Effective Flexible Capacity (EFC) Ratings for Resources

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Meeting Objective/Summary

- EFC Calculation Review
  - General Formula
  - Battery
  - PDR
  - MSG
  - Hydro
  - Combined Heat and Power (CHP)
- EFC Category
- 2020 EFC Update
- Talk through Next Steps and Timeline

Effective Flexible Capacity (EFC) Background

- The ISO calculates an EFC value for all resources that have a NQC.
  - The EFC value is what can be used for Flex RA Showings to meet the Annual Flexible RA requirement.
- EFC calculation by two general formulas
    - Start-Up Time Greater than 90 Minutes
    - Start-Up Time Less than 90 Minutes
- 5 with Special Formulation Categories
  - Hydroelectric Generating Unit
  - Proxy Demand Resource
  - Energy Storage Resource
  - Multi-Stage Generating Resource
  - Combined Heat and Power Resource

Tariff stakeholder process objectives

- This tariff development process is a stakeholder process that provides an open and transparent discussion with comments considered
- The ISO determined proposed tariff clarifications are needed to clarify the calculation and categories behind the Effective Flexible Capacity (EFC) calculations.
  - Due to potential impacts on stakeholders the ISO has set up a Tariff Development Meeting as well as an opportunity for stakeholders to comment.
- Current EFC Policy was developed through the FRACMOO Policy Initiative.
  - This tariff development does not establish new policy but rather better aligns the implementation of the tariff with the policy.

Tariff Section: 40.10.4

EFFECTIVE FLEXIBLE CAPACITY CALCULATION

General Formulas Used for EFC Value

For further details see section 40.10.4.1 of the Tariff.

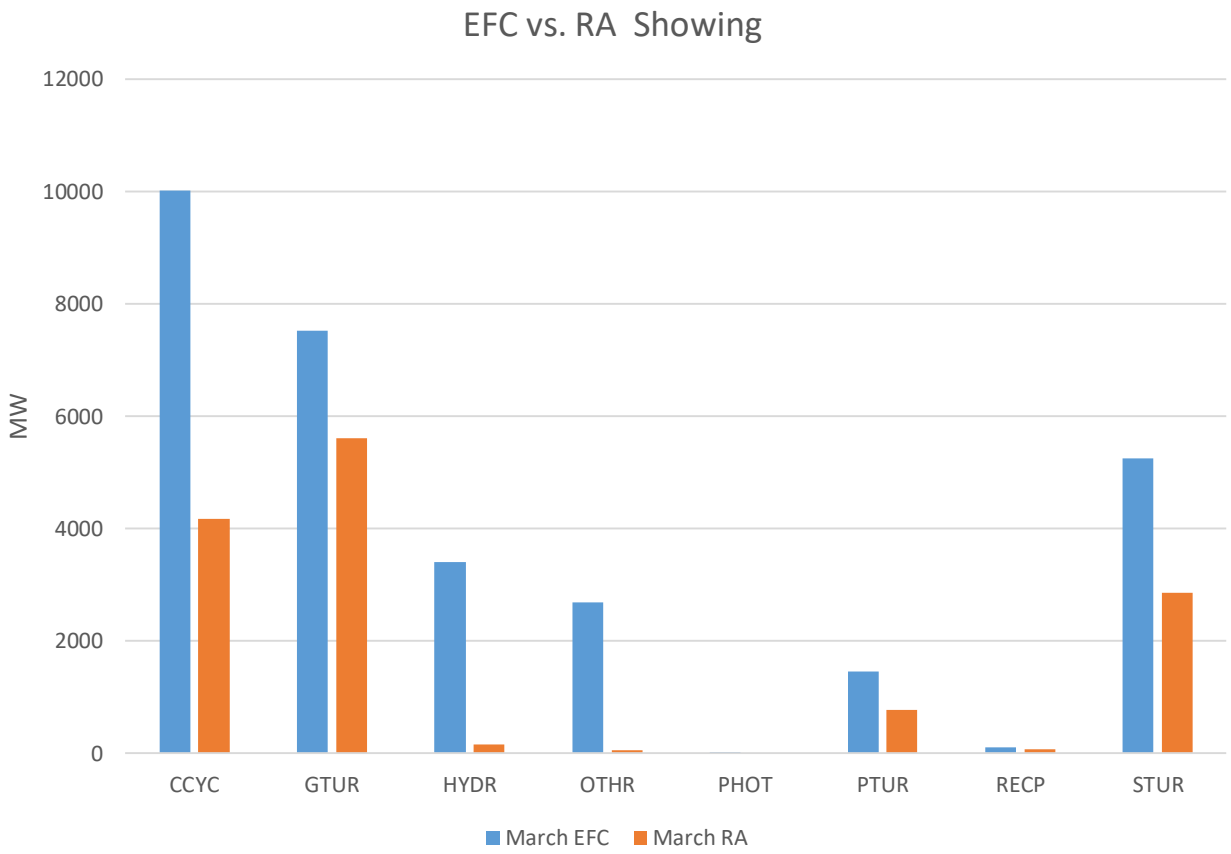
- if startup_time > **90** then
  efc = min(nqc - pmin, **180***weighted_ramp_rate);

- if startup_time_seg <= **90** then
  efc = min(nqc,
  pmin+(**180**-startup_time)*weighted_ramp_rate);

Proposed Tariff Clarifications for General Formula

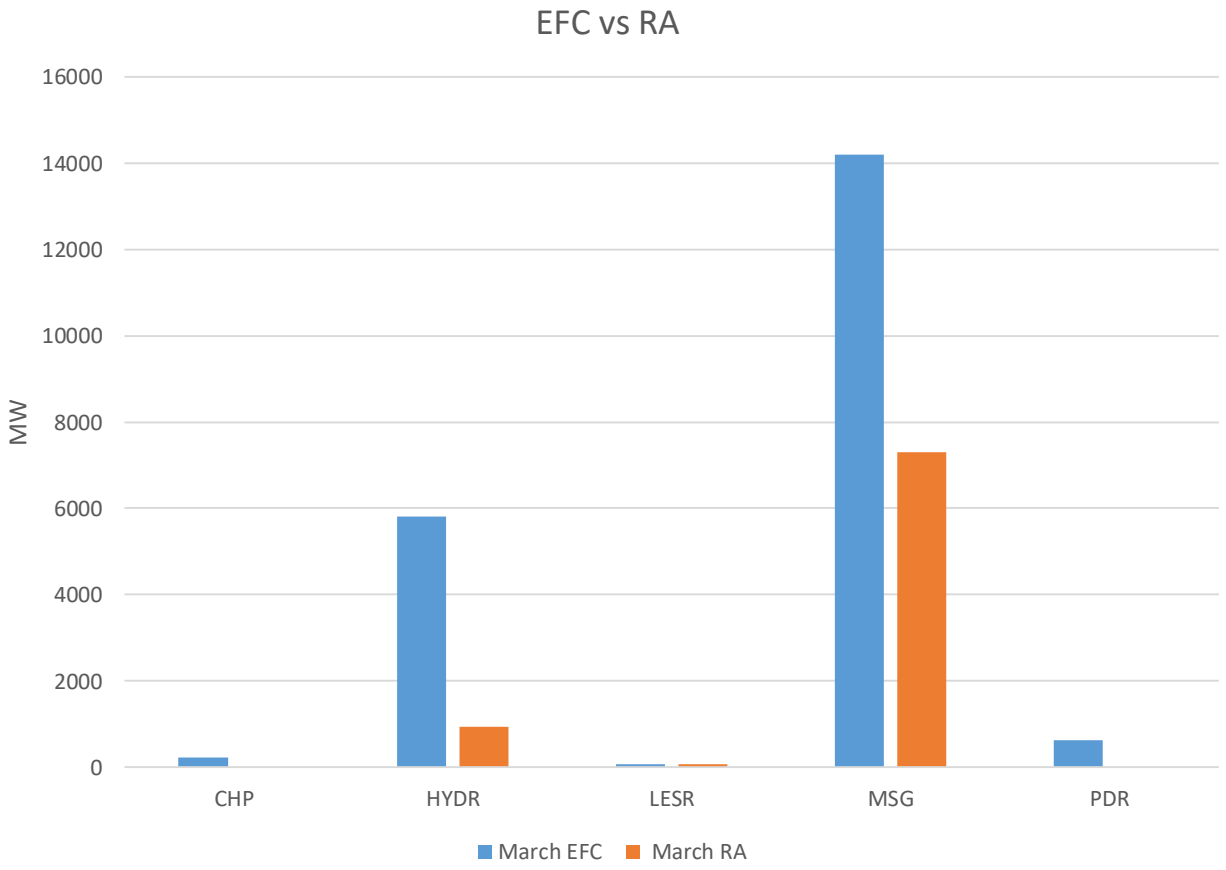
If the Start-Up Time of the resource is less than or equal to 90 minutes, the Effective Flexible Capacity value shall be the resource's PMin plus the weighted average ramp rate of the resource calculated from PMin to Net Qualifying Capacity multiplied by the difference between 180 minutes and the resource's Start-Up Time. ~~weighted average ramp rate of the resource calculated from zero to Net Qualifying Capacity multiplied by 180 minutes.~~ The Effective Flexible Capacity shall not exceed the Net Qualifying Capacity of the resource.

Comparison of EFC to 2019 Flex RA Showing by Generation Type



CCYC - Combined Cycle
GTUR - Gas Turbine
HYDR - Hydro Turbine
OTHR - Other
PHOT - Photovoltaic
PTUR - Hydro Pump-Turbine
RECP - Reciprocating Engine
STUR - Steam Turbine

Comparison of EFC to 2019 Flex RA Showing by Exemption Generation Type



CHP – Combined Heat and Power
HYDR – Hydro Turbine
LESR – Battery Storage
MSG – Multi-Stage Generator
PDR – Proxy Demand Resource

BATTERY EFC

Newly Proposed Formula for Battery Calculation

- Currently:
  - Using general formula shown in slide 6
- New Formula
  - Non-Regulation Energy Management (REM) Batteries:

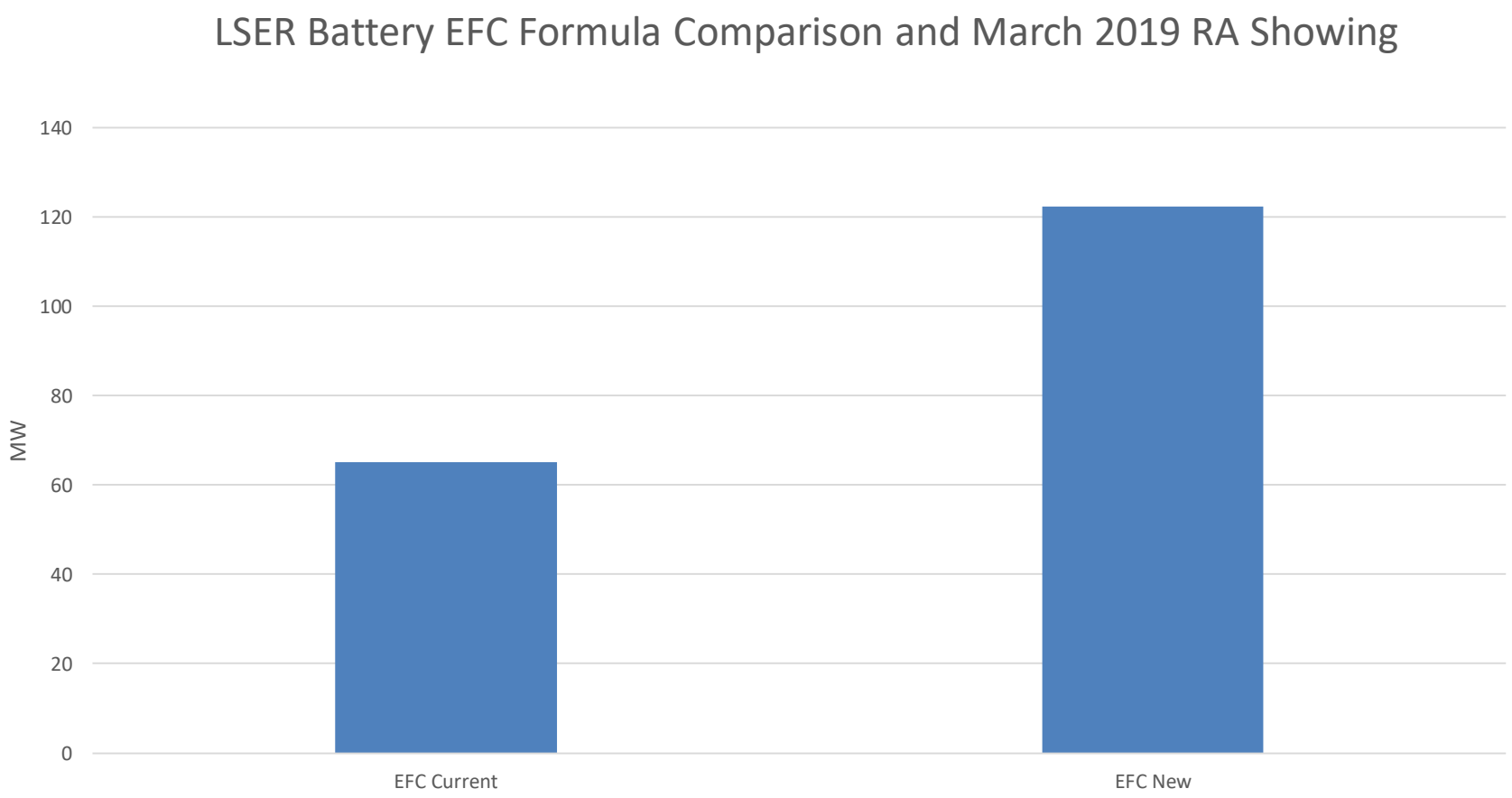
EFC is equal to: $\eta * (-P_{min}) + NQC$

where η is charging efficiency

  - REM Batteries:

EFC is equal to: NQC

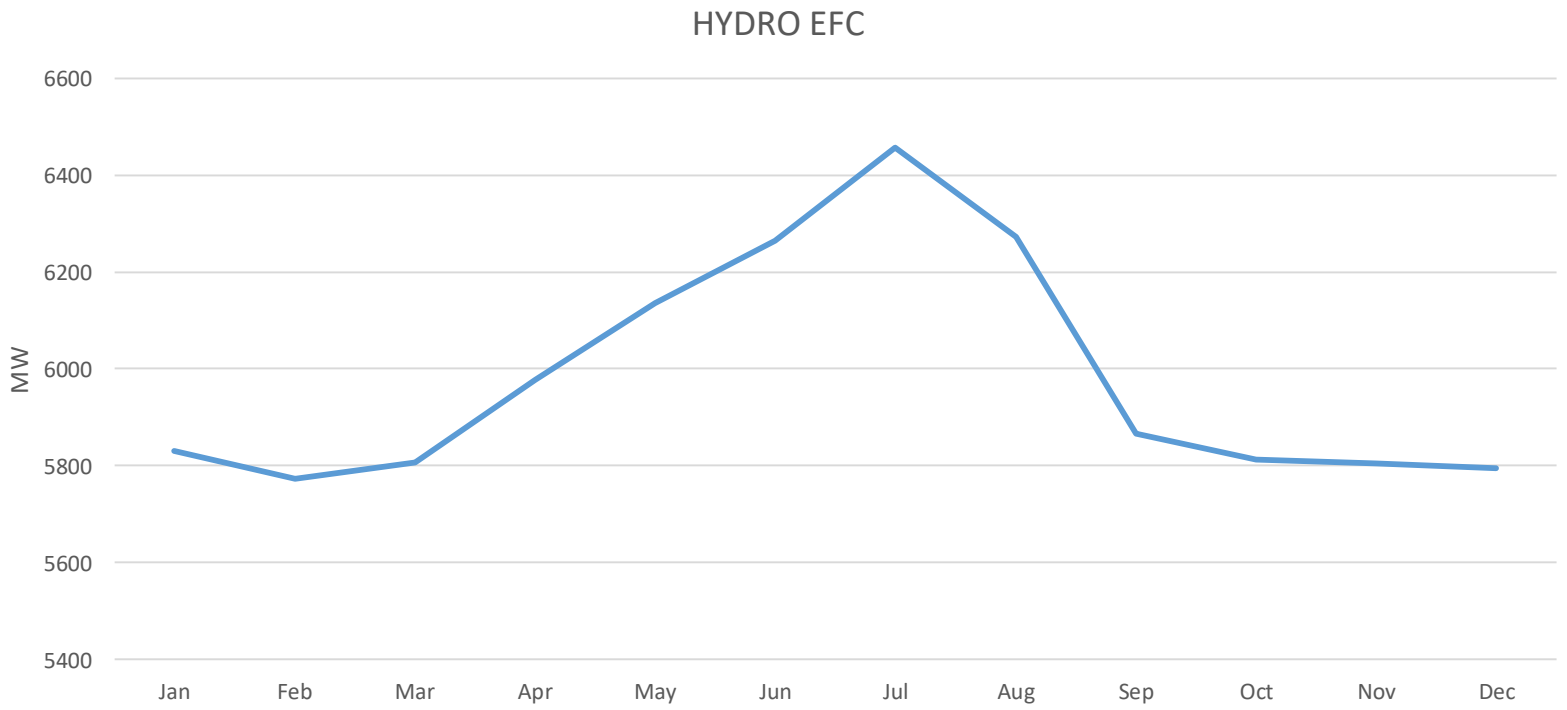
Total EFC allocated to Battery Resources



DISPATCHABLE HYDRO EFC

Dispatchable Hydro Resources

- Section 40.10.4.1(b) establishes Hydro EFC as:
  - *"the amount of capacity from which the resource can produce Energy consistently for 6 hours based upon the resource's physical storage capacity, which shall not exceed its Net Qualifying Capacity."*
- CAISO proposes to make the six hours of consistent production a threshold requirement for hydro to provide flexible capacity.
- EFC will be calculated using the general formula.



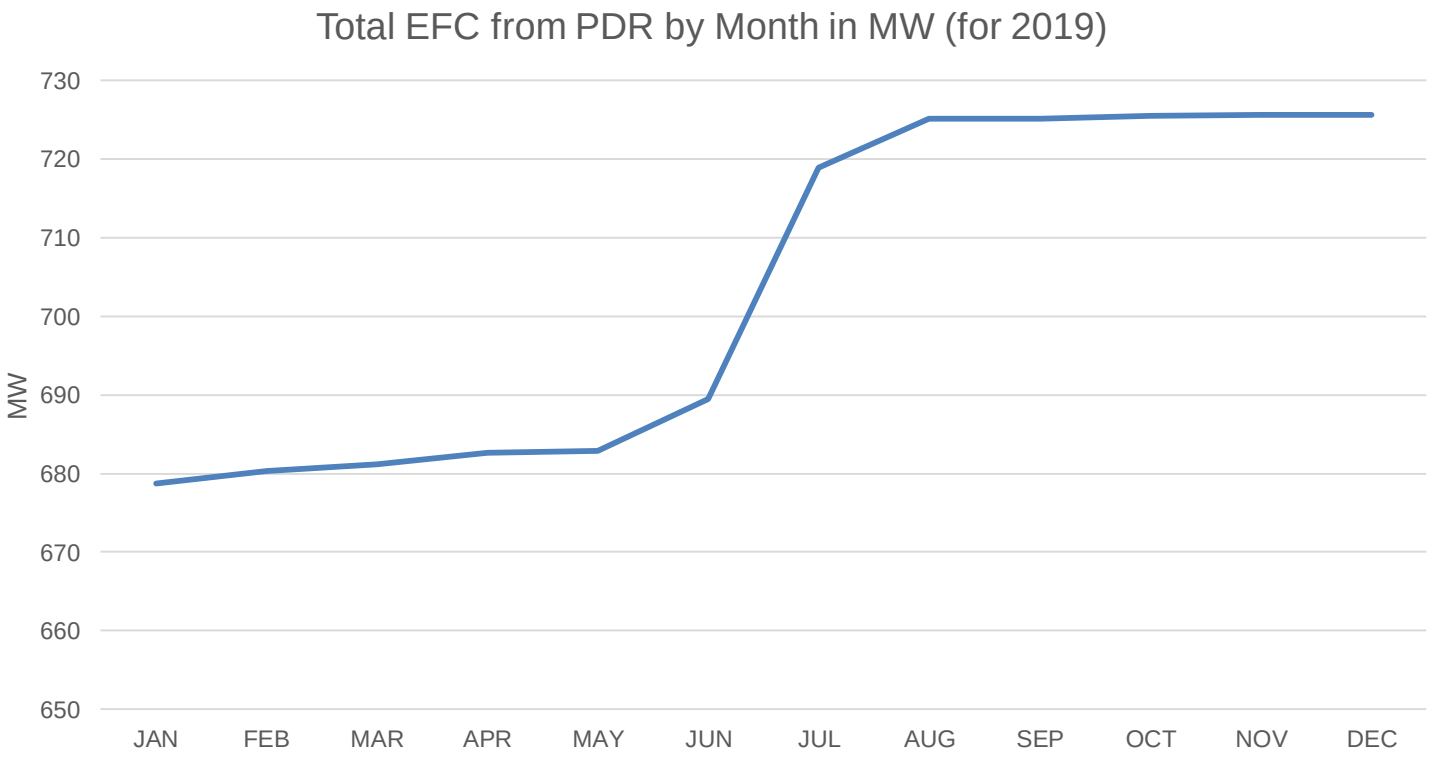
PROXY DEMAND RESPONSE (PDR) RESOURCES

Petition for Limited Tariff Waiver: Tariff Section 40.10.4.1 with Respect to PDRs

- ISO filed waiver on April 26 in Docket No. ER19-1690.
- ISO has been setting PDR EFC using general formulas.
- Section 40.10.4.1(c) requires PDR EFC to be set based on performance during random ISO test.
- If granted, waiver would let ISO maintain status quo up to the duration of 2019 while it develops test processes.
- Otherwise, ISO could not calculate new EFC pending test process development and implementation.

Proxy Demand Response (PDR) Resources

PDR resources are currently using the general formula equation for allocation of their EFC values.



Development of PDR Testing Procedure

- The CAISO is currently developing testing procedures to implement a performance test on the PDR resources and use that data to determine their EFC.
- More information on the testing procedure will be presented to the stakeholders following completion internally.

COMBINED HEAT AND POWER (CHP) RESOURCES

Combined Heat and Power Resources (CHP)

- Currently:
  - Using general formula shown in slide 6, with addition of:

    Pmin: RTMG_MW

  - New Formula
  - Using general formula shown in slide 6, with addition of:

    Pmin: max(Pmin, RTMG_MW)

MULTI-STAGE GENERATING (MSG) RESOURCES

Multi-Stage Generating (MSG) Resources

- The ISO is currently using the general formula shown on Slide 6.
  - No changes expected to MSG EFC Value Calculation.

Tariff Section: 40.10.3; BPM Section: 10.3.1

FLEXIBLE CAPACITY CATEGORIES

Flexible capacity categories allow a wide variety of resources to provide flexible capacity

- Category 1 (Base Ramping Resources):
  - 40.10.3.2
- Category 2 (Peak Ramping Resources):
  - 40.10.3.3
- Category 3 (Super-Peak Ramping Resources):
  - 40.10.3.4

Tariff Section 40.10.3 & BPM Section 10.3.1 – Flexible Capacity Categories

- http://www.caiso.com/Documents/Section40-ResourceAdequacyDemonstration-SCs-CAISOBAA-asof-Nov30-2018.pdf

Flexible Capacity Resource Category Qualification Process

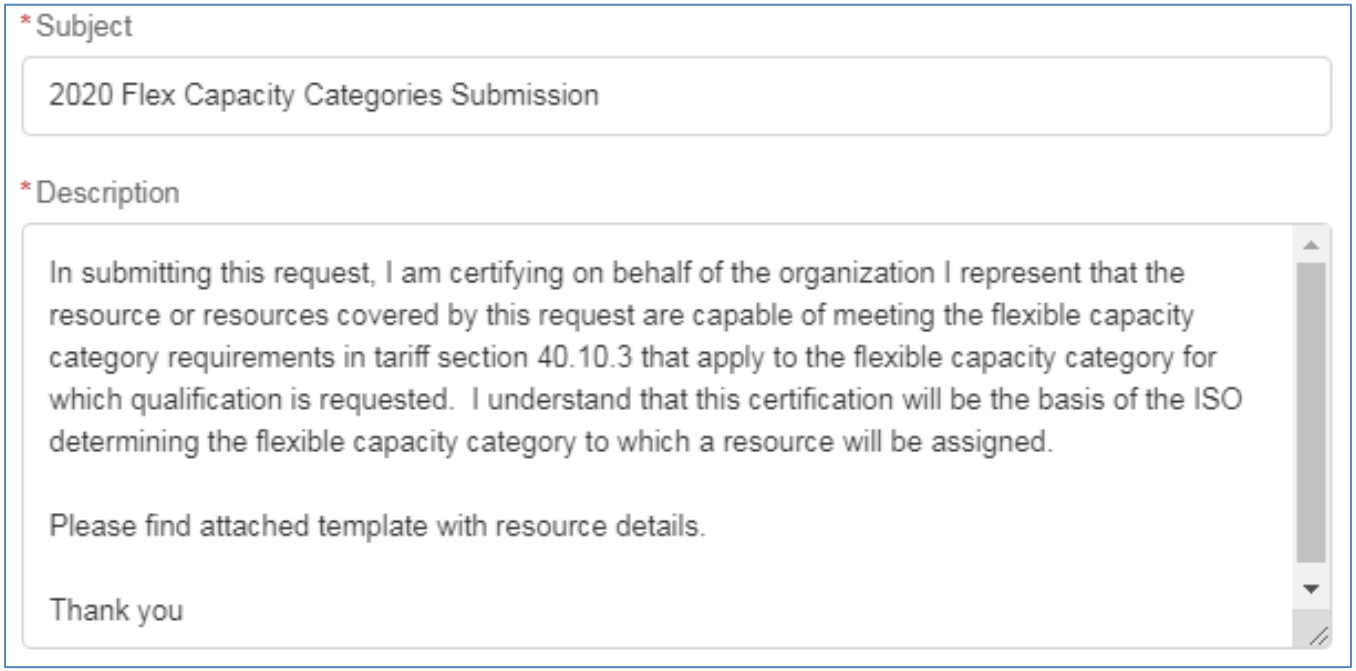
- For the 2020 Annual EFC Category updates the ISO will require all resources wanting an EFC Value to follow the below process in qualifying for the Flexible Capacity Resource Categories.

CIDI Ticket Submittal Example

- Subject Field: "2020 Flex Capacity Categories Submission"
- Description Field: "In submitting this request, I am certifying on behalf of the organization I represent that the resource or resources covered by this request are capable of meeting the flexible capacity category requirements in tariff section 40.10.3 that apply to the flexible capacity category for which qualification is requested. I understand that this certification will be the basis of the ISO determining the flexible capacity category to which a resource will be assigned."
- Spreadsheet Attachment: For each submittal ensure that you submit the CIDI ticket above along with the following titled spreadsheet "EFC_Category_Attestation". This spreadsheet template will be located at the following location on the CAISO website.
  - http://www.caiso.com/planning/Pages/ReliabilityRequirements/Default.aspx

Resource Deadline

- CIDI Ticket Submittals must be completed by **End of Day Monday June 3rd, 2019**. Tickets must be completed with the appropriate text in Subject and Description fields.



NEXT STEPS AND TIMELINES

Key Stakeholder Timelines:

Figure 4: Illustration of the interplay between the annual NQC & EFC processes.

May 9th Stakeholder Presentation Posts

May 14th Public Stakeholder Presentation

May 28th Stakeholder Comments due for Tariff Clarifications and EFC Calculation Updates

June 3rd Flexible Category Resource CIDI Tickets Due

Mid-August: Draft EFC Numbers Posted

End of September: Final EFC Numbers Posted

Next Steps

- Submit written comments over the EFC calculation methodologies to initiativecomments@caiso.com by COB May 28

- Comments template posted under today's meeting at: http://www.caiso.com/informed/Pages/MeetingsEvents/MiscellaneousStakeholderMeetings/Default.aspx