

Business Models: Descriptions & Regulatory Issues

#	Utility Role	Asset Ownership & Rate-Basing		Activities or Services	Utility Revenue/Savings	Role of Customer or Third Party DER Provider	Key Regulatory Issues
		Utility Side	Customer Side				
A: Providing DER-Related Services							
1	<u>SELL NETWORK MANAGEMENT SERVICES, WITHOUT OWNING DER ASSETS</u>			<ul style="list-style-type: none"> • Manage customer demand response for ISO programs • Manage grid for VAR control or back-up services for mini-grids • Metering & billing for solar utilities 	<ul style="list-style-type: none"> • Management fees • Share of ISO DR pmts • Service fees for backup services, metering, billing 	<ul style="list-style-type: none"> • Purchase DR services, possibly through incentive sharing? • Purchase backup services • Purchase metering or billing services 	<ul style="list-style-type: none"> • Should account for utility lost profits or unrecovered costs embedded in lost load – e.g., if new solar utility sells electricity to customers, allow utility opportunity to recover cost-based portion of lost revenue from solar utility customers
2	<u>INVEST IN DG AT OR NEAR CUSTOMER SITES, AND OFFER PREMIUM SERVICES TO DER CUSTOMERS</u>	<ul style="list-style-type: none"> • DG systems such as engine, fuel cell, microturbine, or concentrating solar 	<ul style="list-style-type: none"> • DG systems such as engine, fuel cell, microturbine, or rooftop PV • If CHP, consider treatment of thermal equipment 	<ul style="list-style-type: none"> • Provide premium power quality • Provide enhanced reliability 	<ul style="list-style-type: none"> • Customer payment for premium or enhanced service(s) • Customer capital contribution • If in constrained area, premium or incentive from other ratepayers 	<ul style="list-style-type: none"> • Possibly provide site • Buy premium/enhanced services • Buy energy &/or capacity, possibly including thermal 	<ul style="list-style-type: none"> • ‘Generation’ ownership in restructured regimes • On customer side, antitrust or anticompetitive? • ‘Used & useful’ for ratebase purposes (if serve only selected customers)? • Ratebase treatment of thermal equipment? • Treatment of any revenue reduction from foregone grid charges?
B: Deploying DER Assets and Infrastructure							
3	<u>INVEST IN DER EQUIPMENT AT HOST CUSTOMER SITES, WITHOUT PROVIDING SERVICES</u>		<ul style="list-style-type: none"> • Demand response switches & other equipment • DG systems such as engines, fuel cells, or solar PV; maybe CHP 	<ul style="list-style-type: none"> • Invest in & install DER equipment <ul style="list-style-type: none"> ◦ solicit competitively, or ◦ let customer select & contract with vendor or operator, or ◦ install &/or operate equipment 	<ul style="list-style-type: none"> • Customer lease or tariff payments • Possibly: <ul style="list-style-type: none"> ◦ installation charges ◦ vendor or operator fees 	<ul style="list-style-type: none"> • Customer might select equipment vendor(s) & operator(s) • Vendor or operator compensated by: <ul style="list-style-type: none"> – ISO energy / capacity payments – customer payments 	<ul style="list-style-type: none"> • ‘Generation’ ownership in restructured regimes • Antitrust & anticompetitive issues • ‘Used & useful’ for ratebase purposes if serve only selected customers? • Ratebase treatment of thermal equipment? • Treatment of any revenue reduction from foregone grid charges?
4	<u>INVEST IN ADVANCED GRID INFRASTRUCTURE</u>	<ul style="list-style-type: none"> • Intelligent control & communications devices on circuits & transformers 	<ul style="list-style-type: none"> • Advanced meters, communications & control equipment 	<ul style="list-style-type: none"> • Develop & build advanced grid infrastructure • Purchase, install, maintain & monitor advanced meters 	<ul style="list-style-type: none"> • ROI on ratebase investment • Rate recovery of administrative costs 	<ul style="list-style-type: none"> • Choose vendor or service company to control site equipment & respond to price signals • Control metering info & communication 	<ul style="list-style-type: none"> • Cost/benefit of utility investments • Link between benefits & dynamic pricing • if link is strong, should dynamic pricing be voluntary or mandatory?
C: Using DER to Reduce Costs and/or Improve Grid Reliability							
5	<u>INVEST IN DER TO REDUCE WHOLESALE POWER OR SYSTEM EXPANSION COSTS, AND/OR TO IMPROVE SYSTEM PERFORMANCE</u>	<ul style="list-style-type: none"> • DG systems such as engine, fuel cell, microturbine, or concentrating solar 	<ul style="list-style-type: none"> • Advanced meters, communications & control equipment • Demand response switches & other equipment • DG systems such as engine, fuel cell, microturbine, or concentrating solar 	<ul style="list-style-type: none"> • Plan, install, operate &/or maintain advanced meters, communications & control equipment • Dispatch DG when DG marginal operating costs < wholesale power costs • Use DG to enhance system reliability when DG costs < conventional utility construction 	<ul style="list-style-type: none"> • Equipment charges (DR, (meters, communication & control) • Output sales (wholesale to grid, or retail to customers?) • PBR incentives (if any) for enhanced reliability • Expansion cost savings (between rate cases) 	<ul style="list-style-type: none"> • Customer might provide DG site &/or buy output when grid doesn’t need it 	<ul style="list-style-type: none"> • ‘Generation’ ownership in restructured regimes • Cost/benefit of utility equipment investments • Same incentives for owned & leased equipment? • Ratebase treatment of any thermal equipment? • Linkage of utility returns to improved utilization factor for distribution assets • Sharing of any savings between utility shareholders & ratepayers • Possible antitrust & anticompetitive issues re: customer-side investments
6	<u>OFFER DER CUSTOMERS INCENTIVES TO DEPLOY OR DISPATCH DER TO PROVIDE VALUE TO THE UTILITY AND ITS RATEPAYERS (e.g., by reducing wholesale power or system expansion costs, and/or improving system performance)</u>			<ul style="list-style-type: none"> • Design incentive program to inform & market to customers • For DG, prepare & administer procurements; select & contract with successful proposers • Bill & credit participants 	<ul style="list-style-type: none"> • Savings from deferring wires investment • PBR incentives (if any) for enhanced reliability • Shared savings with customers incented to use DER for system support 	<ul style="list-style-type: none"> • Install, operate & maintain onsite DER • Agree to limit demand at utility request &/or during specified periods • Receive bill reductions or payments for agreed demand limitation 	<ul style="list-style-type: none"> • Cost/benefit of utility payments or credits to participants • Utility recovery of program costs & any customer incentive payments • Approval of participant solicitation & selection process, & of demand limitation agreements

#	Utility Role	Values that this Role Creates			Structure of the Value Chain		Utility Position in DER Value Network
		– FOR UTILITY	– FOR PARTICIPATING CUSTOMERS	– FOR NON-PARTICIPATING CUSTOMERS	How VALUE'S DELIVERED	COST STRUCTURE / PROFIT POTENTIAL	
A: Providing DER-Related Services							
1	<u>SELL NETWORK MANAGEMENT SERVICES, WITHOUT OWNING DER ASSETS</u>	<ul style="list-style-type: none"> Opportunity to sell new services Opportunity to develop new markets in service territory Enhances grid control, flexibility, resiliency & reliability Increases customer interactions & retention 	Customer, Aggregator &/or Mini-Utility: <ul style="list-style-type: none"> Facilitates market access for DR & ancillary services Maximizes value of owned equipment through efficient integration into the grid Outsourcing can reduce cost May substitute for capital outlays 	<ul style="list-style-type: none"> New service revenues and improved utility asset utilization may reduce non-participant rates Effective DR reduces peak power costs, defers utility investment & moderates rates Enhances reliability, utility flexibility to meet local customer needs 	<ul style="list-style-type: none"> Utility provides equipment & experienced personnel to work with customer, set up & monitor systems Utility controls systems using telemetry & internet 	<ul style="list-style-type: none"> Fee for services delivered to customers or aggregators Would need to be treated as incremental service revenue, not simply as pass-through expenses 	<ul style="list-style-type: none"> Utility brings special knowledge & expertise re: system & customers Services aren't inherently 'utility'; general ratepayer benefit would need to be shown Affiliate may be appropriate vehicle?? Strategic partnerships with customers & aggregators useful?
2	<u>INVEST IN DG AT OR NEAR CUSTOMER SITES, AND OFFER PREMIUM SERVICES TO DER CUSTOMERS</u>	<ul style="list-style-type: none"> Opportunity to earn on DG investment & possibly defer system expansion costs Opportunity to sell new services (premium power, enhanced reliability) Potential revenue from sales of power, ancillary services 	<ul style="list-style-type: none"> Service enhancements – e.g., power quality, security, reliability &/or thermal 'Insurance' against downtime for critical operations Avoidance of capital investment; can deploy capital for core business or higher return 	<ul style="list-style-type: none"> New service revenues may reduce non-participant rates May enable utility to retain some customers it would otherwise lose, contributing to fixed costs 	<ul style="list-style-type: none"> Utility sites & installs mobile or other DG on either side of the meter Utility provides premium services to customers who choose them Energy services from utility-owned & operated equipment 	<ul style="list-style-type: none"> Not clear that utility can ratebase customer-side investments, unless they benefit other ratepayers Fee for services delivered to customers or aggregators Would need to be treated as incremental service revenue, not simply as pass-through expenses 	<ul style="list-style-type: none"> Services aren't inherently 'utility'; no clear competitive advantage; general ratepayer benefit needs to be shown May compete with private suppliers; anticompetitive & antitrust challenge Affiliate may be appropriate vehicle, or strategic partnerships with DER vendors & developers?
B: Deploying DER Assets and Infrastructure							
3	<u>INVEST IN DER EQUIPMENT AT HOST CUSTOMER SITES, WITHOUT PROVIDING SERVICES</u>	<ul style="list-style-type: none"> Opportunity to earn on new DER investment Future opportunity to sell new services (installation & maint.) Enables DER for system reliability &/or environ. benefits Mitigate congestion, mkt power Increase customer interactions & retention 	<ul style="list-style-type: none"> Avoidance of capital investment for service enhancements (thermal, power quality, security &/or reliability, etc.) allowing capital to be used for core business or higher returns 'Off-balance sheet' financing lowers debt cost May be able to shift some risks 	<ul style="list-style-type: none"> All benefit where DER is least-cost Environmental &/or system reliability benefits Can mitigate congestion & market power 	<ul style="list-style-type: none"> Brings unique system knowledge Funds/performs feasibility study May bring favorable financing May oversee installation Turnkey installations on customer premises, leased to customers for operation 	<ul style="list-style-type: none"> Not clear that utility can ratebase customer-side investments, unless they benefit other ratepayers Below-the-line investment, not included in rates or subject to ROR regulation? May need to pass "competitive services" test in some states 	<ul style="list-style-type: none"> Utility brings special knowledge & expertise re: system & customers Arguably competes with vendors & developers; subject to anticompetitive & antitrust challenges Arms-length affiliate wouldn't bring all utility advantages, but might insulate May need strategic partnerships with DER vendors &/or developers
4	<u>INVEST IN ADVANCED GRID INFRASTRUCTURE</u>	<ul style="list-style-type: none"> Opportunity to earn on significant system investment Future opportunity to sell new services (installation & maint.) Enhances grid control, flexibility, resiliency & reliability Increase customer interactions & retention 	<ul style="list-style-type: none"> Lowers initial cost of DER & TOU pricing participation Facilitates & leverages DER that offers multiple values accruing to different parties Makes some DER applications viable that wouldn't otherwise be 	<ul style="list-style-type: none"> Benefit from access to resources utility wouldn't otherwise have Enhances reliability, utility flexibility to meet local customer needs May reduce utility risk, cost of capital, rates 	<ul style="list-style-type: none"> Plan, finance, install upgrades Educate customers in value & use of enhanced features Streamline customer access to advanced grid features Deliver onsite meter upgrades & maintenance services 	<ul style="list-style-type: none"> Traditional: cost-based ROR; prudent infrastructure costs plus ROI recoverable in rates PBR or similar: could provide incentives for modernization – bonus ROR, etc. 	<ul style="list-style-type: none"> Utility is best situated to plan, install, maintain & operate 'smart grid', & to integrate & meter customer DER Equipment operation & metering is integral to delivery utility's business; arguably justifiable under regulated monopoly theory
C: Using DER to Reduce Costs and/or Improve Grid Reliability							
5	<u>INVEST IN DER TO REDUCE WHOLESALE POWER OR SYSTEM EXPANSION COSTS, AND/OR TO IMPROVE SYSTEM PERFORMANCE</u>	<ul style="list-style-type: none"> Opportunity to earn on DG investment Reduce wholesale power costs Potential revenue from sales of power & ancillary services Capacity deferral savings Maintaining reliability during system peaks Enhanced flexibility for transfers & switching 	<ul style="list-style-type: none"> [No 'participant' when equipment is on the utility side of the meter] 	<ul style="list-style-type: none"> Lower peak generation costs Possible mitigation of market power &/or local congestion Deferral of more costly utility investment, moderating rates Possible environmental &/or system reliability benefits 	<ul style="list-style-type: none"> On its side of the meter, utility sites & installs mobile or other DG at substations or elsewhere Utility or third party operates DG when it's the least-cost resource, or can otherwise reduce costs or support system 	<ul style="list-style-type: none"> Traditional: cost-based ROR on prudent investment in infrastructure, & maybe customer-side controls that enhance system operations or defer investment PBR or similar: could provide incentives for least-cost solutions, bonus ROR, etc. 	<ul style="list-style-type: none"> Utility is best situated to plan, install, maintain, operate & integrate grid-side DER for customer benefit Some DER appropriate for grid side (e.g., wind, concentrating solar); some aren't (e.g., rooftop PV, CCHP) Arguably integral to delivery utility's business, justified monopoly activity
6	<u>OFFER DER CUSTOMERS INCENTIVES TO DEPLOY OR DISPATCH DER TO PROVIDE VALUE TO THE UTILITY AND ITS RATEPAYERS</u> <i>(e.g., by reducing wholesale power or system expansion costs, and/or improving system performance)</i>	<ul style="list-style-type: none"> Reduce wholesale power costs Savings from deferring capacity investments Enhanced flexibility for transfers & switching 	<ul style="list-style-type: none"> Incentive payments, bill credits or other rewards for limiting demand on utility's request 	<ul style="list-style-type: none"> Lower peak generation costs Possible mitigation of market power &/or local congestion Deferral of more costly utility investment, moderating rates Possible environmental &/or system reliability benefits 	<ul style="list-style-type: none"> Utility provides equipment & experienced personnel to work with customer, set up systems Utility controls customer systems using telemetry, internet, etc. 	<ul style="list-style-type: none"> PBR or similar: could provide incentives for least-cost solutions, bonus ROR, etc. Service fee to customers to establish utility interface, inspect & maintain controls, meter & bill, etc. 	<ul style="list-style-type: none"> Utility is best situated to integrate, meter & reward customer for DER benefiting system Short-run value of customer DER to grid minimal; won't yield much DER