System Requirements Specification (SRS)

Revision History

Date	Version	Status	Description	Author
11/21/2016	1.0	Initial Draft	Transmission Cost Information Center	Julia Spatafore, Jason Quevada Dana Hiser

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- **Objective**

1.1 Purpose of the System Requirements Document

Instructions: This is a statement of the application functional and operational requirements. It serves as an agreement between the developer and the customer for whom the system is being developed. The developers agree to provide the capabilities specified. The client agrees to find the product satisfactory if it provides the capabilities specified in the SRS.

The completed Transmission Cost Information Center (TCIC) will meet the following:

- Create an associated ~~"calculator"~~ worksheet that will incorporate all of the cost estimates and cost allocations ~~"actual"~~ data of current projects in the cost allocation worksheet, and the ~~"projected"~~ estimated transmission ~~replacement~~ project costs, cost allocations, and ~~"projected" in-service and needed-by dates~~PJM required date of future projects
  - o Publicly available annual carrying charge rates (add)

- To the greatest extent possible – automate data extraction, transformation and loading into the new ~~calculator~~ web-page to minimize re-work and potential sources of error

- Design sliders and user filters to allow users to select duration of the analysis

- Design sliders and filters to allow users to select a confidence range or percentage of timely project completions and energizations

  - o Are there ways to improve projected project completion dates? (keeping projects up to date)
  - o System default = all projects
    - ▪ Design feature allow users to amend project list

- Design a "projected" cost result for the user selected time duration and confidence percentage determined by user.

- Projected result(s) (plural if for more than one year or planning cycle) shall be compared to current actual transmission cost to provide direction and magnitude of change

- Cost impacts of all transmission projects that will affect the cost of customers by transmission zone

  - o Retail customer impact (ex. Linden VFT – note to coders)
  - o Consider all zones including UGI, Merchant Transmission, HTP, Neptune

- Will not be a mechanism for rate forecasts/projections

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- o Method to forecast using user inputs (carrying charges, etc.) not a mechanism for TO sanctioned forecast rates
  - ▪ Capture and centralize useful public information to assist transmission customers

- Will not be a mechanism for constructing new requirements (reporting, regulatory, or any other) on any members

- **Overview**

1.2 Purpose

Instructions: In this section, provide the purpose this application is intended to serve. Describe the business objectives, business processes, and the cost-benefit analysis that this application supports.

In order to gain more understanding ~~provide more clarity and transparency~~ surrounding transmission costs, the Transmission Replacement Processes Senior Task Force (TRPSTF) requested that PJM look into creating a Transmission Cost Information Center (TCIC).

- Looking for a centralized location for publicly available information (links to up-to-date annual update posting, etc.)
- Centralize annual update posting timelines planned and filed
- Link to the updated existing spreadsheet

1.3 Scope

Instructions: Give a description of the intended scope of the system.

All of the required information/date is publically available on pjm.com, and the idea is to consolidate the information into the TCIC for a better and more convenient user experience.

1.4 Benefit

Instructions: Provide what benefits this application brings to PJM.

PJM members and stakeholders have expressed the desire for increased understanding ~~transparency~~ surrounding transmission costs and rates, and PJM aims to assist by creating the TCIC.

1.5 Capabilities

Instructions: Describe the capabilities the application must provide in business terms.–

- *Do not describe how the application provides that capability.*
- *Do not describe such design considerations as computer hardware, operating system, and database design unless they are constraints*
- *Is this business functionality unique to this application?*

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Below are the desired capabilities:

- Capability to review "projected" transmission costs in specified TO zone
- Capability to further filter the data by selecting the duration of analysis
- Ability for user to select a confidence range or percentage of timely project completion/energization
- Provide clarification of companies that have a formula or stated rate
- Provide clarification of companies that have leading and lagging formula rates

1.6 System Description

Instructions: In this section, provide an overview of the physical system if known.
Give an estimate of the size and complexity of the system in terms of number of user types, number of locations, interfaces, data capacity in business terms, numbers of major processes, etc.
Summarize the conditions that created the need for the new system (or capability).
Include any relevant background, such as the number of sites that are using the system.
Identify other legacy or new systems with which this system interfaces.

The data is currently being hosted on the PJM.com Web servers and is hosted from a SQL database. The data will just be put in a more user-friendly format for members so we assume the same servers and database will host the new components as well.

- **Assumptions and Constraints**

1.7 Assumptions

Instructions: State the assumptions associated with development of the system, where assumptions are defined as future situations, beyond the control of the project, whose outcomes influence the success of a project. The following are examples of assumptions:

- *Availability of a hardware/software platform*
- *Developments in technology*

Below are the assumptions:

- Stated and/or formula rates updates/changes
- Continued updates to linked publicly available information/data on pjm.com
- Continued updates to reflect ongoing or pending FERC proceedings (remand implementation, specific project litigation, etc.)
- Hosted on the same servers and database as current data.

System Requirements (new section)

Worksheet will include three primary buckets as inputs.

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1. Include project cost estimates, projected IS date, default = all projects, users able to select or deselect projects as desired. Projects will be filterable by transmission zones, and include all pjm zones (ex. UGI). Desire to modify projected IS date. Include project upgrade IDs and descriptions.
2. Carrying Charges - The worksheet is desired to apply carrying charges by TO and by TO zone. Ideally this would be by individual company. As a feature, the user would have the ability to alter the carrying charge for scenario analysis.
    a. Data source, where are we getting the data?
    b. Will have to map the workflow to capture manual process to determine the carrying charge from the formula rate
    c. Average carrying charge?
    d. Base carrying charge for IS projects is included in TEC sheet
    e. All projects that are already in formula rate, that cost to responsible customers is already included in Transmission Enhancement worksheets
        i. Future projects will not have a carrying charges included, and will have to use a projected or average
    f. Carrying charge data sources, not looking for project specific carrying charges. We can leverage either average company carrying charge or pjm 2 year survey average carrying charge from longer term market efficiency window (included in assumptions TEAC presentation prior to long term market efficiency window opening). The worksheet user will have the ability to enter a future year carrying charge rate based on their business assumptions.
    g. Beneficial Feature: Quality assurance logic to ensure projects already included in the existing formula rate but not in service are not added back into the estimation (requires research to determine if data exists to build this logic).
3. Cost Allocation Factors – The worksheet will leverage the existing cost allocation workbook to apply cost allocations to customers within a zone and will include all projects that have a cost impact to the zone (not filter by where the project is being built, but by cost allocation responsibility – responsible customers). Data requirement will be designated entity to help determine the specific carrying charges per project.

1.8 Constraints

Instructions: State the constraints associated with the system and data, where constraints are defined as conditions outside the control of the project that limit the design alternatives. This section should also provide details as to the rationale.

- Flexibility of application within pjm.com
- Stated and/or formula rates updates/changes
- Continued updates to linked publicly available information/data on pjm.com

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- Continued updates to reflect ongoing or pending FERC proceedings (remand implementation, specific project litigation, etc.)
- Ability to choose and filter the user's desired dataset
- **Interface Requirements and Impacts**

1.9 Hardware Interfaces

Instructions: Define any hardware interfaces that are to be supported by the system, including logical structure, storage, physical addresses, and expected behavior. Describe the impact of the data requirements and storage on hardware. Consider impact to interface.

none

1.10 Software Interfaces

Instructions: Define any software interfaces that are to be supported by the system, including logical design and expected behavior. Describe the impact of the data requirements on software.

None?

Expected to link to existing databases and pjm.com links

1.11 Application Interfaces

Instructions: Name the applications with which the subject application must interface. State the following for each such application:

- **PJM.com**
  - **Attachment H Network Integration Transmission Service (NITS):** **http://www.pjm.com/markets-and-operations/billing-settlements-and-credit/formula-rates.aspx**
  - **Transmission Enhancement Charge (TEC):** **http://www.pjm.com/markets-and-operations/billing-settlements-and-credit.aspx**
  - **Schedule 12 – Appendix (page 662 in OATT):** **http://www.pjm.com/media/documents/merged-tariffs/oatt.pdf**
  - **Transmission Construction Status:** **http://www.pjm.com/planning/rtep-upgrades-status/construct-status.aspx**
  - **PJM TEAC Meetings and Meeting Materials:** **http://www.pjm.com/committees-and-groups/committees/teac.aspx**
  - **PJM Cost Allocation Filings:** **http://www.pjm.com/library/filing-order.aspx**
  - **Cost Allocation Worksheet/Webpage:** **http://www.pjm.com/planning/rtep-upgrades-status/cost-allocation-view.aspx**

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1.12 Network Interfaces

Instructions: Describe any communications interfaces to other systems or devices, such as local area networks and firewalls. Describe the impact of the data requirements network infrastructure. Consider impact to interface

none

1.13 Organization Interfaces

Describe the impact of the data requirements on the user and developer organization.

Will need at least one developer and one tester who have experience with PJM.com and it's intricacies with the Planning Database. In addition to those users, we should also have input from Creative Services, Member Services, External Communication, and the WebDev team. We should also pilot this to some members before opening it to all members.

1.14 Retention

Instructions: Describe the length of time the data must be retained. For example, "Information about an application for naturalization shall be retained in immediately accessible form for 3 years after receipt of the application". Consider data retention requirements in terms of the following:

- *historic retention to include the collection of data to be retained and its format, storage medium, and time parameters*
- *periodic report data (retention period after generation of reports and retention period of periodic reports after summary reports are generated)*
- *summary reports data (retention period after generation)*

Planning Data on PJM.com is not removed after a certain period of time and that will remain for this project.

1.15 Data Storage

Estimate the data storage and processing requirements in terms of size and number of records.

Estimated to be similar to the Cost Allocation webpage on pjm.com.

1.16 Frequency of Update and Processing

State the expected frequency of data element change and the expected frequency of processing input data elements. If the input arrives in a random manner, specify both the average frequency and some measure of the variance.

The dataset is expected to require updates in synch with the Cost Allocation webpage. Additionally, whenever ~~TOs update their formula rates.~~any of the cost components are updated.

New Section:

User interface requirements

- Using existing pjm.com frameworks

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1.17 Data Flows

Instructions: Text or data flow diagrams that are needed to further explain the functional requirements or the operation of the system.

PJM Transmission Cost Information Center

Transmission Cost Component Process
(Source: Public data available through PJM)

NITS	+	TEC	+	Transmission Construction	=	Accumulated Costs
Current Year		**Current Year**		**Future Year(s)**		**Total**
Formula Rate Stated Rate		TEC zonal charges TEC zonal credits		Baseline Projects Supplemental Projects		

Note: Zonal updates of NITS and TEC costs are done in accordance with the timing of the annual update for each TO.

1.18 Data Classification

State the consequences of the following breaches of security in the subject application:
All data used will be publically available from pjm.com. Any security concerns would be the same concerns shared with any PJM.com feature.

1.19 Inputs

Instructions: This section describes the input interfaces including what each data input is, what the source is, what the target is, what the transfer mechanism is, and what the trigger that causes data to be sent is. Describe the data requirements by providing data entities, their decomposition, and their definitions. The data requirements describe the business data needed by the application system. Data requirements do not describe the physical database and they are not at the level of identifying field names. Data (attributes) input to and output (including reports) from processes

- *High-level logic used inside the processes to manipulate data (do not state "how")*
- *Accesses to stored data*

Entity / Element Name	Source of Input (business process, operator, or workstation)	Frequency of input from source	Is source internal to PJM or external?	Does source interface directly with system?	Description of interfacing or transmitting source
Stated Rates	Workstation	How often is this updated?[As annual update posting~~FERC filing~~ is posted to the PJM webpage~~?~~]	Internal	Yes	Uploaded by a PJM.com employee at a periodic basis
Baseline Upgrades	Process	Varies	Both	Yes	System Upgrades are identified and added on an as-needed basis. Information will~~can~~ come directly from PJM ~~or from a member.~~
~~This seems~~					

~~incomplete to me, might not be completely understanding.~~					

1.19.1 Medium and Device

Instructions: Describe, in detail, the format of data to be input to the proposed system. Descriptions may be narrative or in the form of data record layouts and screen formats, as appropriate. This may include the identity of each device by name, including a brief description, and the process used to transmit the data.

Identify the medium and hardware intended for entering each data element into the system. In situations in which only specific workstations are to be legitimate entry points, so specify. For instance, CIP workstations

none

1.20 Outputs

Instructions: This section describes the output interfaces including what each data input is, what the source is, what the target is, what the transfer mechanism is if a particular one is required, and what the trigger that causes data to be sent is.

none

1.20.1 Medium and Device

Instructions: Identify the medium and hardware device intended for presenting output data to the recipient. Specify in what medium the recipient is to receive the data. If the output is to be passed to some other automated system, the specifics of the medium should be described.

Output would be provided on pjm.com, excel sheet, or whatever means that is suggested by IT and approved by TRPSTF. Output would be manually consumed by members and non-members accessing pjm.com/planning

1.21 Recipients

Instructions: Identify the consumers or systems that will be receiving the output data.

Members and non-members who visit PJM.com/Planning

1.22 Collection

Instructions: Describe procedures that will be used to collect data, including the format of the input data. Describe how data will be transmitted by the system.

Data is stored within a SQL database and is processed via other means. No new data will be collected or shown as a result of this new feature, this is simply a way to organize and display the data.

1.23 Error Handling

Instructions: Describe the process for handling inaccurate or incomplete data.

If the user provides incomplete/incorrect data as part of assumptions, then provide an error message. To prevent this, use asterisk to show required fields.

1.24 Ownership & Responsibilities

Instructions: Describe the division/ department that will be responsible for managing the data

The responsibility of development and maintenance will be owned by the Planning Applications department (within the ITS division). The data will be provided by multiple departments within the Planning Division.

1.25 Data Access

Instructions: The Data Access Section describes the need to control access to the data. This includes controlling who may view and alter application data.

Publically available to all pjm.com users

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Instructions: List the functional requirements of the application or system. Functional requirements describe what the system should do. Distinguish preferences from requirements. Requirements are based on business needs. Preferences are not. If, for example, the user expresses a desire for sub-second response but does not have a business-related reason for needing it, that desire is a preference.

Please include a Process Flow Diagram

Please see above. Requirements are still being defined.

Provide a story board for customer consultation and feedback.

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- **Non-Functional Requirements**

Instructions: Non-functional requirements cover all the remaining requirements which are not covered by the functional requirements. They specify criteria that judge the operation of a system, rather than specific behaviors, for example:

Distinguish preferences from requirements. Requirements are based on business needs. Preferences are not. If, for example, the user expresses a desire for sub-second response but does not have a business-related reason for needing it, that desire is a preference.

Requirements are still being defined.

1.26 Reliability

Instructions: Reliability is the probability that the system will be able to process all work correctly and completely without being aborted. Reliability is evaluated as follows:
State the following in this section:
What damage can result from failure of this system? From this feature specifically, nothing but failure of the overall system could be detrimental to a member or non-member since the data should be available at all times.

- *Complete or partial loss of the ability to perform a mission-critical function*
- *Loss of revenue*
- *Loss of employee productivity*

What is the minimum acceptable level of reliability? Same as pjm.com

1.27 Availability

Instructions: System availability is the time when the application must be available for use. Required system availability is used in determining when maintenance may be performed. Include the times when usage is expected to be at its peak. These are times when system unavailability is least acceptable.

The system should be available at all times but will likely be accessed mostly during business hours.

1.28 Performance

Instructions: Describe the requirements for the following:

- *Response time for queries and updates*
- *Throughput*
- *Expected rate of user activity (for example, number of transactions per hour, day, or month)*
- *<< List the required capacities and expected volumes of data in business terms. For example, state the number of cases about which the application will have to store data. For example, "The system shall be able to process a projected volume of 600 applications for naturalization per month." State capacities in terms of the business. Do not state capacities in terms of system memory requirements or disk space.*

Same as pjm.com

1.29 Supportability

Instructions: Supportability is the ability of the application to be updated by the vendor and any 3pp that are used.

All development would be done in house and should be supported as needed.

1.30 Scalability

Instructions: The measure of a system's ability to increase or decrease in performance and cost in response to changes in application and system processing demands. Examples would include how well a hardware system performs when the number of users is increased, or how well a database withstands growing numbers of queries

This would match pjm.com

1.31 Usability

Instructions: Usability is the term used to describe how easy (or difficult) is the application to use? Are many steps required for the user to obtain the desired output?

Application doesn't currently exist, the end product should have links to appropriate information/data and instructions on how to use the ~~"calculator"~~worksheet.

1.32 Maintainability

Instructions: Maintainability is the term used to describe how well the application can be maintained. Is PJM or a vendor responsible for routine maintenance or trouble shooting a problem? What diagnostic tools are available?

PJM's Planning Applications department will be responsible for maintenance and feature additions. The data will be updated by the Planning division departments as it applies.

1.33 Flexibility

Instructions: Flexibility is the term used to describe how well will the system respond to changes in business processes or rules, how much effort is needed to modify the system

The system is internally developed; any changes will also be internally developed and tested as needed. Level of effort would rely on the work being done at that time.

1.34 Interoperability

Instructions: Interoperability is the ability for a system or application from one vendor to work with one from another vendor.

Not applicable – this will be an internally developed system

1.35 Manageability

Instructions: Manageability is the term used to describe how efficiently and easily a software system can be monitored and maintained to keep the system performing, secure, and running smoothly. How will the system be managed? Does it interfaces to PJM's management system or have a standalone system.

Same as PJM.com

1.36 Extensibility

Instructions: Describe future growth of the system. Consideration. It is a systemic measure of the ability to extend a system and the level of effort required to implement the extension.

- Leverage the existing Planning Division Cost Allocation Worksheet and webpage
- Consider and implement in design the types of filters and drill downs that may alter the result of the ~~calculator~~ worksheet to meet a user's needs (e.g. by customer type~~Muni, Coop, Zone, Merchant, all but Muni, all but Coop, All but Merchant, etc.~~)

1.37 Portability

Instructions: Do you want the application to be available on multiple OS's, development frameworks, or databases?

This is a web based tool and should be available in the same framework as the existing PJM.com features

1.37.1 Recoverability

Instructions: Recoverability is the ability to restore function and data in the event of a failure. In the event the application is unavailable to users (down) because of a system failure, how soon after the failure is detected must function be restored and how soon does it need to restored?

- **References**

Instructions: List the appropriate reference documents. List the documents that are sources or references for this SRS. Include meeting summaries, white paper analyses, and SDLC deliverables, as well as any other documents that preceded this SRS and provided information for the development of it. Also reference any documents that provided information on the relevant FNS version or business plan >>

none

Cera #	Document Name	Description

- **Approvals**

Name	Role	Date of Approval email