



## Energy Storage System Guidance Configuration Selection Tool

A Joint Industry – Xcel Energy Workshop created a set of Electric Storage System (ESS) Distribution Interconnection Guidance<sup>1</sup> documents and functional one line diagrams that were filed with the Colorado Public Utility Commission (CPUC) in January 2017. The primary purpose of the guidance was to illustrate the configurations that could meet the *tariff* requirements. The tariff compliance requirements for renewable generation, net metering<sup>2</sup>, and non-export are specific and restrictive. The safety and reliability interconnection review aspects, such as is done for photovoltaics (PV) is straight forward.

The interconnection application configuration designation must match the tariff functionality being requested, not what diagram looks most like the proposed diagram. Each configuration is making a specific operational, tariff, and metering review request. Requesting a configuration that does not match the applicant’s desired functionality and equipment can significantly delay the interconnection review.

The attached flow chart steps the user through the pertinent questions for the applicant’s design and will lead to a unique configuration designation. The questions that must be answered to select a configuration designation are:

- Does the ESS operate in parallel with the utility or is it stand alone; i.e. NEC 702 compliant?
- Is the generation energy source fossil fueled?
- Does the ESS connect on the AC or DC side of the PV inverter<sup>3</sup>?
- If AC, is the ESS charged from only a renewable<sup>4</sup> source<sup>5</sup>?
  - If renewable, the battery may discharge to the grid.
  - If non-renewable, do controls prevent battery discharge to the grid?
- If DC, is the ESS charged from only a renewable source?
  - If renewable, the battery may discharge to the grid.
  - If non-renewable, do controls prevent battery discharge to the grid?
  - Is a protected load panel (PLP) installed on a DC side design?

Failure to provide the information specified in the Declaration and Guidelines is a major source of delay. In brief:

Applicant is to provide a narrative supported by specific manufacturer documentation references (not full copies of instruction or installation manuals) that fully illustrate how the system complies with the proposed ESS configuration and that includes the scheme which physically or via software passwords locks down the configurations and restricted access for make changes to the manufacturer, developer, or installer.

---

<sup>1</sup> [https://www.xcelenergy.com/working\\_with\\_us/how\\_to\\_interconnect#tab-7bd9d0dde68f7510VgnVCM1000008d8298aa\\_\\_\\_-3](https://www.xcelenergy.com/working_with_us/how_to_interconnect#tab-7bd9d0dde68f7510VgnVCM1000008d8298aa___-3), “How to Interconnect” for Colorado Service Area

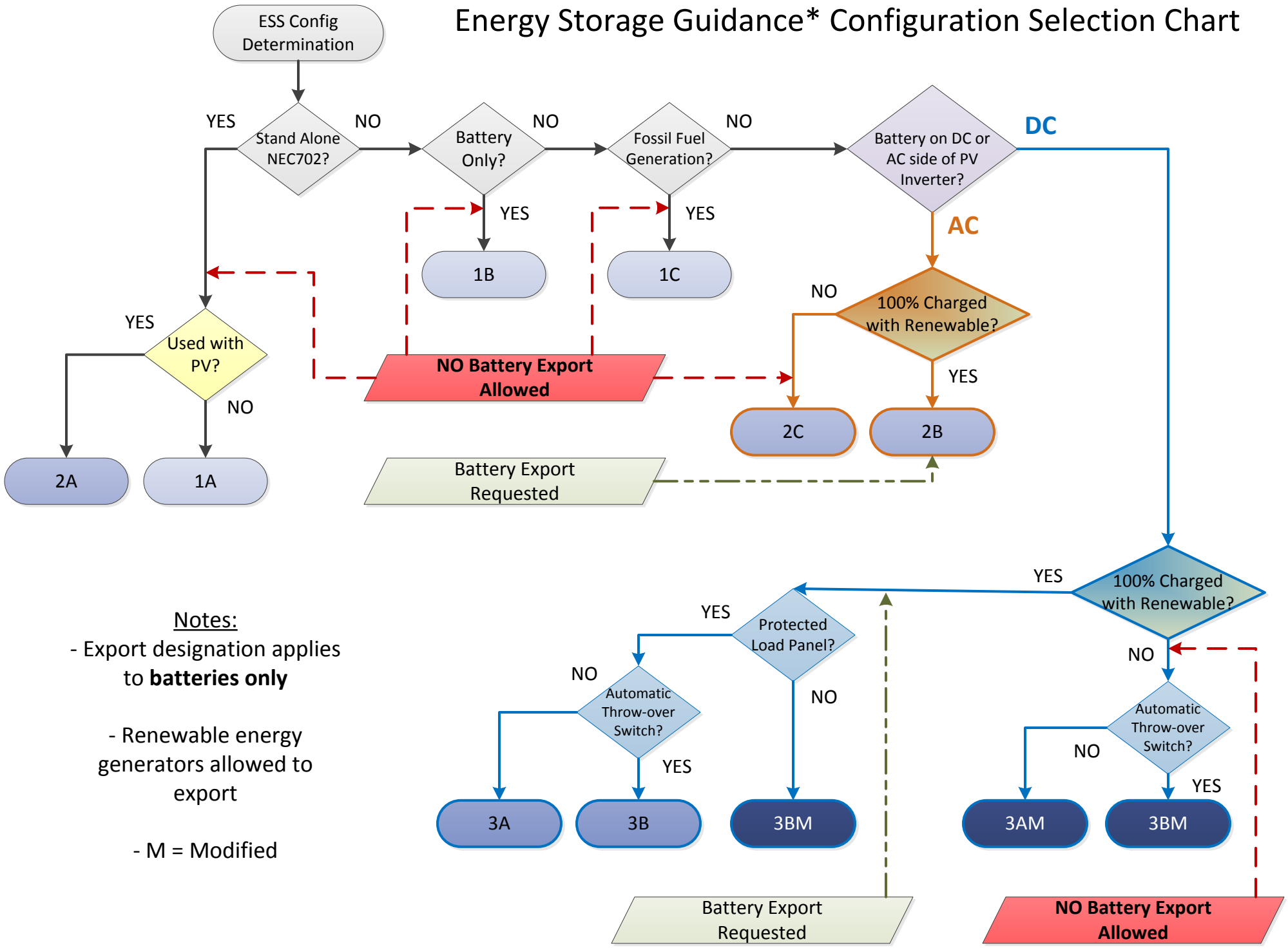
<sup>2</sup> The tariff requirements are determined by the Legislature and the CPUC and the utility tariffs implement those requirements. The utility cannot change the requirements.

<sup>3</sup> The inverter may be a hybrid that does both PV and ESS service.

<sup>4</sup> Eligible renewable sources are defined in the CPUC rules, 4 CCR 723-3, 3652.(aa).

<sup>5</sup> ESS is neither renewable nor non-renewable. It is designated renewable only if the source of the energy by which it is charged is totally renewable.

# Energy Storage Guidance\* Configuration Selection Chart



**Notes:**

- Export designation applies to **batteries only**
- Renewable energy generators allowed to export
- M = Modified

\*Energy Storage System Guidance Documents Available on XcelEnergy.com, "How to Interconnect"