Short Form Work Paper WPSDGENRPR0004

**Revision 1**

**San Diego Gas & Electric**

**Energy Efficiency Engineering**

**Process Fan VSD**

**October 3, 2017**

# SDG&E Process Fan VSD

## Introduction

This short form workpaper documents the ex-ante load impact and cost-effectiveness values used for Process Fan Variable Speed Drive (VSD). All of the units have been normalized per horsepower as cited by “SCE17PR008 Rev 1 Process Fan VSD” workpaper.

## Document Revision History

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| --- | --- | --- | --- |
| **Rev** | **Date** | **Author** | **Summary of Changes** |
| 0 | 02/06/2017 | Eduardo Reynoso /SDG&E | * Adopted lead IOU workpaper “SCE17PR008.0 Process Fan VFD\_Final.docx” with all its assumptions and values. * Added the following agricultural building types   + Other Agricultural “AgOth”   + Livestock Farms “ALF”   + Agricultural Produce Farms “APF”   + Greenhouse “GHs”   + Vineyards and Processing “VPr” |
| 1 | 10/3/2017 | Eduardo Reynoso and Joshua Williams / SDG&E | Updated workpaper to align with CPUC commission staff phase 1 workpaper review by:   * Adopting lead IOU workpaper “SCE17PR008.1 Process Fan VFD\_Final.docx” with all its assumptions and values. * SDG&E is adopting measures SCE PR-19148 & SCE PR-19147 and created a new product code 463998 for “Greater than 3 HP to 5 HP Variable Speed Drive on Process Fan Controls”. |

## Measure Summary

Table 1: Measure Summary Table

| **Section** | **Value** |
| --- | --- |
| **Summary & Purpose** | This short form workpaper documents ex-ante load impacts and cost-effectiveness values for Process Fan VSD for non-HVAC fans. The energy savings and load impacts are based on the lead IOU workpaper “SCE17PR008 Rev1 – Process Fan VFD” associated SCE measure codes “PR-19147 & PR-19148” (Greater than or equal to 3 HP to 75 HP Variable Speed Drive on Process Fan Control). SDG&E takes no exceptions to SCE Process Fan VSD workpaper. |
| **1.1 Measure & Baseline Data** | Measure 1: Variable speed drive (VSD) on an existing process fan.  Baseline 1: Process fan with rated motor capacity > 5 hp and ≤ 75 hp.  Measure 2: Variable speed drive (VSD) on an existing process fan.  Baseline 2: Process fan with rated motor capacity ≥ 3 hp and ≤ 5 hp |
| **1.2 Technical Description** | Per cited per SCE17PR008.1 workpaper |
| Measures | |  |  |  | | --- | --- | --- | | Measure Code | | Measure Name | | SCE | SDG&E | | PR-19148 | 463775 | Greater than 5 HP to 75 HP Variable Speed Drive on Process Fan Control | | PR-19147 | 463998 | 3 HP to 5 HP Variable Speed Drive on Process Fan Control | |  | | | |
| Code for All Measures | As cited per “SCE17PR008.1 Process Fan VSD” lead IOU workpaper with no exceptions and summarized below:   * Title 24 (2016), Section 120.6 [496] provides mandatory requirements for covered processes. * 120.6(e) provides requirements for air compressor systems, but air compressor systems are not covered in this work paper. |
| Requirements | As cited per SCE17PR008.1 Process Fan VSD workpaper:  The existing fan shall meet the following requirements:   * Must not be a HVAC or refrigeration fan. * May be used for exhaust, ventilation, pressurization, or other process applications. Air compressor systems are not eligible. * Must have a motor horsepower rating ≥ 3 hp and ≤ 75 hp because savings for motors below 3 hp are minimal and do not justify the cost of a VSD retrofit. * Must operate continuously or be manually operated with an ON/OFF control switch. Two-speed fans do not qualify.   This measure is applicable only to the following building types:   * Manufacturing - Bio/Tech * Manufacturing - Light Industrial * Agricultural Building types (AgOth, ALF, APF, GHs, and VPr) |
| **1.3 Installation Type and Delivery Mechanisms** |  |
| Installation Type | * Retrofit Add-on (REA)   Full EUL granted to this REA measure since the motor may be replaced but the VSD controller and electrical termination remain. |
| Delivery Mechanisms | * Downstream Rebate – Deemed Rebate * Direct Install |
| **1.4.1 DEER Data** | As cited per “SCE17PR008.1 Process Fan VSD” lead IOU workpaper |
| Net-to-Gross Ratio | All-Default<=2yrs  All other EEMs with no evaluated NTGR: new technology in program for 2 or fewer years |
| GSIA | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | GSIA | Description | Sector | BldgType | ProgDelivID | GSIAValue | | Def-GSIA | Default GSIA | Any | Any | Any | 1 | |
| Effective and Remaining Useful Life | |  |  |  |  | | --- | --- | --- | --- | | EUL ID | Description | Sector | UseCategory | | ProcDist-Motor\_Spd | Variable Speed Drive on Process Fan Control | Com | Process | |
| **Section 2. Calculation Methodology** |  |
| Energy Savings/Peak Demand Reduction – All Measures | All Energy Impacts per “SCE17PR008 Rev1 Process Fan VSD” workpaper.  Annual Energy Savings and Demand Reduction Values   |  |  |  |  | | --- | --- | --- | --- | | Solution Code | | Annual Energy Savings (KWh/HP/Yr) | DEER Peak Demand (KW/HP) | | SCE | SDGE | | PR-19148 | 463775 | 597.83 | 0.34478 | | PR-19147 | 463998 | 672.90 | 0.38795 | |
| **Section 3. Load Shapes** | SDG:35-OTI-OtherIndustrial-PROC\_OTH |
| **Section 4. Costs** | All cost adopted and cited from “SCE17PR008 Rev1 –Process Fan VSD” SCE workpaper. |
| **Section 4.1 Modeled Costs** | All costs have been normalized per “SCE17PR008.1 Process Fan VSD” workpaper to reflect “$/HP” |
| Base Cost – Measure1 | $0.00  For this measure category, the base case cost is assumed to be zero given that the alternative is to make no changes to their existing system. |
| Measure Cost – Measure 1 | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Product Code | | Labor Cost ($/HP) | Material Cost ($/HP) | Measure Cost ($/HP) | | SCE | SDG&E | | PR-19148 | 463775 | 38.29 | 184.71 | 223.00 | | PR-19147 | 463998 | 136.25 | 453.13 | 589.38 | |