

State of California

## Memorandum



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Subject: Non-standard Disposition for VFD on Agricultural Pump Measure Package, SWWP002-02

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### 1. Discussion and Direction

The California Public Utilities Commission (CPUC) approves the measure package for VFD on Agricultural Pump, SWWP002-02 for use during the 2022 and 2023 program years and sets an expiry date for this measure package of December 31, 2023. This measure package requires revisions with resubmission by June 1, 2022, to facilitate the measure package review and approval cycle for 2024-2025 implementation. Future updates must include: ISP research, possible combination of this measure with SWWP005, and measure package updates based on the most recent data for operating profiles.

### 2. Measure Package Summary

Pacific Gas & Electric (PG&E) submitted this new measure package on December 21, 2020. The review team posted preliminary review comments to the CPUC's Measure Project Archive (WPA) on February and June of 2021. The measure package was resubmitted on August 12, 2021.

Variable frequency drives (VFDs) are sometimes installed on irrigation pumps to enable adjustment of the pump speed and flow. Adding a VFD system to an over-designed pump will provide sufficient capacity in worst-case conditions as well as the capability of reducing the pump speed most of the time to avoid developing excess pressure and consuming excess electricity.

PG&E has incentivized "Tier 1 basic VFD systems" and those rebates do not have any minimum performance standards requirement.

### **3. Critical Review Issues**

Updated information and analysis are required by June 2022 to support the Ex Ante savings values in the statewide measure package. The critical issues are:

- Pump operating profiles and participating farm metrics
- Industry standard practice baseline of farm irrigation pumps

#### **3.1. Pump Operating Profiles and Participating Farm Metrics**

The basis for pump operating profiles and participating farm metrics that supports this workpaper are calculations based on a sample of custom and new construction projects and the use of secondary sources. It is unclear if these sources do an adequate job of representing current and future participants in this deemed measure offering. Calculations and assumptions need to be substantiated (verified and documented) to reflect true participant operating hours, pump load profiles, crop types and acreage served per pump motor horsepower. Recent evaluation results suggest that improvement is needed.

Improved accuracy will require the use of participant primary data sources and pump performance models. CPUC reviewers believe that future workpaper updates can benefit from results and methods used to derived gross impacts under the Small/Medium Commercial evaluations for PY2018 and PY2019, and the upcoming PY2020 evaluation, with a final report and results due April 1, 2022. Roughly 40-50 pumps were modeled in each years' evaluation. These results can be mined for use in measure package updates.

Furthermore, the evaluation gross impact modeling approach makes use of models that are calibrated using AMI data. AMI data, often dedicated to a particular pump/utility account, ensures that the resulting models accurately account for actual pump runtime and the pump load distribution across pump speeds. This produces highly accurate results/models. It might be possible for the PAs to build upon the evaluation dataset using a similar modeling approach.

The evaluation also presents various sample point metrics that might be mined for use in developing ex ante savings values for the workpapers – such as annual pump run hours, peak coincidence factors, crop type, acres served, etc.

#### **3.2. Industry Standard Practice Baseline of Farm irrigation pumps**

There is considerable uncertainty regarding the conditions and situations under which VFDs are commonly installed and the market drivers that might trigger those installations. Data must demonstrate how frequently VFDs are installed at the time of pump replacement vs. new pump installation vs. VFD add-on to an existing pump. VFDs provide a host of non-energy benefits that can lead to adoption, even absent program influence: telemetry, soft-start, maintaining constant pressure in the manifold and distribution lines, and reduced pump maintenance and extended life. The program-defined baseline where flow control is attained using a throttle valve does not

necessarily reflect standard purchasing practices which may include VFDs under certain circumstances. An ISP update study is needed to ensure that future workpaper updates include a fully vetted understanding of baseline market practices.

#### **4. Direction**

Based on the critical review items, PG&E is directed to conduct the indicated research, revise the measure package, and resubmit for PY2024-2025 implementation. In order to ensure timely completion of the measure package, PG&E shall formulate and submit a revised measure package by June 1, 2022, once PY2020 evaluation results are available on April 1, 2022.

In addition to this direction, CPUC staff believe that PG&E should consider sunsetting this measure package given the overlap in offerings with SWWP005-02 – the enhanced agricultural pump VFD measure. The enhanced measure offering is designed to address power quality and radio interference issues associated with this basic tier 1 VFD class of measures. If there are reasons to retain both measure packages then PG&E should discuss that with CPUC staff.

##### **4.1 Mine Evaluation Results and Models to Best Inform Ex Ante Estimates**

PG&E is directed to mine PY2018, PY2019 and PY2020 evaluation results and models to best inform ex ante saving estimates. In particular, the sample of calibrated models can inform pump operating profiles and pump load profiles. Furthermore, the models might inform differences in pump operations as a function of segment – for example crop type and acres served per horsepower.

##### **4.2 Conduct ISP research**

PG&E is directed to initiate and complete a study to determine industry standard practice (ISP) for agricultural irrigation pumps. This will be an update to an ISP study completed by PG&E several years ago. Importantly, ISP study updates should differentiate base case by pump size and pump type (booster vs. well) and market event (i.e., VFD add-on to an existing pump, pump replacement and new pump). PG&E shall offer CPUC reviewers an opportunity to review interim work products including the study scope of work, sample plan, survey instruments, and other pertinent details on proposed research activities.