# Resolution E-5115 Very Low and Low Rigor Tiers Equipment Viability Operationalization

# Preface

Participants in the Stakeholders Custom Projects Review Combined Subgroup in collaboration with CPUC staff developed this document to provide operational guidance on CPUC Resolution E-5115. Resolution E-5115 adopts guidance for the documentation required when implementing the preponderance of evidence process adopted in Resolutions E-4818 and E-4939 for custom “accelerated-replacement” energy efficiency (EE) projects. The Stakeholders Combined Subgroup included volunteers from the program implementation community, the program administrators (utility and non-utility) staff, and CPUC staff and CPUC staff consultants.

For those in the program implementation community, kindly provide any questions and feedback on this document to your program administrator. For program administrators, please collect any questions and feedback from your internal custom projects technical review team and your program implementers and provide the feedback to CPUC staff.

# Viability Operationalization of Resolution E-5115

E-5115 directs the project developer to collect information from the customer and provide written documentation supporting the viability of existing equipment. This directed supporting documentation is expected to be collected as the project is being developed and should not be created or re-created after the fact[[1]](#footnote-1). The project submission should include a discussion narrative presenting the evidence as required by the various Rigor Tiers and explaining how the evidence supports the viability. The tiers in E-5115 are based on expected customer incentive at the time of the customer application. The rigor tier for a project can change if there is a scope change for the project application that results in changes to the expected customer incentive. Other changes to the incentive (for example incentive changes based on post-installation measurement and verification results) should not change the tier for the project.

E-5115 is clear that evidence presented must demonstrate that the existing equipment will meet a specific definition of viability to include current equipment operation that meets customer requirements as well as the ability to operate for the default or proposed remaining useful life meeting the customer requirements as they currently exist as well as may be expected to change during that future period.

“The preponderance of evidence requirement for equipment viability includes demonstration of equipment operation and of its ability to remain in service, meeting customer requirements for its remaining useful life.”[[2]](#footnote-2)

This is further amplified that both current and future equipment viability must be supported by the evidence presented and discussed.

“The preponderance of evidence requirement for equipment viability must demonstrate physical equipment operations and of its ability to remain in service, meeting customer requirements for its remaining useful life.”[[3]](#footnote-3)

Establishing customer requirements is a key step in the assessment of equipment viability. Customer requirements cannot be assumed to be static as business plans and requirements can change over time. The assessment of these needs and resultant requirements over the remaining useful life (RUL) of the equipment must be assessed in addition to current requirements. These requirements can vary by equipment type and purpose and the business type, size and plans. Examples of the types of requirements are listed below. Many types of equipment will have several, but not necessarily all, of these features as important aspects of the customers requirement, but few will have many or all as key elements to viability. It is the job of the project developer to identify those which are important to the project and include that discussion in the project narrative.

* Capacity – i.e., processing capacity, servicing capacity, storage capacity, output capacity, etc.
* Controllability and stability – i.e., the ability to accurately control and maintain key equipment parameters such as temperature, speed, quality, etc.
* Flexibility – i.e., the ability to adapt to or be adapted to changes in use or processing needs
* Stability – i.e., the reliability of the equipment in performing its function and its role in the business activity, including past, current, and future (through the RUL period) expected unplanned or planned down time, acceptability of down time duration and frequency and the impact on the business of down time
* Maintainability – i.e., the cost and availability of expertise and parts to maintain the equipment
* Size and spatial arrangement or orientation – i.e., physical characteristics and arrangement of the equipment that may have limiting aspects for future (through the RUL period) operations
* Safety – i.e., the ability of the equipment to provide a safe and secure operation for both employees and staff or contractors and visitors
* Obsolescence – i.e., how the equipment compares to current accepted and standard features and capability of the typical equipment currently available to provide the services and how that impacts the business operation currently and, in the future
* Esthetics and/or physical arrangement – i.e., the visual appearance of the equipment

The objective of this document is to establish documentation and supporting evidence requirements. The project will assess the equipment viability for the remaining useful life based, in aggregate, on the documentation, discussion and supporting evidence both for and against equipment viability relative to customer requirements. It is important that the narrative and its supporting evidence provide adequate information as required for the various Rigor Tiers for this assessment to be made reliably.

The costs of obtaining information and data for the assessment of viability should be weighed against the overall benefit of the information gathered. Emphasis should be placed on obtaining evidence that directly addresses current and future viability assessment. Volumes of data that do not directly support the assessment conclusions should not be presented.

# Very Low Rigor Tier Viability

For the Very Low Rigor Tier sized projects (those with incentives limited to below $7,500) the Resolution removes most of the evidence requirements.

“It is sufficient that for the Very Low Rigor Tier, the requirement is only for the customer to complete the Customer Affidavit Statement.” [[4]](#footnote-4)

Thus, the discussion narrative, typically included in the Project Feasibility Study, must accompany the customer affidavit acknowledgement statement and shall cover the equipment viability definition items including its physical operations and its ability to remain in service and meet customer requirements for its remaining useful life. This discussion narrative should demonstrate that the project developer has discussed with the customer their needs and requirements, the current and historical equipment operation state, any issues or concerns the customer has relating to the existing operation and maintenance of the equipment as well as the future expectations relating to the equipment and its likely use, replacement, removal, or upgrade during its remaining life. The intent is that the customer agrees with the discussion narrative presented.

Low Rigor Tier Viability

For the Low Rigor Tier projects (those with incentives limited from $7,500 to below $25,000) the Resolution adds additional evidence required to support the discussion of viability - photos and/or videos in addition to the customer signed Customer Affidavit.

* + A recent (within six months of submitting the application) photo or video will demonstrate existing equipment is installed and where feasible, operational.
  + The customer or the implementer may take the photo or video and specify the date of the photo.

It is recognized that some customers may have security concerns that cause them to refuse to submit or allow photos or videos to be taken in or on their facilities sites. The Resolution addresses these types of concerns.

“However, waiving provisions of required evidence based on customer security concerns should only be allowed when such evidence of currently installed and operating equipment divulges proprietary information or trade secrets or pertinent to national security. For example, pictures of HVAC equipment or standard off-the-shelf equipment should not be a waived requirement. A site having security constraints cannot have an automatic ability to deny the collection of evidence. The customer has the responsibility to provide evidence as needed to confirm eligibility and support their claims even if others are not able to access the site.”[[5]](#footnote-5)

As with the Very Low Rigor Tier the discussion narrative, typically included in the Project Feasibility Study, must accompany the customer affidavit acknowledgement statement and the photo/video and shall cover the equipment viability definition items including its physical operations and its ability to remain in service and meet customer requirements for its remaining useful life as described in the Very Low Rigor Tier section above.

# Medium Rigor Viability

For the Medium Rigor tier (From $25,000 to $100,000), Resolution E-5115 directs that “**in addition to the customer affidavit statement, we direct** the project developer to collect additional supporting information to answer the question of whether the existing equipment can continue to operate. The information to demonstrate equipment viability includes:

* Photos and/or videos (See the photo and video guidance in the Low Rigor Tier Viability Section)
* Age of the equipment (for example, installation date or initial operation date in determination of whether the original equipment’s RUL or the default RUL will be used in determination of the remaining useful life energy efficiency savings.)
* Operating data
* Describe the customer’s current and past maintenance and repair history (for example, any maintenance and/or repair records history and/or cost information would be helpful in further demonstrating support that the equipment is working as intended and is in good operating condition.)
* Information on current plans or budgeting for expansions, remodels, replacements
* A customer-signed Customer Affidavit Statement”

## Description of Information to Collect

As with the Very Low and Low Rigor Tiers projects, a discussion narrative must accompany the customer affidavit acknowledgement statement and shall cover the equipment viability definition items including its physical operations and its ability to remain in service and meet customer requirements for its remaining useful life. This discussion narrative is expected to be more comprehensive covering some or all of the category of information in the Viability Operationalization of Resolution E-5115 section above while utilizing the collected evidence as supporting documentation. This discussion narrative should demonstrate that the project developer has investigated the current and historical equipment operation state, any issues or concerns the customer has relating to the existing operation and maintenance of the equipment as well as explored with the customer their needs and requirements relating to the equipment as well as the future expectations relating to the equipment and its likely use, replacement, removal, or upgrade during its remaining life.

Information is required to be collected and referenced in the discussion narrative of viability for each of these above listed categories. The discussion narrative should describe interactions/interviews with the customer staff, contractor, or consultants as applicable and provide an overall assessment of customer needs as it relates to continued viability of operation of the equipment/system to meet the customer’s current and future needs. A table showing each of the categories, a description of information collected, and file names containing the source information may be used to reference the supporting evidence.

The discussion narrative should clearly explain how each category of information was used to assess viability and supports that it is more or less likely that the equipment is viable and would continue to meet customer needs for its remaining useful life.

The following provides additional details on the information required to be collected and the value of the differing information required as it pertains to equipment viability.

* **Photos and/or videos** – Provide evidence of the current operation condition of the existing equipment. A recent photo (within 6 months of the application submittal) or video will demonstrate existing equipment is installed and operational.
  + Videos with sound can uncover operational issues of the equipment that may support less likely viability. Note that many industrial facilities or equipment rooms in other facilities may have other equipment that makes ascertaining sounds from the specific equipment/system difficult.
  + Photos or videos of gauges or equipment in motion/operation can support a more likely viability scenario if they show expected operation, such as a VFD speed, fluctuating within the expected range.
  + The customer or the implementer may take the photo or video, submit the raw/original file, and specify the date of the photo. A date stamp on the photo or an email specifying the date of the photo/video is acceptable.
  + Photos or videos must clearly show and allow the review of key elements of the equipment and its controls so as to be able to assess the equipment general condition and operation. Distant views are not acceptable nor are unclear or obstructed views. In many cases several views are appropriate, especially when multiple equipment components are being replaced in several locations (such as lighting or controls).
* **Age of equipment** – When compared to the equipment EUL, the age of equipment can be used to understand the potential for the equipment to continue to operate to meet Customer needs. Examples of information to determine age of equipment include:
  + Installation date or initial operation date
  + Nameplate information (e.g. Serial number with Make/model) showing date of manufacture
  + Documented (e.g. invoices) date of major overhaul of equipment including scope of work
  + If the specific age of the existing equipment is unavailable, an estimate of the age with corresponding customer confirmation and available site data is acceptable.
* **Operating data** – Operating data can show if the existing equipment is or is not reasonably meeting the service needs of the customer. Operating data must be provided that demonstrates operations consistent with meeting customer needs. Examples of this data, as listed below, may include time series or one-time data, as determined, and discussed in the narrative to be appropriate. The first step is to classify measure operation types (constant load - constant operation, constant load – variable operation, variable load – variable operation) and identify which measure operation types require time series data logging versus one-time measurement data. The monitoring period(s) should also align with requirements set forth in the project M&V Plan for establishing the baseline and post-retrofit performance. Note, the measurements and analysis supporting assessment of equipment viability should be documented in the project M&V plan. The data collection plan must also rely on the customer requirements assessment (i.e., room temperature, lumens, delivered water temperature, etc.) and provide measurements demonstrating these requirements are met. These requirements could result in the need for operational data beyond equipment input data such as amps, kW, on/off status normally required for pre/post performance verification, and should be included in the project M&V plan. Data collection covering appropriate period(s) must not have concluded earlier than 6 months prior to the submittal of the application.
  + Time Series Data. The monitoring period must be selected to verify equipment can meet customer requirements over a range of normal operating condition. This selection arises by combining the minimum duration needed to establish typical operation variations with season requirements for equipment with only seasonal operation. For non-lighting equipment or constant load equipment, this can be a minimum of 2 weeks of data over a range of normal operating conditions, plus seasonal requirements, if applicable.
    - Acceptable data may include, but are not limited to, one or more of:
      * Data from logger(s) installed on equipment/system
      * Data from Customer’s Energy Management System or SCADA/Data Historian system showing operation
      * Production data associated with the operation of the equipment
  + One-time data. One-time Vibration or other test spot measurements with multiple data points (e.g. rpm, amperes, voltage, vibration, thermographic, etc. or other evidence of operation), demonstrating stable operation performed within 6 months of submittal of application
  + For lighting equipment or constant load equipment, evidence of operation through pictures, spot measurements with multiple data points (e.g. rpm, amperes, voltage, vibration, thermographic, etc. and other evidence of operation) or other evidence of operation meeting Customer service needs.
* **Maintenance history** – Historical maintenance practices and repair history help to illustrate the operating condition of the equipment. Information on the customer’s current and past maintenance and repair history must be provided. Acceptable information/data may include, but are not limited to, one of the items below:
  + Recent (one year minimum) of maintenance and/or repair record or history (with identification of reasons for previous repairs), if available, showing equipment is operating as intended and is in good operating condition. Customer’s maintenance plan should be provided if available.
    - If information is not available, describe why and provide representation by Customer described below.
    - If maintenance and/or repair records show that the equipment has shown escalated repairs or increased unplanned down-time, viability assessment must discuss this and its impact on future viability.
  + A representation by Customer that the equipment meets the Customer’s operating requirements, is operating as intended, is in good operating order, and has not experienced any escalated repairs or unplanned down-time.
  + Equipment maintenance and operation assessment by an independent party (approved by the PA and/or CPUC).
* **Current plans or budgeting for expansions, remodels, and replacements** – Information on current plans and budgets provide insight into the customer’s strategy for continued operation and/or retention of the equipment/system. For planned replacement or upgrade of the subject equipment/system, a description of the current budgeting for future expansions, remodels, upgrade or replacement of the equipment should be provided. It is important to address the expected continued operational requirements and plans of the customer over the remaining useful life of the equipment to support the viability assessment of the equipment over that period. It is often the case, especially for key facility process equipment, that upgrades and replacements are identified, discussed, or planned many years in advance. However, these plans may not have established precise timeframes within the remaining useful life of the equipment. The discussion narrative should include why and how any potential change in equipment or requirements impacts the viability assessment.
  + Upcoming planned activities that result in increases in requirements of the systems beyond the existing equipment’s capabilities. Some examples include:
    - Building use modification increasing the load due to occupancy density or outside air requirements.
    - Significant modification of Industrial product type or production rate
  + If a planned facility expansion, remodel, upgrade or replacement affecting the equipment is expected to start construction/implementation within 1 year of the submittal of an application, if the project has already been placed in the customer’s books or a published strategic/long-range plan for the period of the remaining useful life, or if the customer has approved funding for construction/implementation at the time of submittal of an application, assignment of accelerated replacement is inappropriate.
  + If a planned facility expansion, remodel, upgrade, or replacement affecting the equipment has a possibility to occur within the remaining useful life of the equipment, that must be disclosed and discussed within the discussion narrative.
* Customer Affidavit – Prescribed language from E-5115 to be signed by the customer

## Viability Factors and Decision Criteria

To operationalize this requirement, the following table provides examples of common attributes for each of the required categories. Note that not all these scenarios will be present for all projects and that there may be alternative scenarios not listed that may be key for viability assessment. It is the job of the developer and reviewer to establish and assess important equipment characteristics and performance parameters that establish viability.

| Viability Factor | Supports Viability | Does not Support Viability |
| --- | --- | --- |
| Photo or Video | Equipment photograph/video shows equipment operating in expected ranges and outputs and appears clean and well-maintained. | Equipment photograph/video shows equipment operating in an abnormal manner or outside the expected ranges or appears neglected, missing panels, dirty, damaged. |
| Video demonstrates equipment sound representing typical mechanical equipment sound in operation. | Video demonstrates equipment sound includes abnormal squeals, hisses, and/or an excessive decibel level or other physical condition (e.g. rust, leaks, damage, etc.). |
| Date stamp of the photo or video is within the last 6 months. | Date stamp of the photo or video is older than 6 months. |
| Age of Equipment | Equipment was installed such that the age is within the expected estimated useful life (EUL) | N/A – Defer to Operating Data |
| Operating Data | Operating data included is sufficient to illustrate that equipment consistently provides the level and full range of service needed to meet identified customer requirements. | Operating data indicates that equipment sometimes or consistently fails to provide the level and full range of service for the equipment to meet customer requirements. |
| Data shows that the equipment is always operating within expected ranges based on system driving variables [1], as applicable. | Data shows that the equipment is sometimes or consistently operating outside expected ranges based on system driving variables [1], as applicable. |
| Data shows the equipment has sufficient capacity reserve to meet service or load requirements | Data shows the equipment is near or at full capacity or has insufficient capacity reserve to meet service or load requirements. |
| Data is within 6 months of the pre-installation package submission date. | Data is not within 6 months of the pre-installation package submission date. |
| Maintenance History | Maintenance practices are consistently performed to maintain equipment operation. | Maintenance practices are sporadically performed or lack sufficient activity to maintain equipment operation. |
| Equipment has undergone a regular minor and/or major overhauls or rebuilds to ensure reliable and proper operation. | Regular minor and/or major overhauls or rebuilds have been performed on equipment that indicates reliability issues or concerns. |
| Maintenance costs are remaining constant or marginal increases (e.g. inflation). | Maintenance costs are significantly increasing in the last two years based on historical levels. |
| Spare parts remain readily available from typical supply chain. | Spare parts are becoming harder to obtain. |
| Current Plans | There are no renovation or remodel plans or budgets involving the equipment have been identified, planned or discussed for the remaining useful life. | Equipment is part of a budgeted or planned or expected renovation or remodel during the remaining useful life. |
| Level of service needs [2] have changed and are met or are not expected to change in the remaining useful life. | Level of service needs [2] have changed and are not reliably met or are expected to change in the remaining useful life. |

[1] Driving variables will vary depending on the system. Examples include outside air temperature for HVAC system, production output for process equipment, and flow requirements for pumping systems. These variables are used when equipment is operated either within or outside of normal operating conditions. Level of service variables such as room temperature, supply air temperature, process temperatures and so on are used to establish the ability of the equipment to meet service levels when operated within normal conditions. Equipment that meets service levels under normal operation but does not meet service levels outside of normal operation indicates a need for capacity expansion.

[2] Examples of level of service may include a change in function of a space, increased production rate or added production capability, and/or different manufacturing product or quality.

1. Resolution E-5115 at 12 states “We wish to stress the importance that documentation of this supporting information should happen as a project is being developed, it should not be created or re-created after the fact.” [↑](#footnote-ref-1)
2. Resolution E-5115 at 15. [↑](#footnote-ref-2)
3. Resolution E-5115 at 15. [↑](#footnote-ref-3)
4. Resolution E-5115 at 15. [↑](#footnote-ref-4)
5. Resolution E-5115 at 16.. [↑](#footnote-ref-5)