out-premise use |
| Monitor in real-time; anticipate problems | Portal and tools to see developing problems and trend power quality |
| More complete understanding of energy & capacity patterns | Detailed load profiling and pattern-recognition; observe real capacity in near-real-time |
| Monitor (knowledge) and isolate outages; reconfiguration | Near-real-time metering info (volts, amps, etc) for isolation; load data for autonomous reconfiguration |
| Knowledge to rapidly respond and limit damage | Near-real-time metering info (volts, amps, etc) to repower unfaulted circuits; public and worker safety |

# Future Data Load

## (1 million customers – one month)

| *New Data Options* | *Per Customer* | *For Utility* |
|---|---|---|
| TOU, CPP; DR | 9.4MB/mo | 9,400 GB/mo |
| Consumer owned DER for consumption and sale | 3.4MB/mo | 1,020 GB/mo |
| Energy data services; use assets for grid services | Included above | Included above |
| Monitor in real-time; anticipate problems | Included above | Included above |
| More complete understanding of energy & capacity patterns | Included above | Included above |
| Monitor (knowledge) and isolate outages; reconfiguration | 18KB | 1.5GB/mo |
| Knowledge to rapidly respond and limit damage | 6KB | 0.5GB/mo |

# Leverage

- Customer Loyalty – be the best partner on the customer-side of the meter
  - Currently others are doing this better than utilities
  - Reliability and PQ decisions; education
  - Going Green; installing renewables
  - Economics, options, and markets
- Fully understand load profile – customer, community, region – to advise customer
- Improve system operations from the customer perspective – consumer and societal benefits

# Future Customer Satisfaction

- Basis is already changing for residential and commercial (74% of load)
  - Rates to electric bills (California experience)
  - “Lights on” philosophy to suite of offerings
  - Silent service to sustainability partner
  - Customer–generation: from discouraging to encouraging
- Creativity based on understanding the commercial (34% of load) customer’s business model
- Hear less “me” and more “thee”

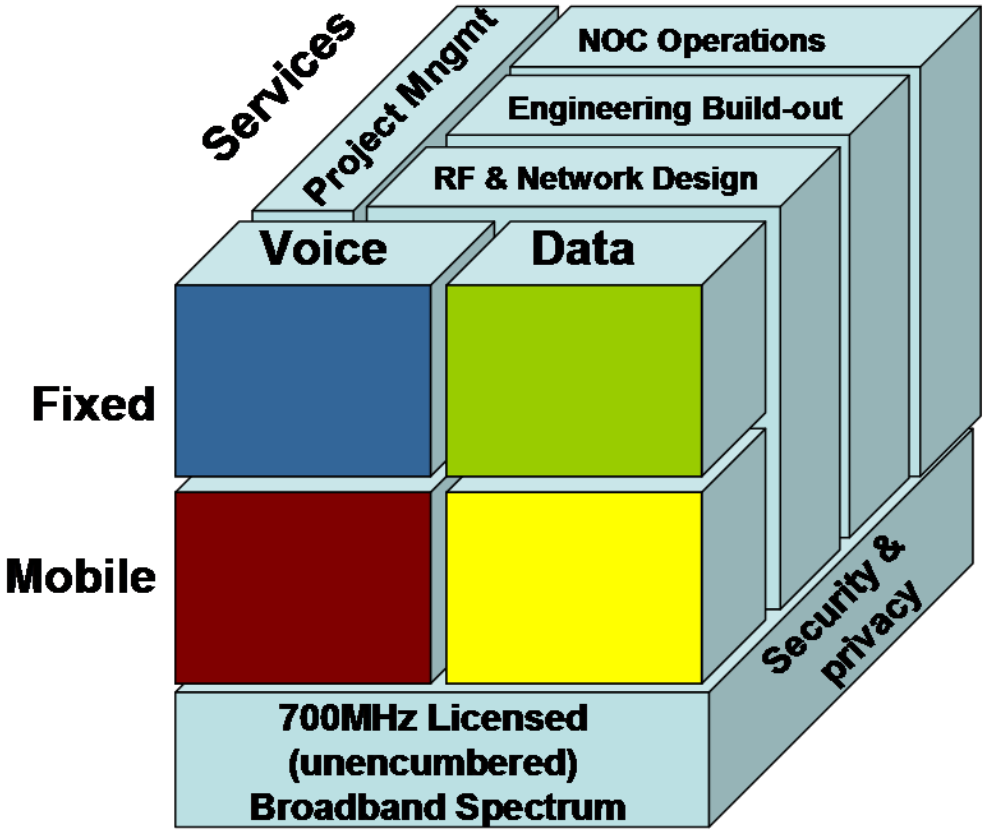
# Extra Credit

**EMBRACING THE CHALLENGE**

# Communication Challenge

- Can do it wrong in AMI design and spoil the Smart Grid implementation
  - If a utility selects a wireless mesh communication network (unlicensed 900MHz) for AMI, the comm layer may not be capable of dispatching DR, DER, and PHEV on top of reading meters
- Many, independent legacy utility communications systems generate inertia against converging of the communications necessary to support the Smart Grid

# Converged Communications

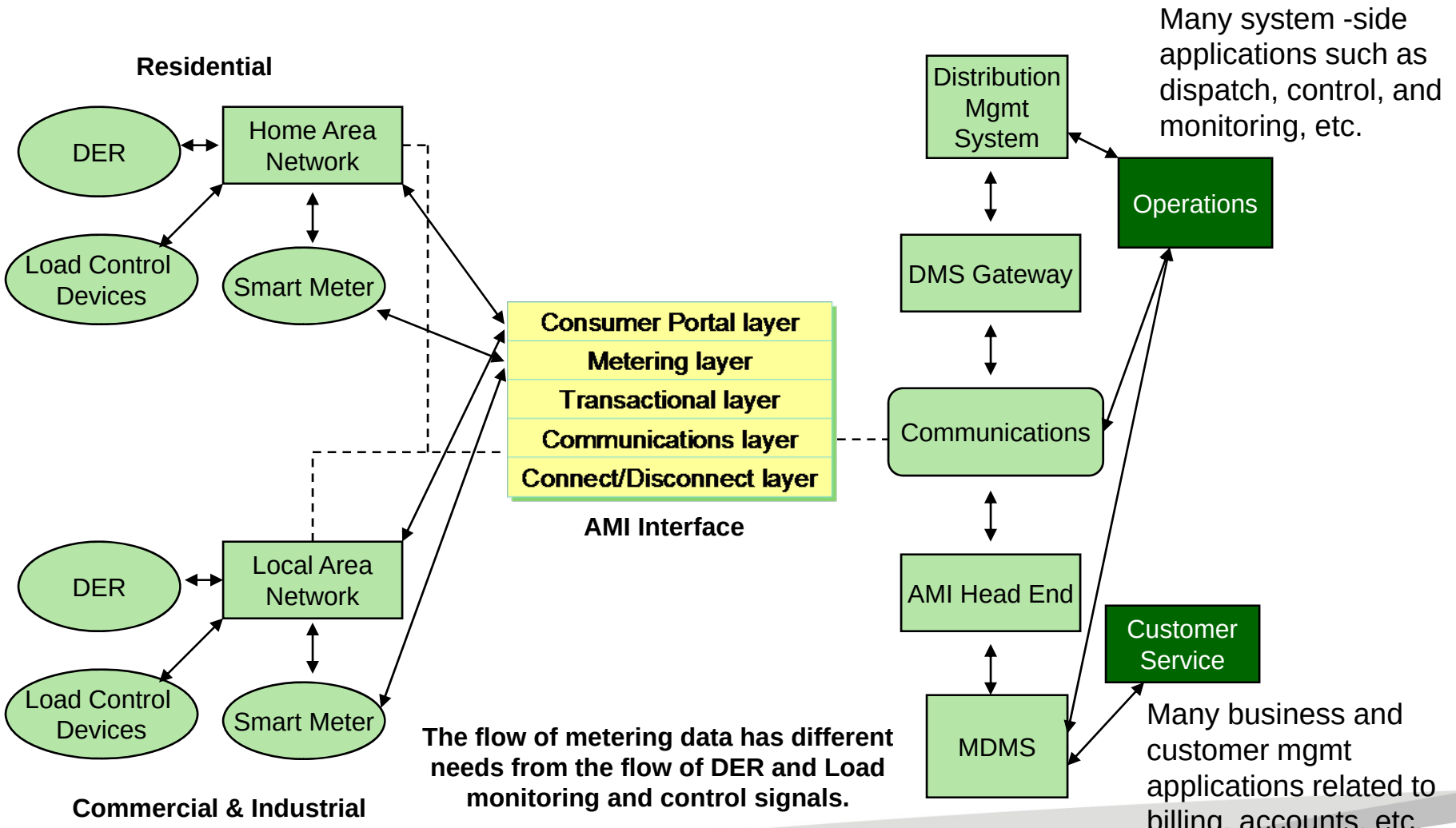



- Data from meter
- Data and updates to meter
- Data from in-home display
- Data to in-home display
- Sense DR
- Control DR

- Sense breakers, switches, capacitors, LTC
- Control distribution devices
- Monitor substations
- Control substations
- Sense distributed generators
- Control distributed generators
- Monitor storage devices
- Control storage devices
- Collect event data
- Collect asset management data

* from Arcadian Networks

# AMI Technologies – How They Fit



# Contact Information

For additional Information, contact

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