Finding Win-Win Opportunities for DER Through Stakeholder Collaboration

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E2I DER Public/Private Partnership Vision

Improving the quality of life by enabling DER to provide reliable and clean power to meet customer needs and support the power delivery system

Market Integration Platform Objective

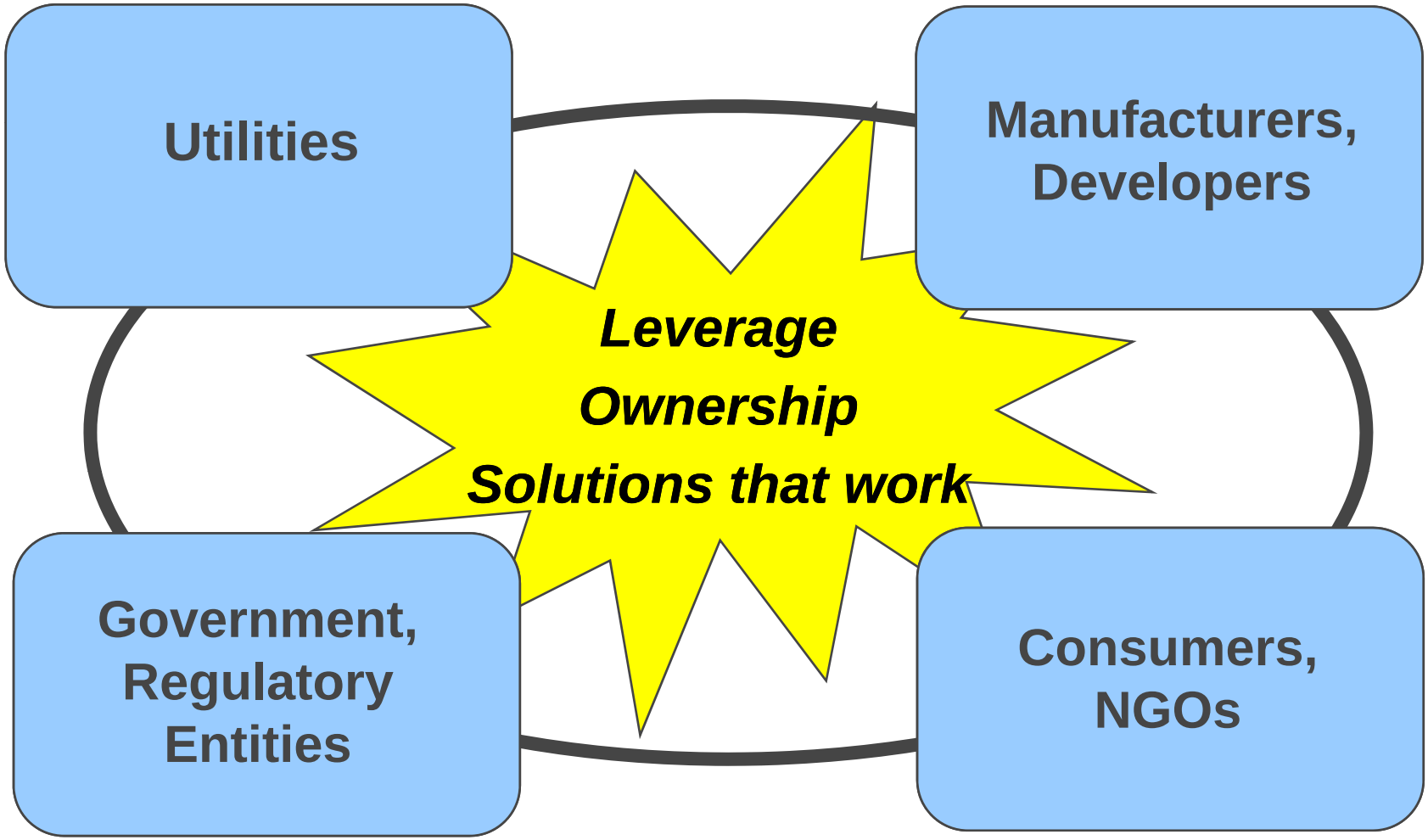
Objective:

Provide decision makers with input on policy and market development opportunities to encourage DER integration where it brings value

Approach:

Facilitate stakeholder development and implementation of win-win approaches for DER integration

Stakeholders: Who are they? Why does it matter?



Numerous partners* and stakeholders participate

Government Entities

*** California Energy Commission**

*** NYSERDA** **DOE**

*** Massachusetts Renewable Energy Trust** NASEO

Colorado Office of Energy

Regulatory Entities

***NJ BPU** PUC Ohio

TX PUC NY PSC

CA PUC FERC

CARB BAAQMD

NRRI NARUC

OR PUC

Manufacturers

Solar Turbines UTC Fuels Cell

Cummins West Fuel Cell Energy

Siemens Westinghouse STM Power

ASCO

Electricity Entities

*** TVA** *** Ameren**

*** NY ISO** *** NYPA**

*** CPS San Antonio** Exelon

SCE First Energy

OPG Southern Co.

PEPCO

Developers

RealEnergy

DTE Energy Technologies

Northern Power Systems

Consumers

Silicon Valley Manufacturers Group

Verizon

NGOs

Energy Foundation

USCHPA NRDC

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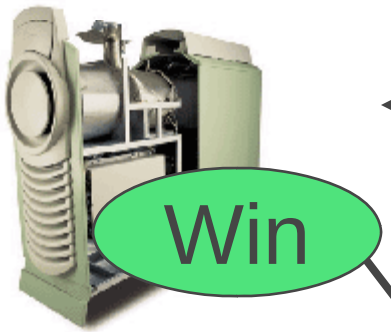
What is Win-Win? How to Achieve?

- Multiple stakeholders benefit; no stakeholder harmed
  - Customers
  - Regulators--Society
  - Utility shareholders and other rate payers

- Developed collaboratively, since a benefit to one is a cost to another
  - Legitimate
  - Accepted
  - Mutually beneficial

What is Win-Win?

DER Customer



DG Costs
and Benefits

Rate Design
Custom Contract

Utility Shareholder
& Other Customers

Cost Savings

Public Incentive

Cleaner Environment
Other Objectives

Society

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DER Market Integration Status

2003: Developed tools to enable stakeholder-driven DER integration programs

- Assessed stakeholder perspectives on DER
- Assembled catalog of existing approaches
- Developed cost-benefit allocation model
- Created framework for collaborative win-win DER program development

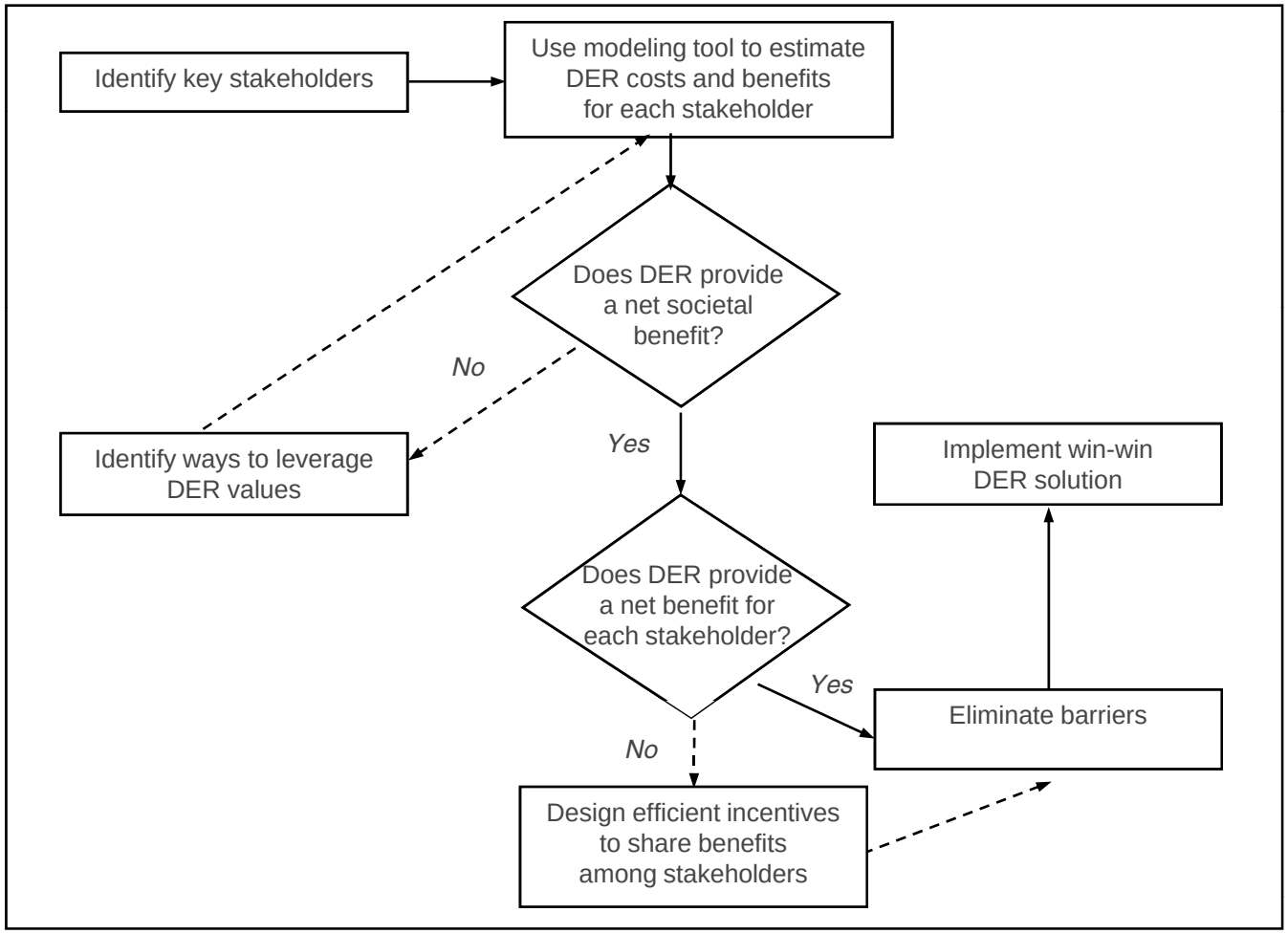
2004: Implement tools in stakeholder collaboratively-developed DER pilot program

- California

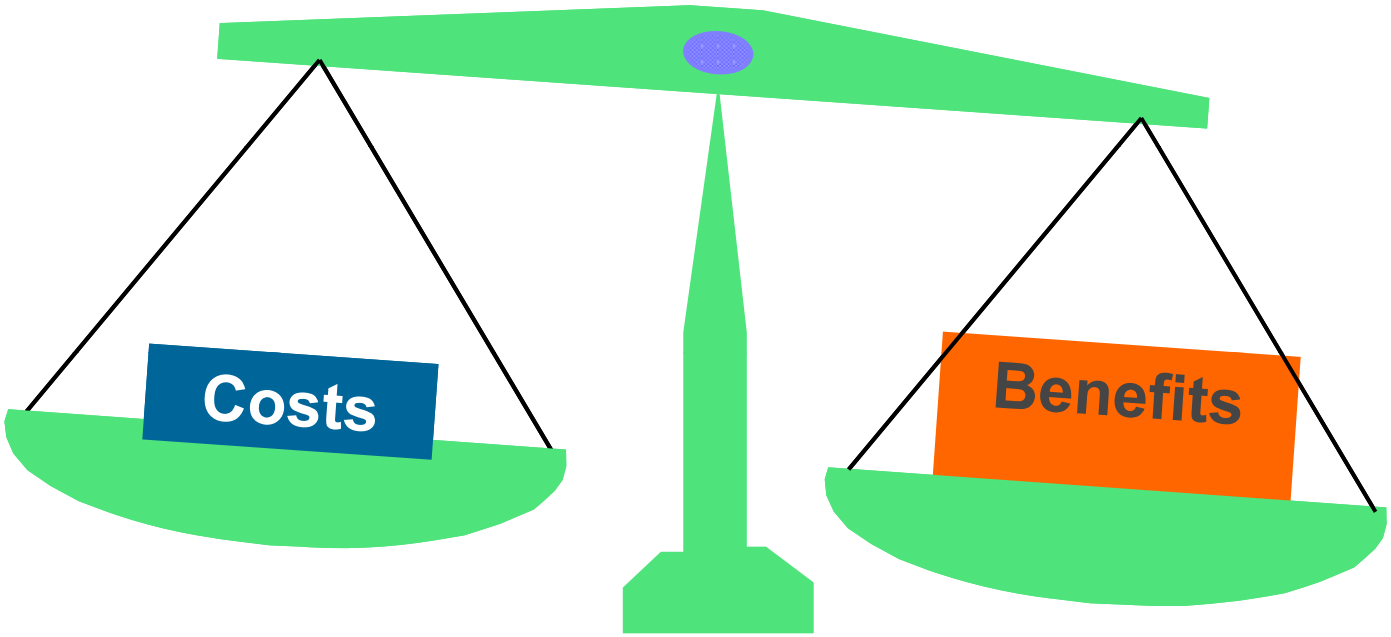
Framework: Use Stakeholder Collaboration to Integrate DER More Widely

- Focus on stakeholder interests
  - Utility, DER customer, DER provider, regulatory and societal interests (including non-participating customers)
- Identify
  - Needs of each stakeholder
  - Barriers to meeting those needs
  - Approaches tried or proposed
- Define collaborative strategies
  - Leverage DER value
  - Design efficient incentives
  - Eliminate barriers
- Match strategies to stakeholder needs, tailor to local conditions

Decision Process to Identify and Allocate DER Costs and Benefits



The Cost Benefit Analysis Takes Each Stakeholder's Perspective



Many Costs and Benefits are Quantifiable

- Customers
  - Costs: DER equipment capital and maintenance, fuel, insurance, emissions offsets, interconnection study and equipment
  - Benefits: Electricity bill savings, fuel savings, energy sales, sales of renewable credits
- Utility shareholders and other rate payers
  - Costs: Revenue reductions due to DER, interconnection study and equipment, upgrades
  - Benefits: Avoided wholesale energy purchases, avoided generation capacity, avoided or deferred T&D capacity
- Society
  - Costs: total resource costs, DER emissions, incentives from public purpose funds

    Benefits: Total resource benefits, reduced central station emissions

Some Costs and Benefits are Harder to Quantify

- Customers
  - Customer reliability, quality, price risk management
- Utility shareholders and other rate payers
  - System reliability, quality, voltage support
- Society
  - System reliability, environmental benefits, market stability, market price management

Looking for Win-Win:
PG&E Peaking Plant in Constrained Area

Costs and Benefits

Units	Levelized $/MWh of DG	Analysis Horizon Years (20 Years Max)	10

DG Customer			
Participant Cost Test: Is it worth it to the DG customer to install the DG?			
Annual Electricity Bill Savings	246.53	Annual Capital Cost	229.80
Annual Avoided Fuel Savings (Thermal)	-	DG Maintenance Cost	14.31
Sales of Renewable Energy Credits	-	DG Fuel Cost	70.66
CEC Buydown / CPUC Self-gen Program	-	Emissions Offset Purchases	-
Incentive / Credit from Other Ratepayers	-	Interconnection Study Cost	1.84
Incentive from Public Purpose Fund	-	Insurance	-
Total Benefits	246.53	Total Costs	316.61
		Net Benefit	(70.08)

Utility Shareholders and Other Ratepayers			
RIM Test: How much will the impact be on earnings or rates?			
Avoided Wholesale Energy Purchases	53.88	Revenue Reductions Due to DG (2)	246.53
Avoided Generation Capacity	-	System Upgrades	-
Avoided T&D Capacity	293.26	Interconnection Study Cost	1.84
Customer Payment for Interconnection Study	1.84	Incentive / Credit to DG Customer	-
Incentive from Public Purpose Fund	-		
Total Savings	348.98	Total Cost	248.37
		Net Benefit	**100.61**

Combined DG Customer, Shareholders, Other Ratepayers			
Total Resource Cost Test: What is the net tangible benefit that can be reallocated to produce a 'win-win'?			
Sum of DG Customer, Shareholder, and Other Ratepayer Perspectives			
		Net Benefit	**30.53**

Incremental Societal Value			
Societal Cost Test: What are the additional net intangible benefits?			
Reduced Central Generation Emissions	2.13	DG Emissions	10.99
		CEC Buydown / CPUC Self-gen Program	-
		Public Funds / Tax Incentives to Utility (1)	-
		Public Funds / Tax Incentives to DG (1)	-
Additional Savings	2.13	Additional Costs	10.99
		Incremental Societal Net Benefit	(8.86)
		Net Societal Benefit (TRC+Societal)	**21.67**

1 Allocations from existing public purpose charges are not considered an incremental cost
2 Net of Standby Charges (if not a DER technology) and Exit Fees

Input Settings

Avoided Costs	
Wholesale Energy Forecast	NP15 9/8/2003
Generation Multiplier	None - 1X
Residual Net Short Position	None - 0%
Generation Capacity Avoided	Zero Cost
T&D Avoided Cost	High (75%)
Customer Characteristics	
Utility	PG&E
Customer Rate	PG&E: E-20T (Large)
DG Type (Qualify for DER Rate?)	Non-DER (Does not qualify)
Customer Size (kW)	Enter --> **1500 kW**
Customer Load Factor	90% Load Factor
DG Technology Type and Financing	
DG Type	Cummins GSK19G - 300kW
DG Operation	Low Cap - No Outages
DG Financing	10-Years
Natural Gas Rate (If Nat. Gas)	Core Industrial
Diesel Cost (If Diesel)	Industrial
Interconnection Cost	Medium - $2000
Customer Payment for Interconnection	High - 100%
Other Inputs	
Rebates	California CEC
Emissions Costs	Low
Attainment Area	Non-Attainment
REC Credits	None - $0/MWh

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Achieving Win-Win: Adjusting incentives

Costs and Benefits

Units	Levelized $/MWh of DG	**Analysis Horizon Years (20 Years Max)**	**10**
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Sales of Renewable Energy Credits	-	DG Fuel Cost	70.66
CEC Buydown / CPUC Self-gen Program	-	Emissions Offset Purchases	-
Incentive / Credit from Other Ratepayers	73.33	Interconnection Study Cost	1.84
Incentive from Public Purpose Fund	-	Insurance	-
Total Benefits	319.86	Total Costs	316.61
		Net Benefit	**3.25**
Utility Shareholders and Other Ratepayers			
RIM Test: How much will the impact be on earnings or rates?			
Avoided Wholesale Energy Purchases	53.88	Revenue Reductions Due to DG (2)	246.53
Avoided Generation Capacity	-	System Upgrades	-
Avoided T&D Capacity	293.26	Interconnection Study Cost	1.84
Customer Payment for Interconnection Study	1.84	Incentive / Credit to DG Customer	73.33
Incentive from Public Purpose Fund	-		
Total Savings	348.98	Total Cost	321.70
		Net Benefit	**27.28**
Combined DG Customer, Shareholders, Other Ratepayers			
Total Resource Cost Test: What is the net tangible benefit that can be reallocated to produce a 'win-win'?			
Sum of DG Customer, Shareholder, and Other Ratepayer Perspectives			
		Net Benefit	**30.53**
Incremental Societal Value			
Societal Cost Test: What are the additional net intangible benefits?			
Reduced Central Generation Emissions	2.13	DG Emissions	10.99
		CEC Buydown / CPUC Self-gen Program	-
		Public Funds / Tax Incentives to Utility (1)	-
		Public Funds / Tax Incentives to DG (1)	-
Additional Savings	2.13	Additional Costs	10.99
		Incremental Societal Net Benefit	(8.86)
		Net Societal Benefit (TRC+Societal)	**21.67**

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Match Strategies to Stakeholder Needs Examples

Needs	Barriers to DER	Current Approach	Alternate Approach	Relevant Strategy
Utility				
Cost-effective asset deployment	High DER capital cost	Utility pays for DER based on singular value to it of deferral or reliability	Share equipment costs according to value created	***Leverage DER value***
Improved margins or ROE	DER that displaces load reduces revenues	Limited use of performance-based rates	Pilot rate approach that tests least-cost societal solutions	***Introduce efficient incentives***
DER Customer				
Reduce turnkey project costs	Cost of equipment	State financial incentives	Share equipment costs according to value created	
	High transaction costs to install equipment due to complex, costly permitting & approval process	Uniform interconnection standards & process, simplified permitting, net metering, etc.	Allow flexible pilot processes, without precedential value for other projects	***Eliminate barriers***
Increased reliability of on-site supply	Cost of clean DER	Each customer pays for back-up generator based on singular value of reliability to itself	Share equipment costs according to value created	
Regulatory & Societal Interests				
Increase bulk power reliability	Small scale of most DER equipment; lack of access to ancillary markets	Ignore potential contributions to bulk power markets	Aggregate small DER units; provide access to ancillary markets	

Tailor Strategy to Local Conditions

Example: *leveraging value of customer-driven CHP*

- Issue: cost/benefit model shows large net benefit to CHP customer, but net cost to utility or other customers
- Challenge: leverage customer value to benefit utility/other customers
  - Create value in wholesale markets, e.g. –
    - *oversize generator to participate in demand response program*
  - Use customer resource to reduce grid costs, e.g. –
    - *reschedule customer operations, cycle equipment, or use excess generation to curtail peak demand*
    - *assure reduced energy usage to defer grid expansion*
- Win/Win: monetize & allocate incremental net benefit to utility &/or other customers to align their interests with CHP customer's

California DER Pilot Project Seeks Win-Wins

- Help SCE develop RFP that receives successful bids
- Objectives
  - Test the E2I stakeholder collaboration process
  - Identify win-win solutions
  - Scale to other parts of CA or states
- Approach
  - Share analysis of SCE distribution system needs and potential win-wins with stakeholders in workshop
  - Develop innovative win-wins with stakeholder working groups
  - Provide input to SCE's RFP development
  - Monitor results and report
- Outcomes
  - Scalable process
  - Cost-benefit analyses of win-win examples

Conclusion

E2I Framework approach offers:

- Collaborative process designed to ensure legitimacy, acceptance, and mutual benefit
- New tool to quantify and assign DER costs and benefits among stakeholders, and to re-allocate to achieve win-wins
- Not just DER technology demonstrations, but also
  - constructive ways to communicate and cooperate
  - new ways to optimize benefits for multiple stakeholders
  - creative rate approaches and regulatory incentives that specifically target value-adding DER
  - innovative departures from business as usual in DER markets