OPALCO 2019 Preliminary Load Forecast

OPALCO

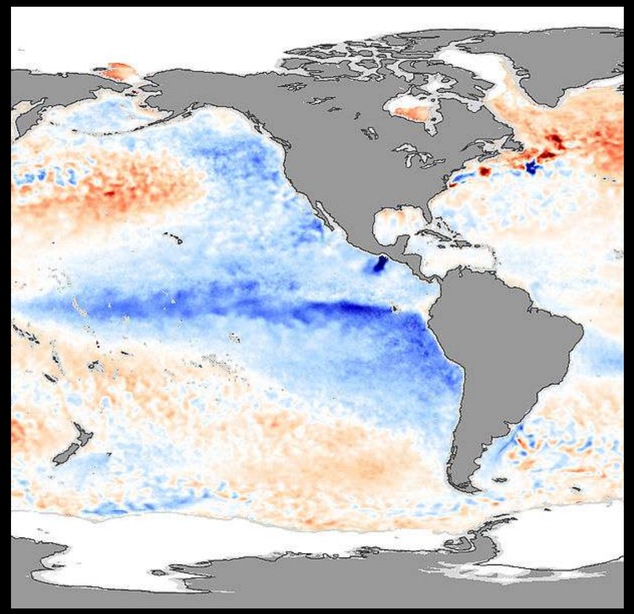
Board Meeting

October 2018

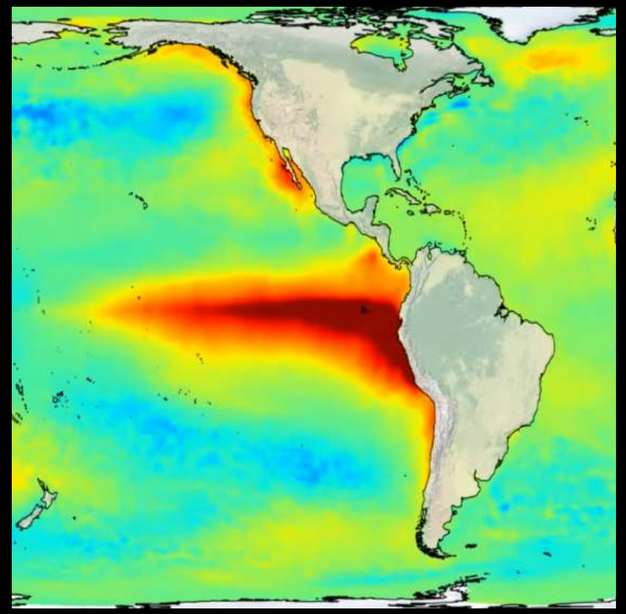
Oceanic Niño Index (ONI)

*Our winds prevail from the south, and the air temperature is influenced by **southern** hemisphere El Niño and La Niña cycles*

Southern Hemisphere Pacific



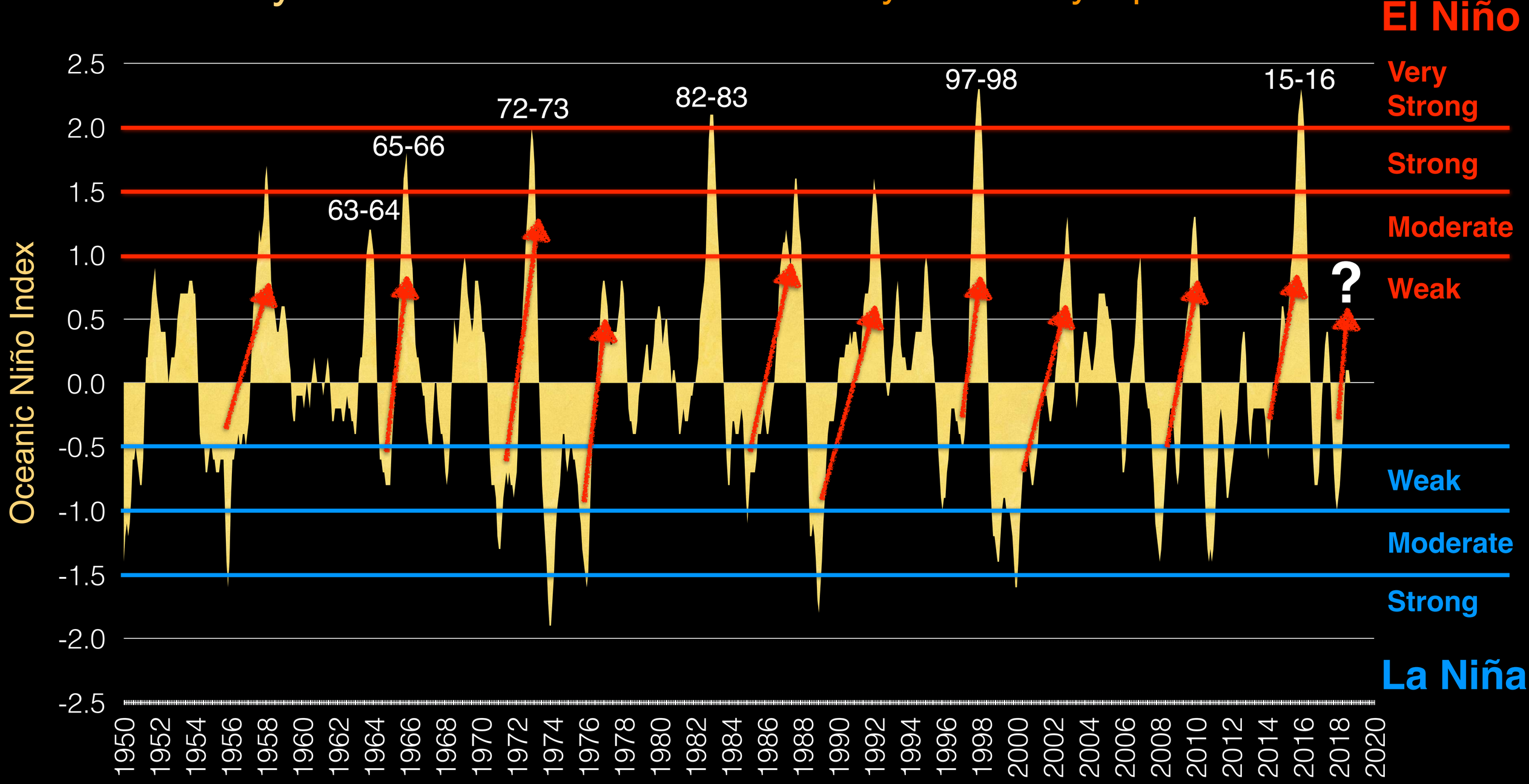
La Niña
(cooler)



El Niño
(warmer)

Source: NOAA

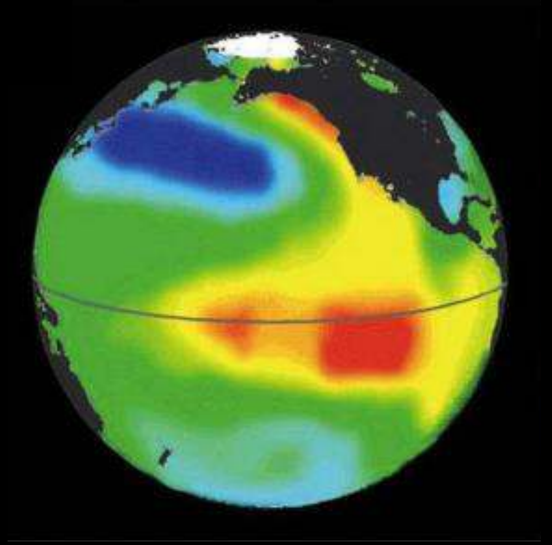
Last year was a La Niña: La Niña cycle usually flips to El Niño



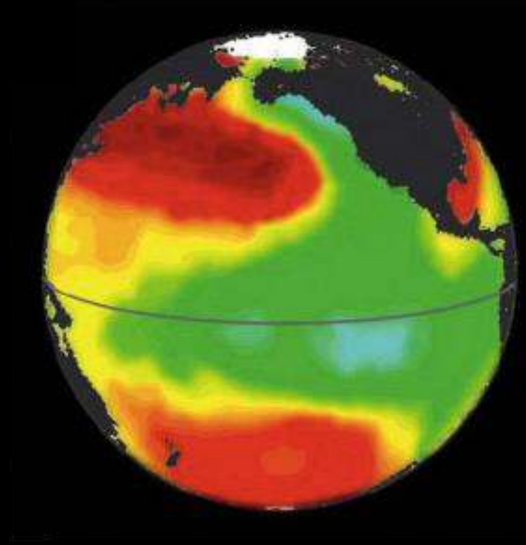
Pacific Decadal Oscillation (PDO)

*Our air temperature is also influenced by **northern** hemisphere PDO which effects nearby ocean temperatures*

Northern Hemisphere Pacific



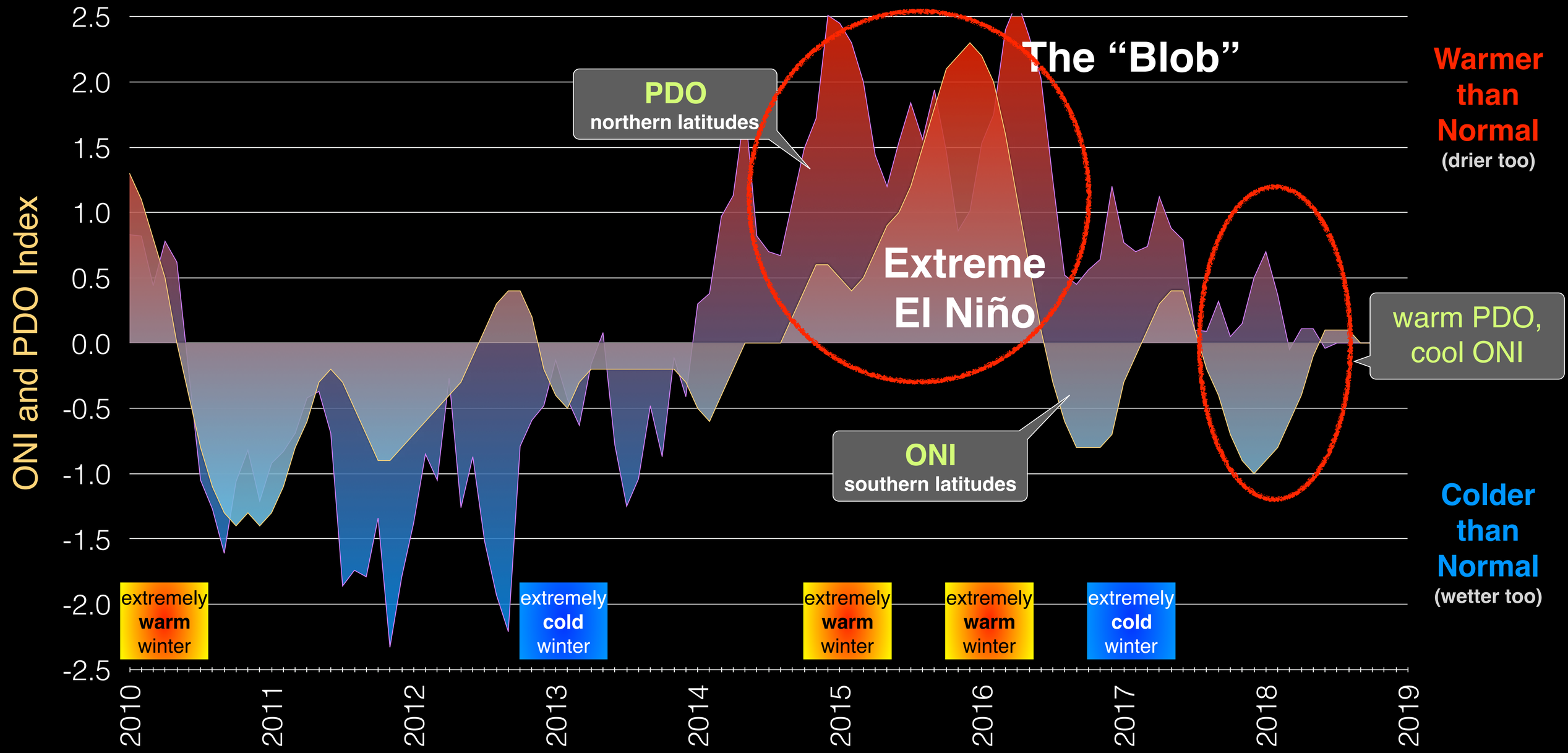
Cold PDO



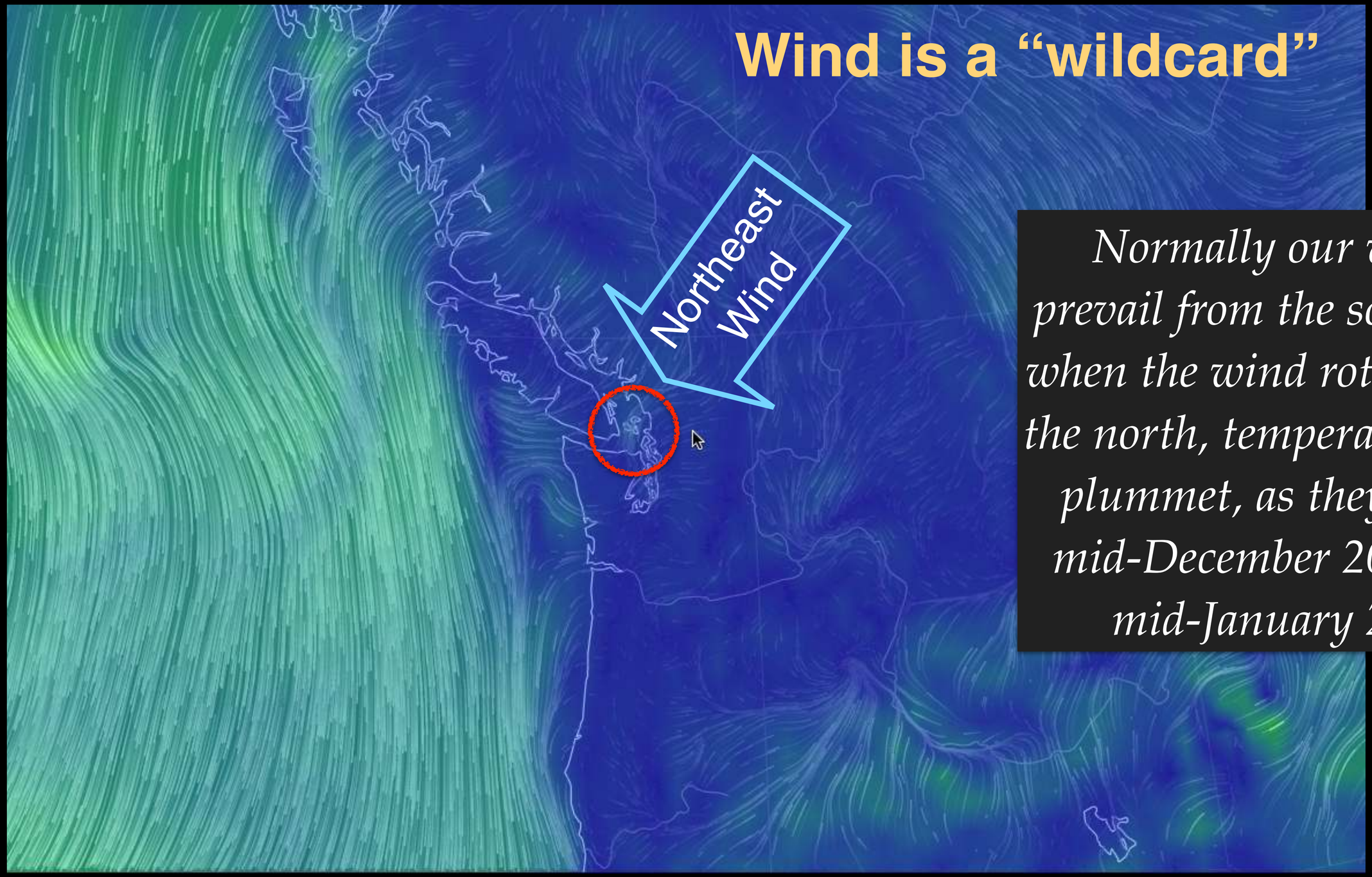
Warm PDO
(The “Blob” 2016)

Source: NOAA

The PDO can “amplify” (or temper) the Oceanic Niño Index

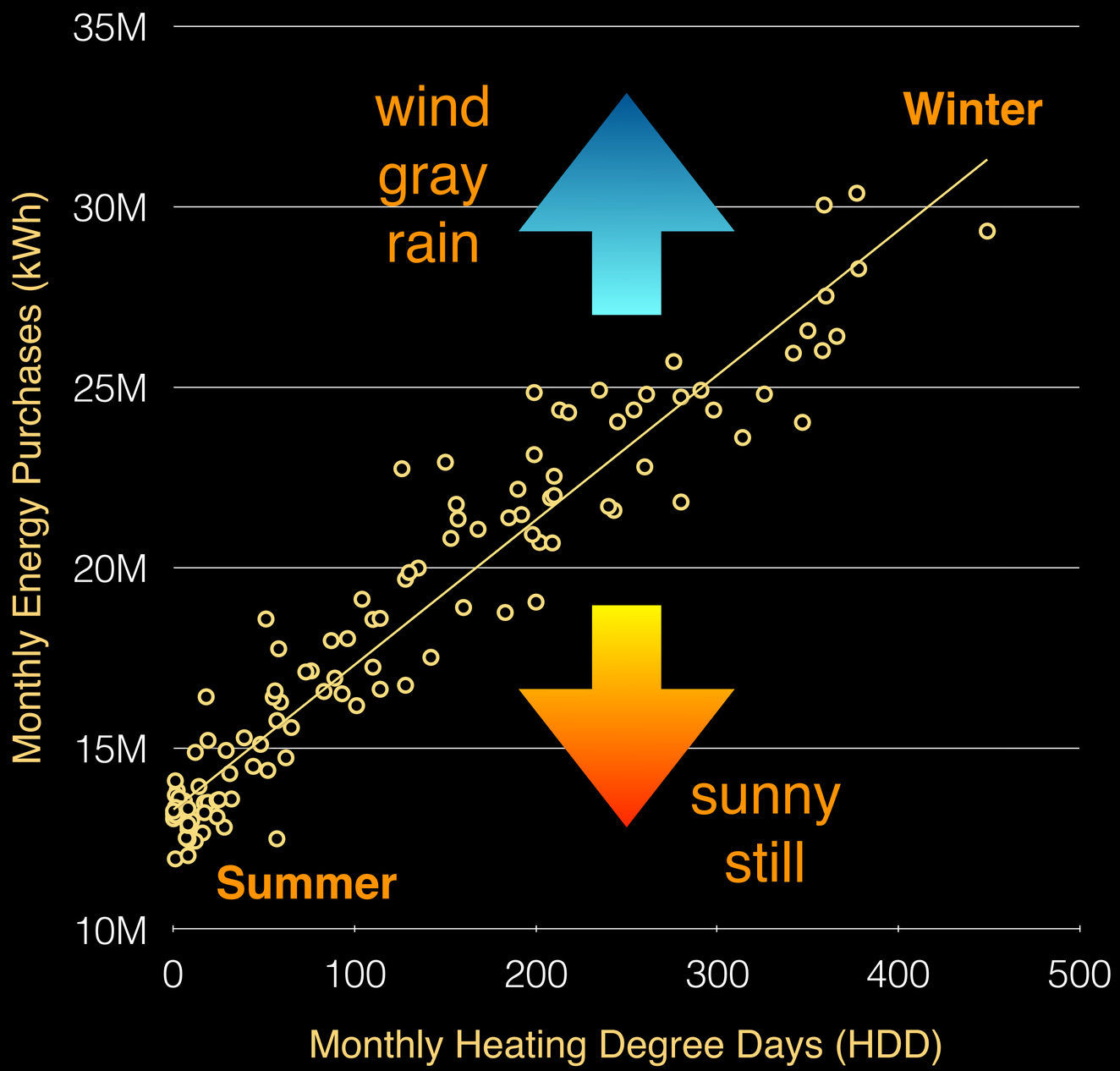


Wind is a “wildcard”



Normally our winds prevail from the south, but when the wind rotates from the north, temperatures can plummet, as they did in mid-December 2016 and mid-January 2017

Monthly HDD and kWh Purchases Scatter Plot: 2008 to Present



Heating Degree Days (HDD) drive energy consumption

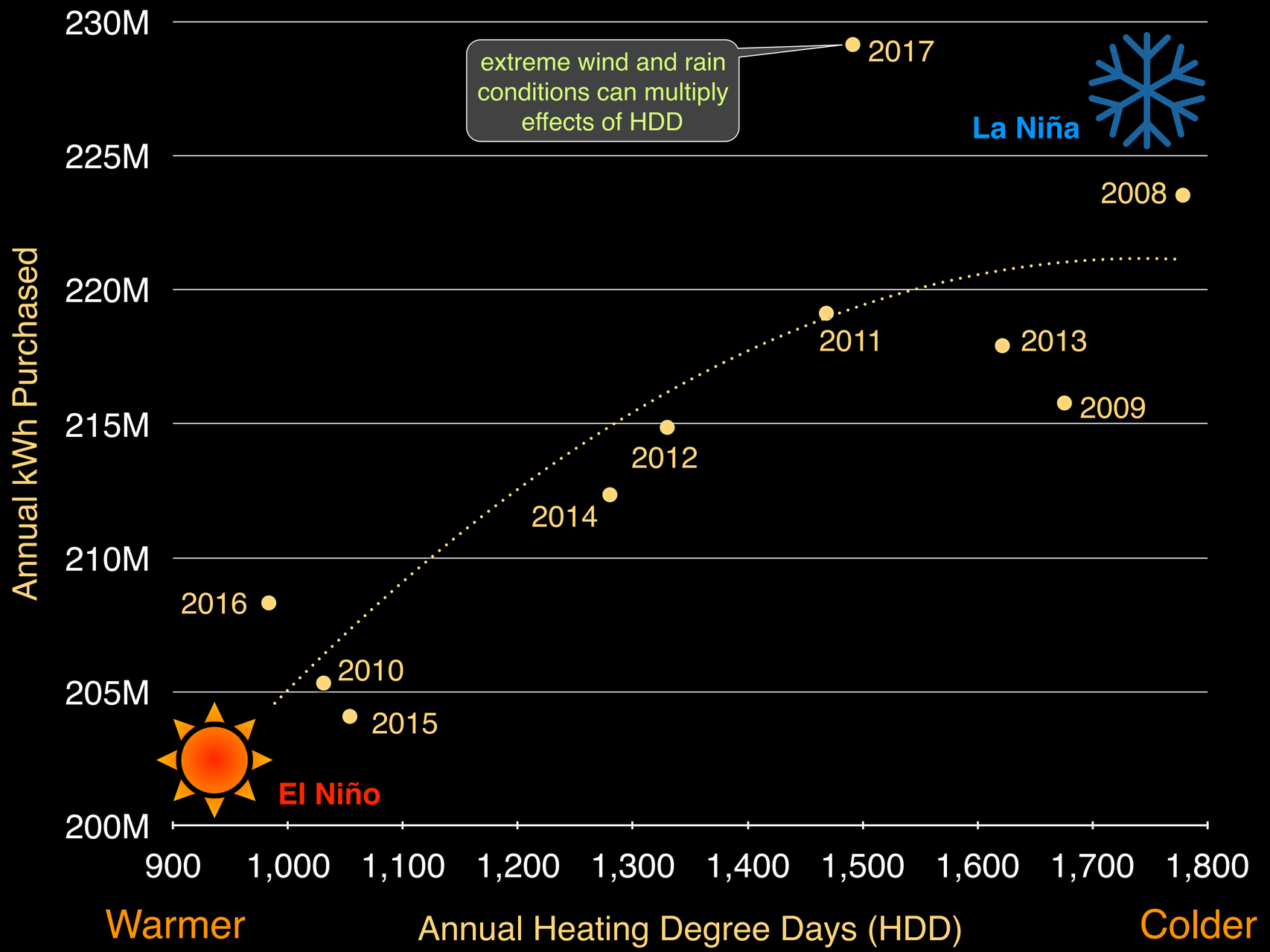
Variance Factors

wind / still

rain / dry

gray / sunny

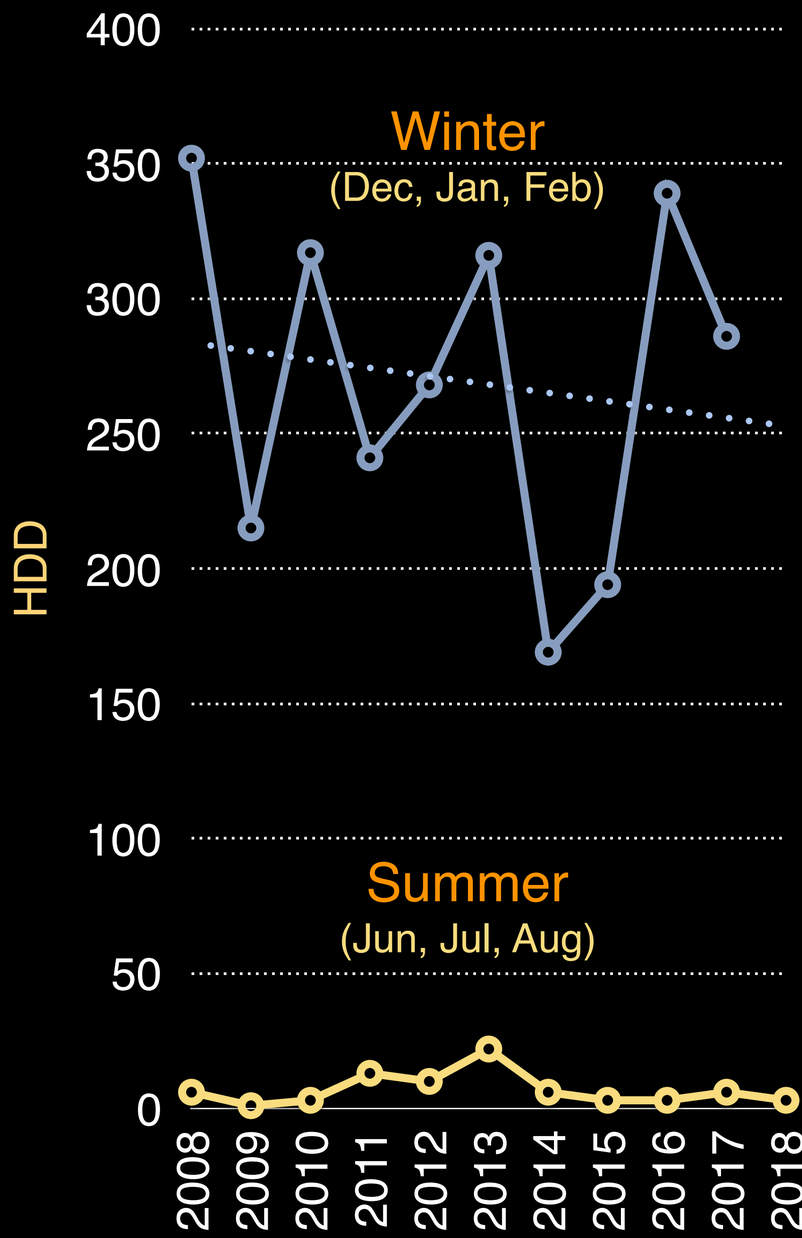
Load Forecast - Past: 2008 through 2017

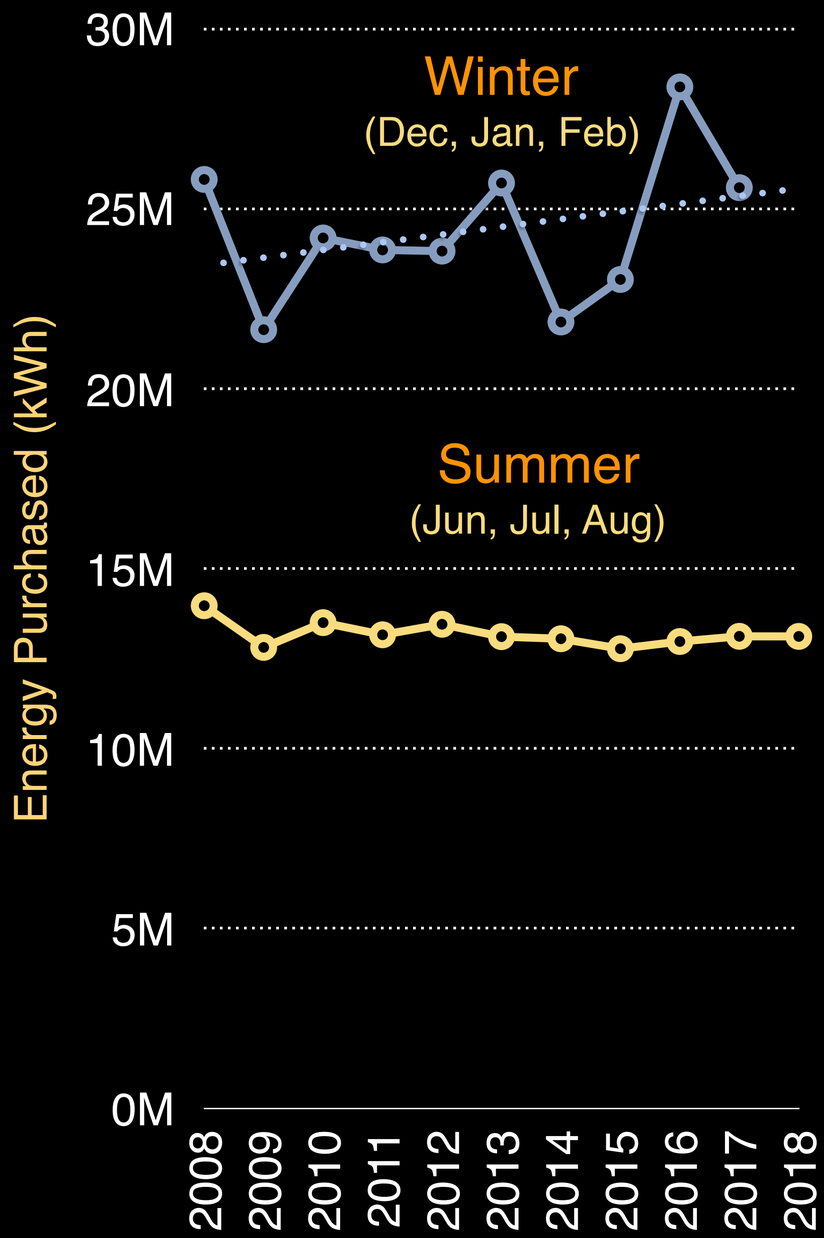


Notes

- La Niña (cooler) condition has more heating degree days (HDD) and larger electric load (kWh)
- El Niño (warmer) conditions have lower HDD and therefore less load
- 2017 extreme load spike
  In the northwest, during La Niña winters, strong, cold north winds are twice as likely as during El Niño winters, causing unpredictable increases in load (N.B.: preliminary study by staff, working with NOAA)

Average Monthly HDD and Energy Purchased: Summer, Winter

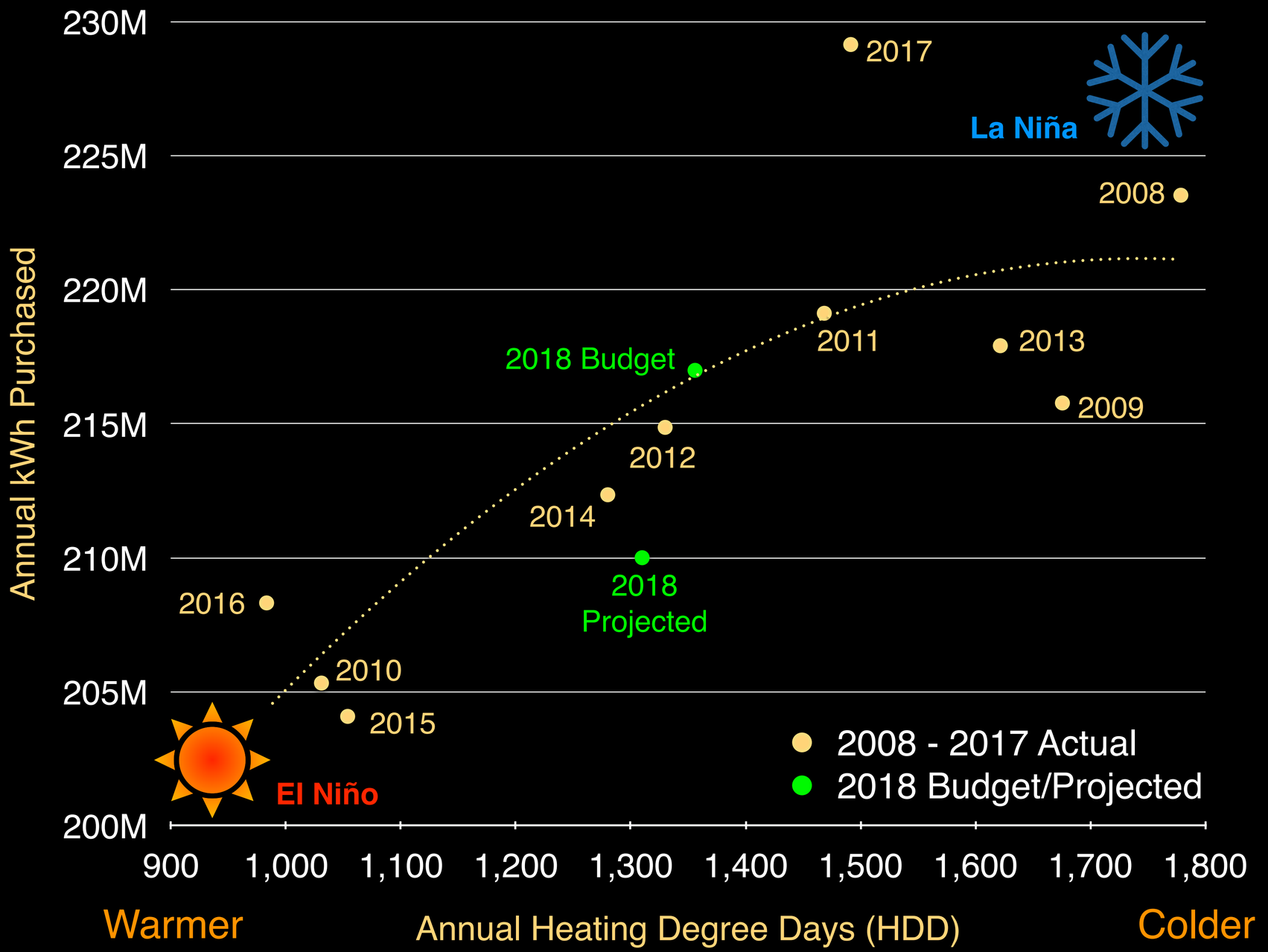




Notes

- Summer: Jun, Jul, Aug
- Winter: Dec, Jan, Feb
- Winter is December of indicated year, and January/February of following year
- Note summer load has been flat, despite growth in county, thanks to efficiency initiatives, rebates, etc.
- Despite HDD warming trend, winter load has slowly increased.
- OPALCO has been winning market share thanks to the lower cost of heating with electricity, tempered by increased efficiency as resistance heating is converted to super efficient ductless heat pumps.

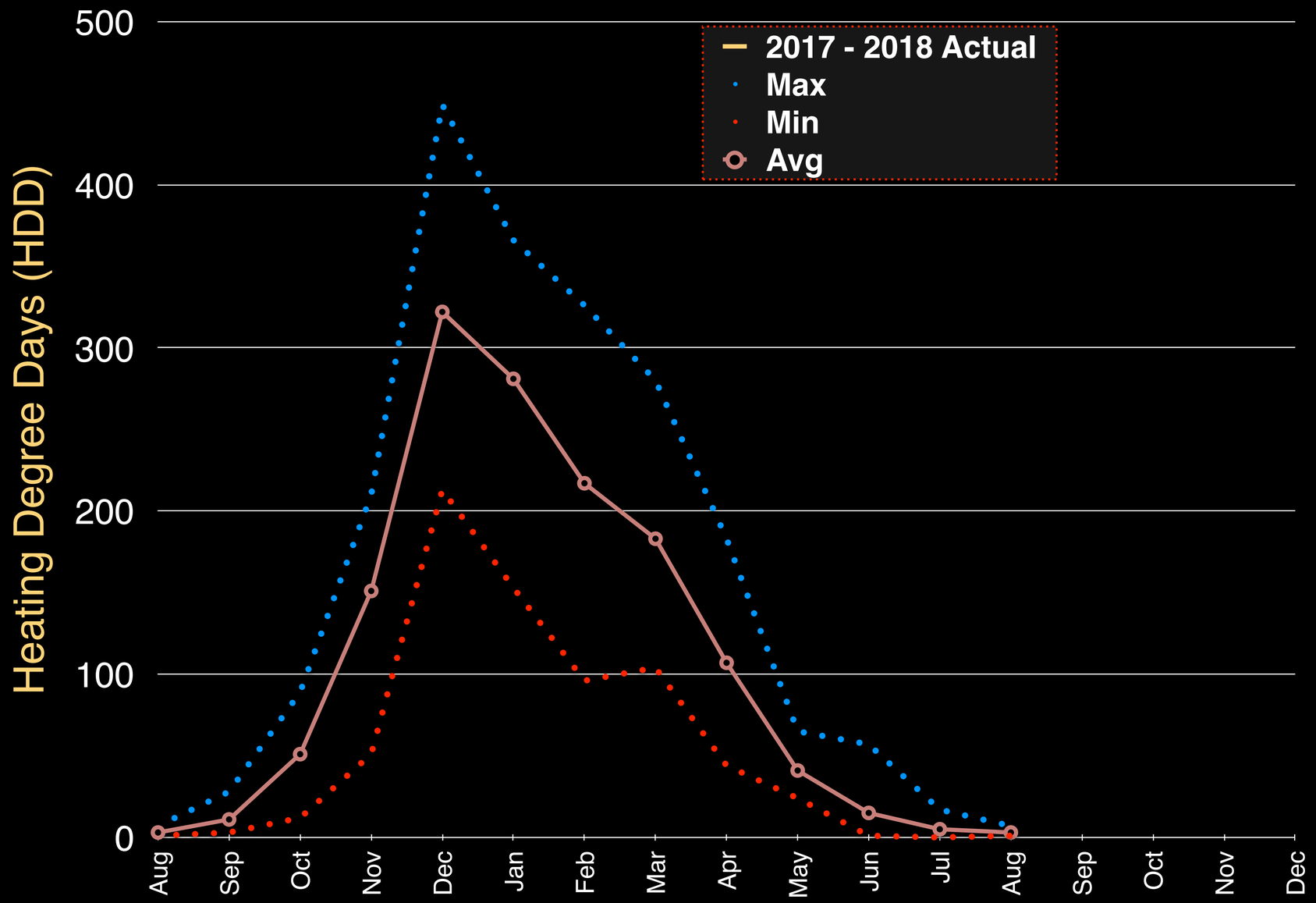
Load Forecast - Present: 2018 Budget to Actual



Notes

- A weak La Niña (cooler) quickly transitioned to neutral, and now appears to be transitioning to El Niño (warmer) conditions

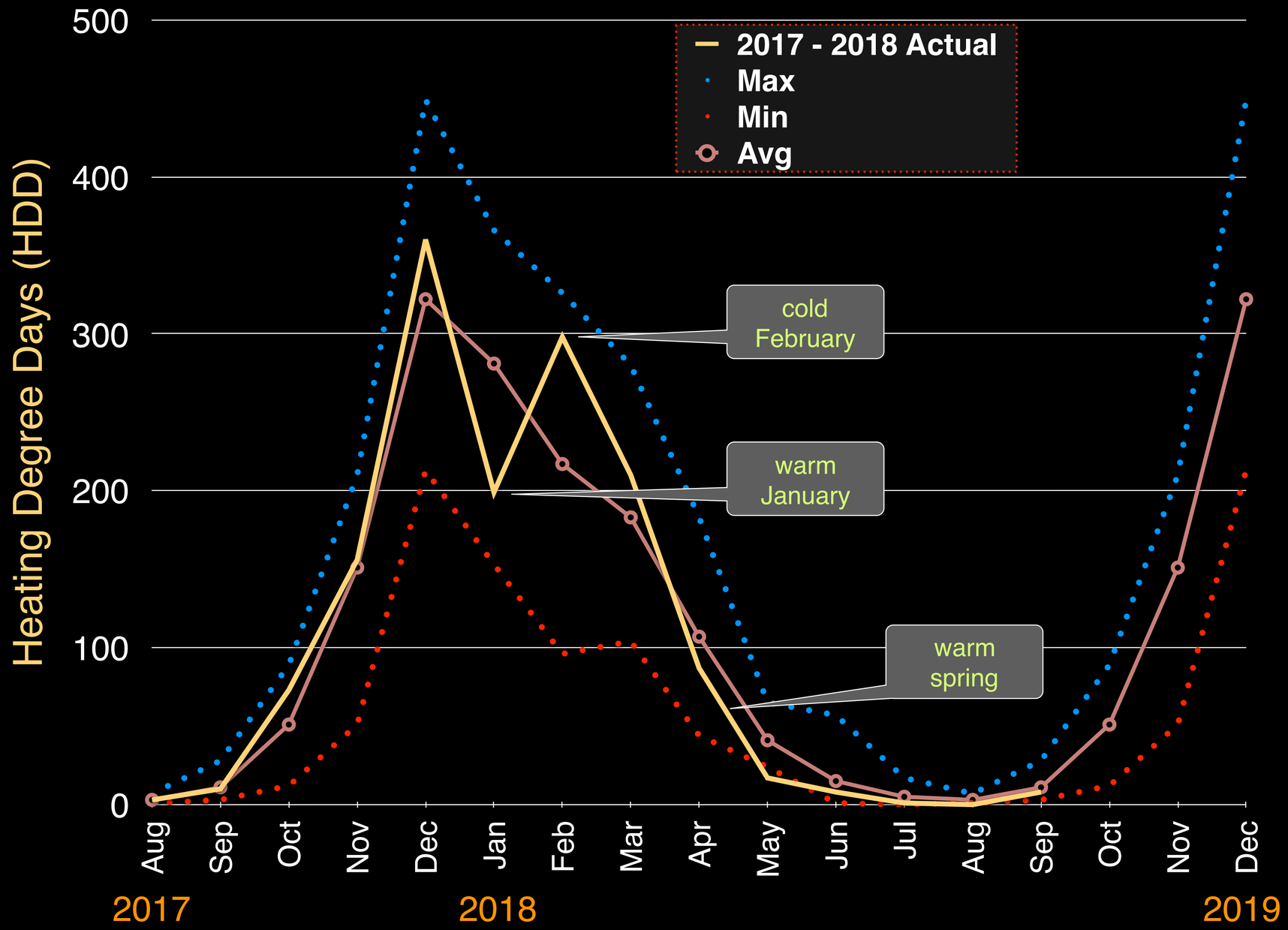
Monthly SJC HDD: 10 Year Average, Max, Min



Notes

- Max, Min and Average are 2008 through 2017
- Min line driven by strong El Niño winters (warm), Max line driven by strong La Niña winters (cold)

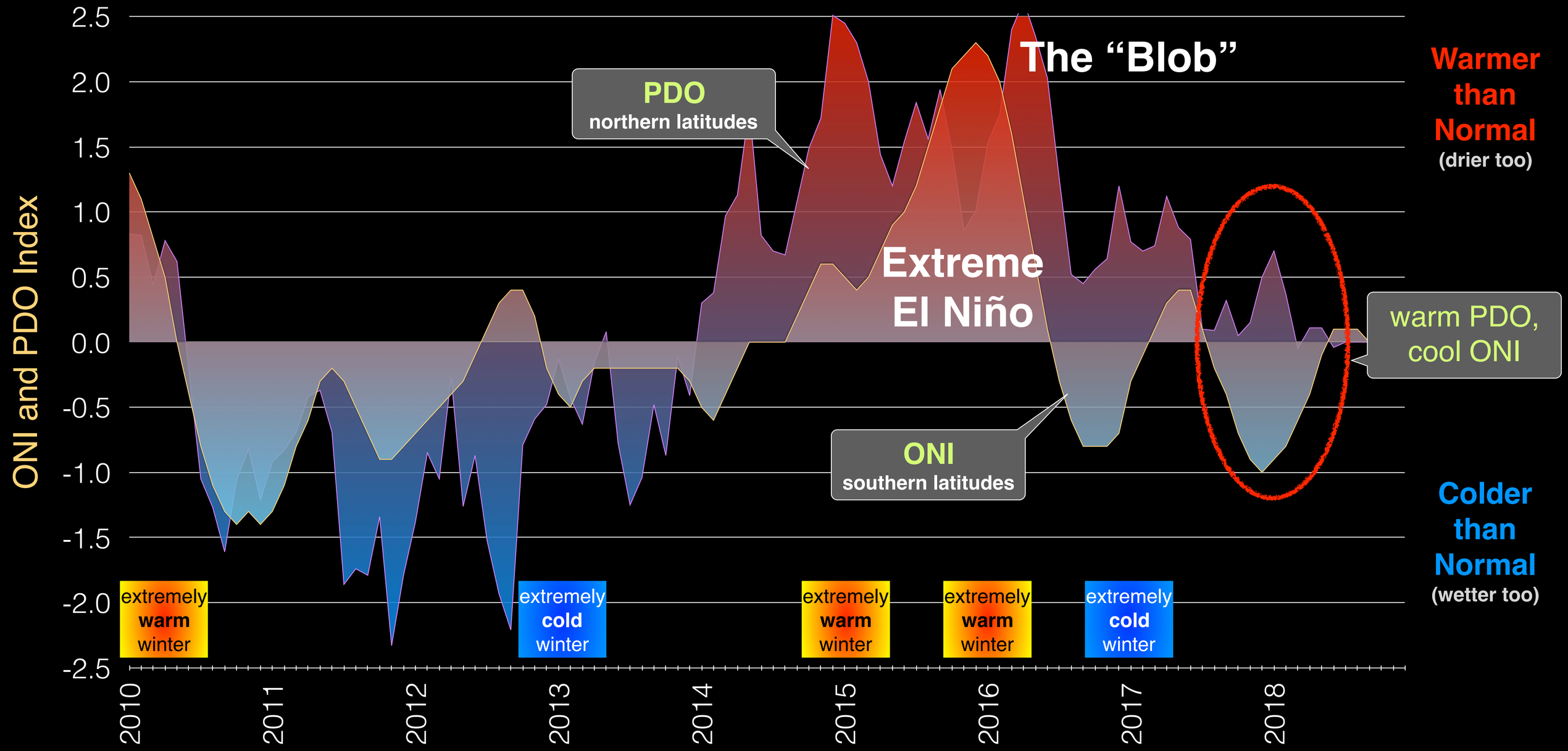
Monthly SJC HDD: 2018 Actual



Notes

- Though this past winter was a projected to be weak La Niña, note uncharacteristic warm January and warmer spring.
- This may have been driven by northern hemisphere PDO which was in weak warming cycle.
- We project that the rest of 2018 will be warmer than normal as we transition to an El Niño cycle

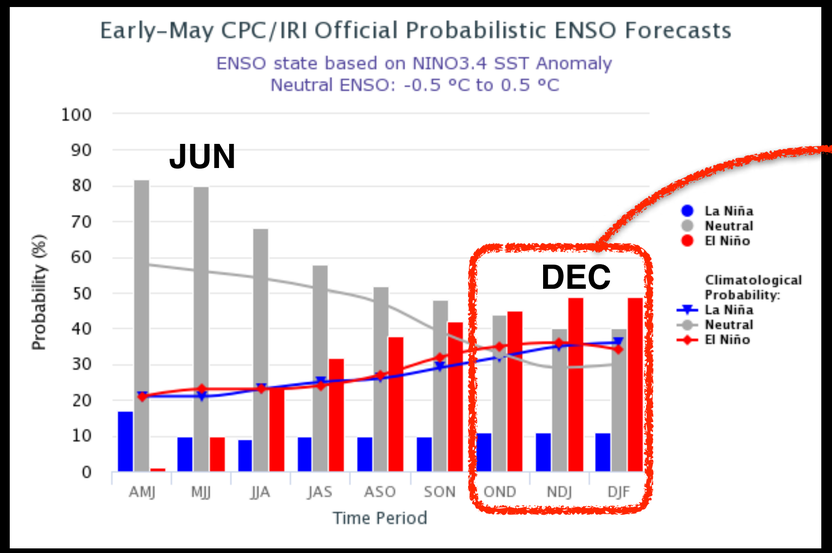
Oceanic Niño Index and Pacific Decadal Oscillation: Neutral



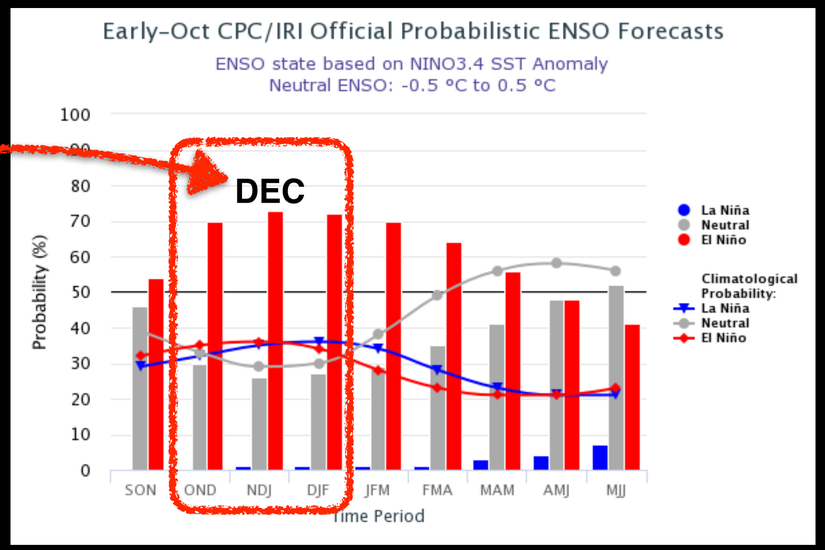
What's projected for this coming winter? NOAA Update (9 October 2018)

73% probability of warmer El Niño by end of year

May Forecast



October Forecast

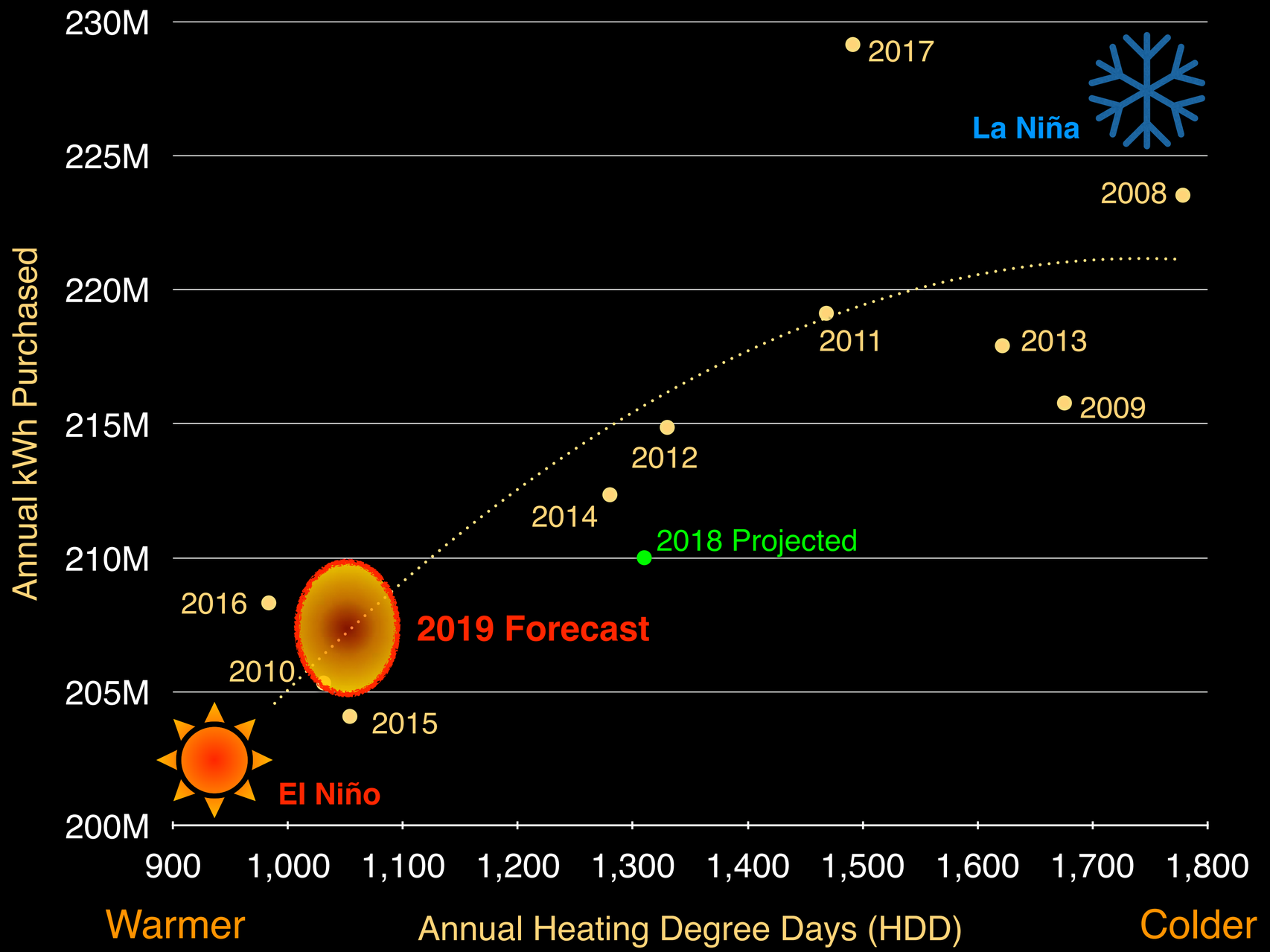


Notes

- Warmer El Niño winter is higher probability (73%) than cooler La Niña winter (1%)
- El Niño/Southern Oscillation (ENSO)
- Global perspective - influences NW, but other factors pertain too - e.g. Pacific Decadal Oscillation (PDO), local wind, sun, rain, overcast, etc.

Source: NOAA

Load Forecast - Future: 2019 Forecast - warmer than normal



Notes

- NOAA has been increasing the probability of El Niño for the coming winter and spring. Combining that expected warming weather with the longterm climate changed HDD downward warming trend, we are erring on the conservative side of winter heating load.

Rule of Thumb

each 1 million kWh sold
= $150,000 in revenue
= $100,000 incremental margin

each 1% rate increase ~= $250,000 in revenue

Thank You!