Demand Response Research Center

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Open Automated Demand Response Communications Standards

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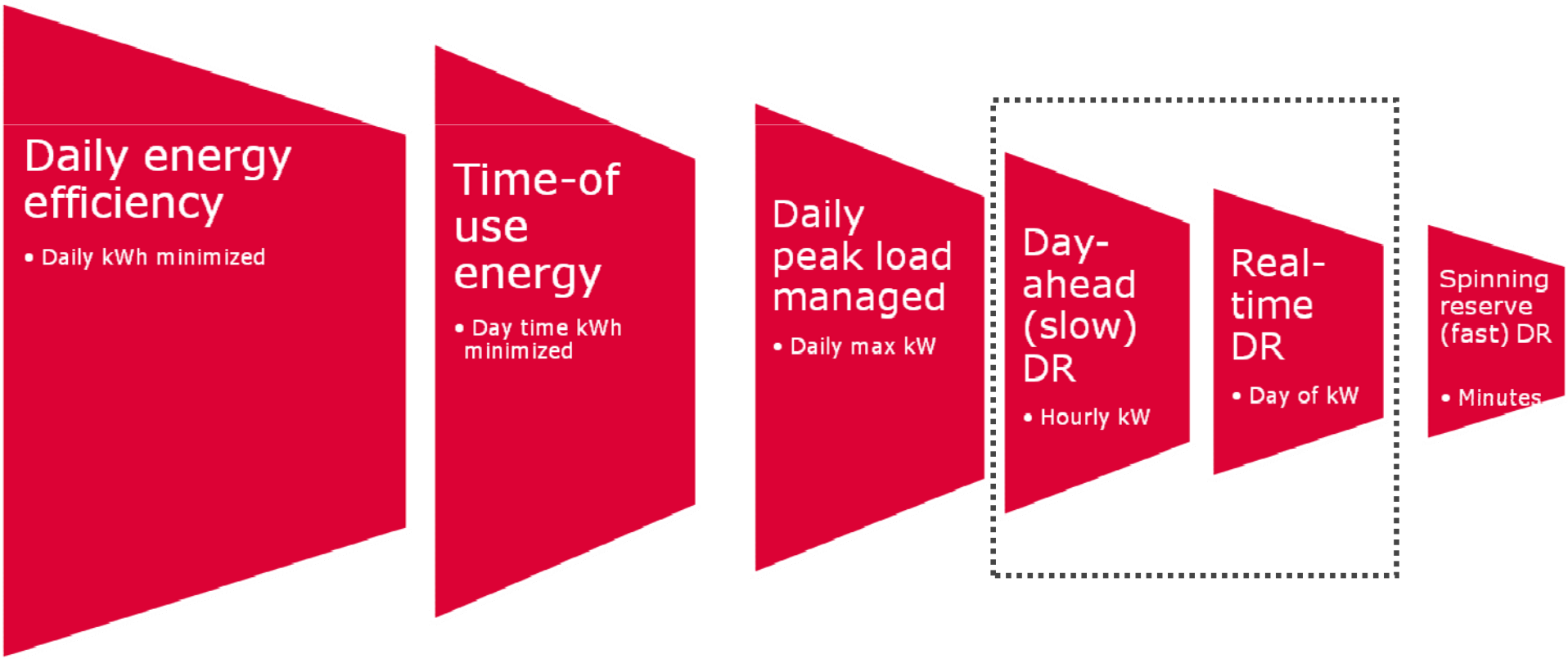
Agenda

- Definition and History of Open Automated Demand Response (Open-ADR)
- Open-ADR concept and what is being standardized
- Standards effort and status

Energy Management / DR Spectrum



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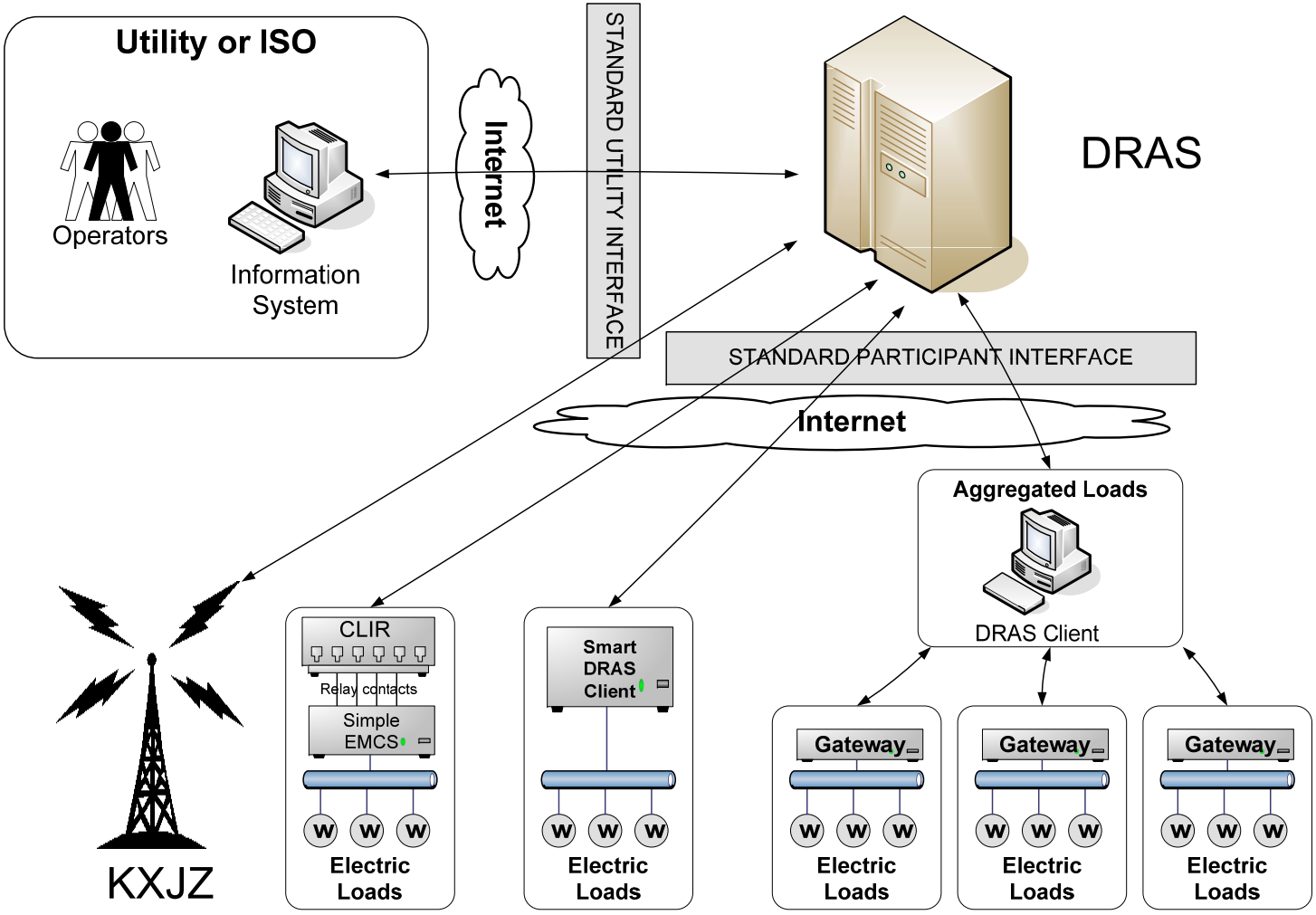
History

- 2002 - Research begun at LBNL Demand Response Research Center (DRRC) into automated DR
- 2003 – Initial development at DRRC using XML exchange of information with limited field trials.
- 2004 – Use of internet relays in field trials to support automation with simple EMCS, scaled up field tests.
- 2005 – Development of DRAS concept. Collaboration with PG&E's CPP DR program.
- 2006 – Expanded field trials and use in PG&E's Pilot DR programs. Development of CLIR box for use as Simple DRAS Client.
- 2007 & 2008 – Commercialization and use of DRAS in PG&E, SCE, and SDG&E DR programs.
- **2007 – Standardization effort for Open-ADR begins**

Automation of DR Signals



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Open ADR Standardization

- **Impact interoperability**
  - Reduces “vendor lock-in”
  - Increases innovation
  - Lowers technology costs
- **Change a utilities current business practices**
  - Allows DR technology specifications to be interoperable
- **Impact predictability and responsiveness**
  - AutoDR can be used for price or reliability DR
  - Standards are secure and reliable
- **Impact pricing or financial planning for a utility**
  - CORNERSTONE of technology development is to enable DR with dynamic tariffs – facilitate ubiquitous response capabilities

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Synergistic Efforts

- **Facility Systems**
  - BACnet Standard Project Committee (SPC) and Analysis Program (http://www.bacnet.org/) – NIST
  - LonMark
  - OASIS/Obix
  - Continental Automated Building Association (CABA) (http://www.caba.org/)
- **Utility / ISO and Intelligent Grid**
  - IntelliGrid™ (http://intelligrid.info/) Living Laboratory Project with Enernex
  - Open Home Automation Network (OpenHAN) and Advanced Metering Infrastructure (AMI) (http://www.sdge.com/ami/) – SDG&E
  - AMI (http://www.pge.com/smartmeter/) – PG&E
  - AMI (http://www.sce.com/PowerandEnvironment/ami/) – SCE
  - OpenAMI (http://www.openami.org/)
  - Gridwise™ (http://www.gridwise.com/) and Gridwise Architecture Council (GWAC) (http://www.gridwiseac.org/)
  - Programmable Communicating Thermostats (PCT) (http://pct.berkeley.edu/) – CEC/PIER
  - Standardization of Bidding Messaging Models – CA ISO
  - Southern Company RTP XML Demonstration
  - UCA International Users Group (http://sharepoint.ucausersgroup.org/default.aspx)
  - IEEE PES Intelligent Grid Coordination Committee
  - CAISO -MRTU
  - IEC TC-8 (European)
- **Industry Initiatives**
  - New Energy Alliance
  - DRAM
  - Utility Standards Board
  - Retail Energy Alliance

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OpenADR Standardization Status

- Recruited participation from major stake holders including:
  - Utilities and ISO's including CAISO, PG&E, SCE, SDG&E, etc.
  - Variety of national standards bodies including NIST, OpenAMI, TC-8, etc.
  - Facility controls vendors and organizations including BACnet, LonMark, Obix, etc.
  - End user organizations including aggregators and Retail Energy Alliance (Big box retailers representing 3B square feet of retail space)
- First draft just released for public review:
  - http://drrc.lbl.gov/openadr

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