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Pool Pump Motors

CEC Staff Workshop

Developed by Energy Solutions
on behalf of the California IOUs

July 13th, 2016

PG&E

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IOU Involvement in Pool Energy Efficiency

2001- PG&E voluntary program for time clocks and 2-speed motors

2004- IOUs propose CASE study for residential filtration pool pumps motors

2006- Prescriptive pool pump motor requirements banning split-phase or capacitor start - induction run type.

2008- Two-Speed, Multi-Speed, Variable-Speed requirement for residential filtration pump motors over 1 THP

2010- Title 24 Pool efficiency requirements take effect

2012- Current CEC rulemaking begins

2013- Energy Star certification for pumps Energy Factor >3.8

2015/2016- Participated in DOE Working Group

Current Title 20 Pool Pump Motor Standards

Motor Efficiency

Pool pump motors manufactured on or after January 1, 2006 may not be split-phase or capacitor start - induction run type.

Two-, Multi-, or Variable-Speed Capability.

1. **Residential Pool Pump Motors.** Residential pool pump motors with a pool pump motor capacity of 1 HP or greater which are manufactured on or after January 1, 2010, shall have the capability of operating at two or more speeds with a low speed having a rotation rate that is no more than one-half of the motor's maximum rotation rate. The pump motor must be operated with a pump control that shall have the capability of operating the pump at least at two speeds.

2. **Pump Controls.** Pool pump motor controls manufactured on or after January 1, 2008 that are sold for use with a two- or more speed pump shall have the capability of operating the pool pump at least at two speeds. The control's default circulation speed setting shall be no more than one-half of the motor's maximum rotation rate. Any high speed override capability shall be for a temporary period not to exceed one 24-hour cycle without resetting to default settings.

IOU Involvement in Current Rulemaking

July, 29th 2013- Submitted Codes and Standards Enhancement (CASE) Report on Pool Pump Motors

Jan, 15th 2014- CEC holds workshop, seeks input

March 3rd, 2014- CEC issues formal data request

May 23rd, 2014- IOUs docket response to data request

July/ August, 2014- IOUs engaged with APSP-15 Committee

Sept 30th, 2014- IOUs docket revised data request response

Oct 9th, 2014- IOUs convened Industry Roundtable w/ CEC

February 18th, 2016- Staff Workshop

IOUs support CEC Staff Proposal

IOUs support the CEC staff proposal and believe the proposed standards are cost-effective, achievable and will lead to significant savings statewide. (~1,200 GWh)

The CEC Staff proposal makes three important changes to the current Title 20 standards including:

1. Clarification and simplification to the test procedure and reporting requirements
2. Extending the motor design and motor efficiency standards to cover all pool pump motors under 5 THP
3. Shifting from a prescriptive standard to performance standard for motor efficiency

Test Procedure and Reporting Changes

Current IEEE-114 test procedure is not ideal for testing motors at multiple speeds

IOUs worked with APSP-15 committee and manufacturers to identify an appropriate test procedure and testing points

CEC adopted proposal to switch to CSA C747-09

New test procedure & reporting requirements will add clarity to manufacturers and strengthen CEC database

CA IOU Proposed Standards Applicability Overview				
Motor Design/ Speed	Full Speed 3450 RPM*	3/4 Speed 2600 RPM*	1/2 Speed 1725 RPM*	1/4 Speed 900 RPM*
Single Speed				
Dual Speed				
Variable Speed				
Multi-Speed**				
* Tolerance of +/- 50 RPMs ** If no preset speeds exist within range then test to nearest preset speed.				
	Test/ List Only			
	Test/ List & Minimum Efficiency Requirement			
	No Test/ List or Minimum Efficiency Requirement			

Expanding Coverage to All Pool Pump Motors

Current Title 20 language only applies to “residential filtration” applications

This has created a significant challenges with compliance as well as confusion among installers, retailers, etc.

This CEC proposal will:

- Extend the motor efficiency standards to cover all pool pump motors under 5 THP (except waterfall pump motors)
- Expand the dual, multi, variable speed requirement >1THP to all pool pump motors under 5 THP

This change will greatly improve compliance with existing standard and expand savings into new applications.

Booster Pump

Water Features

Replacement Motors

Residential Filtration

Aboveground Pool

Small Commercial

Prescriptive to Performance Standards

Shifting to a performance standard will allow all motor types to compete

The IOUs support CEC proposal treats dual, multi and variable speed motors the same as we believe there is no difference in utility to the customer

Table 6-3: Proposed Standards for Pool Pump Motors

Proposed Minimum Efficiency According to Modified CSA C747-09 Test Procedure		
Motor Design	**Full-Speed (3450 RPM)**	**Half-Speed (1725 RPM)**
Single-Speed (0 total hp up to 0.49 total hp)	70%	N/A
Single-Speed (0.50 total hp up to 0.99 total hp)	75%	N/A
Variable-/Multiple-/Dual-Speed (1 to 5 total hp)	80%	65%

Source: California Energy Commission

January 1st, 2019 Effective Date

The IOUs support the CEC's proposed standards and the proposed effective date of January 1st, 2019.

Each year of delay costs CA pool owners ~$34 million dollars in electricity costs.

Table 7-5: Motor Efficiency and Integral Filter Timer Statewide Annual Savings

Product	First-Year Savings		Annual Existing and Incremental Stock Savings	
	Electricity Savings (GWh/yr)	Savings ($M)	Electricity Savings (GWh/yr)	Savings ($M)
Motor Efficiency Total Savings	164.0	$26.2	1081	$173
Integral Filter Timer Savings	**49.0**	**$7.8**	**196**	**$31.3**
Total Savings	**213.0**	**$34.1**	**1277**	**$204.3**

Source: Staff calculation

Suggestions for Improvement

The IOUs broadly support the staff proposal, but will make recommendations:

- Remove the hydraulic testing and characterization of waterfall pumps and booster pumps as we believe this is unnecessary and creates manufacturer burden.
- Propose to treat waterfall pump motors no differently than other pool pump motors
- Ensure integral product timer doesn’t become a loop hole for non-integral products
- Strengthen language to ensure on-board controllers are sold with all pool pump motors over 1 THP
- Align CEC/ DOE terms and definitions as much as possible