Demand Response – Utility Commanded Load Control

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

Demand Response – Utility Commanded Load Control

1.2 Function ID

IECSA identification number of the function

M-2.1,M-3,M-4.5,M-5,G-1,G-9.1,T-6.21,L-10,L-10.1,L-10.2,C-5,C-7

1.3 Brief Description

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

Many Energy Service Providers and Market Operators administer customer side Demand Response and Load Control programs to ensure grid stability and stable operation during times of peak demand or system emergencies arising from generator outages or transmission and/or distribution constraints. With some programs, the customer – either residential or commercial - reduces the required load upon instruction from the Energy Service Provider or Market Operator. With other programs, the Energy Service Provider, Market Operator, or a Curtailment Service Provider remotely reduces the load. Some of these programs are conducted on a voluntary basis, where the customer can opt to maintain the level or load, or mandatory, where the customer either will be dropped off the system or will incur significant financial penalties for noncompliance. The customer may or may not realize benefits from the program, such as discounted rates. Some programs may be mandated to enable the Energy Service Provider to provide electric service to the customer in areas where there are transmission or distribution constraints. This function focuses on Demand Response/Consumer Load Control that is non responsive to price – pricing signals are not sent to the customer. Communication systems play a key role in this function as in the consumer control load configuration, instructions must be sent to the customer to reduce or eliminate load and verification of compliance/noncompliance must be obtained by the Energy Service Provider or Market Operator. In the configuration where the Energy Service Provider, Market Operator or CSP controls the load, commands must be sent to equipment at the customer site that will cycle down or cease operation. Verification of successful action must also be obtained.

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 typical day-in-the-life scenario is as follows (note that the discussion is marked up with numbers that are used later in the analysis to derive requirements from the scenario):

Utilities with significant periods of peak demand often establish and administer demand response/load control program where residential and commercial customers may, in exchange for discounted rates, agree to, on a voluntary or mandatory basis, reduce or cycle down load. Utilities, especially those with a customer base operating significant cooling and/or electric heating loads – primarily heat pumps, and electric water heating loads, are implementing programs centered around these loads to address periods of peak demand – extremely hot or cold days or times of system emergency – where a generator may be removed from service for maintenance or where the transmission and/or distribution system may be constrained. These utilities operate in markets where customer participation in Real Time Pricing programs has not been authorized by the state regulatory body or implemented by the utility.

Inside this program, residential and commercial customers sign up for a program where they receive discounted rates for participation. The customer may choose to opt out of participating in a particular instance, but will be compelled to pay a peak demand penalty for nonparticipation. The utility installs equipment at the customer meter to receive commands from the utility system operator. These commands operate a load control transponder, which either interfaces with the thermostat controlling air conditioning/heating equipment or operates a breaker closing the circuit powering water heaters and/or pool pumps.

(1)At the onset of a day where the weather is forecast to be extremely hot or cold or when it is known the possibility exists for a system emergency, the SystemModeler runs models to determine where and when times of peak demand will occur. This modeling involves clearly defined parameters such as weather, tracked seasonal load, load availability factors, and customer load served by the transmission and/or distribution system. It is determined that with the available amount of bulk power and the system experiencing some transmission constraints due to maintenance issues or locations of some loads in relation to the infrastructure, that a peak demand event will occur requiring reduction of a certain amount of customer load.

(2)Under normal operating conditions, the utility provides two hours' notice to customer account representatives and customer service representatives that load reduction is required and will occur. In a system emergency where a generator trips offline or lightning or some other event causes the transmission and/or distribution infrastructure to be overloaded or unavailable, fifteen minutes' notice is provided. Other utility personnel are alerted.

(3)When the peak demand period is about to begin or when the system emergency occurs, the utility control center sends a command via the utility's internal frame relay system to the distribution substations, where a substation controller sends a command via Power Line Communication (PLC) to a LoadControlTransponder (LCT). The system operator can target individual substations to address the amount of load reduction required and the operational situation of the utility system.

(4)Commands are broadcast out to the substation controllers, which then broadcast to all LCTs connected to it. The load control commands are sent out in staggered fashion to manage information flow across the utility system. "Thermostat Setback," "Turn Off," "Turn On" and "Check Transponder Health" are the commands sent out. The transponder has an internal counter that counts the off/on commands and whether the relays were successfully opened. At the onset of the program, the utility downloaded data from the counters to determine system health and to validate the models used to predict system operation, peak demand, and needed load reduction. The utility has since abandoned this, preferring to rely on automated, staggered interrogation of the transponders to verify transponder health. This interrogation does not involve any turning the relays on or off.

[5]The relays control thermostats, water heaters, and swimming pool pumps. This customer equipment is located at both residential and commercial locations and was selected for its predicted load patterns and ease of remote control. Customers can choose to override the transponder, but will pay a peak demand penalty if they do so.

[6]The utility verifies customer participation via acknowledgement of a successful "Turn Off" command. After each instance of load reduction, the utility conducts an assessment of how many MW of load was reduced and uses this information, along with a review of the command logs and receipt of successful "Turn On" and Turn Off" commands to refine the model used to ascertain when the load control programs needs to be activated, how it needs to be implemented across the service territory, and operating condition of the communications and control equipment.

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***
Top Level Actors		High-level actors who have significant stake on the Demand Response/Load Management function.
Actor Role Name	***Actor Type (person, device, system etc.)***	***Role Description***
Energy Service Provider	organization	Responsible for day to day operation of the demand response/load control program
PublicUtilityCommision	organization	Supervises implementation of demand response/load control program with direct oversight of rates and penalties

Grouping(Community)		*Group Description*
CustomerInformationSystem	Server	Stores information about customers participating in the program with details on participating history, loads to be controlled, and whether customer has previously negotiated to opt out of program in certain situation. Also contains customer billing data including any demand penalties and rate scheduled
SystemDemandModeler	System	Conducts daily modeling to determine whether demand response/load control is required. Contains databases on weather conditions, generation availability, transmission and distribution system constraints, load availability, predicted control patterns, and details on performance of individual substation control units and load control transponders
SystemModeler	Person	Operates system demand modeling capability and lets control room personnel and customer service personnel know whether load control will be needed according to the model.
ControlRoomOperator	Person	Individual responsible for activation of automated load control notification and implementation
Notification and ControlSystem	System	Upon receipt of command from control room operator, sends either 2 hour notification or 15 minute notification and then sends commands out to substation control units
Customer Account/Service Representative	Person	Receives notification from system that load control is needed and/or imminent and handles calls from customers about situation - may in time be able to provide notification to key or sensitive customers

Grouping(Community)		*Group Description*
SubstationController	Device	Receives commands from control center and sends commands out to load control transponders to either cycle thermostats or shut off water heaters and pool pumps
LoadControlTransponder	Device	Upon receipt from substation control unit, either transmits command to thermostat or to water heater or pool pump. Sends notification of successful or unsuccessful execution of command back to substation control unit
Remotely-ControlledThermostatDevice	Device	Upon receipt of command from LoadControlTransponder, cycles space cooling or heating down or off
RemotelyControllerCircuitBreakerDevice	Device	Upon receipt of command from LoadControlTransponder, shuts off power to water heater and/or pool pump
Frame Relay Network	System	Carries load control commands from control room to substation control unit
TransmissionSystemOperator	System	Provides power system configuration and real-time data to system demand modeler
TransmissionSystem	Power equipment	Transmission power system equipment
TransmissionSCADASystem	System	System that provides forecast and real-time transmission information to the system demand modeler and control room operator

Grouping(Community)		*Group Description*
DistributionManagementSystem	System	Provides real-time data to the system demand modeler and control room operator
DistributionSystem	Power equipment	Distribution power system equipment
SCADASystem	System	System that monitors load control as well as providing forecast and real-time distribution information to the system demand modeler and control room operator
MeterDevice	Devices	Collects energy and demand data per time period
Customer	Person	Agrees to participate in program. May or may not at time of system operation choose whether or not to participate
ITPersonnel	Person	Oversees operation of frame relay network and powerline communications system
constraint data		
Distribution outage		
EnergyScheduleDatabase		
EnergyScheduleDatabase database		

Grouping(Community)		*Group Description*
Generation maintenance/scheduled availability database		
Generation outage		
HistoricLoadForecastDatabase		
HistoricLoadForecastDatabase		
LoadSchedule		
LoadForecaster		
Transmission outage		
WeatherForecastData		
WeatherService		
CustomerServiceRepresentative		

Grouping(Community)		*Group Description*
Everyone		
Substation control unit database		

Replicate this table for each logic group.

1.6 Information exchanged

Describe any information exchanged in this template.

Information Object Name	*Information Object Description*
Energy Schedules	EnergyScheduleDatabase submitted to the Utility Control Center and System Modeling
Weather Forecast Data	Information on forecast temperatures – especially high and low temperatures
Generation Outage and Constraint Data	Data containing transmission outage and constraint information
Transmission Outage and Constraint Data	Data containing transmission outage and constraint information
Distribution Outage and Constraint Data	Data containing distribution outage and constraint information
Historical load data	Data containing load levels for similar seasonal parameters – actual demand; temperature; generation, transmission, and distribution system availability

Information Object Name	*Information Object Description*
Customer Participation Schedule	Tables of customers agreeing to participate in the load control program classified by geographic location (by substation providing control)
Load Schedule	Schedule for Customer Load equipment: turning on and off, cycling, and/or level of load
Customer Load Forecasts	Forecasts of individual customer load that can be controlled
Aggregated Customer Loads	Forecasts of aggregated customer load that can be controlled – broken down by geographical location and substation
Loads Forecast	Load forecasts, based on different inputs and possible operating scenarios
Generation System Data	Generation data, including scheduled outages, operating constraints, and real-time information
TransmissionSystem Data	Transmission power system data, including scheduled outages, transmission constraints, and real-time information
DistributionSystem Data	Distribution power system data, including scheduled outages, distribution constraints, and real-time information
Real-time Monitoring and Control Data	Status, settings, curtailable load requirements, automated on/off commands, automated settings, responses back from substation control units and load control transponders
Real-time Power Systems Operations Data	Loads, generation, A/S, etc.
Meter Data	Energy and demand data per time period
Customer Compliance Data	Any peak demand charges for customers not complying with participation requirements

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***
Load forecast function	Function uses generation, transmission and distribution information, energy schedules, weather, and past history to forecast loads and ability of system to accommodate them
Weather forecast function	Function uses data to estimate probable weather temperatures, etc.
Load availability function	Function determines the available load capacity based on power system constraints, operational costs, environmental conditions, etc.
Load control modeling function	Function determines extent and operating parameters of load control based on geographic patterns, load forecast and availability, and system operating conditions
Load control aggregation function	Function that aggregates load information from multiple customers and manages the submittal to the utility control center
Notification function	Function sends out 2-hour notification to control room and customer service personnel or 15 minute notice in system emergency situations
Load control implementation function	Function where load control commands are sent out to substation control units, which then relay commands to load control transponders
Equipment control function	Function that adjusts thermostat settings to cycle down space cooling or heating or operate breakers to shut off water heaters or pool pumps
Load control compliance function	Function that transmits successful or unsuccessful execution of control commands back to

Activity/Service Name	*Activities/Services Provided*
	control center
Load control override function	Function where customer can override automatic setting of thermostat or restore power to water heater and/or pool pump
Demand penalty assessment function	Function where penalty charges are calculated for customers who override the load control commands or are unable to comply due to equipment malfunction

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*
Utility operations	FERC and state regulators oversee utility operations
Market tariffs	Peak demand rates
Customer contracts with ESPs	Determines which customers participate in load control programs

Policy	*From Actor*	*May*	*Shall Not*	*Shall*	*Description (verb)*	*To Actor*
Peak Demand Information	Energy Service Provider			X	Provide notification of peak demand period or system emergency to customer service representative	CustomerServiceRepresentative
Notification of Imminent Load Control	Energy Service Provider			X	Provide notification of anticipated load control (within 2 hours) or imminent load control (within 15 minutes) to customer account/service representative	CustomerServiceRepresentative
Assessment of	Energy Service Provider			X	Provide notification of demand penalties assessed for	Customer

demand penalties					noncompliance in load control activities	
Technology utilization	Energy Service Provider	X			Utilize different methodologies and technologies for providing notification	CustomerServiceRepresentative
Delivery	Energy Service Provider	X			Undertake delivery of notification data via reasonable variations in implementation approaches through robust system designs	CustomerServiceRepresentative
Data receipt	Customer	X			Can decide whether or not to override load control command	Energy Service Provider
Sensitive data	Everyone		X		Sensitive information must not be accessible by unauthorized entities and must not be prevented from being accessed by authorized entities	Everyone
Equipment	Everyone		X		Changes that are variations in delivery methods must not require field equipment changeouts	Everyone

Constraint	*Type*	*Description*	*Applies to*
Laws of physics	Environmental	Laws of physics for power system operations	All
Technology	Environmental	Technology constraints for providing notification and compliance data	All
Security	Environmental	Security policies and technologies must be established and used to address all security needs at the appropriate/contracted levels	All

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***
System operations	Infrastructure has been put in place to implement automated load control
Transmission/distribution operations	Normal power system operations where some customers have contracted to receive and respond to load control signals
Customer equipment	These customers have electric space cooling and/or heating that can be remotely controlled and/or electric water heaters and/or pool pumps that can be remotely shut off

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
#	*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	Energy Service Provider initiates daily analysis of scheduled load versus available capacity	SystemDemandModeler, SystemModeler	Load forecast Weather forecast Load availability	Forecast power system conditions for that day. Analyze forecast temperature conditions against generation availability, transmission and distribution system conditions, and historical load patterns	EnergyScheduleDatabase, Generation maintenance/scheduled availability database, TransmissionSCADASystem, SCADASystem, WeatherService, HistoricLoadForecastDatabase	ControlRoomOperator	- EnergyScheduleDatabase - WeatherForecastData - Generation outage and constraint data - Transmission outage and constraint data - Distribution outage and constraint data - HistoricLoadForecastDatabase and parameters	- Intra utility communications must be supported - Existing weather protocol and weather format must be used	Control Centers / ESPs

[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
1.2	Energy Service Provider determines that scheduled load may or will exceed available capacity	SystemDemandModeler, SystemModeler	Load forecast Weather forecast Load availability	Calculate an hourly predicted load versus available capacity schedule	EnergyScheduleDatabase database - Generation maintenance/scheduled availability database - TransmissionSCADASystem system - SCADASystem system - WeatherService - HistoricLoadForecastDatabase	ControlRoomOperator	- EnergyScheduleDatabase - WeatherForecastData - Generation outage and constraint data - Transmission outage and constraint data - Distribution outage and constraint data - HistoricLoadForecastDatabase and parameters	- Intra utility communications must be supported - Existing weather protocol and weather format must be used	Control Centers / ESPs

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
1.3	Energy Service Provider calculates customer load to be curtailed to meet anticipated demand	SystemDemandModeler, SystemModeler	Load forecast Weather forecast Load availability Load control modeling Load control aggregation	Based on additional capacity required, determine extent of customer load to be managed and delineate geographical parameters and notification level	- EnergyScheduleDatabase database - Generation maintenance/scheduled availability database - TransmissionSCADASystem system - SCADASystem system - WeatherService - HistoricLoadForecastDatabase - Customer participation database - Substation control unit database	ControlRoomOperator	- EnergyScheduleDatabase - WeatherForecastData - Generation outage and constraint data - Transmission outage and constraint data - Distribution outage and constraint data - HistoricLoadForecast Database and parameters - Customer participation schedule - LoadSchedule - Customer load forecasts - Aggregated customer loads - LoadForecaster	- Intra utility communications must be supported - Existing weather protocol and weather format must be used	Control Centers / ESPs

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
1.4	Energy Service Provider assigns customers to be curtailed by geographic area and by substation	SystemDemandModeler, SystemModeler	Load forecast Weather forecast Load availability Load control modeling Load control aggregation	Taking entire amount of customer load to be managed, assign geographic areas, substations, and individual customers to be curtailed	- Customer participation database - Substation control unit database	ControlRoomOperator, CustomerServiceRepresentative	- Customer participation schedule - LoadSchedule - Customer load forecasts - Aggregated customer loads - LoadForecaster	- Security is major concern	Control Centers / ESPs
1.5	Energy Service Provider sends out notification for Customer Account/ Service Representatives	Notification and ControlSystem	Notification	Energy Service Provider issues automatic notification to CustomerServiceRepresentatives, who, depending on circumstances, receive either two hours' notice or 15 minutes' notice	- Customer participation database - CustomerServiceRepresentative database	CustomerServiceRepresentative	- Customer participation schedule - LoadSchedule - Customer load forecast	• Sent over Energy Service Provider WAN	Customer / ESP
1.6	CustomerServiceRepresentative prepares to field calls from Customers	CustomerServiceRepresentative	Notification	CustomerServiceRepresentatives, upon receipt of notification, prepare to field inquiries from customers whose loads will be controlled	- Customer participation database	Customer	- Customer participation schedule - LoadSchedule - Customer load forecast	- Sent over Energy Service Provider WAN	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
1.7	Notification and ControlSystem sends commands to SubstationControllers	Notification and ControlSystem	Load Control Implementation Function	System sends commands out to targeted SubstationControllers to be relayed to LoadControlTransponders	- Customer participation database - Substation control unit database	SubstationController	- Customer participation schedule - LoadSchedule	- Sent over utility WAN - Commands staggered to accommodate available bandwidth	Control Center / Customer Equip
1.8	SubstationController sends commands to LoadControlTransponders	SubstationController	Load Control Implementation Function	SubstationControllers send commands out to individual LoadControlTransponders	LoadControlTransponder database	LoadControlTransponder	- Customer participation schedule - LoadSchedule	- Sent via powerline communication	Control Center / Customer Equip
1.9	LoadControlTransponder issues command to customer thermostat or operates breakers to shut off water heater or pool pump	LoadControlTransponder	Equipment Control Function	LoadControlTransponder issues command to customer thermostat or operates breakers to shut off water heater or pool pump	Command sent from SubstationController	Remotely-ControlledThermostatDevice RemotelyControllerCircuitBreakerDevice	Real-time monitoring and control data	- Command delivered via dedicated wiring inside residence or business	Control Center / Customer Equip
1.10	LoadControlTransponder sends signal back to SubstationController indicating results	LoadControlTransponder	Load Control Compliance Function	LoadControlTransponder sends signal back to SubstationController indicating whether or not command was successfully executed	LoadControlTransponder	SubstationController Notification and ControlSystem SystemDemand Modeler	Real-time monitoring and control data		Control Center / Customer Equip

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
1.11	Notification and ControlSystem stores results in database	Notification and ControlSystem	Load Control Modeling Function	Information on system performance used to refine subsequent analyses	LoadControlTransponder, SubstationController	SystemDemand Modeler	Real-time monitoring and control data		Control Centers / ESPs

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
1.9a	LoadControl Transponder Override	Customer	Load Control Override Function	LoadControlTransponder detects active override by customer (as opposed to malfunction). Customer has to activate switch on LCT to override	LoadControlTransponder	SubstationController Notification ControlSystem SystemDemand Modeler CustomerService Representative Meter	Real-time monitoring and control data		Control Center / Customer Equip
1.12	Customer is assessed peak demand charge	Energy Service Provider	Demand Penalty Assessment Function	If it is determined that customer overrode LCT, then a demand penalty is assessed against the customer. Information on this event, as well as any malfunctions, is factored into system modeling	CustomerInformationSystem	Energy Service Provider CustomerService Representative	Meter data Customer Compliance Data		Customer / ESP

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*
All	System ready to be implemented again in case load continues to need to be curtailed

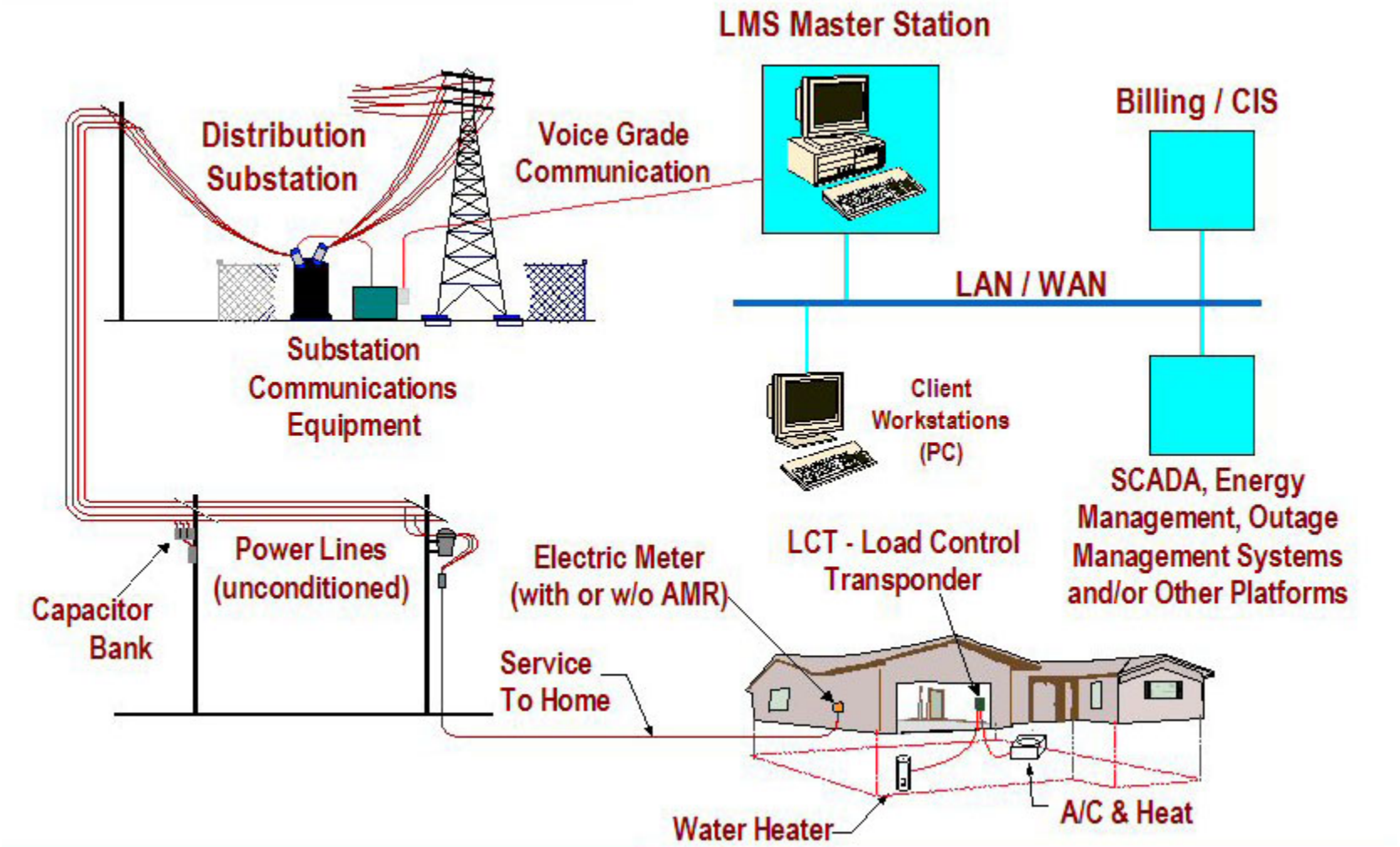
2.2 Architectural Issues in Interactions

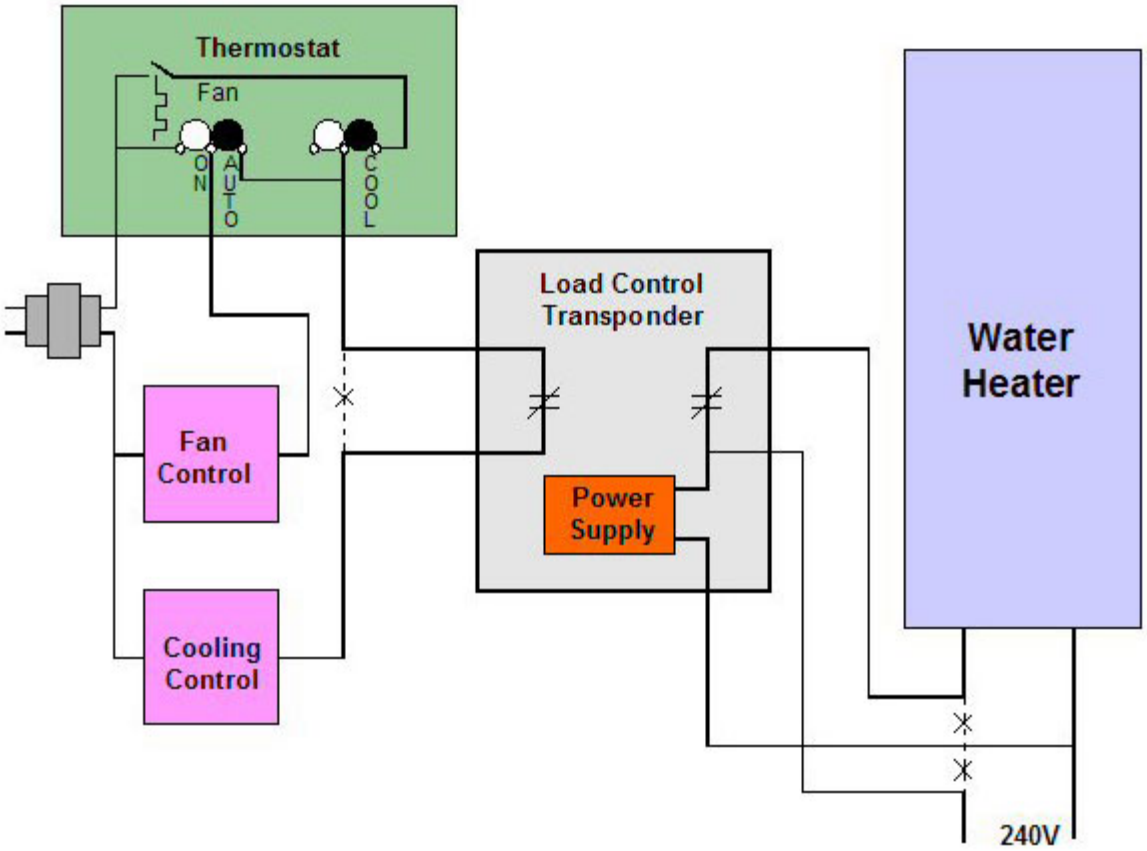
Elaborate on all architectural issues in each of the steps outlined in each of the sequences above. Reference the Step by number..

Microsoft Excel Worksheet

2.3 Diagram

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




Thermostat
Fan
ON
AUTO
COOL
Load Control
Transponder
Water
Heater
Fan
Control
Power
Supply
Cooling
Control
240V

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]	Ed Malemezian, Ed Malemezian Consulting	8009 SW Yachtsmans Drive, Stuart, FL 34997 772-286-9831 ed@emalemezian.com
[2]	Brian White, Gulf Power Company	One Energy Place, Pensacola, FL 32520-0231 850-444-6438 BLWHITE@southernco.com

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

This page intentionally left blank.