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Project Title:	Pool Pumps and Spa Labeling
TN #:	225968
Document Title:	Presentation - Replacement Pool Pump Motors
Description:	Staff Proposal Workshop Slides by Sean Steffensen, November 28, 2018
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Docketed Date:	11/27/2018

CALIFORNIA ENERGY COMMISSION

Replacement Pool Pump Motors

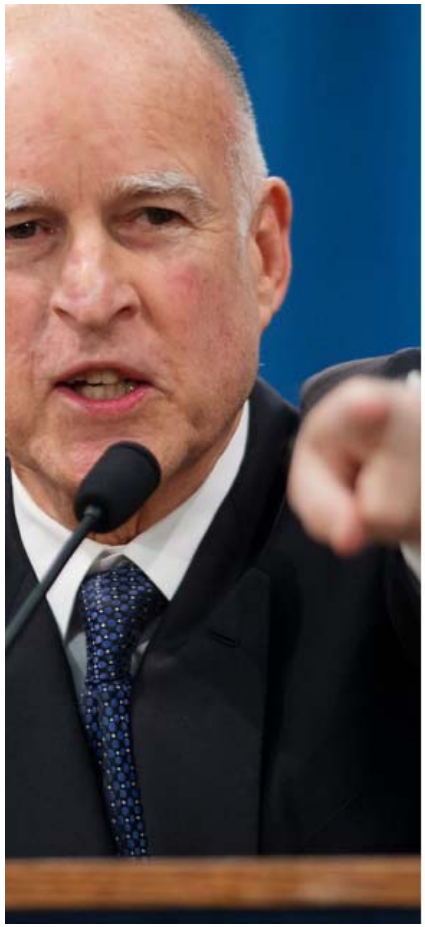
Sean Steffensen
Appliances Office
Efficiency Division

Staff Workshop
November 28, 2018

Outline

- Policy driving energy efficiency
- Update since last workshop
- Staff proposal
- Technical feasibility
- Cost effectiveness
- Statewide savings
- Discussion topics

It's up to you



> ***It's up to you,*** *and it's up to me and tens of millions of other people ... to roll back the forces of carbonization and join together to combat the existential threat of climate change.*
>
> *Governor Edmund G. Brown Jr.*

Small changes can make a big difference

Why Energy Efficiency?

Hurricane Florence Eyewall
September 12, 2018

Devastation to Mexico City,
Florida from Hurricane Michael

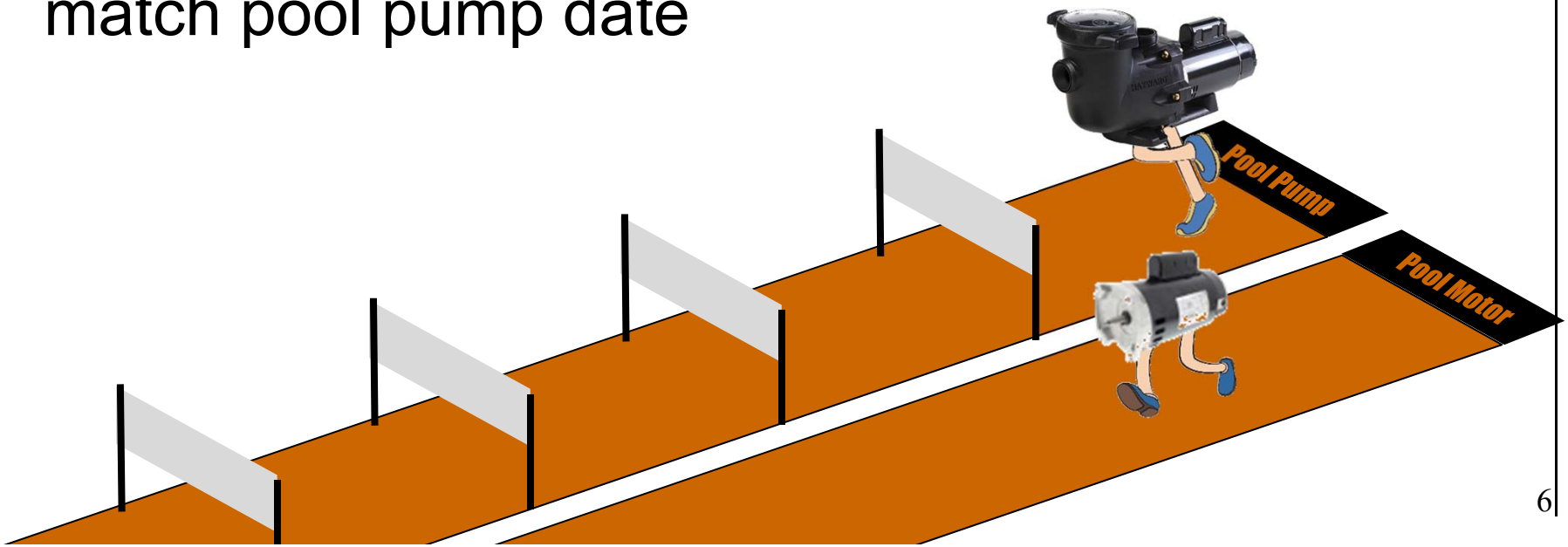
Energy efficiency fights climate change

We heard you!


negotiated
correlation
thankful
non-compliant
complementary
original-motor
physical-characteristics
prescriptive
warranty
unintended
performance
clear
loopholes
July-2021
three-speeds
enforcement
Consistency
efficiency
vetted
DPPP
California-only
protect
harmonize
educational
harmonization
solution
concerned
timing
power-end
efficient
level-playing-field
DOE
focus
data
easier
align
challenge
preempt
alternatives
definitions
enforceable
regulation
distinguish
implementation
total-horsepower
water-feature
pool-owners

Workshop and Negotiation Comments

- Level playing field between motors in pumps and motors sold separately
- Desire simple motor standard
- Seek motor compliance date of July 19, 2021, to match pool pump date



Staff Proposal

- Expand scope to include residential and commercial replacement pool pump motors
- Update motor test method
- Set minimum motor efficiency and remove prescriptive motor type prohibition
- Set prescriptive variable speed motor control
- Incorporate DOE pool pump test methods and standards

New

Building on previous proposals and negotiations

Comparison of Current and Proposed Regulations

Current Title 20 Regulation	Staff Proposed Change	Rationale
Scope limited to replacement pool pump motors for residential filtration use only	Expand scope to include commercial and non-filtration replacement pool pump motors	Close loophole and improve compliance to Appliance Efficiency Standards
IEEE-114 test procedure for small single phase AC induction motors	CSA 747-09 Energy efficiency test methods for small motors	New test method provides for efficiency testing of all small motor types
Prescriptive motor prohibition on least efficient motor types	No prescriptive prohibition of motor types. All motor types must meet minimum motor efficiency	Standard will lead to energy savings by improving efficiency of all replacement pool pump motors
Prescriptive two or more speed at 1 THP and above	Prescriptive variable speed at . 5 THP and above	Allow pump motors to operate at optimum setting
Existing pool pump and motor combination regulations	DOE Dedicated-Purpose Pool Pump Regulations	Align with DOE due to federal pre-emption

New

Staff Proposal

- The draft staff report contains proposal details
  https://efiling.energy.ca.gov/GetDocument.aspx?tn=225891

- Staff seeks public comments on the proposal

Equipment Class

- One motor class regardless of pump type
  - Enforceable
  - Simple
  - Level playing field

Different pump types - similar motors

Self Priming
Filter Pump

Non-Self Priming
Filter Pump

Pressure Cleaner
Booster Pump

Proposed Test Points

- Measure performance at motor maximum speed and full load
  - Consistent with a pool pump operating on pool system curve C

Aligned with U.S. DOE pool pump test point

Proposed Standard

- Motor efficiency levels follow recommendation by Association of Pool and Spa Professionals
- Comments from 2016 pool pump workshop

Total Motor Capacity	Prescriptive Requirements	Minimum Motor Efficiency
Motor hp < 0.5 hp	None	66%
0.5 hp ≤ Motor hp <1.0 hp	Variable Speed	72%
1.0 hp ≤ Motor hp <5.0 hp	Variable Speed	80%

Proposed Standard

- Threshold for variable speed set for user utility
  - Turndown of motor speed limited by pressure required for pool system

Total Motor Capacity	Prescriptive Requirements	Minimum Motor Efficiency
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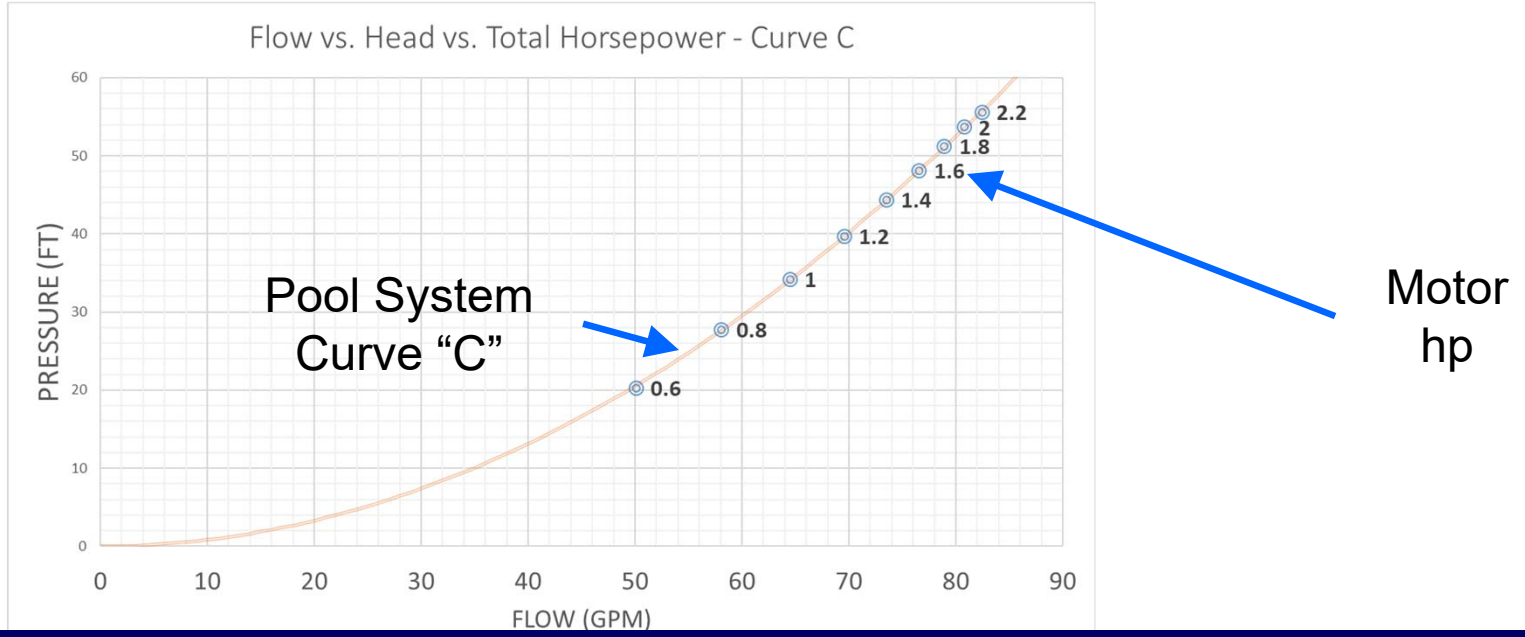
Why Variable Speed?

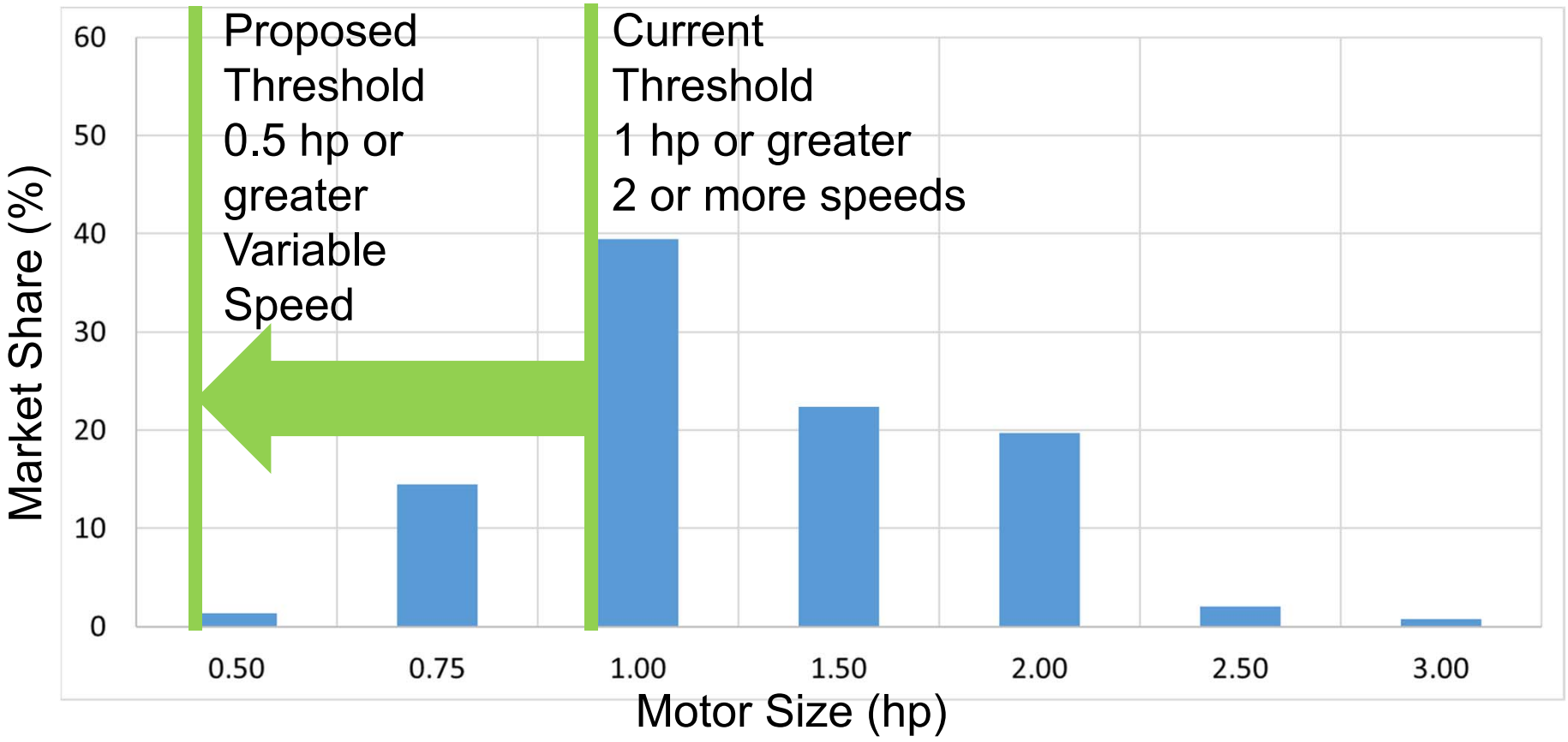
- Pool users and contractors often oversize pool pumps to ensure sufficient flow at a pump's available full and half speed settings
- Variable speed allows the owner to right-size the pump by providing more choices to find the most efficient setting



Every pool deserves a pump that is the right size

Comparison of Speed Thresholds

Filter Pool Pump Motor Sizes in Southern California



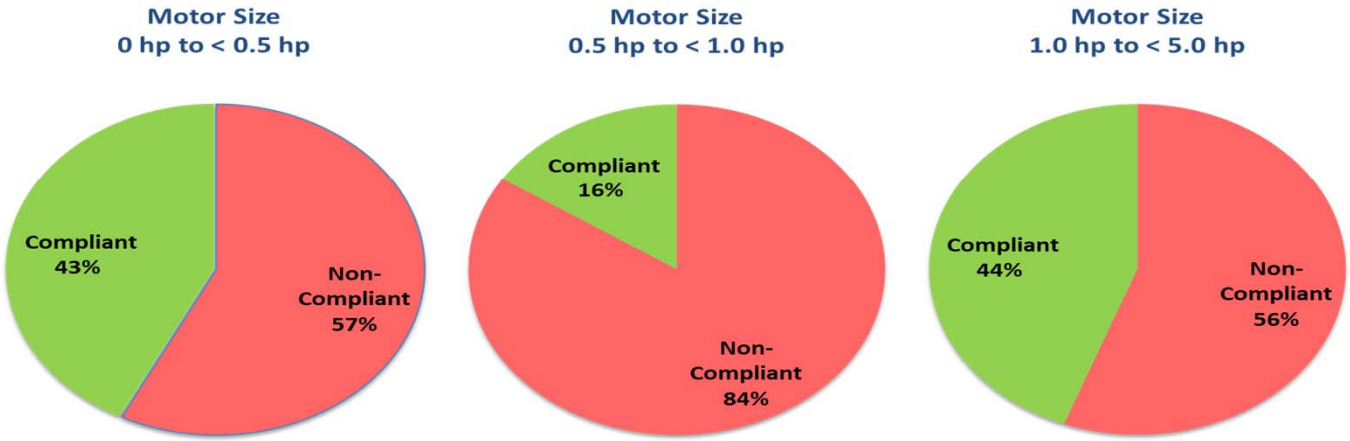
Expand threshold to lower horsepower to cover most sales

Technical Feasibility

- Proposed standards can be met with existing models and technology

  Pool Pump and Motor Combinations

: Residential Pool Pump and Motor Combinations in Energy Commission Database – February 2018

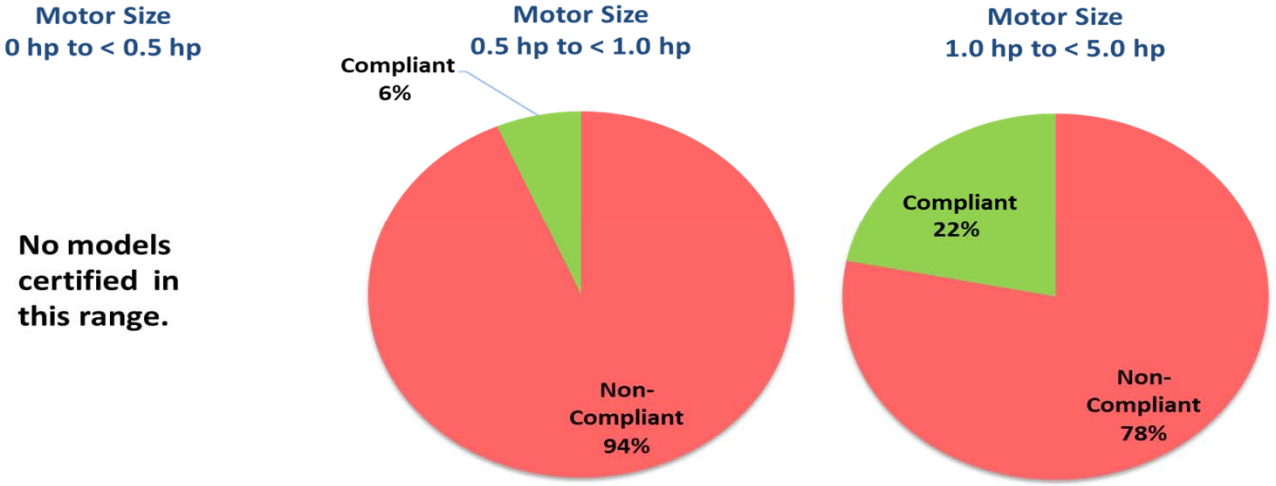


Technical Feasibility

- Proposed standards can be met with existing models and technology

  Replacement Pool Pump Motors

Replacement Residential Pool Pump Motors in Energy Commission Database – February 2018



Cost Effectiveness

- Proposed standards are cost effective

Product	Application	Design Life (years)	Electricity Savings (kWh/yr)	Average Incremental Cost ($)	Average Annual Savings ($)	Life Cycle Savings ($)	Life-Cycle Benefit ($)
Replacement Self-priming Pool Filter Pump Motor (1.90 hp)	Residential	7.3	63	$17	$12	$86	$59
Replacement Self-priming Pool Filter Pump Motor (3.76 hp)	Residential	7.3	86	$10	$16	$117	$93
Replacement Self-priming Pool Filter Pump Motor, small-size	Residential	7.3	1,410	$289	$261	$1,909	$1,403
Replacement Non-Self Priming Pool Filter Pump	Residential	7.3	1,520	$367	$282	$2,058	$1,458
Replacement Pressure Cleaner Booster Pump (1.24 hp)	Residential	7.3	361	$356	$67	$489	$77
Replacement Self-priming Pool Filter Pump Motor (1.90 hp)	Commercial	7.3	6,092	$358	$1,130	$8,250	$6,956
Replacement Self-priming Pool Filter Pump Motor (3.76 hp)	Commercial	7.3	9,502	$348	$1,763	$12,868	$11,061
Replacement Self-priming Pool Filter Pump Motor, small-size	Commercial	7.3	1,579	$380	$293	$2,139	$1,516

Statewide Cost and Energy Savings

	First Year Savings		Annual After Stock Turnover Savings	
	Electricity Savings (GWh/yr)	Savings ($M)	Electricity Savings (GWh/yr)	Savings ($M)
Residential	44.1	$8.2	322	$59.8
Commercial	20.6	$3.8	150	$27.9
Total Savings	64.7	$12.0	472	$87.7

$88 million is about the cost of a Falcon Heavy Launch

Comparison of Energy Savings

CITY OF ROSEVILLE CALIFORNIA

472 GWh/yr equals the energy to power Roseville, CA

Discussion Items

- Proposal's goal is to transform the replacement pool pump motor market to variable speed
- How will the proposal interact with DOE pool pump standard?

How can we best achieve savings?

Discussion Items

- Do the terms and definitions communicate a clear, accurate and understandable description of scope and requirements?
- Are there gaps in the proposal and if so how may they be closed?

Are the terms and definitions clear?

Discussion Items

- Discuss the motor performance standard
  - Efficiency levels
  - Motor segments at 0.5 hp and 1.0 hp
- Discuss the approach to measuring motor performance
  - Efficiency
  - Power factor

Are there areas to improve the proposal?

Discussion Items

- Are some pool pump motors covered by the DOE Small Electric Motor rule or the Electric Motor rule?
  - Does staff's proposal overlap with the DOE motor rules?
  - If so then how best to resolve overlap?

How best to exclude what is already covered?

Discussion Items

- How well does the proposal map the DOE DPPP regulations into the California Appliance Standards?
  - Scope
  - Definitions
  - Testing
  - Standards
  - Marking

Comments

- Comments due by 5:00 p.m. on January 4, 2019
- To submit electronically:
  - Go to http://www.energy.ca.gov/appliances/2015-AAER-02/rulemaking/
  - Click on “Submit eComment”
- To send a hard copy:

  California Energy Commission
  Dockets Office, MS-4
  Re: Docket No. 15-AAER-02
  1516 Ninth Street
  Sacramento, CA 95814-5512
- To send a digital copy: docket@energy.ca.gov, include docket number 15-AAER-02 and indicate Replacement Pool Pump Motors in the subject line

Thank You!

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