

PG&E's Demand Response Technology Initiatives

Roadmap and Opportunities

April 11, 2014





Agenda

- Demonstrate ED and PG&E priorities alignment
- Discuss customer-centric end-use automation and PG&E's DR roadmap
- Discuss 3rd Party DR



PG&E is:

1. Expanding residential/SMB participation in Demand Response(DR)
2. Expanding the portfolio of DRresources to provide wholesale market capacity
3. Allowing 3 parties to become more involved in addressing residential
4. Utilizing AMI technology in the DRspace



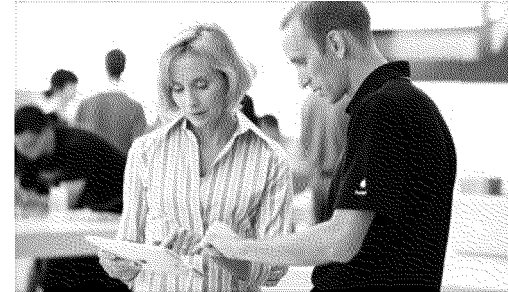
Customer-centric end-use automation

Opencommunication standards



- Enable cost-effective integration with broader range of customer devices
- Customers can choose devices that they find valuable and appealing

Newchannels to reach customers



- Retailers and service providers engaging customers where they live and shop
- Customer acquisition and fulfillment costs shared with other markets

Enables us to reach a broader audience of customers

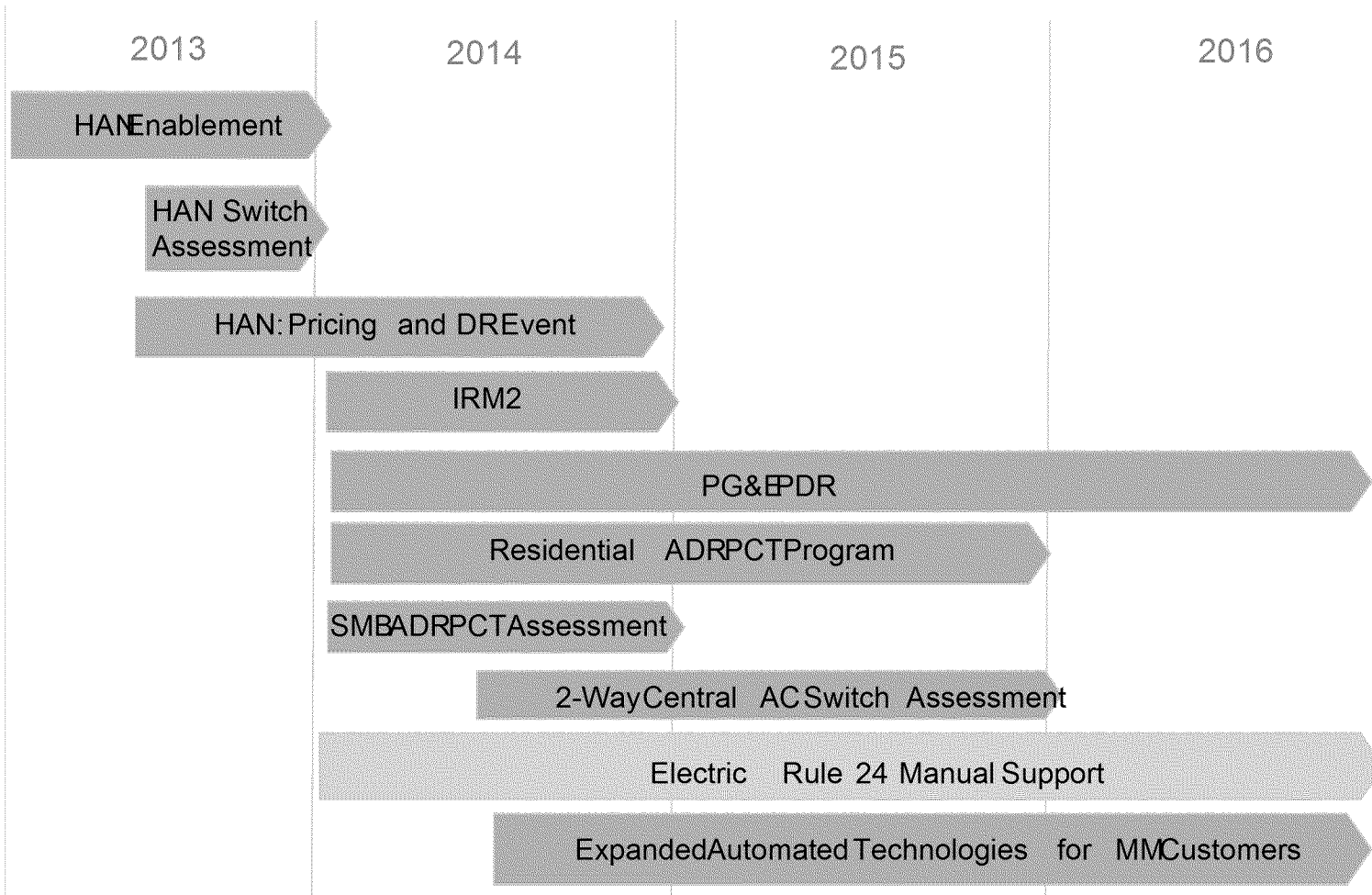


PG&E's current DR options

	Information Enablement	Automated Response	Automated DLC
Description	<p>Offer customers information about upcoming DR events, their energy usage and the price of energy in order to support their behavioral efforts during DR events.</p>	<p>Offer customers information about upcoming DR events, their energy usage and the price of energy as delivered to a load controller installed in customer premises that automatically responds to the DR signal. Customers do not have the ability to alter how the load controller responds to the information.</p>	<p>Offer customers DR program participation through the installation of a load controller in the customer premise that automatically responds to a DLC signal. Customers do not have the ability to alter how the load controller responds to the DLC signal.</p>
Current Activities	<ul style="list-style-type: none"> • Phone, Fax, Email, Text • HAN Pricing Information & Event Signal • HAN Real Time Energy Usage • Customer Data Access Enablement 	<ul style="list-style-type: none"> • HANSMB- Price Information • ADRfor Residential and SMB - Event Signal • ADRfor C&I - Event Signal 	<ul style="list-style-type: none"> • ACCycling – DLCSignal • One and Two-way communications (e.g., AMI/HAN) • Direct installation by controlling entity



Initiatives for 2014 -16



- Expand residential/SMB participation in DR
- Expand portfolio of DR resources to provide more wholesale capacity
- 3rd parties involvement



Leveraging the AMI Network

What's available now?

- Real time energy usage
- Ability to join HANdevices to a SmartMeter™ via MyEnergy

What's being delivered in 2014?

- DRevent notifications
- Customer pricing information

What are we looking at in 2015 and beyond?

- DLCover HAN
- Next generation Smart AC
- Third Party opportunities



Third-party DR

PG&Es committed to supporting the third-party DR aggregation market:

- Intermittent Renewables Management (IRM2) pilot is currently underway in the PG&E service territory to provide nonutility entities training and experience with registering with the CAISO,
- Voluntarily led the PFM to modify current AMP contracts in support of third-parties
- Meter data for direct CAISO bidding will be available via Rule 24 implementation
- Proposing to support residential aggregation (as part of Supply-Side Pilot) in 2015-16



Third-party DR

How are we doing it?

- PG&E is building an open-standard platform to enable behind-the-meter DR solutions
 - PG&E is implementing AMI/HAN and AutoDR using leading industry standards (SEP 1.x, OpenADR 0)
 - Customers adopting these standards-based solutions should be able to leverage them with any utility or third-party DR programs
 - PG&E is working with a third-party certification facility (NTS) to enable any manufacturer to validate HAN device interoperability with PG&E's network
- Third-party DR aggregators do not currently have the ability to leverage PG&E's AMI network to notify/dispatch customer loads
 - Investigating if/how third-parties can use AMI network for DR event notifications or direct load control.



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