



**Synapse**  
Energy Economics, Inc.

# **What is Coming? Challenges for State Commissioners Related to a Changing Electric Grid**

---

**2016 NECPUC Symposium**

**Consumer Panel**

**June 7, 2016**

**Paul Peterson and Spencer Fields**

## **E4 Group funded much of this research and analysis.**

---

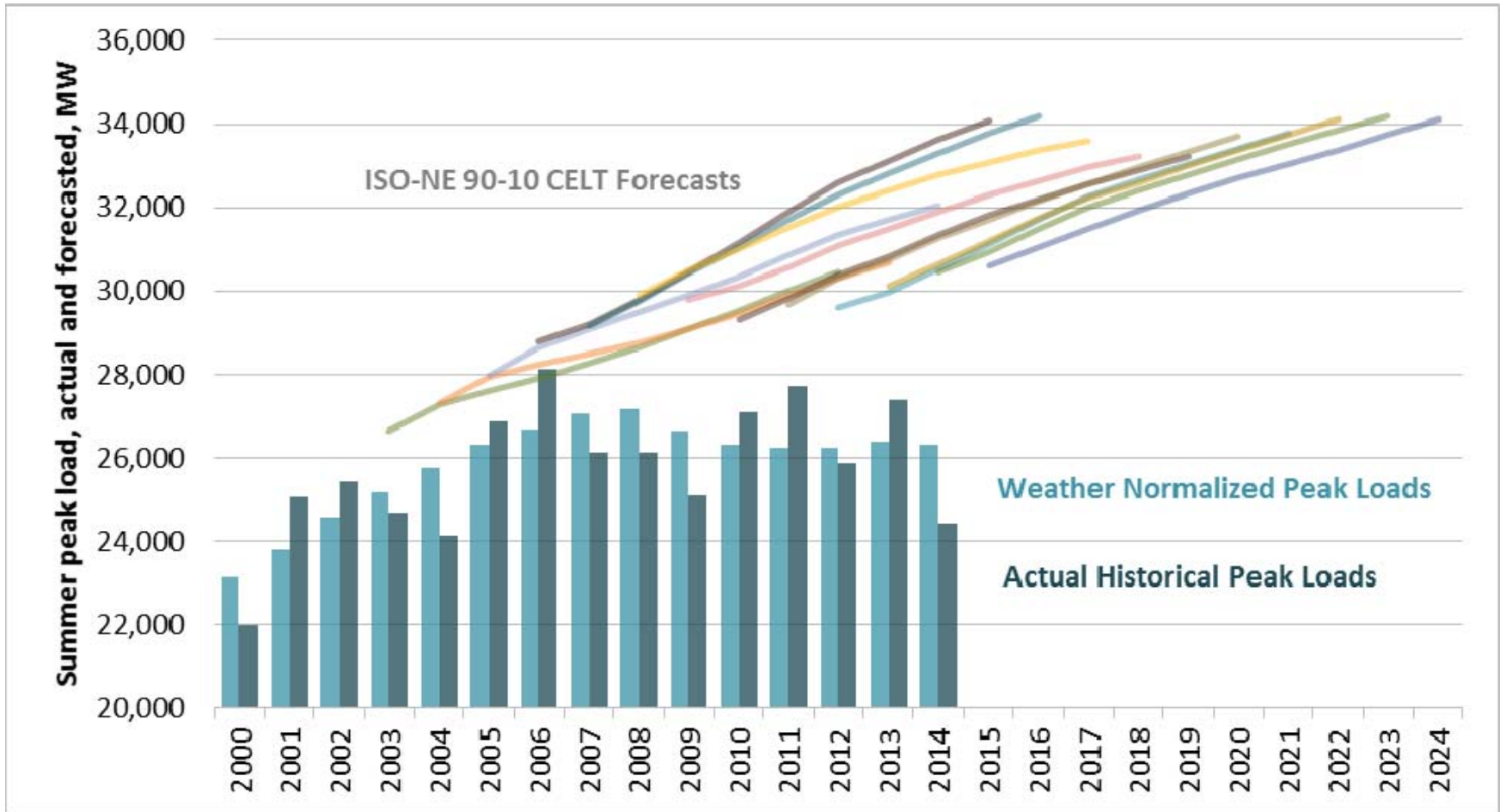
- Conservation Law Foundation
- Acadia Center
- Grid Solar
- 
- Industrial Energy Consumer Group
- Maine Public Advocate
- Natural Resources Council of Maine

## Three Current Trends

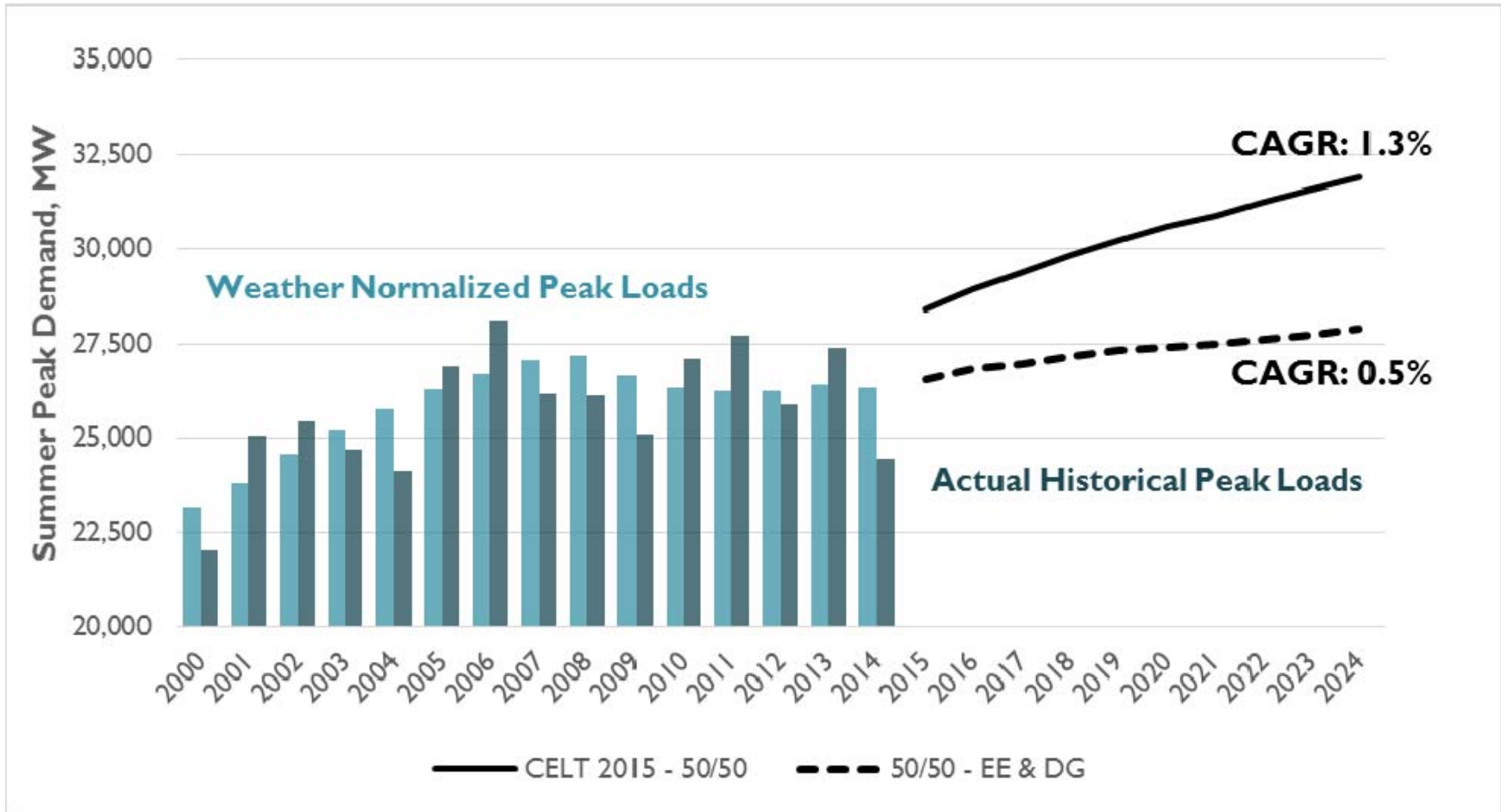
---

- ❑ Increasing costs for new T&D
- ❑ Increasing costs for FCM resources
- ❑ Increasing costs for RNS and LNS rates

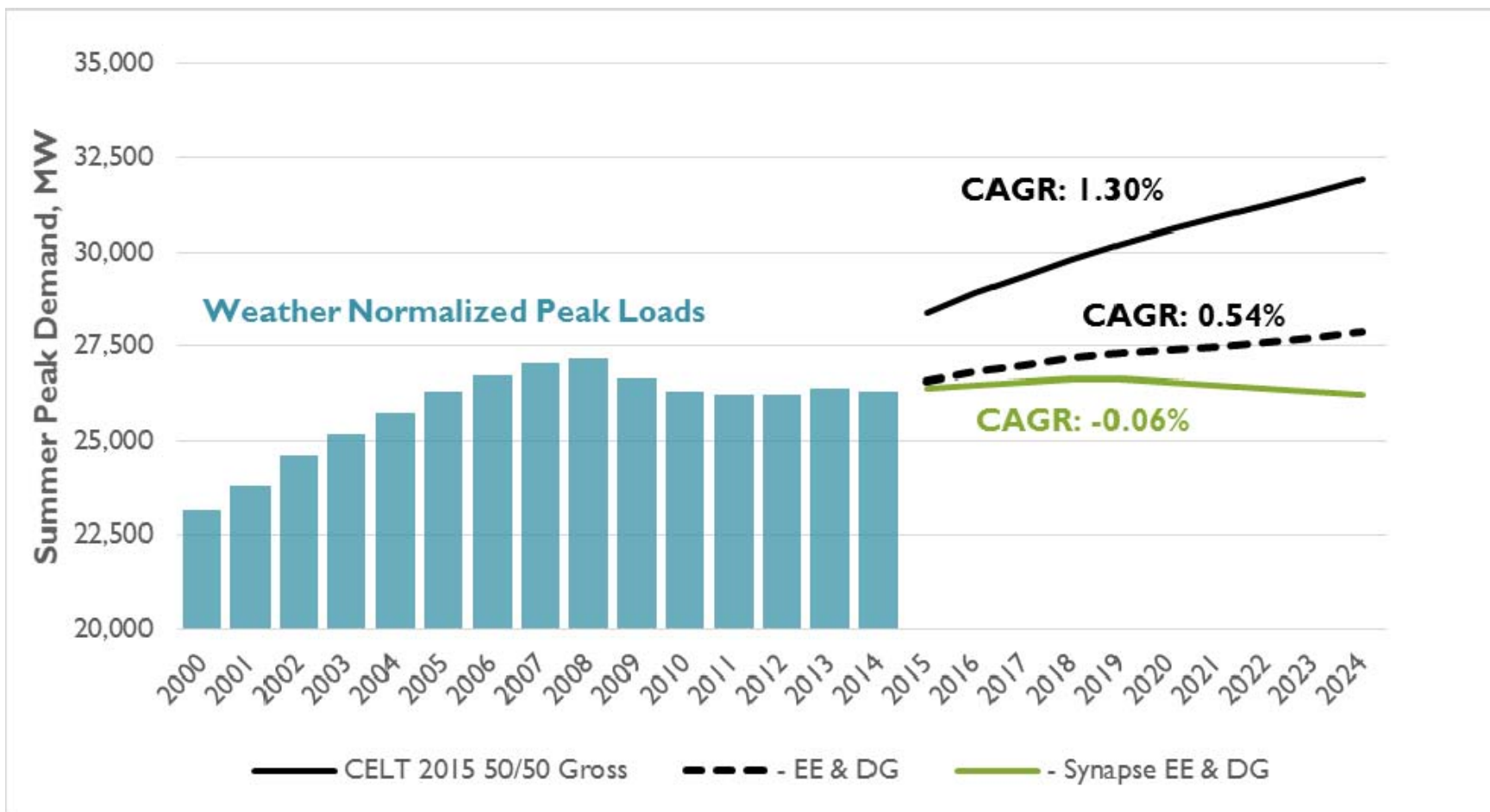
# Comparison of 90-10 forecasts to historical peak load: reconstituted weather normalized and actual



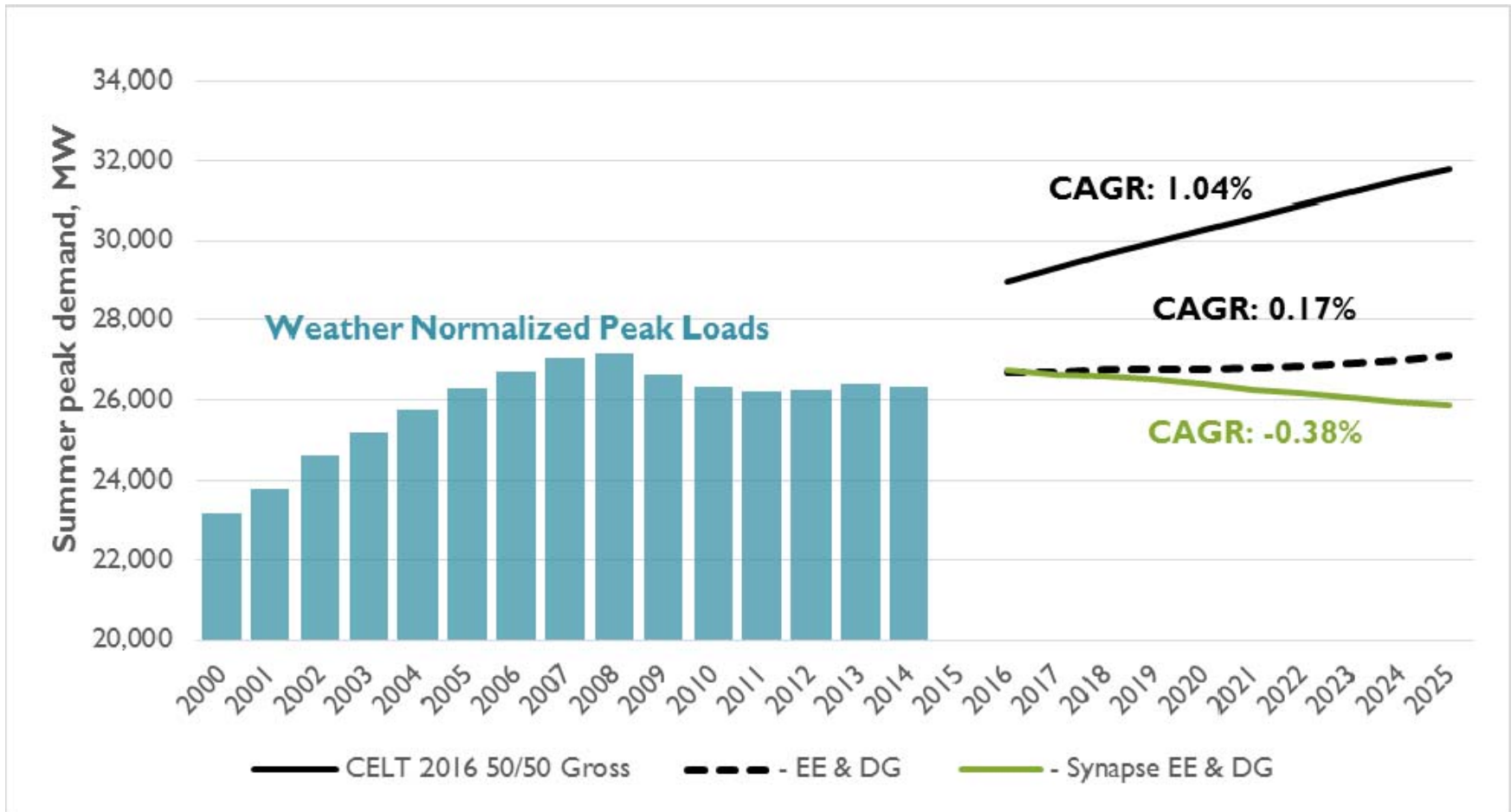
**2015 CELT 50/50 forecast modified for EE and DG compared to actual and weather normalized historical peak loads with compound annual growth rates (CAGR)**



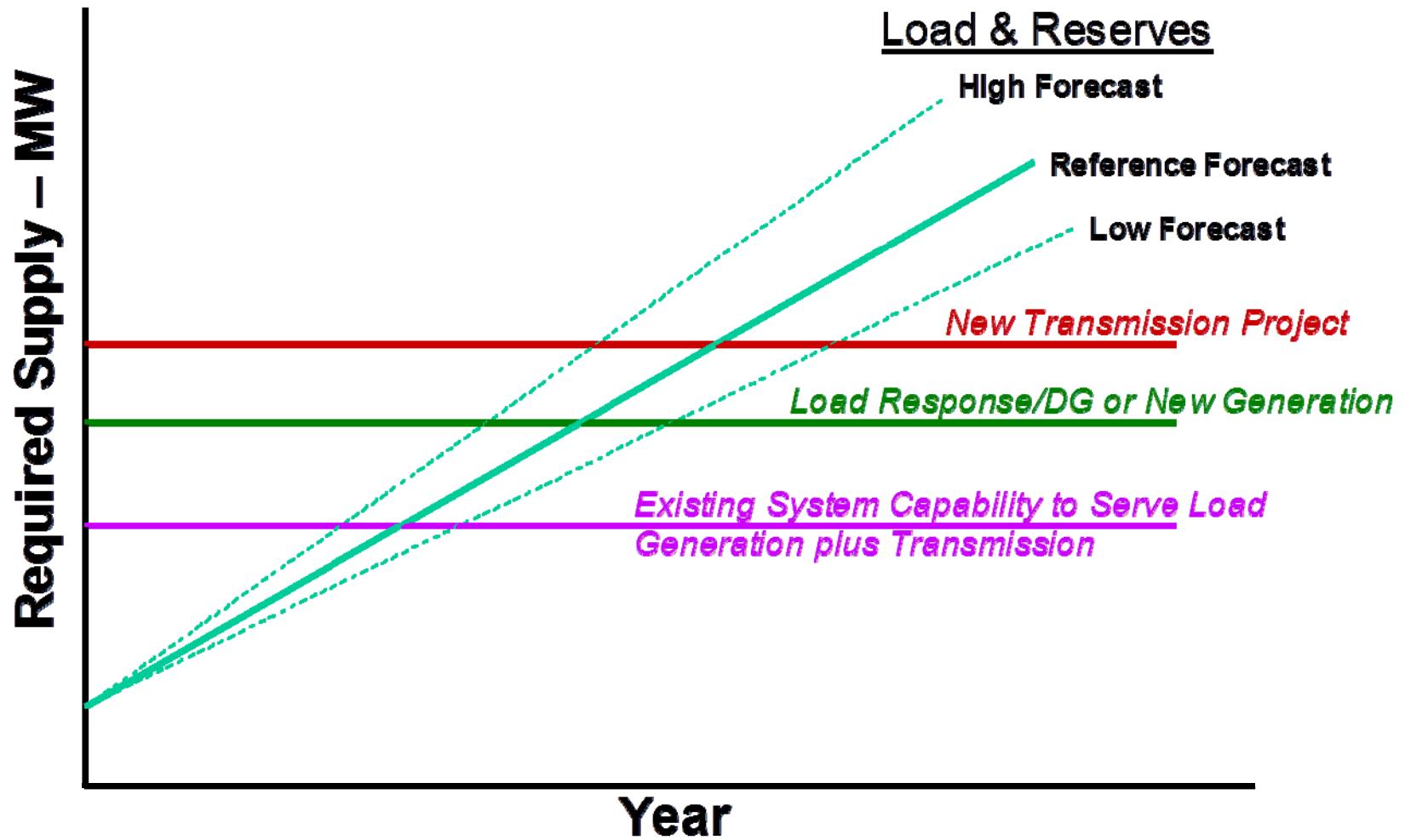
# 2015 Synapse adjustments for EE and PV



# 2016 Synapse adjustments for EE and PV

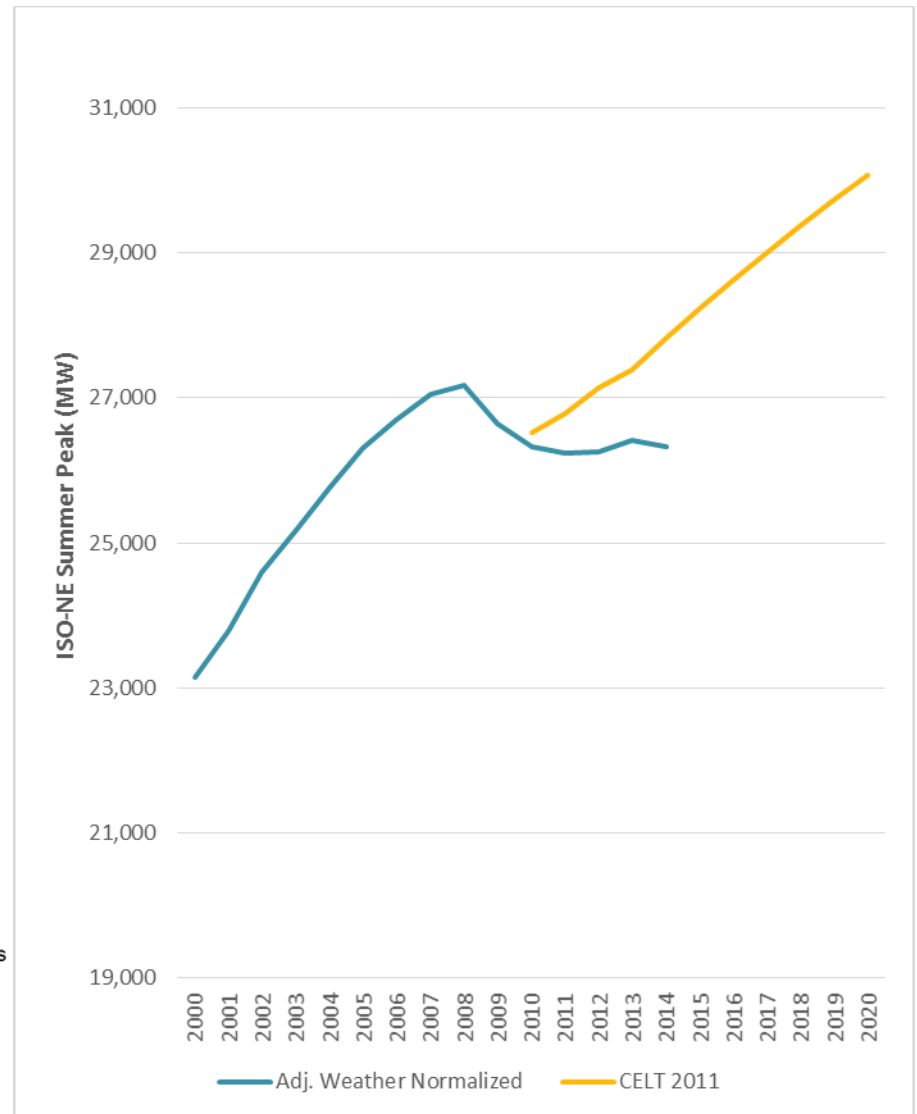
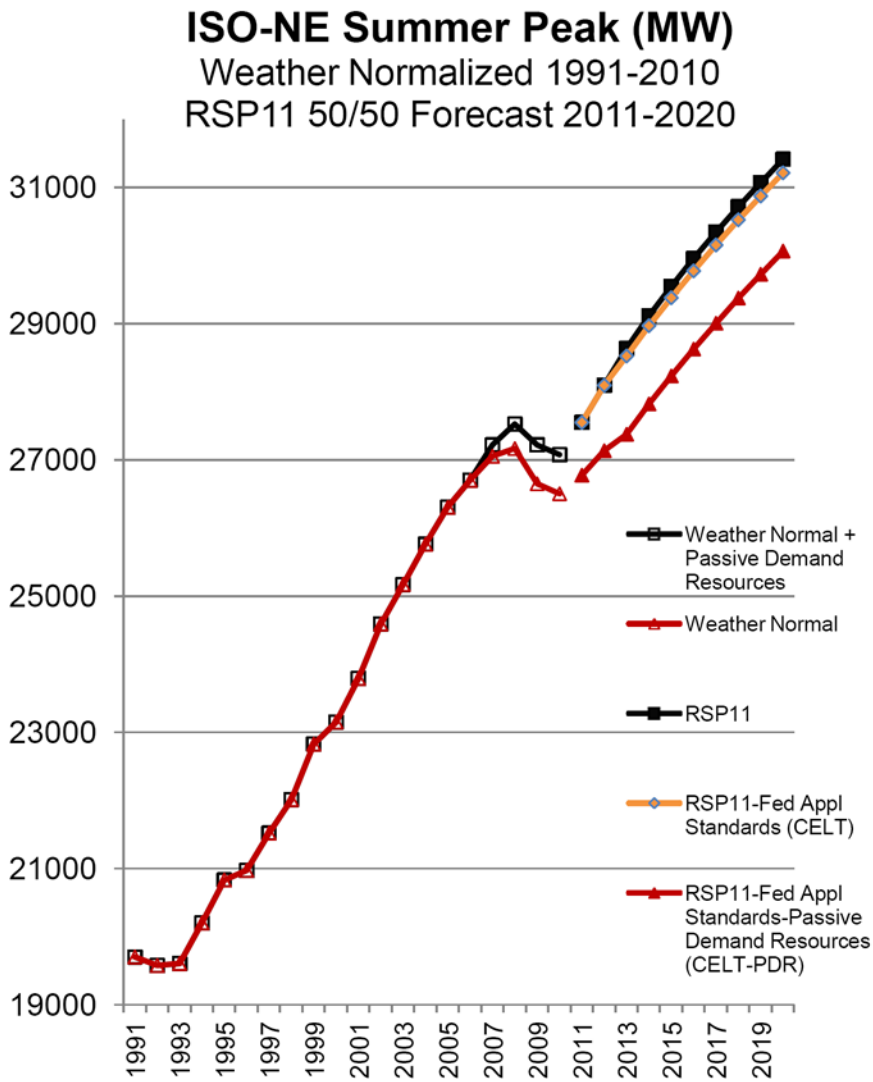


# Planning Horizon (from RTEP 2004)





# 2011 ISO forecast and 2015 Actual

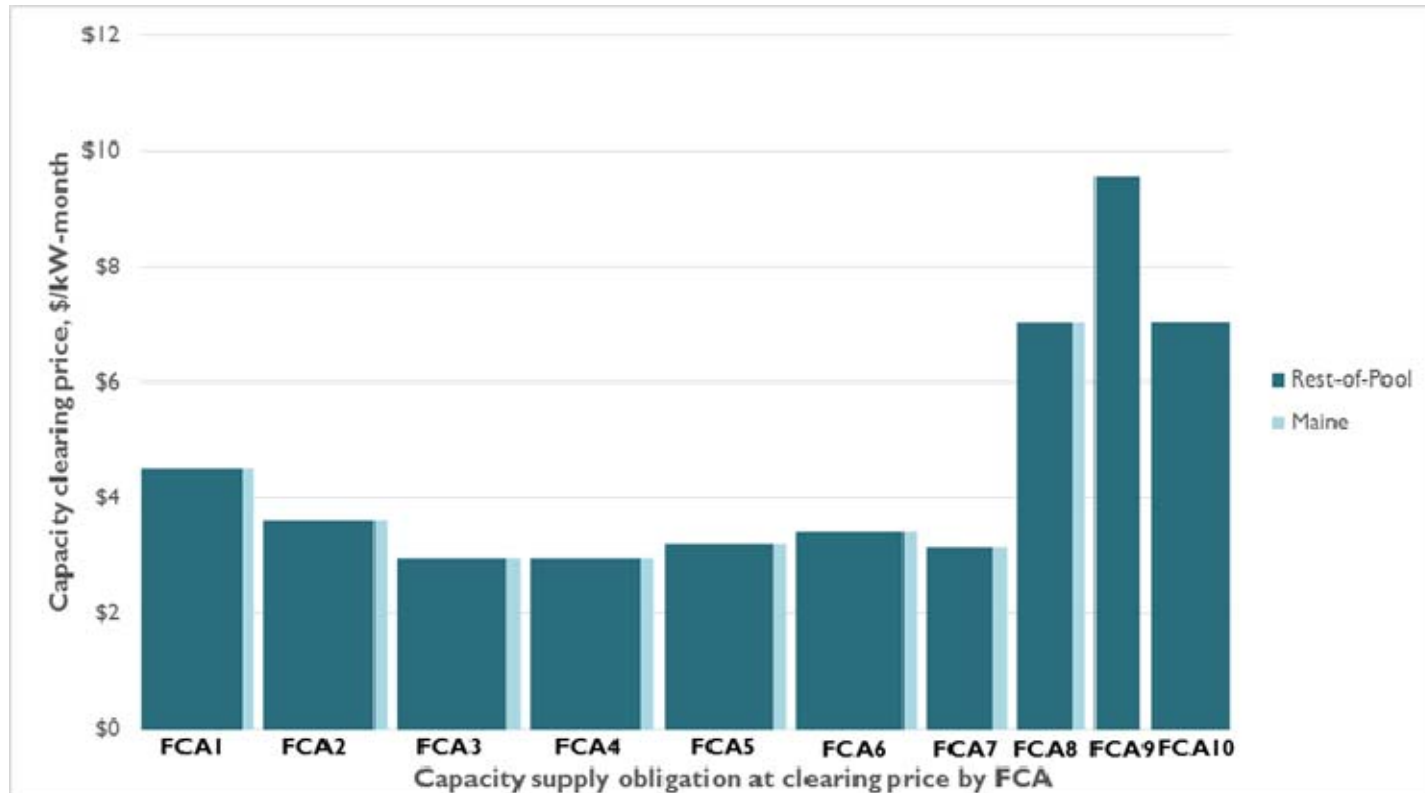


## Horizon for fixing system needs

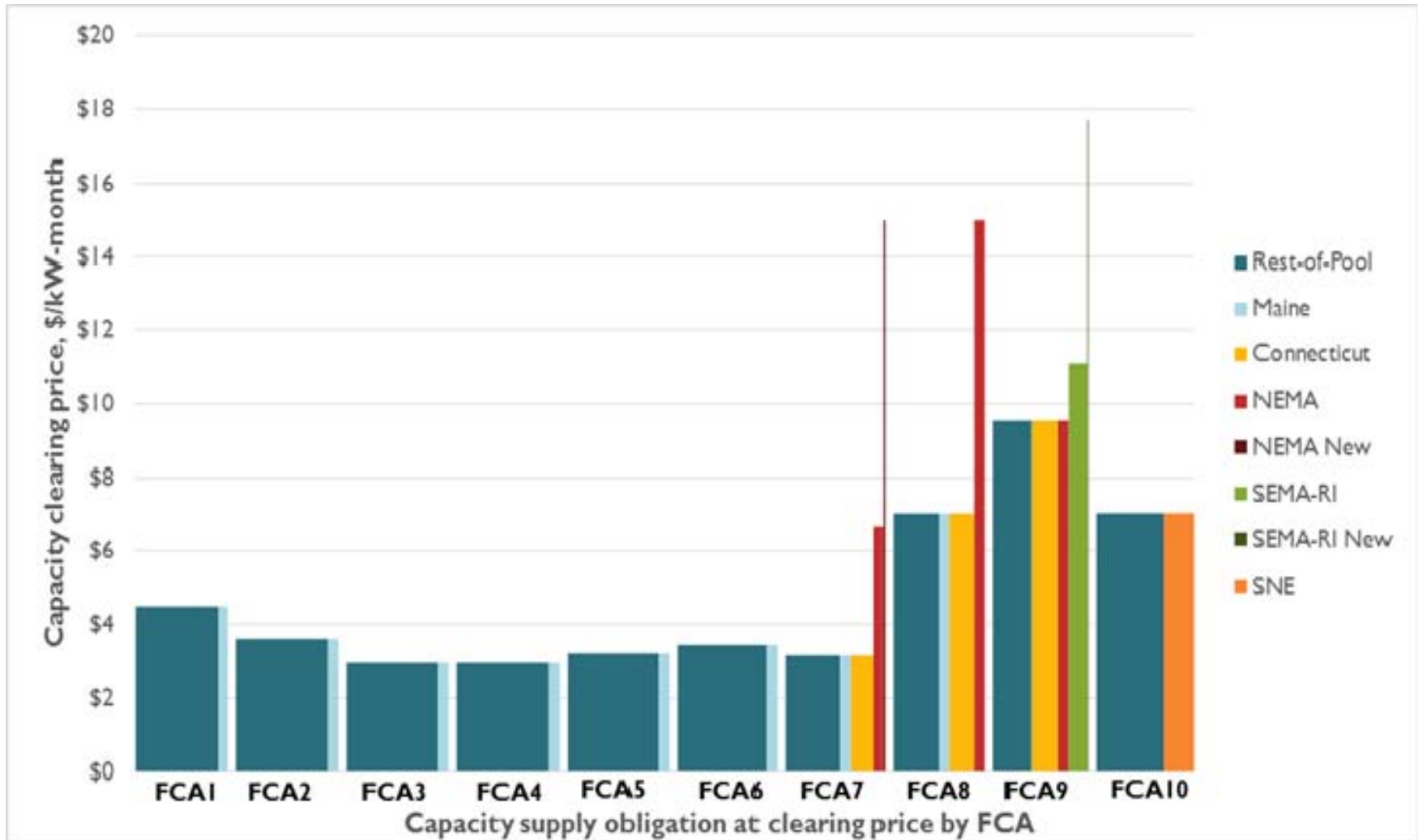
---

- For forty years, the electric grid has seen annual growth rates of 6 percent, declining to 2%. Since 2002, growth rates have been 2% or less.
- With those earlier compound annual growth rates (CAGR), the entire electric demand will double in 12 years (6%) to 36 years (2% CAGR).
- With 2015's forecasted peak demand growth of 0.5 percent CAGR, the entire electric system would double in 144 years.
- The planning horizon for addressing system needs has expanded; system planners have substantially more time to plan and build solutions
- Consistently over-stating peak load growth puts consumers at risk of paying for transmission upgrades that may never be needed.

# FCM trends



# FCM trends



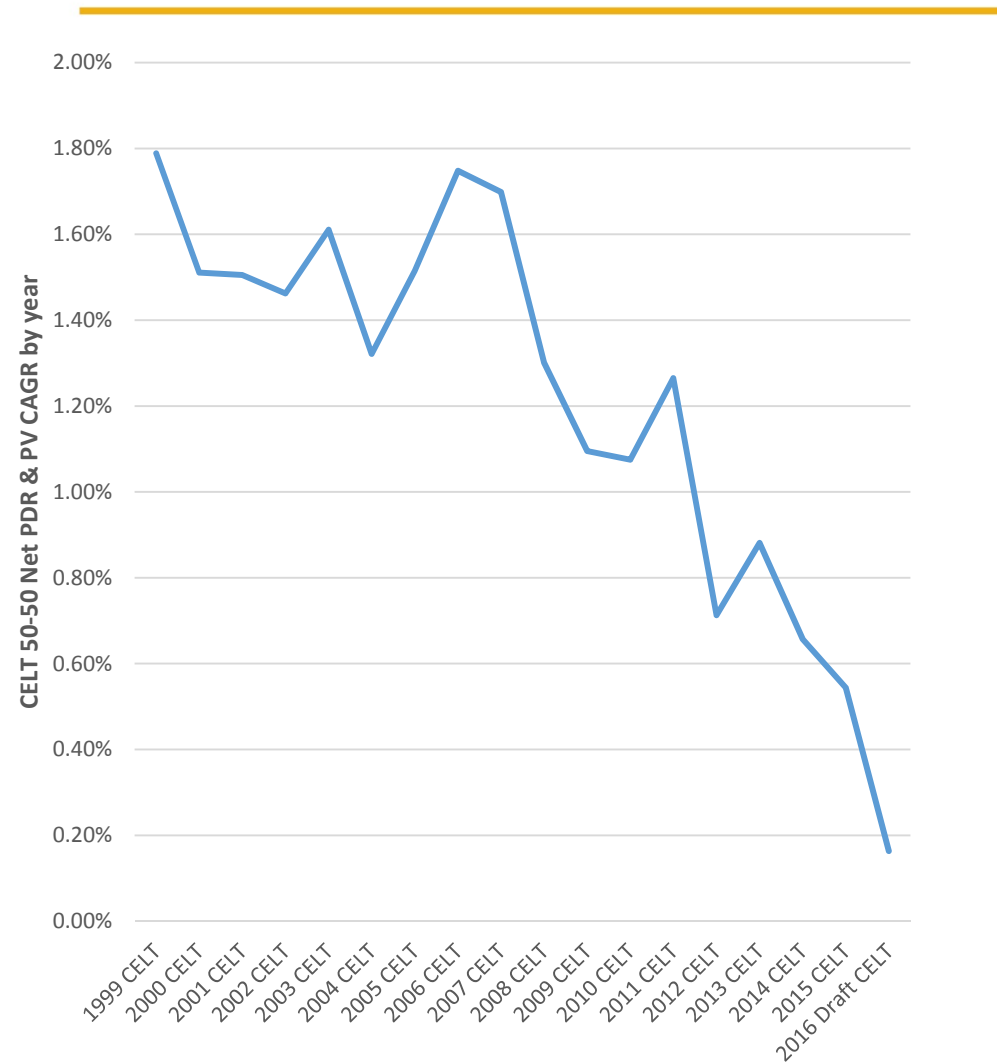
## Regional Network Service Rates

	<u>(\$ / kW-year)</u>
<b>RNS Rate at 6/1/14 (a)</b>	<b>\$90.28</b>
<b>ROE Adjustment (b)</b>	<b>(\$2.93)</b>
<b>2015 Forecast</b>	<b>\$6.47</b>
<b>True-ups</b>	<b>(\$0.54)</b>
<b>Load Impact</b>	<b><u>\$5.42</u></b>
<b>RNS Rate at 6/1/15</b>	<b>\$98.70</b>

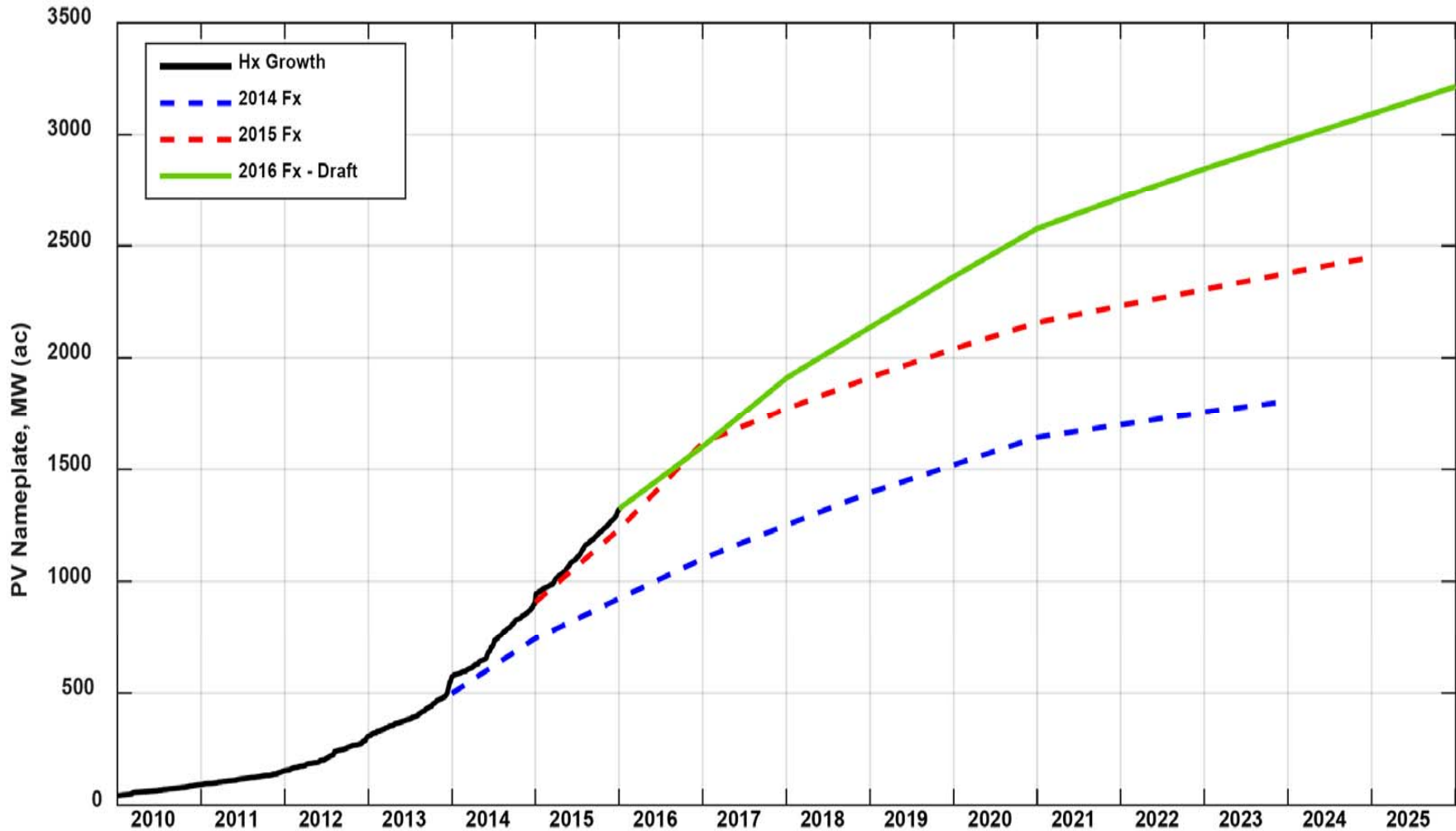
“Primary drivers of the 6/1/15 RNE Rate increase are the 2015 forecast and the decreased 12CP loads.” -PTOAC

CELT	CAGR
1999 CELT	1.79%
2000 CELT	1.51%
2001 CELT	1.51%
2002 CELT	1.46%
2003 CELT	1.61%
2004 CELT	1.32%
2005 CELT	1.51%
2006 CELT	1.75%
2007 CELT	1.70%
2008 CELT	1.30%
2009 CELT	1.10%
2010 CELT	1.07%
2011 CELT	1.27%
2012 CELT	0.71%
2013 CELT	0.88%
2014 CELT	0.66%
2015 CELT	0.54%
2016 Draft CELT	0.16%

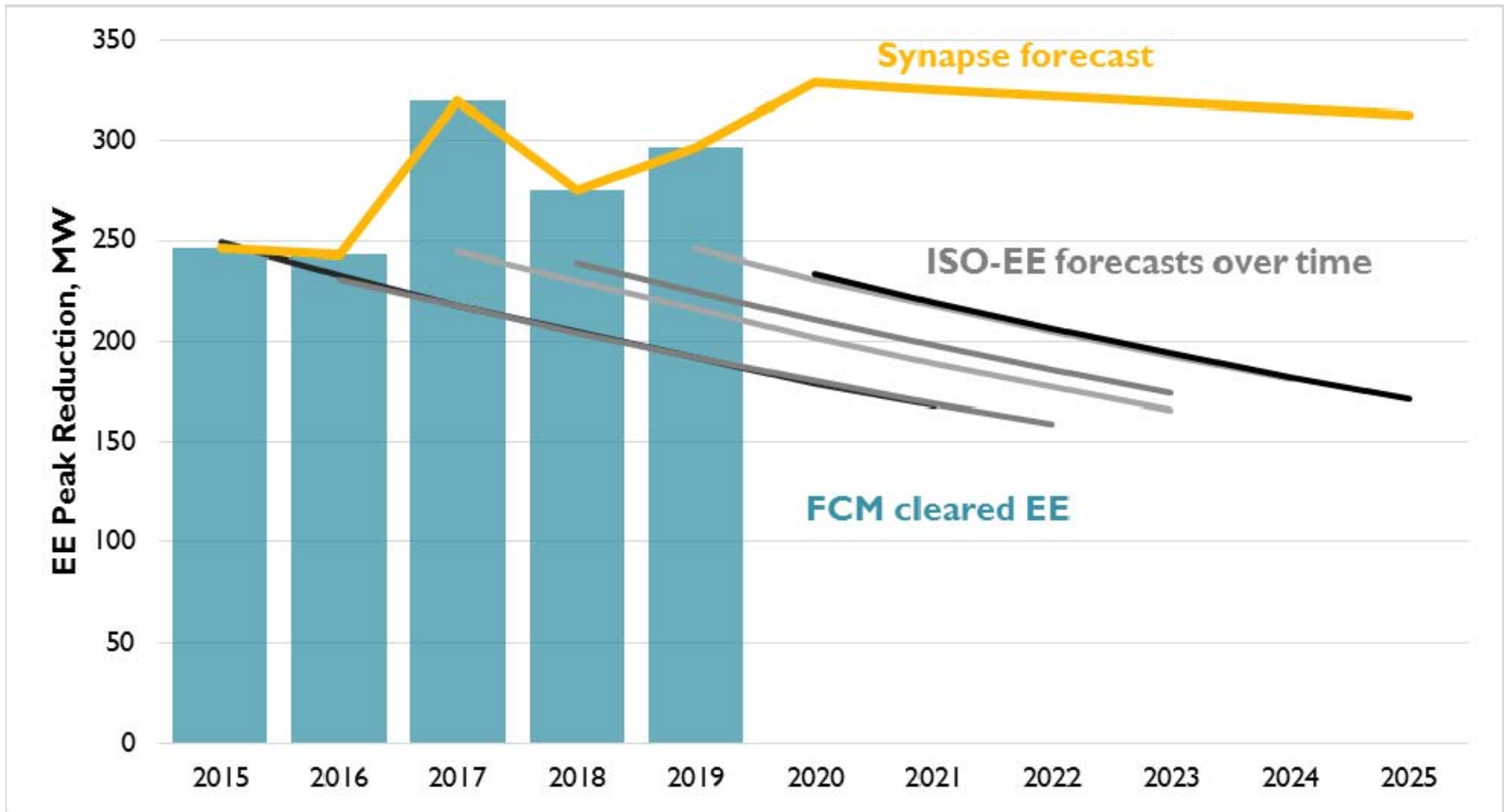
## CELT Compound Annual Growth Rates



# ISO under-forecasting DG



# ISO under-forecasting EE





# Challenges for State Commissions

---

- ❖ Get the best picture you can
  - ❖ Peak load and energy growth rates
  - ❖ Forecasts of new resources
  - ❖ Policy impacts on resources
- ❖ Align rates with costs
  - ❖ Time of use based to align with markets
  - ❖ Avoid static charges
  - ❖ Third-party providers



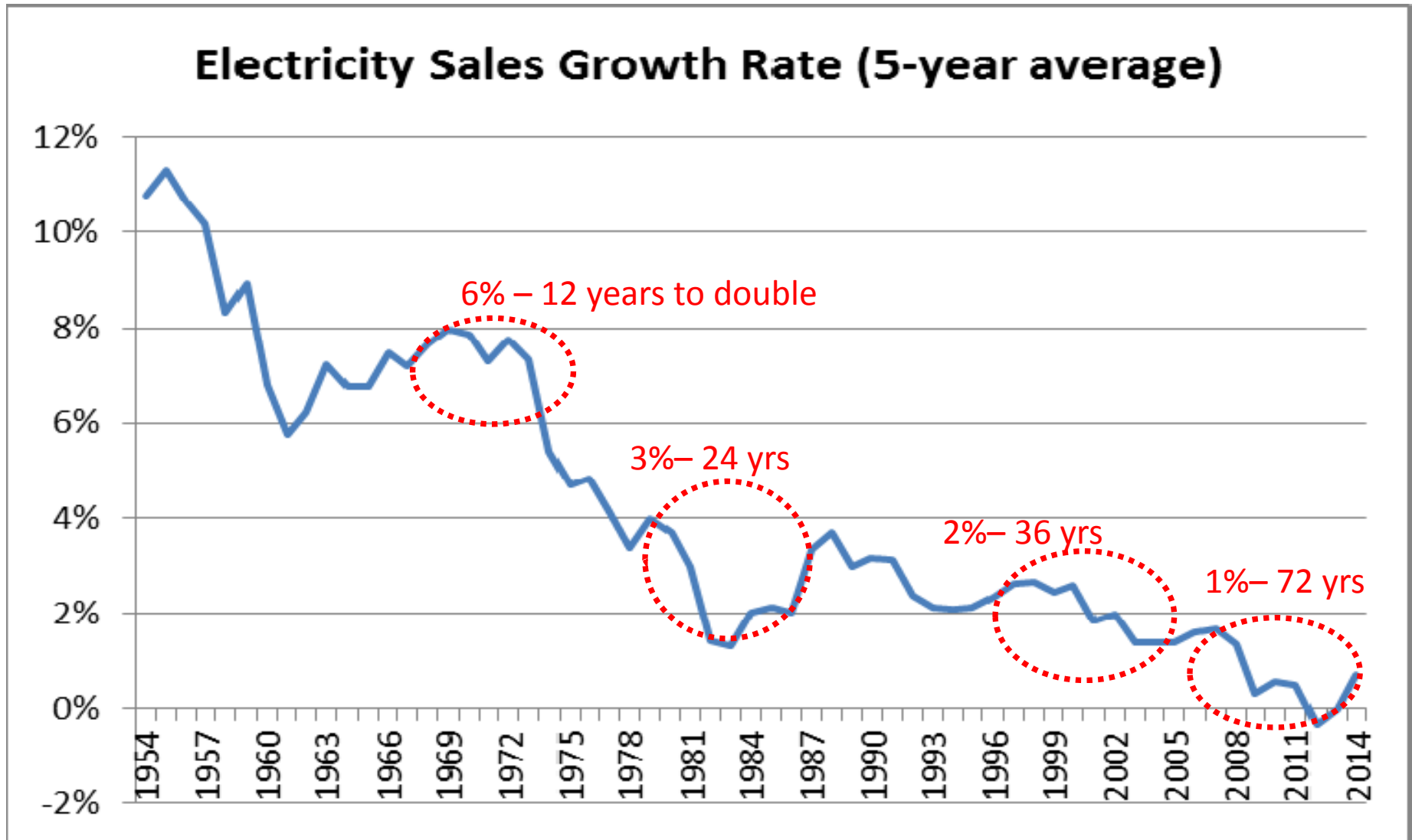
---

# Questions?

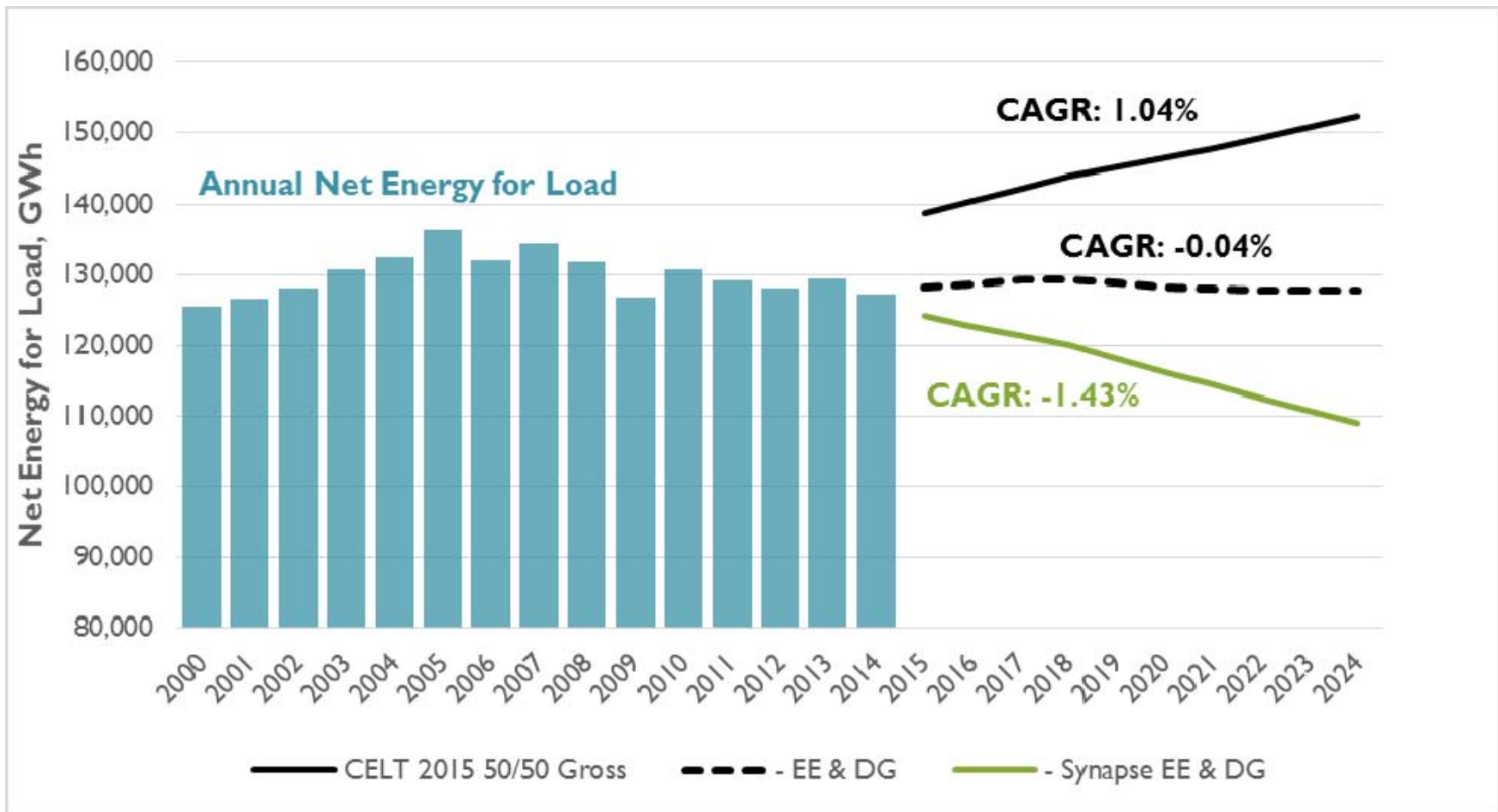
# FCM trends

	Rest-of-Pool		Maine		NEMA		Connecticut		SEMA-RI		SNE	
	New	Existing	New	Existing	New	Existing	New	Existing	New	Existing	New	Existing
FCA 1	\$4.50		\$4.50									
FCA 2	\$3.60		\$3.60									
FCA 3	\$2.95		\$2.95									
FCA 4	\$2.95		\$2.95									
FCA 5	\$3.21		\$3.21									
FCA 6	\$3.43		\$3.43									
FCA 7	\$3.15		\$3.15		\$14.999	\$6.661						
FCA 8	\$15.00	\$7.025	\$15.00	\$7.025	\$15.00		\$15.00	\$7.025				
FCA 9	\$9.551				\$9.551		\$9.551		\$17.728	\$11.08		
FCA 10	\$7.03										\$7.03	

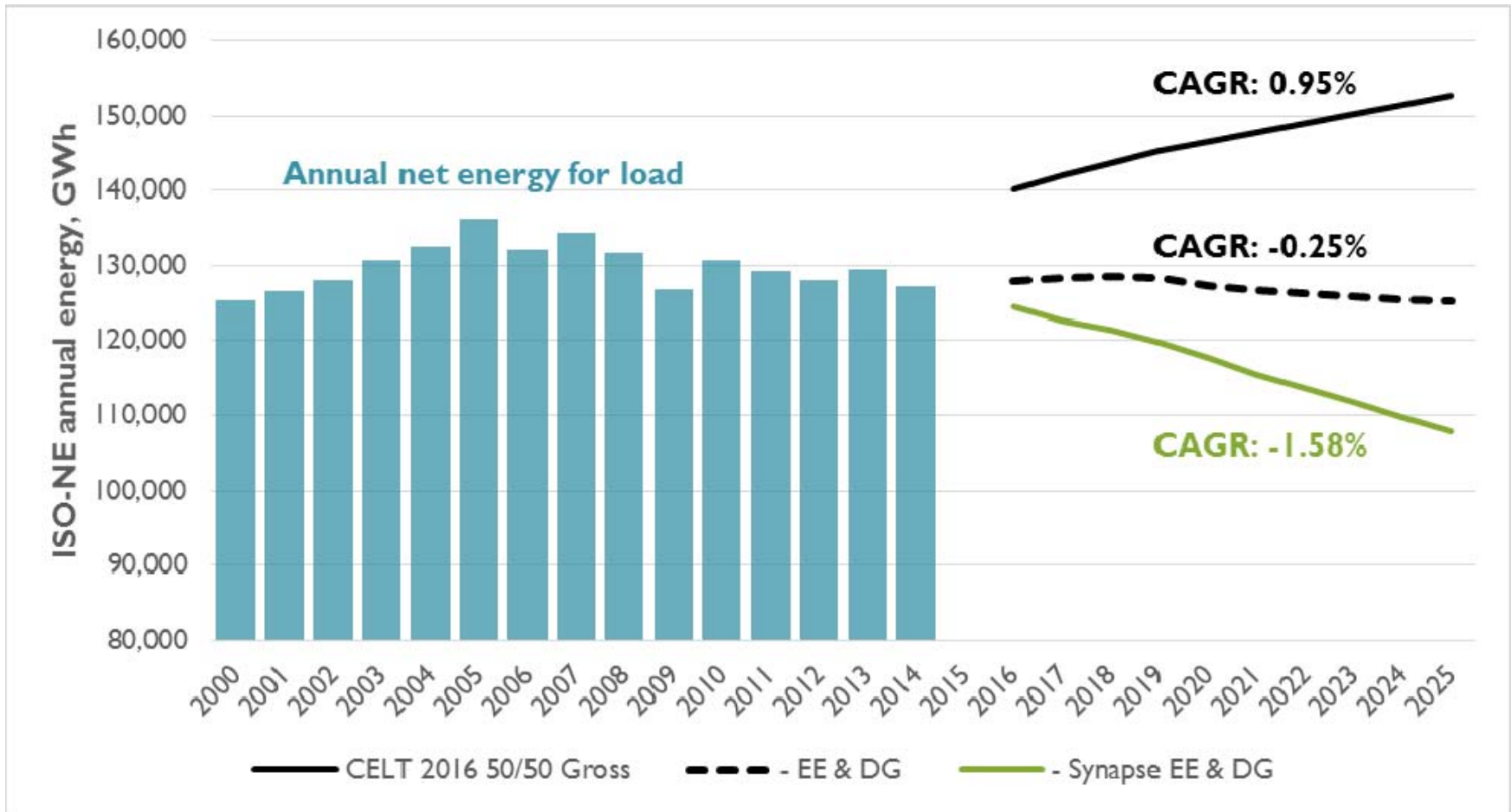
# Diminishing growth expands horizon



# 2015 Synapse annual energy adjustments

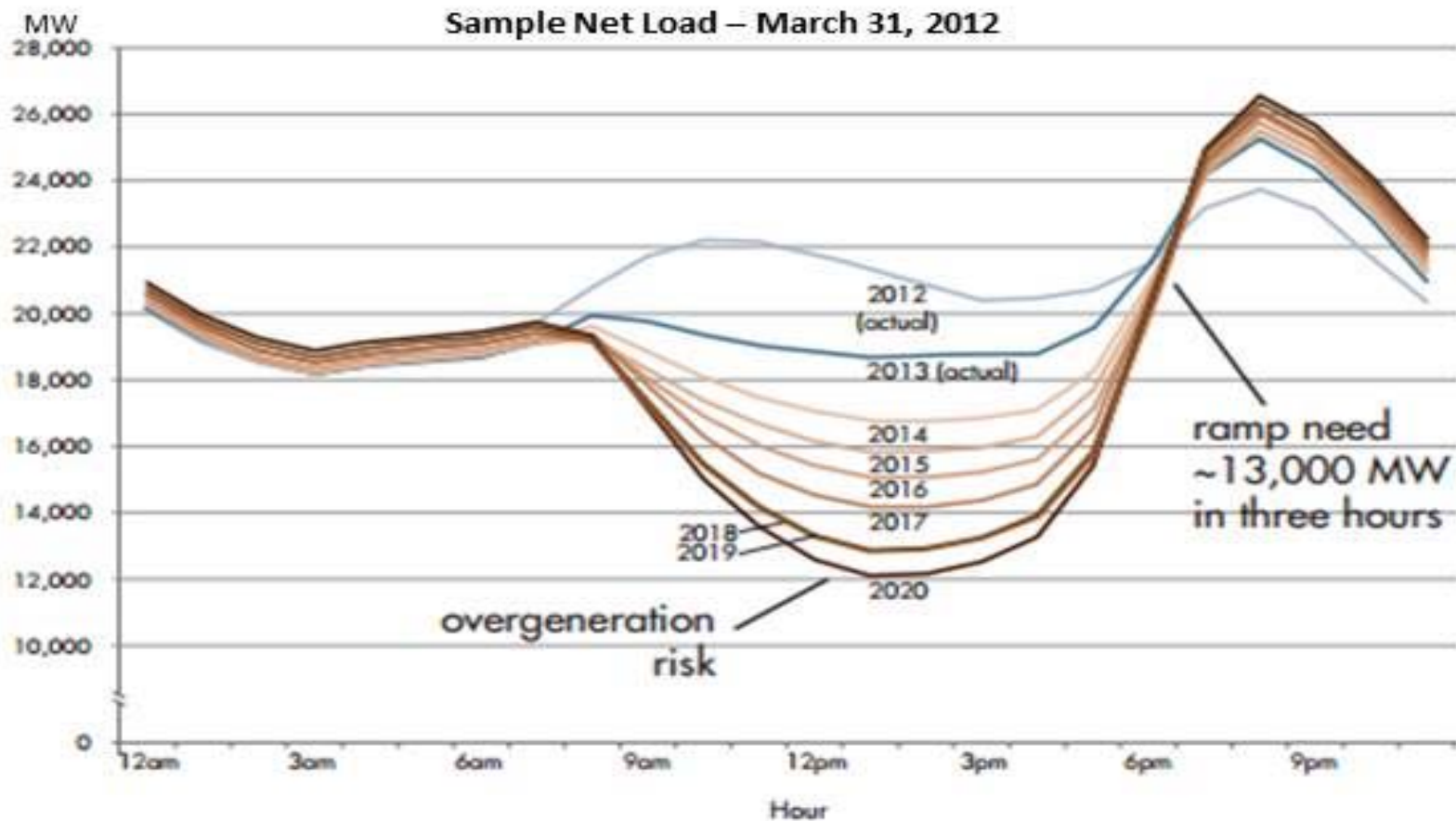


# 2016 Synapse annual energy adjustments



# California Duck Curve

The duck curve shows steep ramping needs and overgeneration risk



(from the California Independent System Operator)

## **E4 E4 Group consists of the following organizations**

---

**Conservation Law Foundation** is a nonprofit, member –supported public interest advocacy organization dedicated to solving environmental problems that threaten the people, communities, and natural resources of New England.

**Acadia Center** is a regional nonprofit organization incorporated in Maine that researches and advocates innovative policies that tackle our environmental challenges while promoting sustainable economies.

**Grid Solar** is a Maine company that utilizes “non-transmission” alternatives built around smart grid tools and new clean energy technologies to solve reliability concerns and provide new sources of clean, renewable energy – all at lower total costs and with less risk than major new transmission build-outs.



## **E4 Group consists of the following organizations**

---

**Industrial Energy Consumer Group** is a Maine-based incorporated association of large energy consumers. The IECG participates in state, regional and federal energy regulatory proceedings, litigation, and legislative matters pertaining to the cost and supply of energy.

**Maine Public Advocate** is an agency of the State of Maine charged with representing the ratepayers of Maine's regulated utilities.

**Natural Resources Council of Maine** is a nonprofit membership organization protecting, restoring, and conserving Maine's environment, now and for future generations.