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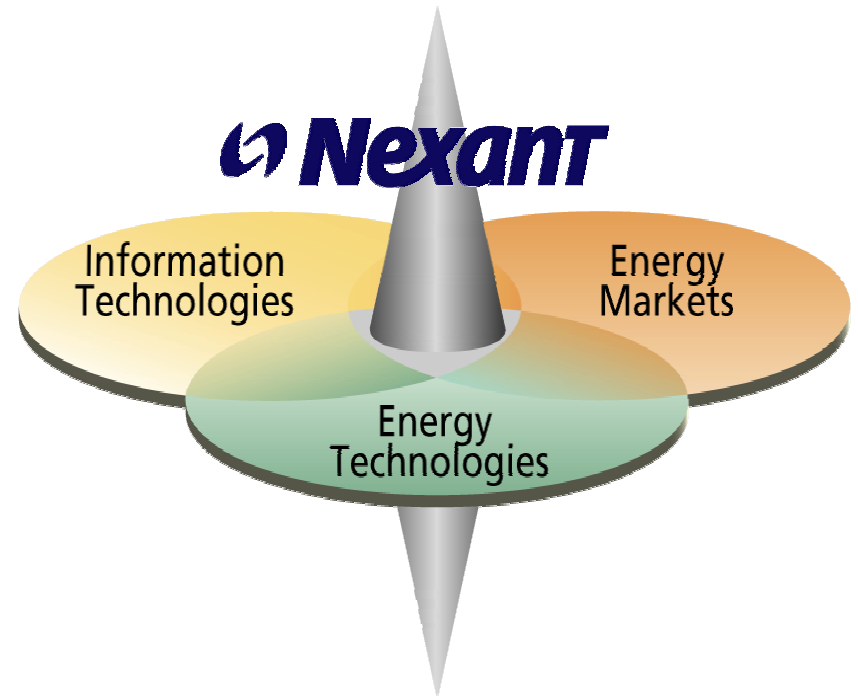
# **DRBizNet Project: From Today's World Boldly into the Future**

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Nexant, Inc.**

**June 10, 2004**

# Nexant—Our market position

*lies at the intersection of changing energy markets, advancements in energy technologies, and the proliferation of information technologies....*

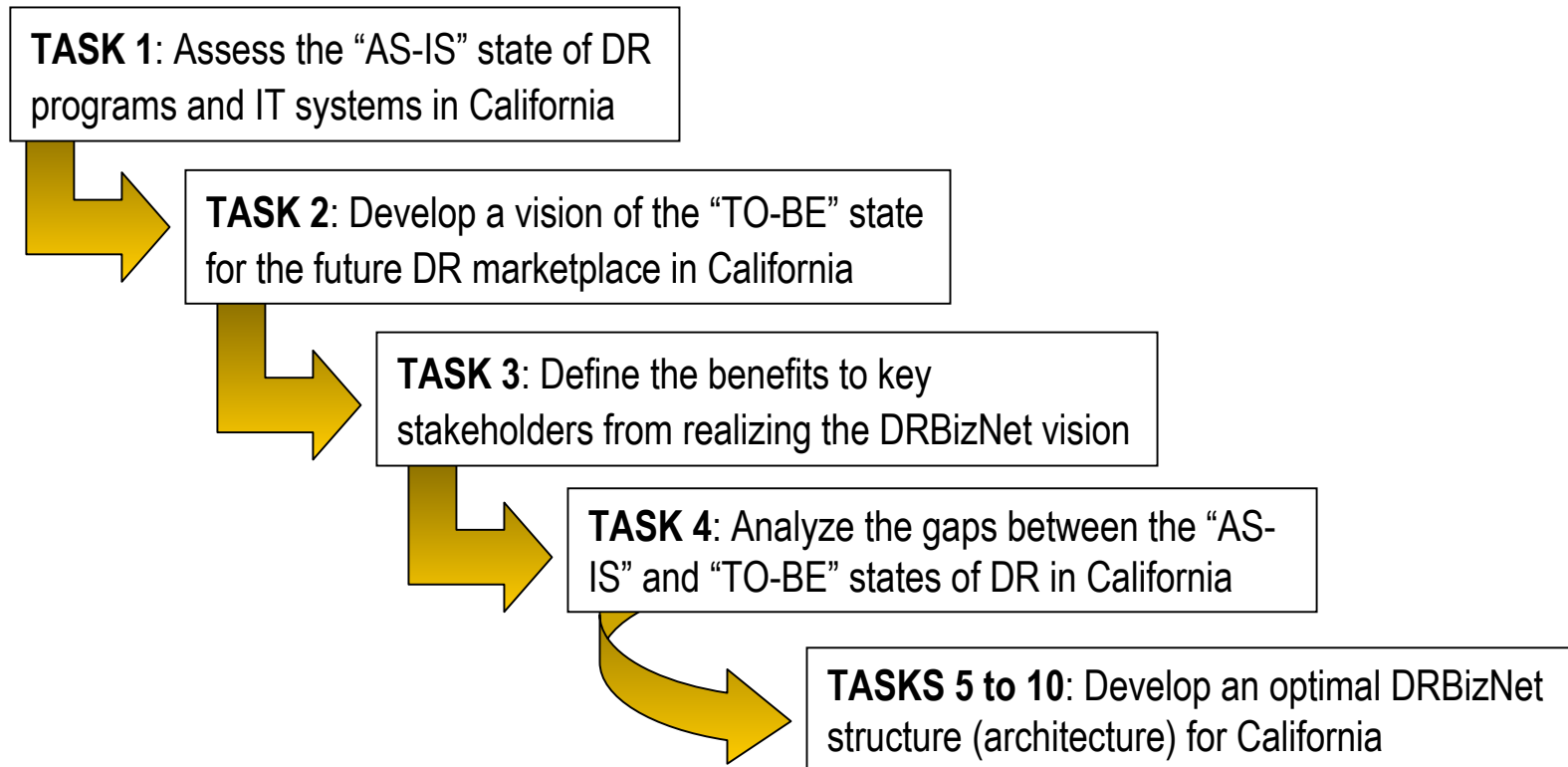


# Project Background and Presentation Outline

- **Goals:** Priority objectives of initial DRBizNet project tasks include:
  - Provide an educational snapshot of the existing California DR landscape
  - Develop a vision for a future DR market
  - Assist DRBizNet design efforts by getting architects up to speed on the DR market in California
- **Project Status:** Draft reports have been completed for initial DRBizNet tasks that are works in progress. Analyses build upon long history in California of DR-like programs and ongoing DR initiatives
- **Presentation Topics:** Key results stemming from work completed during DRBizNet project Tasks 1 to 4 will be reviewed

# Project Methodology – Key Work Tasks

*Tasks 1 to 4 provide intelligence on the current DR market and legacy systems while outlining a future vision upon which to build upcoming DRBizNet design efforts*



# Task 1 - AS-IS Assessment: Key Elements

- **Review of past and present DR initiatives in California**
- **Identification of current DR business network components and stakeholder groups**
- **Analysis of a selected sample of DR case studies (existing pilot programs in California)**
- **Summary of existing trends in the California DR market and major challenges to overcome**

# DR Programs: Past & Present Perspective

- **DR is not new to California - TOU tariffs, curtailable rates, interruptible rates, and direct load control programs have been in use for over 30 years**
- **Past DR programs were utility-sponsored and targeted specific SICs, load shapes, and end-users**
- **Prior DR programs built on the assumption that utilities knew best regarding customer wants**
- **Past programs relied on customer incentives to facilitate peak demand clipping on adverse peak days**
- **Existing array of DR initiatives lack a unifying structure that:**
  - **Expands customer choice on both a per customer and aggregated customer basis**
  - **Reflects the time specific and location specific market value of energy**

# Key Network Components & Stakeholders

*The DRBizNet project team compiled a list of definitions (presented in a detailed report glossary) that highlight key DR business network components and stakeholders, including:*

- **Stakeholders**: market players that influence the operation and evolution of the DR market (in policy, process, infrastructure-related areas)
- **Business Processes**: collection of activities that consume resources to produce products or provide services of value to customers
- **DR Services**: functions performed within the network that are standardized and closely linked to DR business processes
- **Products**: commodities exchanged within the network, e.g., day-ahead bidding, hourly pricing options, and real time data
- **DR Program “Black Boxes”**: each individual DR program and its construct is outside DRBizNet’s scope. DRBizNet will provide the common platform upon which they will operate

# Analysis of Existing DR Case Studies

*A sample of DR pilot programs, covering a range of stakeholder and participant groups, were analyzed to assess the AS-IS state*

Program Name	Program Administrator	Program Stakeholders	Brief Program Description
<b>Demand Bid Program (DBP)</b>	Southern California Edison (SCE) - Example	CDWR (later CAISO), CEC, CPUC, SCE, Itron Silicon Energy (vendor), SCE's C&I customers	Voluntary day and hour-ahead bidding program for large C&I customers
<b>PowerStat</b>	Sacramento Municipal Utility District (SMUD)	SMUD, CEC, SMUD's, Comverge (vendor), residential customers	A residential pilot program utilizing radio-controlled thermostats used for cycling whole-house AC systems
<b>Demand Reserves Partnership (DRP)</b>	CPA, CDWR, APX	CAISO, CEC, CPUC, IOUs, C&I customers	Demand aggregators operating administratively distinct from IOUs
<b>Critical Peak Pricing</b>	Pacific Gas & Electric (PG&E) - Example	CAISO, CEC, CPUC, PG&E, PG&E's C&I, customers, Itron Silicon Energy (vendor)	Reduced Time-of Use tariffs for participants willing to respond to significantly higher prices during 12 "events"



# Screening of DR Case Studies

*The performance of each of the DR case studies was evaluated using DRBizNet project goals and success criteria*

DRBizNet Project Goals & Success Criteria	Demand Bid Program (SCE)	PowerStat (SMUD)	Demand Reserves Partnership (CDWR/CPA)	Critical Peak Pricing, (PG&E)
<b>Flexibility</b>	Untested	Limited	Adequate	Untested
<b>Cost Minimization</b>	Untested	Adequate	Limited	Unknown
<b>Speed of Operation</b>	Untested	Good	Adequate	Untested
<b>Interoperability</b>	Limited	Limited	Adequate	Limited
<b>Reliability</b>	Untested	Good	Adequate	Untested
<b>Security</b>	Adequate	Adequate	Adequate	Adequate
<b>Scalability</b>	Untested	Good	Moderate	Untested

# Main Outcomes of the AS-IS Assessment

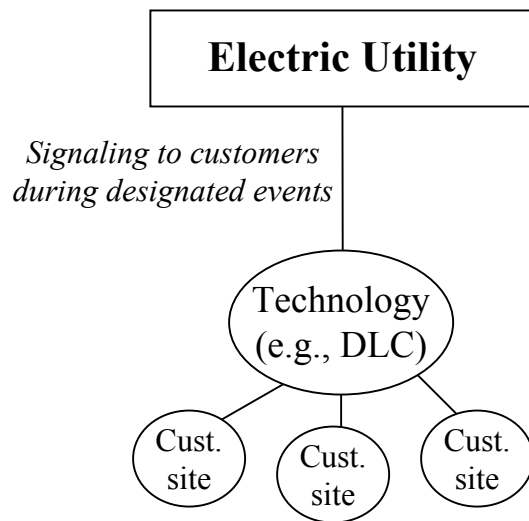
*The AS-IS assessment underscores the need to address the following challenges that limit the realization of the potential benefits from an expanded DR Market:*

- **Absence of a standardized DR business network structure**
- **Development of DR programs on an ad-hoc basis**
- **Reliance on historical DR program design concepts/ideas**
- **Recent California DR program evaluations indicate that low customer participation levels are due to a:**
  - **Lack of customer choice of DR services and products**
  - **Low customer awareness and high complexity of DR programs**
  - **Insufficient economic benefits and lack of a perceived emergency**
  - **Timing of DR offerings in the marketplace**
- **Current data flow mapping capabilities are insufficient to meet the demands of many existing DR programs...**

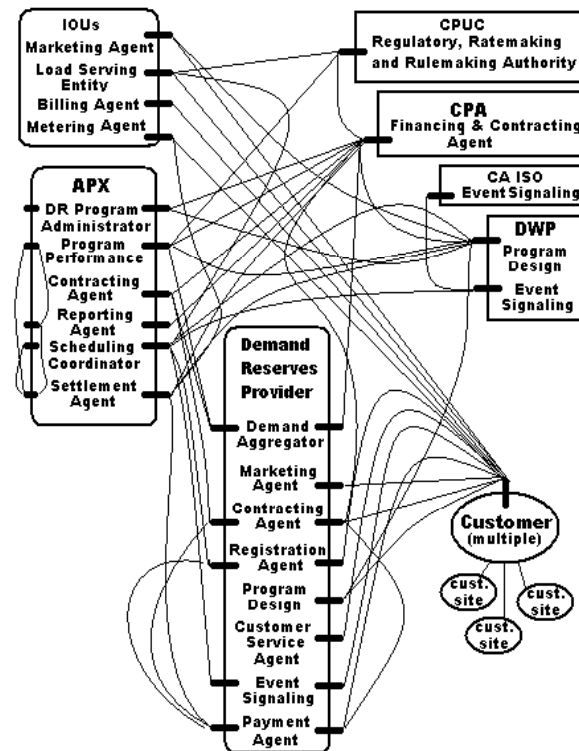
# Data Flow Mapping Capabilities Shortfall

*The AS-IS assessment reveals that existing DR programs are outstripping data flow mapping capabilities that were used to manage previous DR initiatives*

## Historical DR Program Model



## Current DRP Program



## **Task 2 - TO-BE Vision: Key Elements**

*Putting aside AS-IS realities, the project team developed a TO-BE vision by completing the following work steps:*

- **Develop assumptions (e.g., timing, architecture, stakeholders, etc.) to guide the design of the TO-BE state for DR in California**
- **Identify principles to guide the design of DRBizNet – circa 2020**
- **Define the main attributes of the TO-BE vision from key DR stakeholders' perspectives**

# Main Assumptions of the TO-BE Vision

- **The time horizon in which the “TO-BE” state could realistically be established is at least 10 years away**
- **Incremental changes in business processes and DRBizNet building blocks can be rapidly incorporated into DR programs and network design**
- **The number of DR participants will grow exponentially compared to today’s marketplace**
- **Load Serving Entities (LSEs, including IOUs and municipalities) will still play major roles**
- **“Edge devices” (i.e., the interface between DRBizNet and individual DR program “black boxes”) will be standardized and fully integrated into the operation of all DR programs**

# Guiding Principles of the TO-BE State

*Guiding principles for the TO-BE state encompass the following two main areas:*

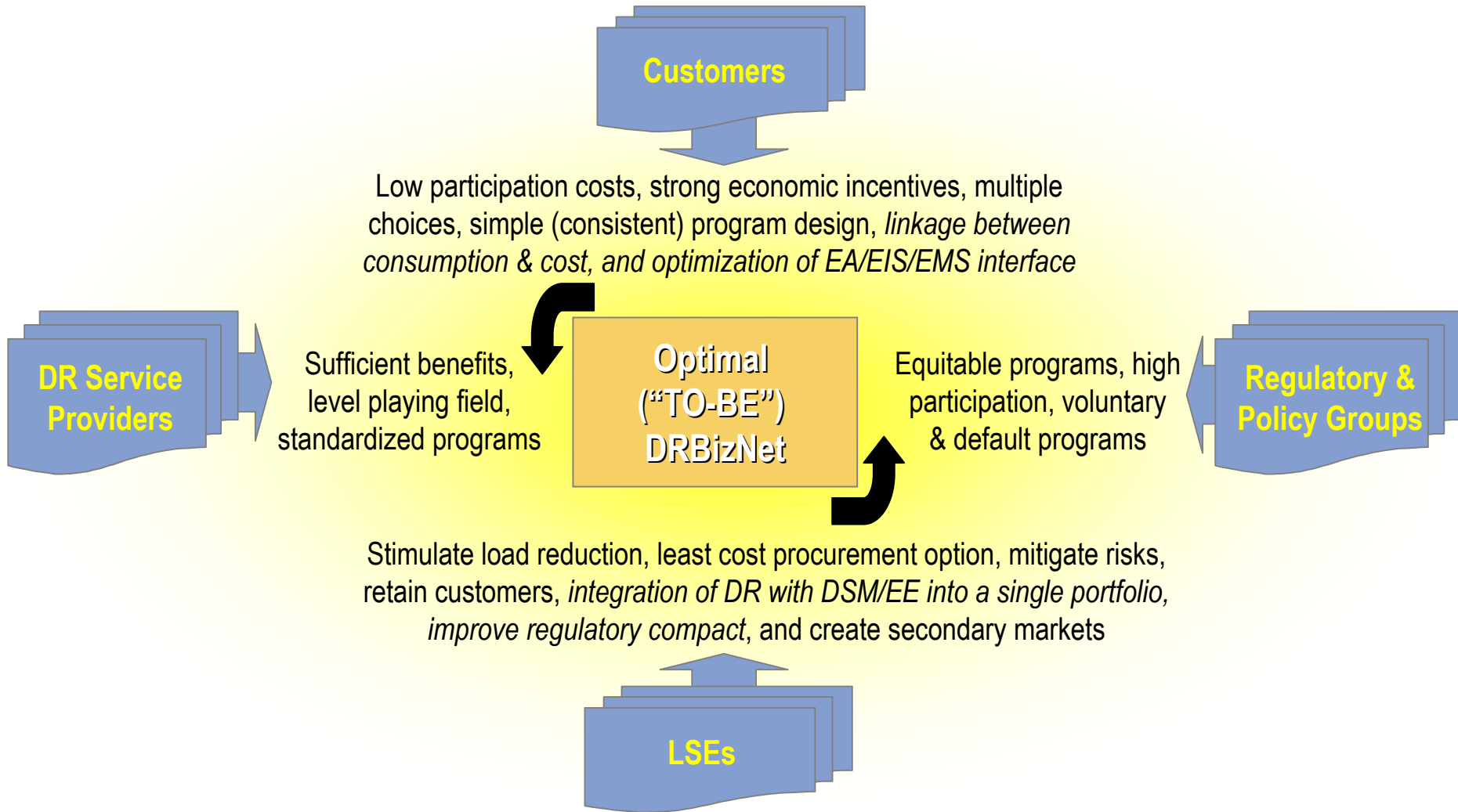
## Business Processes Elements

- Standardize DR business process responsibilities
- Group process responsibilities into distinct roles and transactions
- Allow for stakeholder roles to evolve over time
- Define “black box” processes and their interface
- Establish distributed “control & coordination” processes

## Technology Driven Elements

- Maximize the balance between technology flexibility and operational simplicity relating to DR business processes
- Provide a clear definition of required technology related services
- Use a software architecture that can be closely mapped to key DR business network functions and processes

# Core Attributes of the TO-BE Vision

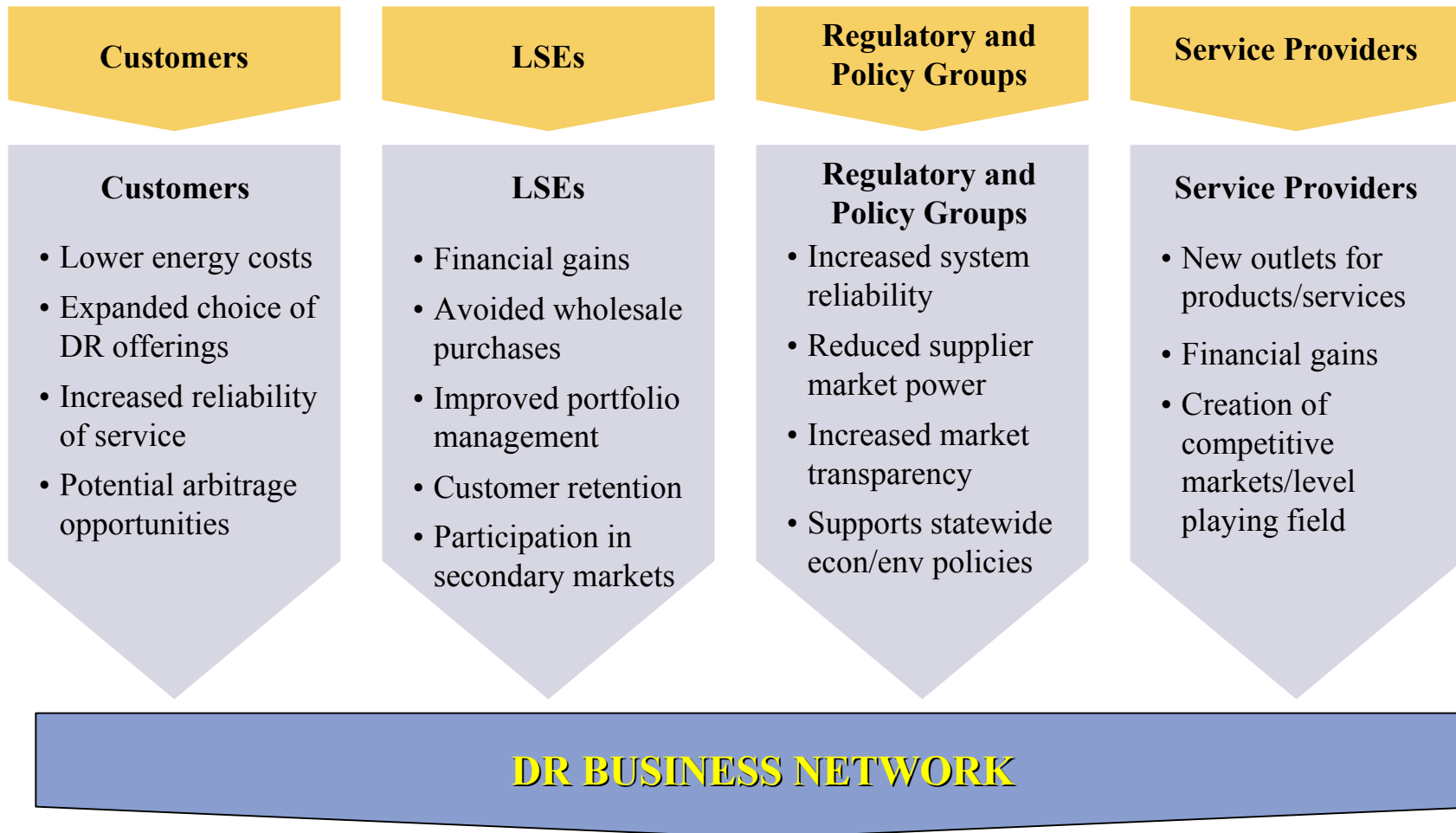


## **Task 3 - Review of Benefits: Key Elements**

- **Summary of potential economic, technical, and environmental benefits from realizing DRBizNet's TO-BE vision**
- **Qualitative assessment that, going forward, could be quantified...once the envisioned DRBizNet is more advanced**
- **Benefits analysis was segmented by the following key stakeholder groups:**
  - **Customers**
  - **LSEs**
  - **Regulatory & policy groups**
  - **DR service providers**



# Main Benefits for Stakeholders



## **Task 4 - Gap Analysis: Key Elements**

- **Comparative analysis of the AS-IS and TO-BE states of DR in California**
- **Task 4 analyses are based on a historical review of DR, case study results, and recent assessments of other DR initiatives (e.g., WG2 reports and June 8<sup>th</sup> workshop at SMUD)**
- **Gap analysis broken out in terms of economic elements, IT issues, market operations, and policy elements**
- **Task 4 analyses used to outline preliminary implementation priorities for DRBizNet (and other future DR efforts)**

# Gap Analysis: AS-IS & TO-BE States

KEY	
No Significant Development	--
Early Stages of Development	○
Moderate Development	◐
Fully Developed	●

ECONOMIC ELEMENTS	
Low cost of participation	◐
Sufficient level of economic benefits	◐
IT ELEMENTS	
Flexible DR Business Architecture	--
Highly Integrated IT Infrastructure for DR	--
MARKET OPERATIONS	
Broad-base of DR programs	○
Consistency of DR program offerings	○
Use of DR as a reliable power resource	--
Scalability of DR Programs	○
High penetration across customer classes	--
Voluntary and default programs	○
High level of customer awareness	○
POLICY ELEMENTS	
Active market monitoring by regulators	○
Standardized market rules & regulations	--
Quality assurance standards for DR services	--



# DRBizNet Implementation Priorities

	"TO-BE" ATTRIBUTES	Immediate	Mid-term	Long-term
Economic Elements	Low cost of participation		✓	
	Sufficient level of economic benefits	✓	✓	
IT Elements	Flexible DR Business Architecture	✓	✓	
	Highly Integrated IT Infrastructure for DR		✓	✓
Market Operations	Broad base of DR programs		✓	✓
	Consistency of DR program offerings	✓	✓	
	Use of DR as a reliable power resource		✓	✓
	Scalability of DR Programs		✓	✓
	High penetration across customer classes			✓
	Voluntary and default programs		✓	✓
	High level of customer awareness	✓	✓	
Policy Elements	Active market monitoring by regulators	✓	✓	✓
	Standardized market rules & regulations	✓	✓	
	Quality assurance for DR services		✓	✓

# DRBizNet Design Goals and Success Criteria

*Going forward, the following goals and success criteria will continue to guide DRBizNet communication and coordination design efforts:*

- √ **Flexibility**: Adaptability to a range of program structures & reporting requirements
- √ **Cost Minimization**: Implementation and maintenance of the DR architecture
- √ **Speed of Operation**: Real time performance adapted to current and expected norms in intervals for meter data recording and analysis
- √ **Interoperability**: Open systems that allow the use of standardized “plug & play” systems while maintaining “multi-lingual” communication protocols
- √ **Reliability**: Robust operations with high levels of fault tolerance
- √ **Security**: Appropriate firewalls and management of data access/utilization
- √ **Scalability**: Functional long-life platforms that accommodate the growing diversity of programs, program modifications, and expanding participation within programs