Consumer Portal Scenario P5 Customer Sign-up for Demand Reduction Program

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: Customer sign-up for Demand Reduction Program

1.2 Function ID

IECSA identification number of the function

C-2.2

1.3 Brief Description

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

A customer wants to sign up for the Demand Reduction Program offered by the utility which would give the utility permission to cycle customer's air conditioning system during peak load periods in return for incentives. The utility representative signs up the customer, handles installation of needed devices and implements the customer's participation in the program. At a later, the customer asks to be transferred to a different load reduction program level and this change is implemented accordingly.

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 has a high residential turnover rate as customers come to and leave the service area more frequently than typical utilities.

The utility has demand relief requirements and has multiple demand response programs in place. It additionally supports active residential conservation programs as well as residential alternate, renewable and distributed generation.

The results of all of these efforts are reported to the Sate PUC as part of their requirements to receive credit in rate base.

On Monday morning a residential customer of utility X calls Customer Service and requests a "sign up" in the utility's air-conditioning demand response programs that they read about in the newspaper. The Customer Service representative [CSR] transfers the call along with the customers account information "utility program specialist" while the customer is still on the line. The program specialist [PS] opens up a computer file that delineates the features and requirements for participation in each of the utilities AC demand reduction program (that includes a gateway product, a smart thermostat product, and a simple switching product, all with different incentives). The customer selects a specific program and the specialist asks pertinent questions about the customer's participation to help reduce problems. The specialist selects a convenient date for installation of equipment and to start the program at the specific residence. Once the program specifics and the customer specifics are entered into the Demand Response database, the installation company is notified of the specific program requested, the installation date, customer information and specific tracking number/ID. The information is automatically downloaded into a PDA designed to accommodate the data.

The installer places the appropriate equipment, in this case a DLC switch, on the customers AC unit, tests the system with a handheld unit, and places all information into the same PDA as used to download the original request. After the installation is completed, the PDA is connected to the installers computer system in the truck and via a web-hosted database all information is uploaded to the utility. The utility software automatically notifies the DemandResponseProgramManager [DRPM], advises billing that the customer will receive a financial incentive, which is listed on their monthly bill during the appropriate summer months and subtracted from the "amount due" line. At the end of the summer program, the billing software automatically reverts to the normal invoice and removes incentives from the bill.

In addition to billing, the program initiation also triggers a summer-months energy consumption-tracking program. The software recalls specific customer usage data for the previous year for the months of June, July, August and September. The database also includes average daily and monthly ambient temperatures, which will be used with customer usage data to ascertain savings and relative demand reduction. The information is inserted into a database that is used by the DemandResponseProgramManager to assess relative load reduction as well as to determine if free-ridership is an issue.

The residential customer participates in the program through July, but after several 110+ degree-days decides that participating in the program at the 100% cycling strategy (complete AC shut down for the designated curtailment period) is too severe and wants to be placed in the 50% cycling program. The request in placed into the system by the utility program specialist and the customer is automatically removed from the 100% strategy, placed on the 50% strategy, billing is notified automatically and the incentive is recalculated. The Program Manager is notified of the change in participation level, the billing is advised to adjust the financial incentive and the tracking database flagged with the information as well.

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.

Grouping (Community) '		Group Description
Customer Site		Those entities that are located at customer's premises
Actor Name	Actor Type (person, device, system etc.)	Actor Description
Customer	Person	One requesting the sign up for the Demand Reduction Program.
CustomerCommunicationPortal	Power System	Power System handling communications function at customer's premises
DLCSwitchController	Device	Device performing cycling of the air conditioning unit

Replicate this table for each logic group.

Grouping (Community) '		Group Description
Load Serving Entity Customer Service		Those entities that are charged with handling customer service functions for the power company
Actor Name	Actor Type (person, device, system etc.)	Actor Description
Load Serving Entity	Power System	Power company communications system that handles customer call center services
CSR	Person	Customer Service Representative (CSR), Person who interfaces with the customer initially for the power company
Utility Program Specialist	Person	Person who handles load reduction-related services for the customer
CustomerInformationDatabase	Power System	Power System that contains information about customer accounts of the power company

Grouping (Community) '		Group Description
Load Serving Entity Customer Service		*Those entities that are charged with handling customer service functions for the power company*
Actor Name	**Actor Type (person, device, system etc.)**	**Actor Description**
DemandReductionProgramDatabase	Power System	Power System that contains information about all of the Demand Reduction Program [DemandReductionProgramDatabase] Database offered by the utility, participation requirements, equipment details and links to customer billing system for passing incentive information
DemandReductionProgramDatabase Manager	Person	DemandResponseProgramManager
CustomerBillingSystem	Power System	Power System that handles generation of bills for the services provided to the customer
CustomerId	Device	A common customer identification key that is used by service providers authorized by the customer to identify all of their service accounts
InstallationScheduleDatabase	Power System	Power System that handles scheduling installation of equipment at customer premises [in this case, the DLC switch], specifying equipment to be installed, confirmation of completion of installation and links to the billing system using the common customer id

Grouping (Community) '		Group Description
Installer		***Those entities that are associated with the installation function***
Actor Name	*Actor Type (person, device, system etc.)*	*Actor Description*
Installer	Person	Utility person assigned to handle the specified customer site installation task
DLCSwitchController	Device	Power System handling cycling of air conditioning equipment at customer's premises [generally consists of a RF receiver and a switch component to turn the air conditioning compressor on/off]
InstallationSystem	Power System	Power System for managing the installation activities at the customer site – in this case consists of a PDA that contains the installation order information, a test unit to verify proper installation and software to record installation details
Installer Computer	Power System	Power System for accessing utility's installation database, downloading specific order information to the InstallationSystem PDA, communications link to the utility's network to access order data and to upload confirmation data

Grouping (Community) '		Group Description
Others		***Those entities that are involved in this activity, but do not fit in any of the Groupings above***
Actor Name	*Actor Type (person, device, system etc.)*	*Actor Description*
PublicUtilityCommision	Person	The entity that receives results of the utility's demand reduction program.

Grouping (Community) ,		Group Description
Others		Those entities that are involved in this activity, but do not fit in any of the Groupings above
Actor Name	**Actor Type (person, device, system etc.)**	**Actor Description**
DemandResponseProgramManager	Person	Person managing the DemandReductionProgramDatabase at the utility
EnergyServiceProvider		
ServiceProvider		
AirConditioningEquipment		

1.6 Information exchanged

Describe any information exchanged in this template.

Information Object Name	Information Object Description
Customer Demand Reduction Program Signup Request	Information from the customer call for signing up to participate in the utility's Demand Reduction Program
Customer Power System Installation Order	Information on scheduling the installation at customer's site, equipment to be installed, programming information on cycling regime, details to be passed on to the billing program on initiating incentive reward, intimation to DemandResponseProgramManager and triggers to start tracking energy usage for program performance verification
Program Change Request	Information from the customer call on the changes to be made to the customer's participation level in

Information Object Name	Information Object Description
	the utility's Demand Reduction Program
Program Change Confirmation	Information confirming the changes made to the account based on the customer call, with appropriate notification and triggers as per those initiated on program activation

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.

Activity/Service Name	Activities/Services Provided
Signup Customer to Requested Demand Reduction Program	Initiate actions to modify customer's account information to indicate details of participation in the Demand Reduction Program specified by the customer and generate trigger to installation scheduling program
Set Up Customer Power System Installation Order	Initiate actions to schedule installation at customer site, and transmit customer site information, equipment details and scheduling to the installer
Power System Installation	Perform installation at customer site, verify system performance, and upload installation confirmation back to utility
Installation Follow-up	Initiate actions to update load reduction system to send out appropriate control signals to customer unit, update customer billing information with applicable incentives, alert the applicable DemandResponseProgramManager about installation, initiate energy usage tracking, and set up flags in the billing database to revert to regular billing at the end of incentive period
Customer Request to Change Program Participation	Initiate actions to modify customer account information with the change to the program participation, transmit revised incentive information to billing system, and alert the applicable DemandResponseProgramManager about change in participation level

Activity/Service Name	Activities/Services Provided
Program Change Conformation	Initiate actions to generate a confirmation message to the customer with details of the change made in program participation level and the applicable incentive rewards at the new level

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.

Contract/Regulation	Impact of Contract/Regulation on Function
Demand Reduction Program Tariffs	Equipment installed at customer site, cycling regime implemented and incentive rewards applied to customer bill

Policy	From Actor	May	Shall Not	Shall	Description (verb)	To Actor
Cycle Energy to Equipment	EnergyServiceProvider	X			Cycle power to air conditioning unit on utility trigger	AirConditioningEquipment
Provide Load Control Equipment	ServiceProvider			X	Install specified equipment at customer site	Customer
Provide Incentive Rewards	EnergyServiceProvider			X	Provide incentive reward on customer energy bill	Customer
Modify Incentive Rewards	EnergyServiceProvider			X	Modify incentive reward on customer energy bill	Customer

Constraint	Type	Description	Applies to
Program Participation	Level of Participation	The level of Demand Reduction Program participation chosen by the customer	Power cycling regime implemented and amount of incentive reward provided
Reward Period	Inactive	Months of the year when the program is not active [i.e., non-summer months for this program]	No incentive reward provided
Energy Usage	Minimum Threshold	Tracked energy usage to meet or exceed program requirements to qualify to participate in the program and receive incentive reward on bill	Eligibility to continue participation in the program

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'.

Actor/System/Information/Contract	Preconditions or Assumptions
CustomerId	Assumes that a common customer id is used by the customer service, Demand Reduction Program, installation and billing departments
Demand Reduction Program tariff	Assumes that a tariff exists with details of program requirements and incentive rewards that the customer can sign up
CustomerCommunicationPortal	Assumes that the CustomerCommunicationPortal is installed in the customer location that will permit usage monitoring at specific times to verify program effectiveness

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:

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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
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Sequence 2:

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2.1 - Do step 1
2.2 - Do step 2
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#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
#	*Triggering event? Identify the name of the event.[1]*	*What other actors are primarily responsible for the Process/Activity? Actors are defined in section1.5.*	*Label that would appear in a process diagram. Use action verbs when naming activity.*	*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.*	*What other actors are primarily responsible for Producing the information? Actors are defined in section1.5.*	*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)*	*Name of the information object. Information objects are defined in section 1.6*	*Elaborate architectural issues using attached spreadsheet. Use this column to elaborate details that aren't captured in the spreadsheet.*	*Reference the applicable IECSA Environment containing this data exchange. Only one environment per step.*
1.1	Customer call to utility	Customer, CSR	Request program signup	Customer service representative identifies customer account	CustomerInformationDatabase	CSR	Customer account information	?	Customer / ESP
1.2		CSR	Service Request Type	CSR determines nature of service request [in this case, signup for DemandReductionProgramDatabase]	Customer	CSR	Program signup request		Customer / ESP
1.3		CSR	Transfer call	Transfers call to utility's Program Specialist	CSR	Utility Program Specialist	Customer account information, Program signup request		Customer / ESP
2.1	Customer interest in	Customer, Utility Program	Determine which DLRP is	Utility Program Specialist determines	CustomerInformationDatabase,	Customer	DemandReductionProgramDatabas		Customer / ESP

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[1] 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
	signing up for DLRP	Specialist	appropriate for customer	which level of DLRP is appropriate for this customer	DemandReductionProgramDatabase		e details		
2.1.1		Utility Program Specialist	Signup customer to specific DLRP	Program Specialist signs up customer to the DLC switch program	CustomerInformationDatabase, DemandReductionProgramDatabase	Customer, CustomerBillingSystem	Specific program requirements and reward incentives		Customer / ESP
2.1.2	Determines specific DLRP	Utility Program Specialist	Schedules installation	Program Specialist schedules installation	CustomerInformationDatabase	Customer site installation database	Installation details		Customer / ESP
2.2	Request to install specific DLRP	Installer	Installation by service provider	Specified equipment is installed and tested by installation service providers	Installer	CustomerInformationDatabase, DemandReductionProgramDatabase Manager, CustomerBillingSystem	Installation confirmation		Customer / ESP
2.3	Installed new customer site installation	CustomerCommunicationPortal	CustomerCommunicationPortal to monitor energy usage	CustomerCommunicationPortal is alerted to monitor energy usage and ambient temperatures	CustomerCommunicationPortal, CustomerInformationDatabase	DemandReductionProgramDatabase	Average and peak temperatures, customer's historical energy usage and current energy usage		Customer / ESP
2.4		CustomerBillingSystem	Billing system generates billing	Billing system generates summer billing with applicable reward incentives	CustomerBillingSystem	Customer	Monthly billing with deductions for applicable incentives		Customer / ESP

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
3.1	Customer request to change participation level	Customer	Change DemandReductionProgramDatabase participation level	Customer requests change from 100% to 50% cycling program level	Customer, CustomerInformationDatabase	Utility Program Specialist	Changes in program participation level		Customer / ESP
3.2	Utility Program Specialist receives change of participation request	Utility Program Specialist	Program Specialist confirms change	Program Specialist confirms change in cycling rate and corresponding reward incentives	Utility Program Specialist	Customer, CustomerInformationDatabase, DemandReductionProgramDatabase	Program participation change		Customer / ESP
3.3	Customers participation level is changed	CustomerInformationDatabase	Affected parties are informed	Applicable affected parties are informed of the change	CustomerInformationDatabase	CustomerBillingSystem, DemandReductionProgramDatabase Manager	Change in participation level and reward incentive change		Customer / ESP
3.4		DemandReductionProgramDatabase	CustomerCommunicationPortal and DLC system notified	CustomerCommunicationPortal and DLC system notified of cycling rate change	DemandReductionProgramDatabase	CustomerCommunicationPortal, DLCSwitchController	Programming change to DLC for new cycling rate and revised monitoring instructions to CustomerCommunicationPortal		Customer / ESP

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

Actor/Activity	Post-conditions Description and Results
Consumer	50% cycling rate on air conditioning equipment and revised reward incentives on monthly bills
DLC switch system	Implement 50% cycling instructions at customer site
CustomerInformationDatabase	Updated with revised program participation level information
Billing system database	Updated with revised reward incentive information
DemandReductionProgramDatabase database	Updated with change to the program participation level
DemandReductionProgramDatabase Manager	Updated with change in program participation level

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 15, 2003	P S V	Initial draft
0.2	December 30, 2003	P S V	Edits and corrections