RTP - ESP Customer Specific RTP Calculator

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

ESP Customer Specific RTP Calculator

1.2 Function ID

IECSA identification number of the function

C-4

1.3 Brief Description

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

This function uses the base RTP values calculated by Market Operators to calculate customer-specific RTP rates, based on their tariffs and market conditions.

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.

This function calculates the customer specific RTP schedule that is sent to the customer's BAS for implementation. The calculation is first based on the base RTP calculations performed at the Market Operators level that take into account many factors including the marginal energy costs, costs of losses, risk adjustments among others. These calculations are performed for each settlement interval in the RTP schedule for every delivery node in the system.

The ESP uses the base RTP and applies factors related to losses and other costs as well as local tariffs and contracts with the customer. The RTP may be combined with the CBL for the customer if a two part rate is in place. Once the customer specify RTP schedule is calculated, it is communicated to the customer or the customer Building Automation System (BAS) where the customer can optimize their energy usage

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, Intelligent Electronic Device, 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***
Energy Service Providers		Receives to base RTP tables and calculates customer-specific RTP tables
Actor Name	***Actor Type (person, device, system etc.)***	***Actor Description***
RTPCalculator	System	The program that integrates Base RTP calculations from Market Operations and customer specific tariffs and contracts to produce customer specific RPT schedules for the settlement period.
EnergyServiceProvider		

Grouping (Community)		*Group Description*
Market Operations		Forecasts loads, determines optimal loads, and initiates process to determine tables of Base RTP values for the next hours and days
Actor Name	***Actor Type (person, device, system etc.)***	***Actor Description***
Market Interface Server	System	Provides access to market information to ESPs and other market participants. In particular, the base RTP tables are provided.

Grouping (Community)		*Group Description*
Customer		Energy end-use customers and their systems.
Actor Name	***Actor Type (person, device, system etc.)***	***Actor Description***
CustomerBuildingAutomationSystem	Person or system	The customer system that receives the customer specific RTP schedule and acts upon it. This could be a person or automated process that is part of a Building Automation System.
Customer		

Replicate this table for each logic group.

1.6 Information exchanged

Describe any information exchanged in this template.

Information Object Name	*Information Object Description*
Base RTP schedules	RTP schedules for the market based on load forecasts, weather forecasts, system configuration and energy costs among other factors. RTP schedule is a table of time and price for the settlement period.
Customer Specific RTP schedules	RTP schedules calculated for specific customers. RTP schedule is a table of time and price for the settlement period.

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*

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*
Market tariffs	Controls the content and frequency of base RTP schdules
Customer RTP contracts with ESPs	Controls the content and delivery of customer RTP schedules. Drives technology and security requirements

Policy	*From Actor*	*May*	*Shall Not*	*Shall*	*Description (verb)*	*To Actor*
Provide RTP schedules				X	Provide RTP schedules for customers who subscribe to RTP tariffs	Customer
Security and compliance	ENERGYSERVICEPROVIDER			X	Meet security requirements and ensure compliance with all critical information in tariffs, laws and policies must be auditable	Customer
Delivery	ENERGYSERVICEPROVIDER	X			Undertake delivery of RFP data via reasonable variations in implementation approaches through robust system designs	Customer

Constraint	*Type*	*Description*	*Applies to*
Laws of physics	Environmental	Laws of physics for power system operations	All
Technology	Environmental	Technology constraints for providing real-time pricing information to all customers with RTP as part of their customer tariffs	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

Calculation of Customer Specific RTP schedule

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***
Market Operations	Calculated energy prices for the settlement period based of forecasted loads, weather and other factors as described in Load Forecasting and Base RTP Calculation use cases.

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	Base RTP table updates become available on Market Interface Server	Market Interface Server		Base RTP schedules are published on market interface server where the Energy Service Providers RTP system can access them. RTP Calculator application receives information on Base Real-Time Prices and calculates the customer-specific RTP tables for different customers based on contracts and tariffs.	Market Interface Server	RTPCalculator	Base RTP schedules		RTOs / Market ParticipantsRTOs / Market Participants
1.2	Updated Customer RTP schedules available	RTPCalculator		RTP calculator publishes customer specific schedules. These schedules are made available to the customers via agreed communications method. This could be Fax, Email or through WWW interface.	RTPCalculator	CustomerBuildingAutomation System	Customer Specific RTP schedules		Customer / ESP

[1] Note – A triggering event is not necessary if the completion of the prior step – leads to the transition of the following step.

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***
RTPCalculator	New or updated Customer Specific RTP schedules are available to the Energy Service Provider's RTP subscribing customers.

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.

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]		
[2]		

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.			