

## Consumer Portal Scenario P8

### 1 Descriptions of Function

*All prior work (intellectual property of the company or individual) or proprietary (non-publicly available) work should be so noted.*

#### 1.1 Function Name

*Name of Function:* Utility use of DERSystemControllers in conjunction with net-metering and Power Quality.

#### 1.2 Function ID

*IECSA identification number of the function*

L-11, C-9.2, C-9.3

#### 1.3 Brief Description

*Describe briefly the scope, objectives, and rationale of the Function*

A utility company wants to effectively use the DERSystemControllers (DER) installed in customer sites to reduce its contract power purchase during peak load periods. These customers have signed up for net-metering and agreed to meet specified Power Quality (PQ) criteria. The utility would use its internal demand projection models and communications with the DER, along with guaranteed buy-back of power agreements, to implement economic peak rate power purchase under its contract power purchase agreements.

#### 1.4 Narrative

*A complete narrative of the Function from a Domain Expert's point of view, describing what occurs when, why, how, and under what conditions. This will be a separate document, but will act as the basis for identifying the Steps in Section 2.*

A western utility has a residential customer base of 1 million meters. The meters are installed in single-family detached housing (SFD), single-family attached housing (SFA), apartment buildings and mobile homes. The utility wishes to promote the use of renewable resources within its residential and light commercial client base.

The utility decides to incentivize the residential and light commercial use of DERSystemControllers (DER) by offering a guaranteed buy-back of power under specific conditions. The plan requires the customers to install DER with their own resources and the utility will purchase power delivered to the grid (specified in DER regulations) during periods of high demand.

A specific subset (100 total) of the customers participating in the DER program resides on a congested T & D feeder in a specific geographic area of the service territory. Thus it's advantageous for the utility to "involve" these customers during times of peak demand or high purchase power contractual periods.

The issues confronting the utility during seasonal high demand periods are:

- They need to know which homes of the 100 have DER installed, the size of the DER (kW) and the type of DER (solar PV, generator, etc).
- They need to know which customers have signed net-metering contracts.

The utility enters into a typical high demand period; ambient temperatures are rising and HVAC loads are increasing. The utility desires to call up DER. and goes through the following procedures:

1. The utility interrogates primary line meters on the T & D feeder and starts to continuously monitor line loading. The utility has developed a model to assess the primary MeterDevice load ramp and can predict when the feeder will become overloaded at the monitored rate-of-change. The model predicts that at the present rate of change the line will become critical within one hour.
2. Based on this fact, the utility calls up an internal database for that specific geographic area and determines which customers have DER and how much power (kW) they have. Based on the database results, the utility interrogates the customer portals to assess which units are already on line and which ones are available to be called up (available units must provide an "availability" signal as part of their contract with the utility).
3. The utility notifies the customers that specific DER units will be called up within 30 minutes. The DER is brought on line at a specific time and the contractual buy-back rate goes into effect (the rate is guaranteed at 90% of purchase power at that time period, with the 10% differential going into system O & M). Thus the utility is now buying DER power at 90% of a purchase power rate that is determined by calling up the utility's purchase power contracts interactive spot-power database.
4. The utility Power Quality group examines each customer's DER to insure that the output is within the contractual standards for Power Quality. Units not complying are dropped from the line within 500 milliseconds and a notation is made as to why the unit(s) was dropped.
5. The remaining customers' net-meters are now supplying the utility enterprise with delivered power for a prescribed time that must be credited to the customers' accounts and eventually show up on their monthly invoice as a credit.
6. The utility determines that the peak demand problem has been averted and does not elect to purchase expensive power under contract.
7. The billing department now calculates the amount of money to re-imburse each DER participating customer based on agreed upon rates [see Step 3 above] and for the measured time period.
8. The Power Quality department notifies the DER customers that failed PQ monitoring, the reason why and requests repairs to permit continued participation in the net-metering/DER program.

## 1.5 Actor (Stakeholder) Roles

Describe all the people (their job), systems, databases, organizations, and devices involved in or affected by the Function (e.g. operators, system administrators, technicians, end users, service personnel, executives, SCADA system, real-time database, RTO, RTU, IED, power system). Typically, these actors are logically grouped by organization or functional boundaries or just for collaboration purpose of this use case. We need to identify these groupings and their relevant roles and understand the constituency. The same actor could play different roles in different Functions, but only one role in one Function. If the same actor (e.g. the same person) does play multiple roles in one Function, list these different actor-roles as separate rows.

<i>Grouping (Community)'</i>		<i>Group Description</i>
<i>Customer Site</i>		<i>Those entities that are located at customer's premises</i>
<i>Actor Name</i>	<i>Actor Type (person, device, system etc.)</i>	<i>Actor Description</i>
Customer	Person	One signed up to participate in the DERSystemController (DER) program.
CustomerCommunicationPortal	System	System handling communications function at customer's premises [in this case, communications with the installed DER, net-MeterDevice, power quality system and the utility's DER operations]
NetMeterDevice-MeterDevice	Device	Device that can measure and transmit the net flow of power to the customer [i.e., it measures power flow in both directions – into the customer premises from the utility and out to the utility from customer premises – and generates a net MeterDevice data that can be used by the utility to bill the customer accordingly]
DERSystemController	System	System at the customer site that generates power and is set up to be brought online at the demand of the utility company
RemoteMeterDevice	System	System for transmitting MeterDevice data on demand to the utility.

Replicate this table for each logic group.

<i>Grouping (Community)</i>		<i>Group Description</i>
<i>Power Company DERSystemController Operations</i>		<i>Those entities that are charged with managing the DERSystemController functions for the power company to optimize the loading of the Transmission &amp; Distribution grid</i>
<i>Actor Name</i>	<i>Actor Type (person, device, system etc.)</i>	<i>Actor Description</i>
DERSystemController	System	DERSystemController Center: System at the power company that handles DER operations [such as the system load model, decisions on when to initiate DER activities, triggering communications with other utility departments and the DER program participants, etc]
LineMeterDevice	Device	Device that measures loading of feeder line in specific T & D grid sectors of the utility
Transmission & Distribution Feeder	System	System that handles the T & D function to specific geographic sector in utility's service area.
DERDatabase	System	System that contains information about customers participating in the DER program, their location, details of their system (such as DER installed, the size of the DER (kW) and the type of DER (solar PV, generator, etc)), whether they have signed net-metering contract, and so on.
CustomerBillingSystem	System	System that handles generation of bills for the services provided to the customer
PQMonitoringSystem	System	Power Quality Monitoring System: System that monitors the operation and the power quality of the power generated by customer's DER to qualify it for transmission on to utility's grid
Purchase Power Contracts Interactive Spot-Power Database	System	System used by the utility to track and determine the spot price of power that it can purchase under its existing contracts

<i>Grouping (Community)'</i>		<i>Group Description</i>
<i>Power Company DERSystemController Operations</i>		<i>Those entities that are charged with managing the DERSystemController functions for the power company to optimize the loading of the Transmission &amp; Distribution grid</i>
<i>Actor Name</i>	<i>Actor Type (person, device, system etc.)</i>	<i>Actor Description</i>
LoadPredictionModel	System	System that a models feeder load by automatically tracking weather, load and other conditions to project overload events at specific feeder lines and connected to the DER database
Utility Communications Network	System	System responsible for managing communications between the utility and the participants in the DER program [for functions such as remote MeterDevice reading, controlling DER units at customer sites, monitoring net-meters and other related communications activities]

<i>Grouping (Community)'</i>		<i>Group Description</i>
<i>Others</i>		<i>Those entities that are involved in this activity, but do not fit in any of the Groupings above</i>
<i>Actor Name</i>	<i>Actor Type (person, device, system etc.)</i>	<i>Actor Description</i>
Metering	Person	Department at the utility that manages meters and their installation at the customer site
Purchasing Selling Entity	Person	Department at the utility company that handles procurement of power resources for the utility company.
T & D	System	Transmission & Distribution (T & D) Grid : System at the utility company that manages the Transmission and Distribution grid for the utility company and monitors

<i>Grouping (Community)'</i>		<i>Group Description</i>
<i>Others</i>		<i>Those entities that are involved in this activity, but do not fit in any of the Groupings above</i>
<i>Actor Name</i>	<i>Actor Type (person, device, system etc.)</i>	<i>Actor Description</i>
		for loading factors, etc.
Utility Communications Network	System	System responsible for managing communications between the utility and the participants in the DER program [for functions such as remote MeterDevice reading, controlling DER units at customer sites, monitoring net-meters and other related communications activities].
EnergyServiceProvider		

## 1.6 Information exchanged

Describe any information exchanged in this template.

<i>Information Object Name</i>	<i>Information Object Description</i>
T & D Feeder LineMeterDevice Query	Query from utility's DER Center to T & D feeder line MeterDevice to determine the potential for line overload and generating the trigger to activate the DER program in the affected segment
DER Activation Order	System order to initiate DER ahead of projected line overload, communications to the participating customers to alert the onset of DER, verifying DER availability at each customer site, bringing online selected DER at customer sites, monitoring the PQ at each site, alerting the CustomerCommunicationPortal and net-MeterDevice at each site to record delivered power and flagging the power delivered for appropriate payment by the billing system

<i>Information Object Name</i>	<i>Information Object Description</i>
DER Order Termination	System order to terminate the DER at the customer site based on model projection of averting peak demand problem, crediting each customer for power delivered as per applicable rates, decision on not purchasing power under contract from other sources and alerting customers whose DER failed to meet applicable PQ criteria

## 1.7 Activities/Services

*Describe or list the activities and services involved in this Function (in the context of this Function). An activity or service can be provided by a computer system, a set of applications, or manual procedures. These activities/services should be described at an appropriate level, with the understanding that sub-activities and services should be described if they are important for operational issues, automation needs, and implementation reasons. Other sub-activities/services could be left for later analysis.*

<i>Activity/Service Name</i>	<i>Activities/Services Provided</i>
Determine Potential Feeder Peak Load Problem	Based on ambient temperatures and HVAC loads crossing the threshold values, trigger a query to utility feeder load model to determine if a specific feeder line will face overload problem; if the model predicts potential overload problem, trigger activation of DER activities for that sector
Initiate DER Program Activation	Initiate actions to activate DER program activities for the targeted feeder line: query DER database to flag DER customers in the affected segment, identify amount of power (kW) available from registered DER from customers in that segment, generate a query to those customers to determine their DER system availability and generate an alert to those with available DER system to indicate potential program activation within 30 minutes
Implement DER	Activate DER systems at customers already alerted and with available systems, alert the CustomerCommunicationPortal and net-meters at those locations to record power delivered and duration of power delivery, activate PQ monitoring of delivered power to verify compliance with system requirements, drop non-complying units from the grid and flag for notice after the event, track feeder load to determine timing for program termination and hold-off contract power purchase on spot market during the DER program period
Terminate DER	On indication by the power model of the end of the projected overload problem for the feeder line, send out a trigger to customer DER systems supplying power to terminate operation, record power supplied

<i>Activity/Service Name</i>	<i>Activities/Services Provided</i>
	and duration of power supply, finalize decision not to buy power under spot-market purchase contract and revert system back to monitoring mode for next overload situation
Complete Post-DER Activities	Initiate actions to transmit net-metering data to billing to generate credit to customers for the power supplied at the contractual buy-back rate, generate an alert to customers whose DER systems failed to meet prescribed PQ criteria and notify all customers in the DER program that the current DER event has been successfully terminated

## 1.8 Contracts/Regulations

Identify any overall (human-initiated) contracts, regulations, policies, financial considerations, engineering constraints, pollution constraints, and other environmental quality issues that affect the design and requirements of the Function.

<i>Contract/Regulation</i>	<i>Impact of Contract/Regulation on Function</i>
DER Program Tariffs	Specifications of DER equipment installed at customer site, net-metering equipment at customer site, contractual buy-back rates, PQ acceptance criteria and power supply credits applied to customer bill

<i>Policy</i>	<i>From Actor</i>	<i>May</i>	<i>Shall Not</i>	<i>Shall</i>	<i>Description (verb)</i>	<i>To Actor</i>
Install DER Equipment	Customer			X	Customer needs to install DER system at site to participate in the program	EnergyServiceProvider
Install NetMeterDevice-Meter	EnergyServiceProvider			X	Install specified net-metering equipment at customer site	Customer
Activate DER	EnergyServiceProvider	X			Activate and bring online customer's DER	Customer
Meet PQ Criteria	Customer			X	Customer shall maintain the DER system in a manner that will ensure that the DER meets specified PQ criteria for power delivery	EnergyServiceProvider

Buy-back Power During DER Event	EnergyServiceProvider			X	Utility shall buy-back power at contract rates from customer's DER during a DER event if the customer's delivered power meets PQ criteria	Customer
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<i>Constraint</i>	<i>Type</i>	<i>Description</i>	<i>Applies to</i>
<i>Program Participation</i>	<i>System Availability</i>	<i>A customer can participate in a given DER event only if the DER system is in "available" state</i>	<i>Selecting customer for DER participation</i>
<i>Power Delivery</i>	<i>PQ</i>	<i>Customer's DER unit to meet specified PQ criteria to be permitted to deliver power to the utility</i>	<i>Acceptance of power from customer's DER and eligibility to continue participation in the program</i>
<i>Power Buy-back</i>	<i>Buy-back Rate</i>	<i>On DER program activation and customer DER meeting availability and PQ criteria, the utility is obligated to buy-back power at 90% purchased power rate at that time</i>	<i>Rate paid by the utility to customer for power delivered to the grid</i>

## 2 Step by Step Analysis of Function

*Describe steps that implement the function. If there is more than one set of steps that are relevant, make a copy of the following section grouping (Preconditions and Assumptions, Steps normal sequence, and Steps alternate or exceptional sequence, Post conditions)*

### 2.1 Steps to implement function

*Name of this sequence.*

#### 2.1.1 Preconditions and Assumptions

*Describe conditions that must exist prior to the initiation of the Function, such as prior state of the actors and activities*

*Identify any assumptions, such as what systems already exist, what contractual relations exist, and what configurations of systems are probably in place*

*Identify any initial states of information exchanged in the steps in the next section. For example, if a purchase order is exchanged in an activity, its precondition to the activity might be 'filled in but unapproved'.*

<i>Actor/System/Information/Contract</i>	<i>Preconditions or Assumptions</i>
DER Equipment	Assumes that the customer has installed DER equipment that will be made available to utility on demand
DER Program tariff	Assumes that a tariff exists with details of program requirements and buy-back rates that the customer can sign up
DERDatabase	Assumes that the utility has a database with customer DER information keyed to feeder and geographic information
CustomerCommunicationPortal	Assumes that the CustomerCommunicationPortal is installed in the customer location that will permit communications with the customer and DER equipment

<i>Actor/System/Information/Contract</i>	<i>Preconditions or Assumptions</i>
NetMeterDevice	Assumes a net-MeterDevice has been installed at customer site to monitor power delivery to the grid
Feeder LoadPredictionModel	Assumes that a model is available to the utility to automatically track weather, load and other conditions to project overload events at specific feeder lines and connected to the DER database

## 2.1.2 Steps – Normal Sequence

*Describe the normal sequence of events, focusing on steps that identify new types of information or new information exchanges or new interface issues to address. Should the sequence require detailed steps that are also used by other functions, consider creating a new “sub” function, then referring to that “subroutine” in this function. Remember that the focus should be less on the algorithms of the applications and more on the interactions and information flows between “entities”, e.g. people, systems, applications, data bases, etc. There should be a direct link between the narrative and these steps.*

*The numbering of the sequence steps conveys the order and concurrency and iteration of the steps occur. Using a Dewey Decimal scheme, each level of nested procedure call is separated by a dot ‘.’. Within a level, the sequence number comprises an optional letter and an integer number. The letter specifies a concurrent sequence within the next higher level; all letter sequences are concurrent with other letter sequences. The number specifies the sequencing of messages in a given letter sequence. The absence of a letter is treated as a default ‘main sequence’ in parallel with the lettered sequences.*

### *Sequence 1:*

*1.1 - Do step 1  
1.2A.1 - In parallel to activity 2 B do step 1  
1.2A.2 - In parallel to activity 2 B do step 2  
1.2B.1 - In parallel to activity 2 A do step 1  
1.2B.2 - In parallel to activity 2 A do step 2  
1.3 - Do step 3  
1.3.1 - nested step 3.1  
1.3.2 - nested step 3.2*

### *Sequence 2:*

*2.1 - Do step 1  
2.2 - Do step 2*

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
#	<i>Triggering event? Identify the name of the event.<sup>1</sup></i>	<i>What other actors are primarily responsible for the Process/Activity? Actors are defined in section1.5.</i>	<i>Label that would appear in a process diagram. Use action verbs when naming activity.</i>	<i>Describe the actions that take place in active and present tense. The step should be a descriptive noun/verb phrase that portrays an outline summary of the step. “If ...Then...Else” scenarios can be captured as multiple Actions or as separate steps.</i>	<i>What other actors are primarily responsible for Producing the information? Actors are defined in section1.5.</i>	<i>What other actors are primarily responsible for Receiving the information? Actors are defined in section1.5.  (Note – May leave blank if same as Primary Actor)</i>	<i>Name of the information object. Information objects are defined in section 1.6</i>	<i>Elaborate architectural issues using attached spreadsheet. Use this column to elaborate details that aren’t captured in the spreadsheet.</i>	<i>Reference the applicable IECSA Environment containing this data exchange. Only one environment per step.</i>
1.1	T & D Feeder LineMeterDevice Query	DERSystem Controller	Check feeder overload projection	DER system receives ambient temperature, demand data and HVAC load data	Utility T & D data	DERSystemC ontroller	Ambient temperature and load data exceeding specified threshold values	?	DER Monitoring and Control
1.2		DERSystem Controller	DER system queries	DER system queries utility’s load prediction model	DERSystemC ontroller	LoadPredictio nModel	System data for use by the model		DER Monitoring and Control
1.3		DERSystem Controller	Identifies feeder line risk	Load prediction model identifies feeder line at risk of overload event	LoadPredictio nModel	DERSystemC ontroller	Information identifying feeder at risk		DER Monitoring and Control
1.4		DERSystem Controller	Activation trigger for DER program activities	DER system generates trigger to activate DER program for the identified feeder line	DERSystemC ontroller	DERDatabase	Activation trigger for DER program activities		DER Monitoring and Control
2	DER Activation	DERSystem Controller	Find Amount and types of power that can	DER system queries DER database to determine power	DERSystemC ontroller, T & D system,	DERSystemC ontroller	Amount and types of power that can be		DER Monitoring and Control

<sup>1</sup> Note – A triggering event is not necessary if the completion of the prior step – leads to the transition of the following step.

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
	Order		be obtained from the customers participating in the DER program	capacity from customers in the affected segment	DERDatabase		obtained from the customers participating in the DER program		
2.1.1		DERSystem Controller	Actual available power from the targeted DER customers	DER system signals identified customers to determine availability	DERSystemC ontroller, CustomerCo mmunication Portal, DERSystemC ontroller	DERSystemC ontroller	Actual available power from the targeted customers		DER Monitoring and Control
2.1.2	DER systems signals to check for availability	DERSystem Controller	Activation alert to customers on pending program activation	DER system alerts customers with available power on system activation in 30 minutes	DERSystemC ontroller	CustomerCo mmunication Portal, DERSystemC ontroller	Activation alert to customers on pending program activation		DER Monitoring and Control
2.2		DERSystem Controller	Signal to turn on DER equipment at available customer sites	DER system turns on DER equipment at targeted customers' sites	DERSystemC ontroller	CustomerCo mmunication Portal, DERSystemC ontroller	Signal to turn on DER equipment at available customer sites		DER Monitoring and Control
2.3		DERSystem Controller	Activate PQ monitoring system	Activates PQ monitoring of delivered power	PQMonitorin gSystem	DERSystemC ontroller	PQ data on delivered power		DER Monitoring and Control
2.3.1	DER equipment failing	DERSystem Controller	Turn-off DER equipment	Turn off DER equipment failing PQ criteria	DERSystemC ontroller	DERSystemC ontroller, CustomerCo mmunication	Signal to failing units to turn off		DER Monitoring and Control

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
						Portal			
2.3.1.1		DERSystem Controller	Flag PQ failing DER	Flag failing units for follow-up remedial actions	DERSystemC ontroller	DERDatabase	List of DERSystemCont roller units failing PQ criteria		DER Monitoring and Control
2.4		DERSystem Controller	Record energy delivered to the grid	Alert CustomerCommunicationPortal at conforming DER customers to record power delivery	DERSystemC ontroller	CustomerCommunication Portal, Customer NetMeterDevice-MeterDevice	Information on amount of power and duration of power delivered to the grid		DER Monitoring and Control
2.5		DERSystem Controller	Delay buying power on spot-market	Signal Purchasing Selling Entity to delay spot-market power purchase	DERSystemC ontroller	Purchasing Selling Entity	Delay buying decision for power purchase on spot-market		DER Monitoring and Control
2.6		DERSystem Controller	Determine contract power buy-back rate	2.6 Query utility's spot-market power database to determine contract power rate	Purchase Power Contracts Interactive Spot-Power Database -	DERSystemC ontroller, DERDatabase , CustomerBillingSystem	Power buy-back rate applicable to power from DERSystemCont roller to utility grid		DER Monitoring and Control
2.7		DERSystem Controller	On-going tracking feeder overload	On-going tracking feeder overload condition and load prediction model	LoadPredictionModel, T & D	DERSystemC ontroller	Status data indicating the need for DER power from customers		DER Monitoring and Control
3.1	Monitor T&D	DERSystem Controller	Predict if DER program and	LoadPredictionModel and T &D data indicate	LoadPredictionModel, T &	DERSystemC ontroller	Trigger to initiate DER		DER Monitoring

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
	data		DRP can be terminated	DER activation can be terminated	D		event termination		and Control
3.2	DER program and DRP can be terminated	DERSystem Controller	DERSystemController initiates termination sequencing	DERSystemController initiates orderly sequencing DER program termination	DERSystemController, DERDatabase	CustomerCommunication Portal, DERSystemController	Message to DERSystemController unit on shutdown schedule		DER Monitoring and Control
3.2.1		DERSystem Controller	Transmit DER turn-off signal	Transmit DER turn-off signal to each customer as per the schedule	DERSystemController	CustomerCommunication Portal, DERSystemController	Signal to individual DER unit to terminate power delivery		DER Monitoring and Control
3.2.2	Transmit DER turn-off signal	DERSystem Controller	Confirmation of power delivery turn-off	Confirmation by customer unit of power delivery termination	CustomerCommunication Portal, DERSystemController	DERSystemController	Positive acknowledgment of system turn-off		DER Monitoring and Control
3.3		DERSystem Controller	Power delivered during DER event	Customer site transmits net power delivery during DER event	CustomerCommunication Portal, CustomerNetMeterDevice-MeterDevice	DERDatabase	Details of amount of power delivered, duration of power delivered during the DER event		DER Monitoring and Control
3.3.1		DERSystem Controller	Generate power delivery and rate information	Delivered power information and applicable rate data sent to billing system	DERSystemController, DERDatabase	CustomerBillingSystem	Amount and details of credit to be issued to customer for power delivered during the DER		DER Monitoring and Control

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
							event		
3.3.2		DERSystem Controller	Amount of power purchase avoided due to DER program	Delivered power by customer DER units and peak load averted data to Purchasing Selling Entity	DERDatabase	Purchasing Selling Entity	Amount of power purchase avoided due to DER program activation		DER Monitoring and Control
3.3.3		DERSystem Controller	Signal no additional DER power to be purchased	Signal Purchasing Selling Entity that no additional power needs to be purchased	DERSystemController	Purchasing Selling Entity	Finalize decision not to purchase power in spot-power market		DER Monitoring and Control
3.4		DERSystem Controller	Retrieve list of failed DER units	Retrieve list of customer DER units that failed PQ criteria	DERDatabase	DERSystemController	List of customers requiring follow-up actions		DER Monitoring and Control
3.4.1	DER units failed PQ criteria	DERSystem Controller	Alert customer on PQ failure	Alert these customers on PQ failure details	DERDatabase	CustomerCommunication Portal	Details of PQ failure during DER event		DER Monitoring and Control
3.4.2	DER units failed PQ criteria fixed	CustomerCommunication Portal	Request PQ capability compliance confirmation	Request these customers to alert DERSystemController on bringing their system into compliance	DERDatabase	CustomerCommunication Portal	Alert affected customers on need for remedial actions		DER Monitoring and Control
3.4.3		DERSystem Controller	Flag affected customer sites	Flag the affected customer sites for future event till compliance confirmation is received	DERSystemController	DERDatabase	Flag the affected customers to indicate compliance confirmation is needed before they can be considered for		DER Monitoring and Control

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
							program participation during future DER events		

### 2.1.3 Steps – Alternative / Exception Sequences

Describe any alternative or exception sequences that may be required that deviate from the normal course of activities. Note instructions are found in previous table.

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments

### 2.1.4 Post-conditions and Significant Results

Describe conditions that must exist at the conclusion of the Function. Identify significant items similar to that in the preconditions section.

Describe any significant results from the Function

<i>Actor/Activity</i>	<i>Post-conditions Description and Results</i>
Consumer	System status information [DER unit meets/fails PQ criteria], credit based on net-metered power delivery on next bill

<i>Actor/Activity</i>	<i>Post-conditions Description and Results</i>
T & D Grid	Satisfactory operation having avoided peak demand load event
DERDatabase	Updated with customer DER units that delivered power, DER units that failed, and details of power delivery (amount, duration and net-metered amount) during the DER event
Billing system database	Updated with credit to be issued to participating customers for power delivered as per applicable contract rates (90% of contracted spot-market power rates) during the DER event
Customer DER Equipment	Updated with pass/fail status after the DER event
Purchasing Selling Entity	Avoided purchase of power in spot-power market and details of the amount of power purchase avoided
LoadPredictionModel	Updated with actual system performance during the DER event for refining future projections

## **2.2 Architectural Issues in Interactions**

*Elaborate on all architectural issues in each of the steps outlined in each of the sequences above. Reference the Step by number..*

## 2.3 Diagram

*For clarification, draw (by hand, by Power Point, by UML diagram) the interactions, identifying the Steps where possible.*

## 3 Auxiliary Issues

### 3.1 References and contacts

*Documents and individuals or organizations used as background to the function described; other functions referenced by this function, or acting as “sub” functions; or other documentation that clarifies the requirements or activities described. All prior work (intellectual property of the company or individual) or proprietary (non-publicly available) work must be so noted.*

ID	Title or contact	Reference or contact information
[1]	P. S. Vishwanath	Paragon Consulting Services, 301-323-4088
[2]	Joe Kelly	Paragon Consulting Services, 503-978-8289

### 3.2 Action Item List

*As the function is developed, identify issues that still need clarification, resolution, or other notice taken of them. This can act as an Action Item list.*

ID	Description	Status
[1]		
[2]		

### 3.3 Revision History

*For reference and tracking purposes, indicate who worked on describing this function, and what aspect they undertook.*

No	Date	Author	Description
0.1	December 17, 2003		First draft
0.2	December 19, 2003	P S V	Revisions and updates to missing sections

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