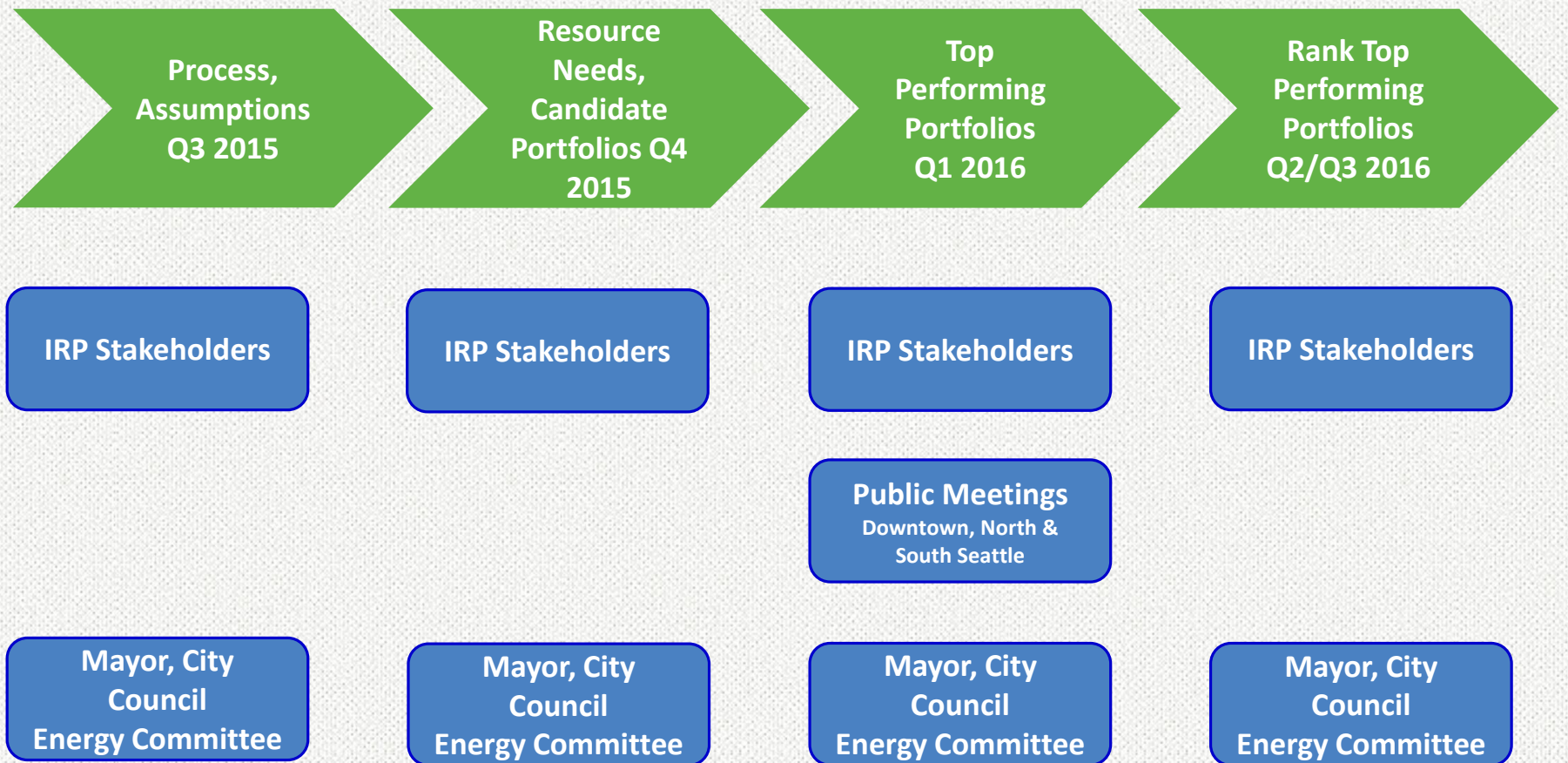


# SEATTLE CITY LIGHT IRP PUBLIC INPUT PROCESS





# LOAD FORECAST DISCUSSION

City Light Review Panel Meeting

May 17, 2016

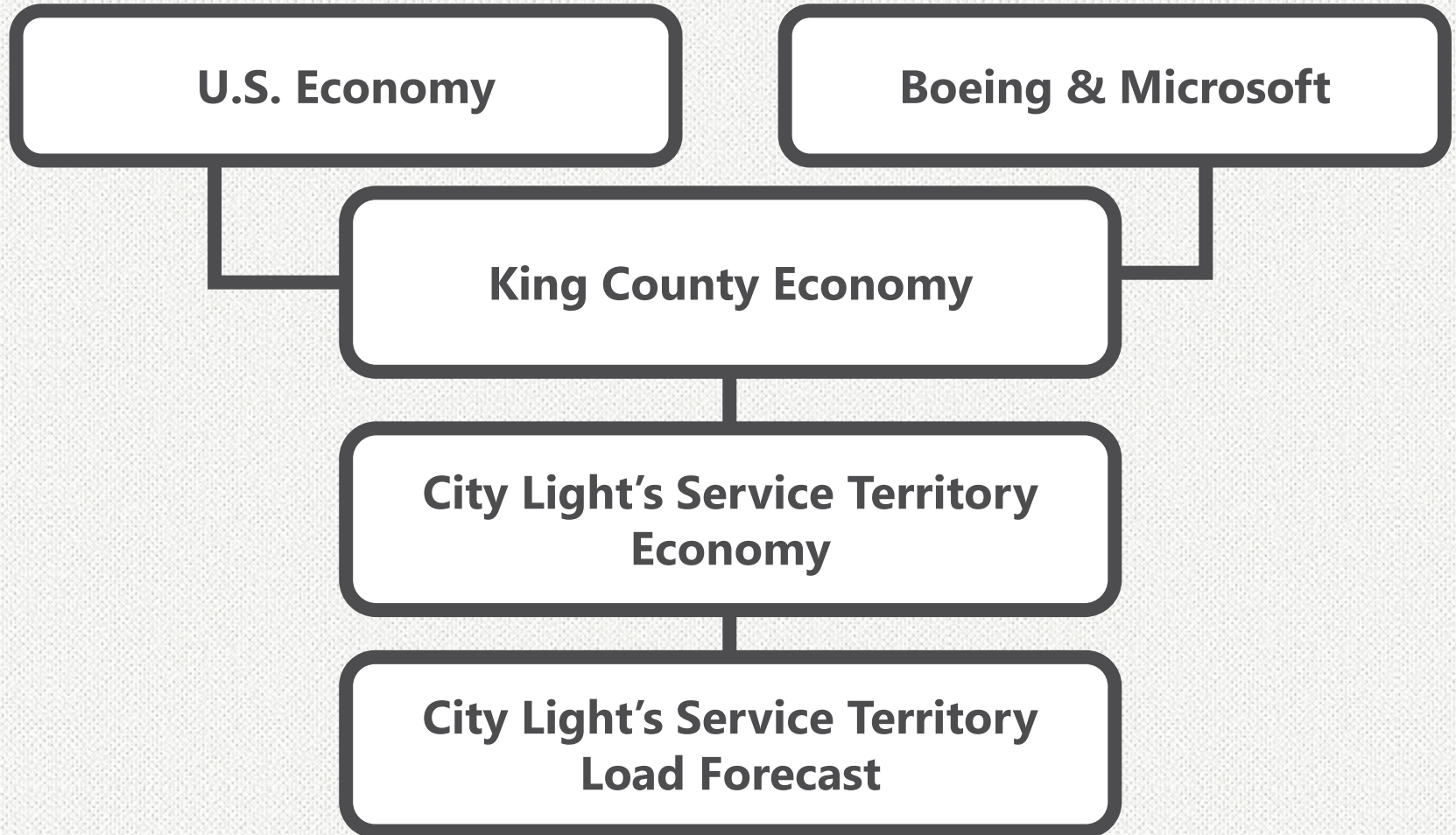


## ASSUMPTIONS OVERVIEW

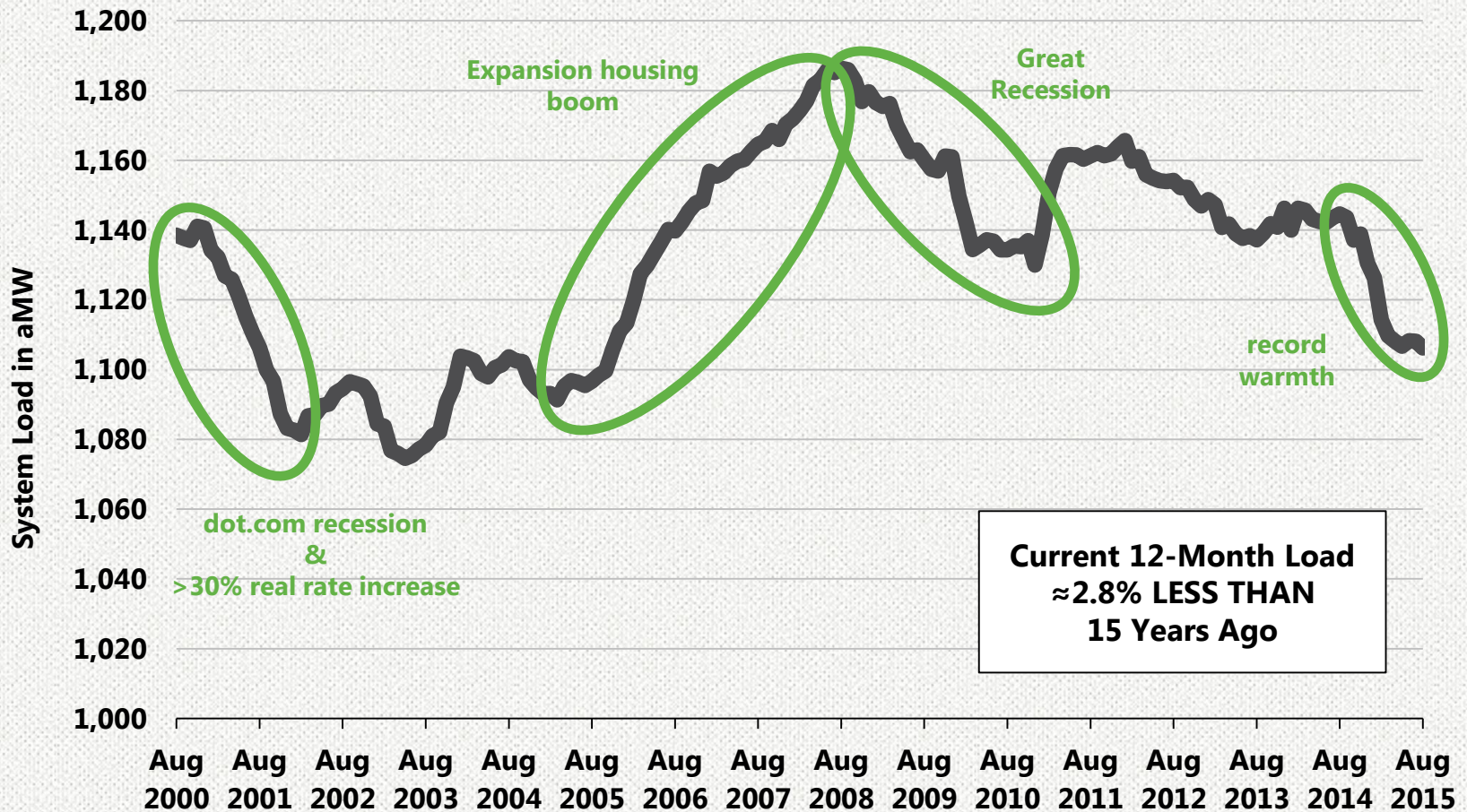
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- Economic outlook includes inputs on U.S. growth in GDP, industrial production, employment, income, CPI, housing starts & population
- Forecast based on “normal weather”
- Load forecast assumes historic **achieved** conservation continues into the future
- Forecast of tunnel boring machine not included

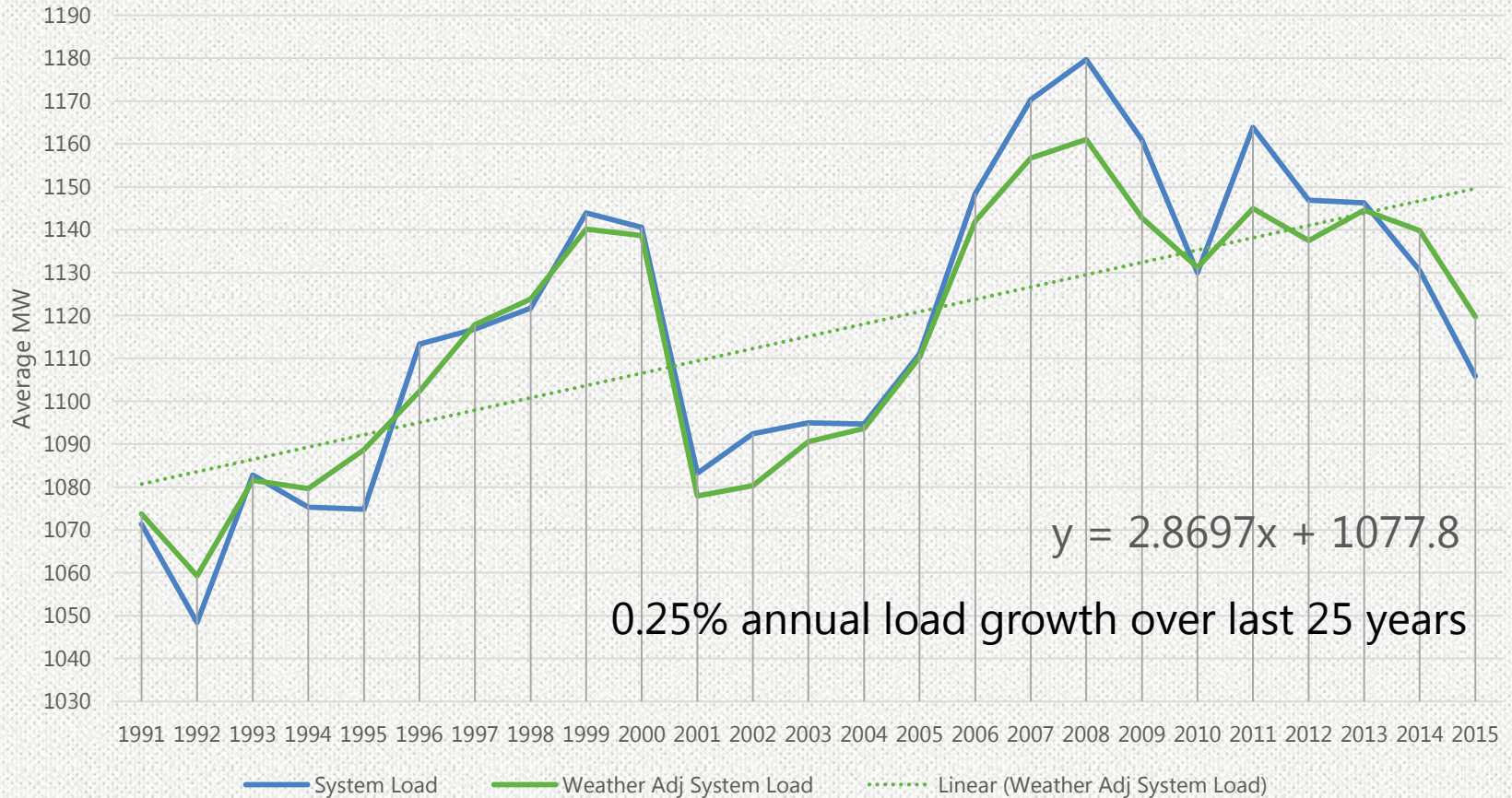
# LOAD FORECAST MODEL STRUCTURE



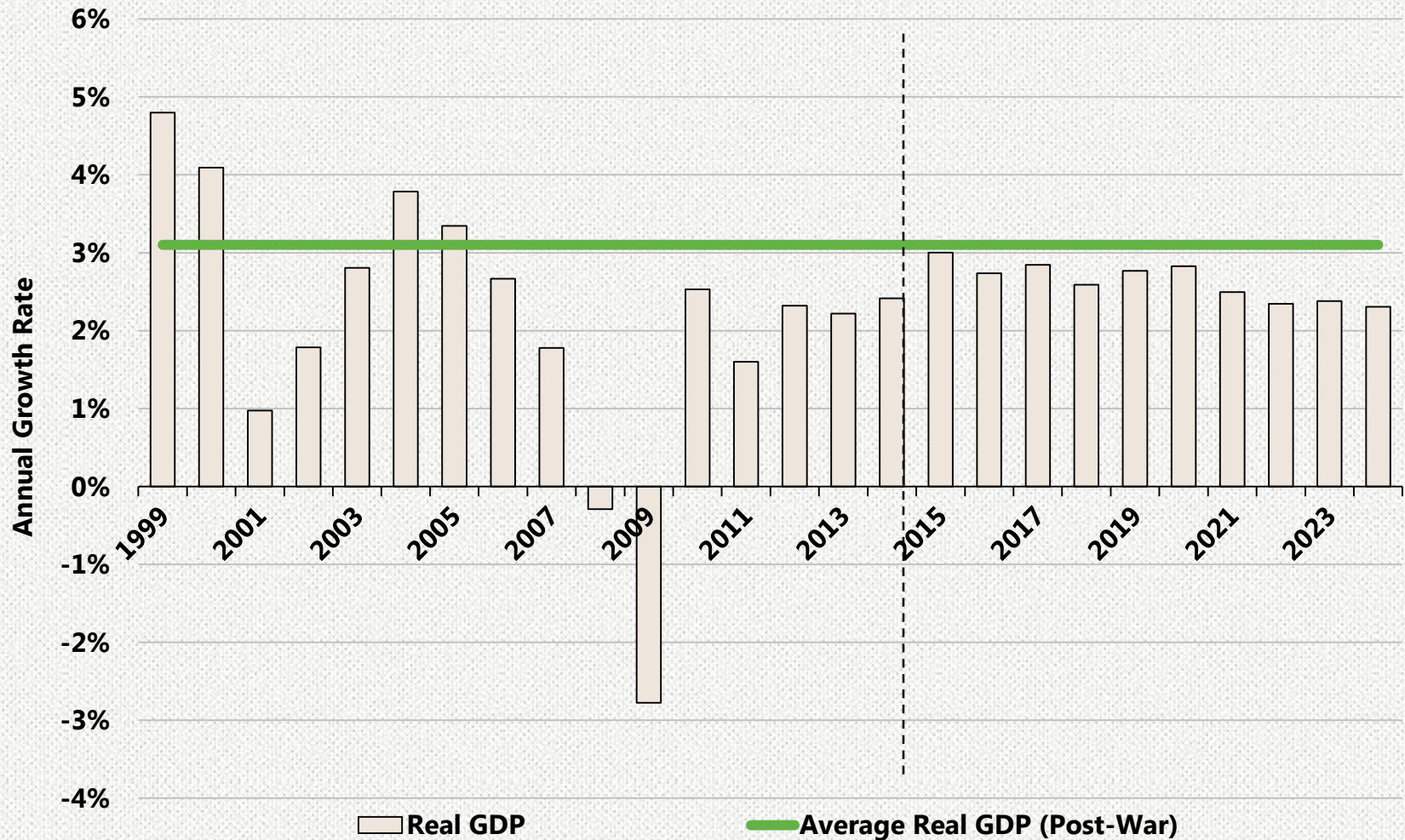
# CITY LIGHT LOAD HISTORY – ROLLING 12 MONTH



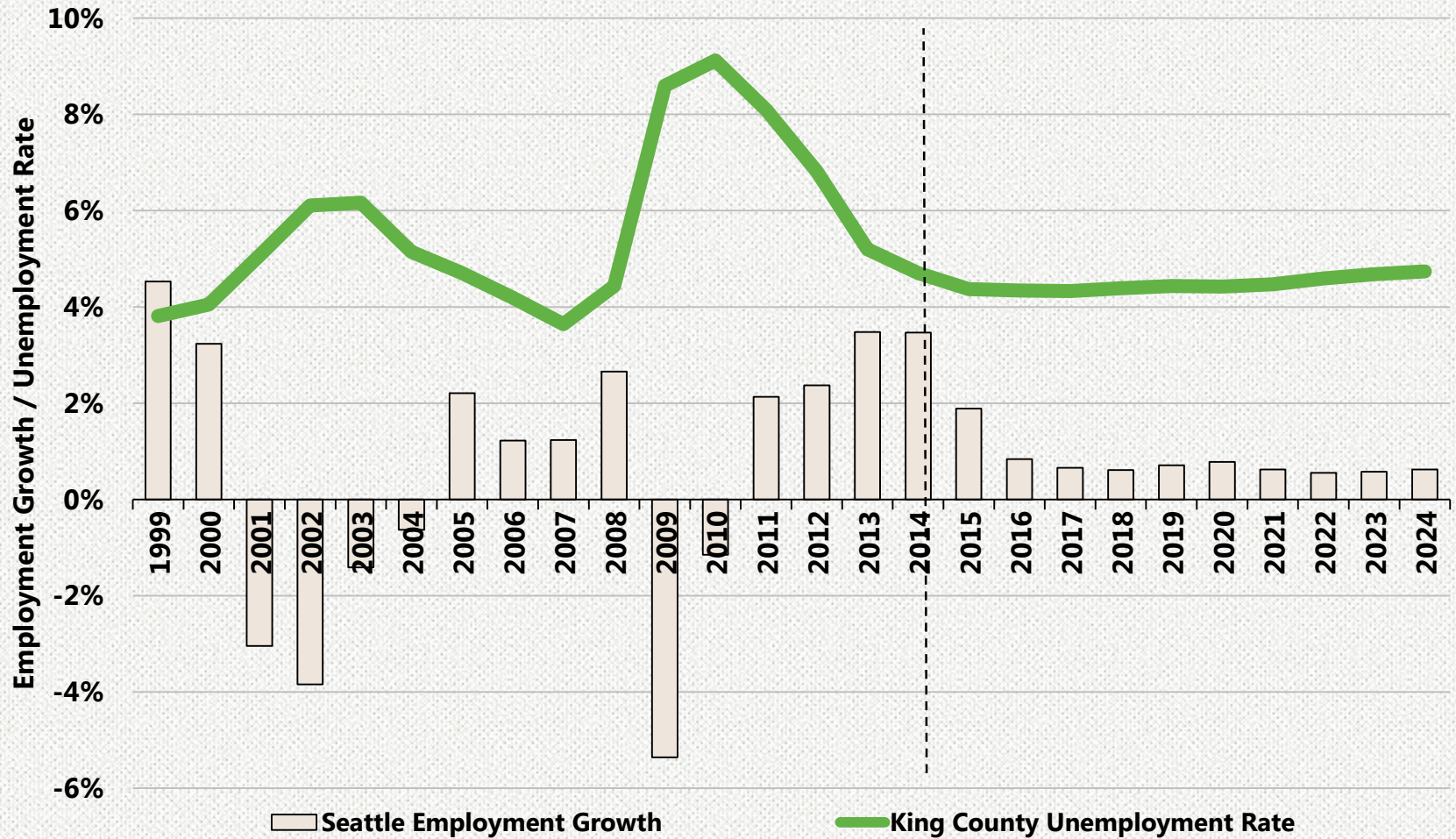
## City Light System Load and Weather Adjusted Load



# "NEW NORMAL" OF ECONOMIC GROWTH?

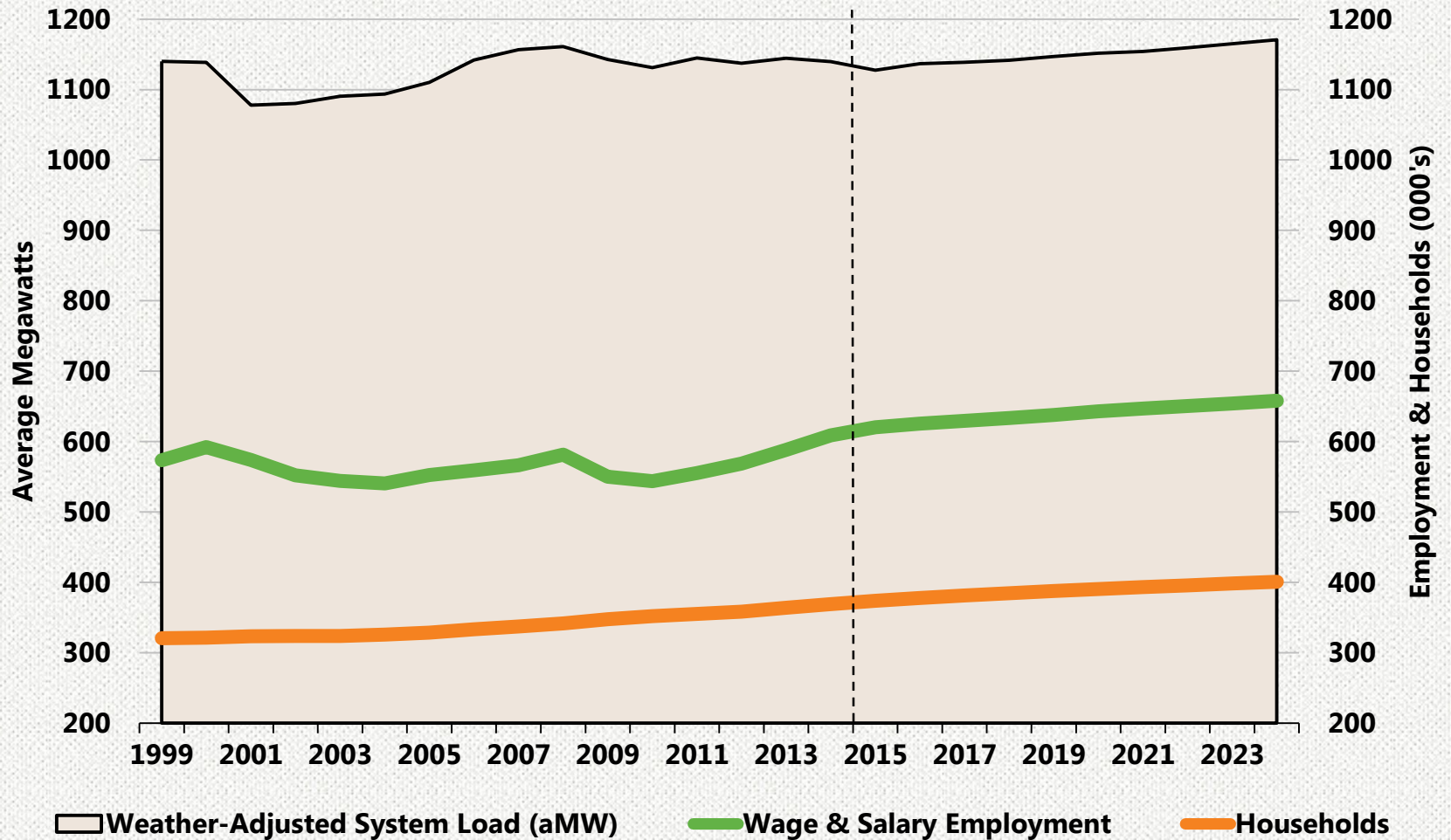


# LOCAL LABOR MARKETS

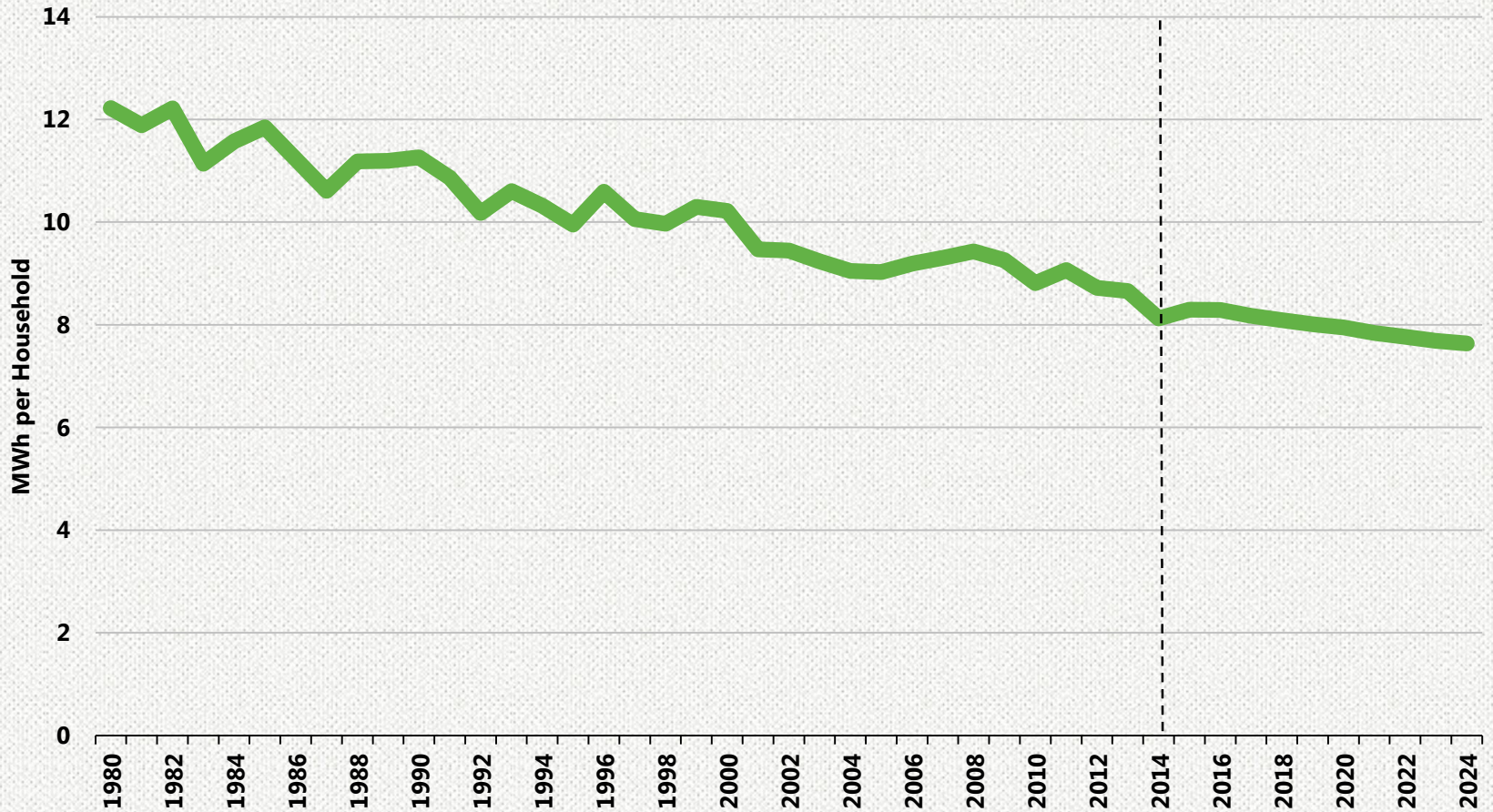




# LOAD, EMPLOYMENT, AND HOUSEHOLDS

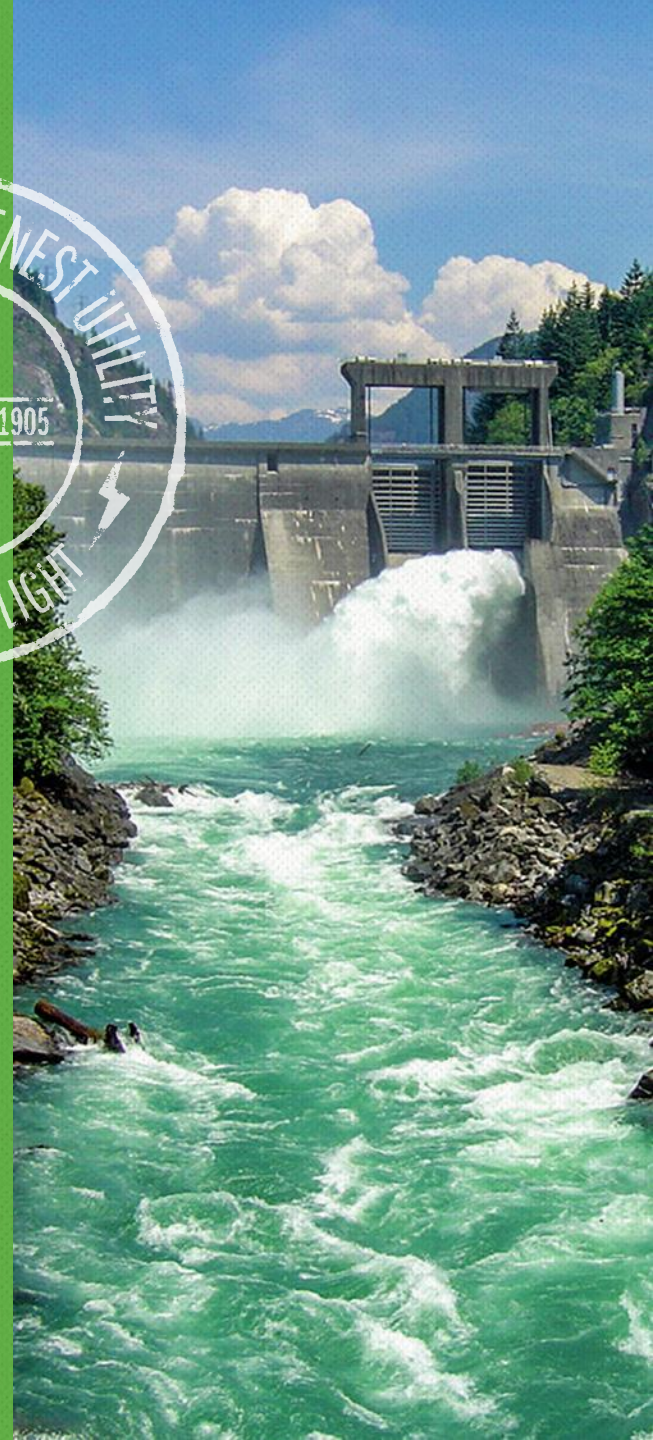


# ENERGY EFFICIENCY, CODES, & FUEL SWITCHING.... RESIDENTIAL MWH PER HOUSEHOLD





# LAND USE



# RESIDENTIAL EXAMPLE

## NO NET ENERGY CHANGE

2009



- One single family home and one duplex
- 31,000 kWh total
- ~10,000 kWh per unit

2013



- Six townhomes
- 32,000 kWh total
- ~6,000 kWh per unit

# COMMERCIAL EXAMPLE

## NET ENERGY DECREASE

2011



2015



- Group Health Anhalt
- Historically used as an office building
- 20,000 Sq ft
- ~220,000 kWh Annually

- Original building renovated plus 10K sq ft modern addition
- 30,000 Sq ft Total
- ~180,000 kWh Annually

# COMMERCIAL EXAMPLE

## NET ENERGY INCREASE

2014



- College Club of Seattle
- 15,000 Sq ft
- ~500,000 kWh Annually

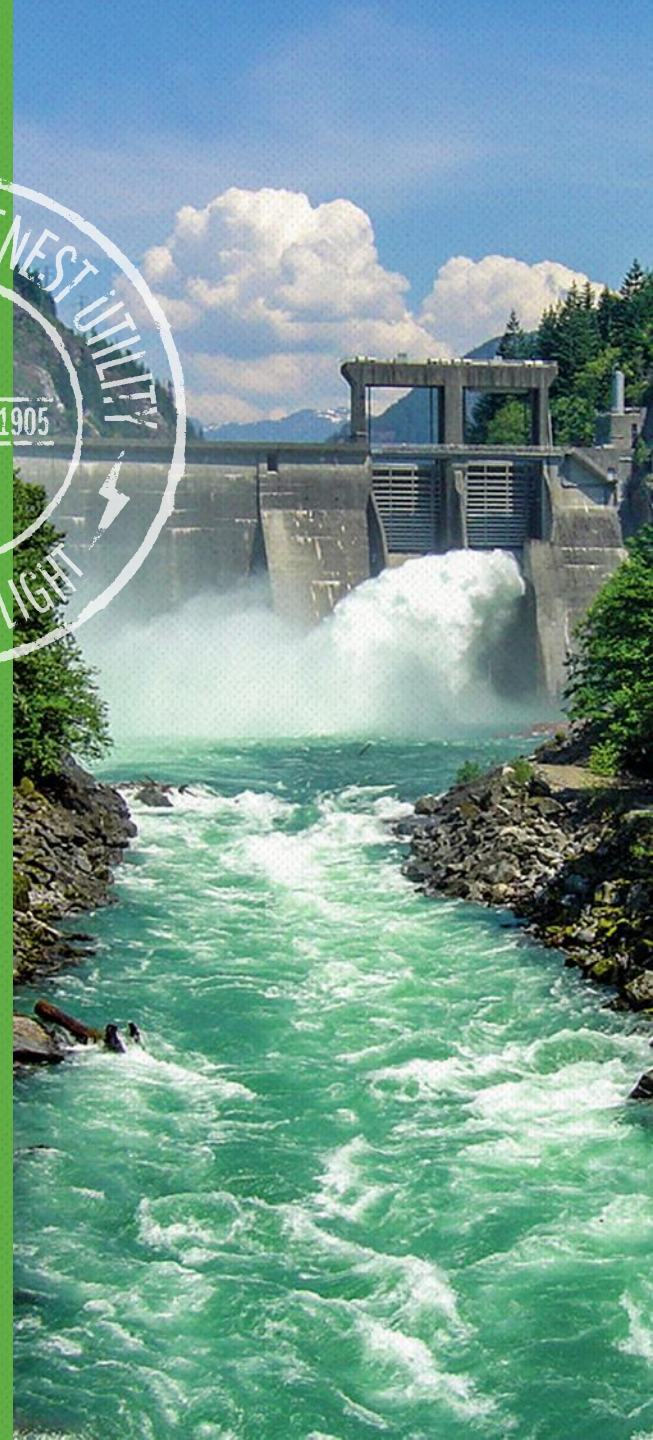
2017



- Madison Center
- 780,000 Sq ft
- ~10 million kWh annually



# ENERGY EFFICIENCY



# EFFICIENCY ECOSYSTEM

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**Utility  
Programs**



**Codes &  
Standards**

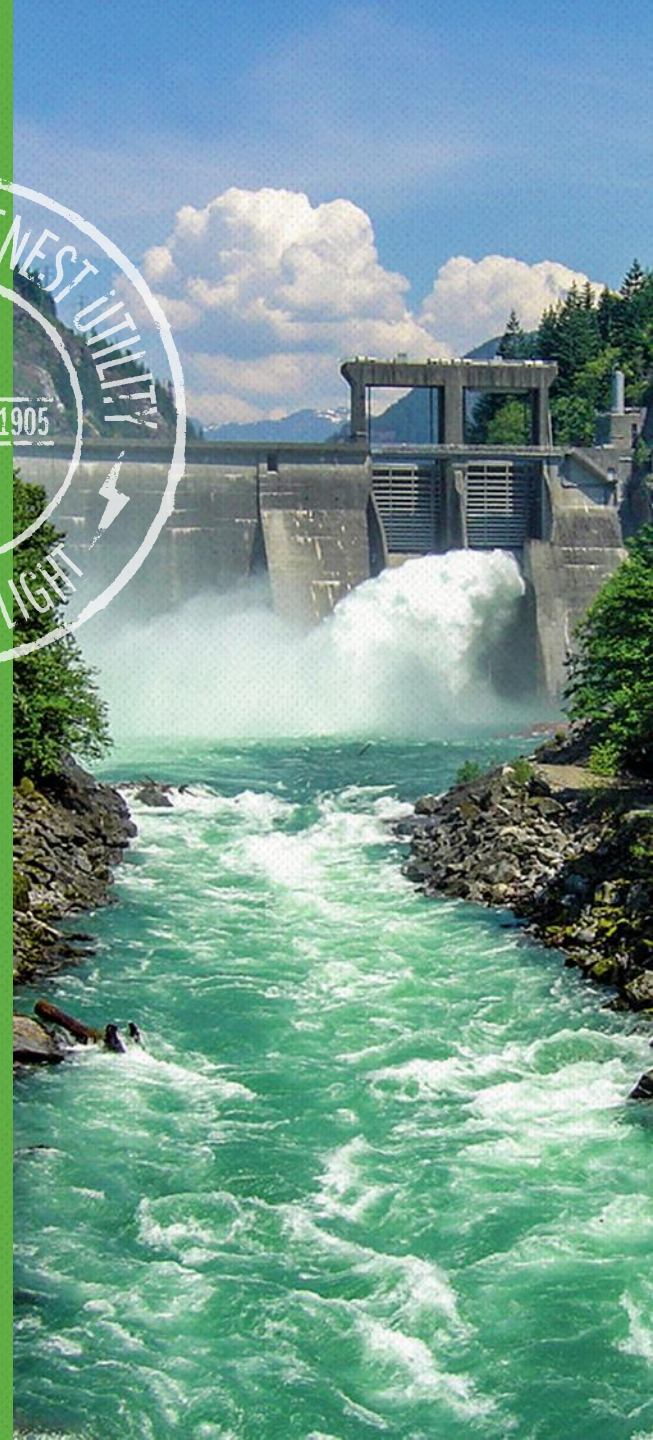


**Technology  
Adoption**

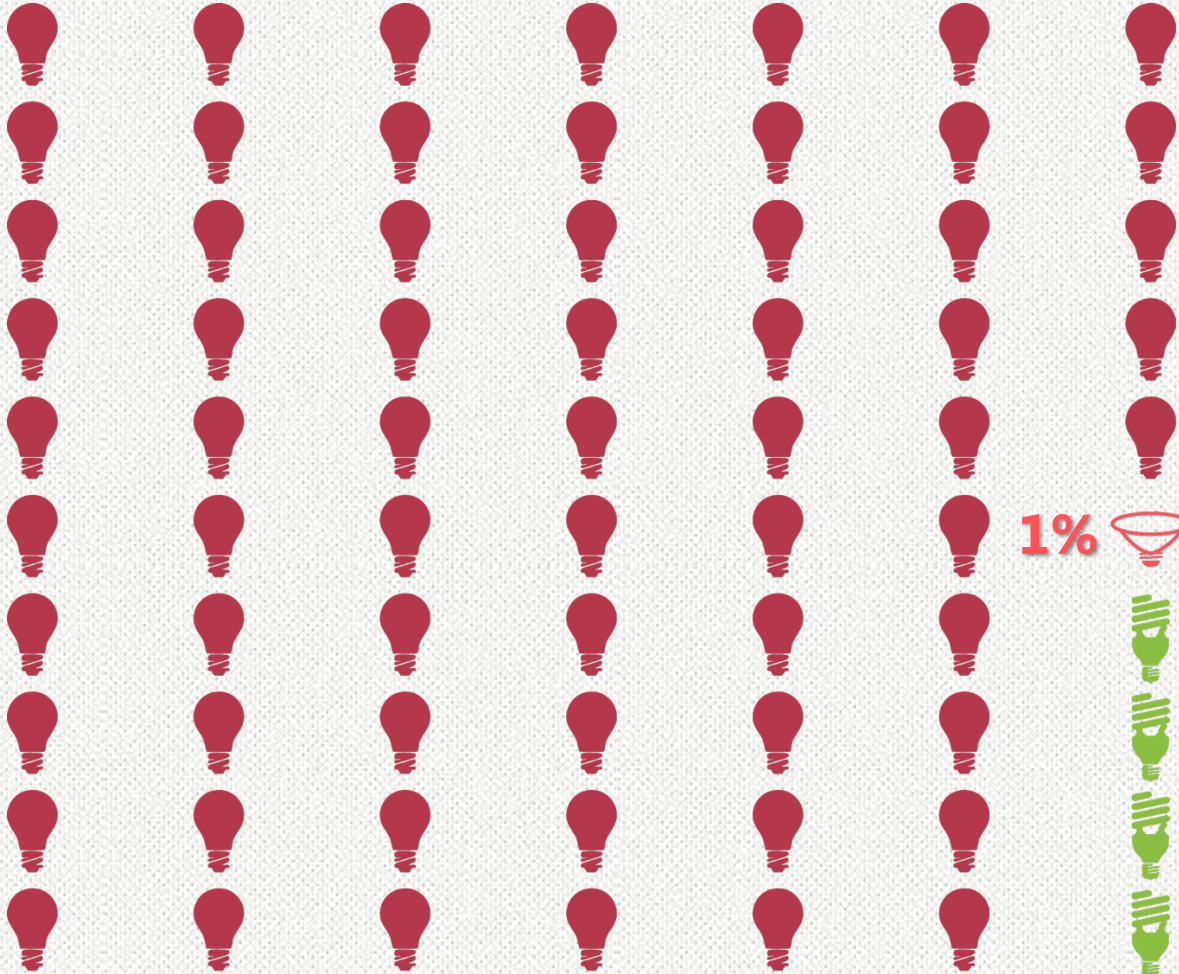




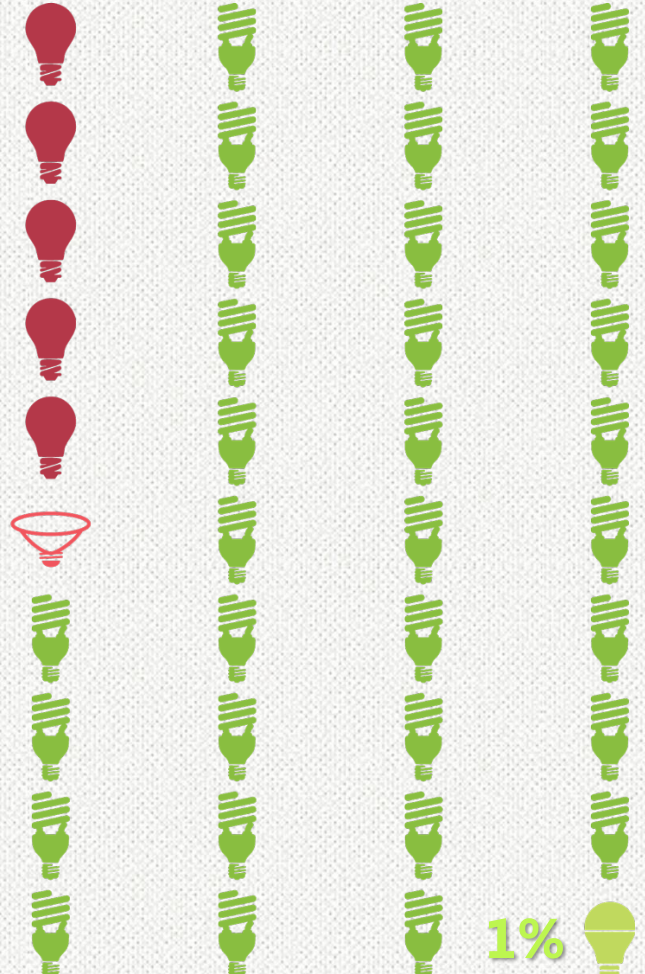
# LIGHTING EXAMPLE



65%



33%



1%



1%



# 2011



INC



HAL



CFL



LED

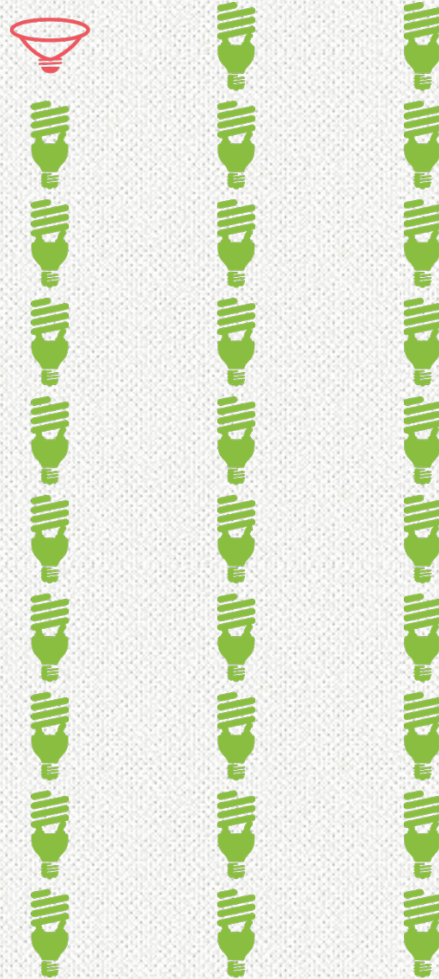
11%



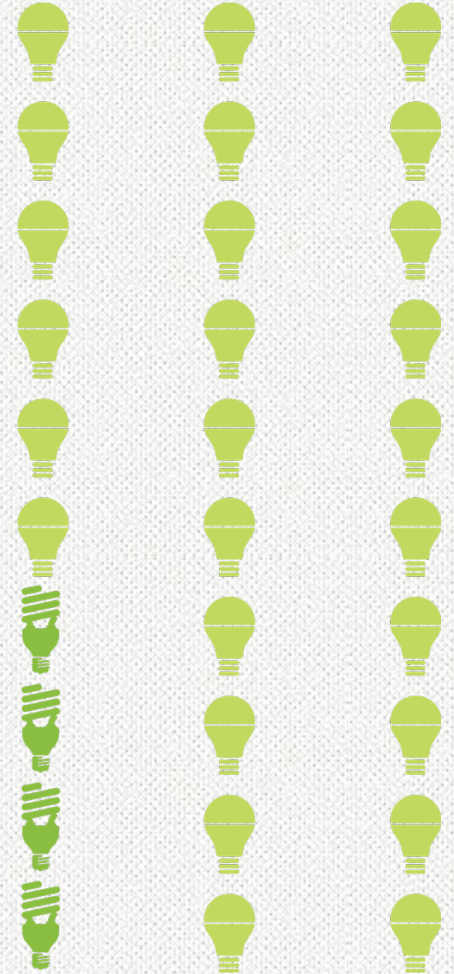
30%



33%



26%



2015

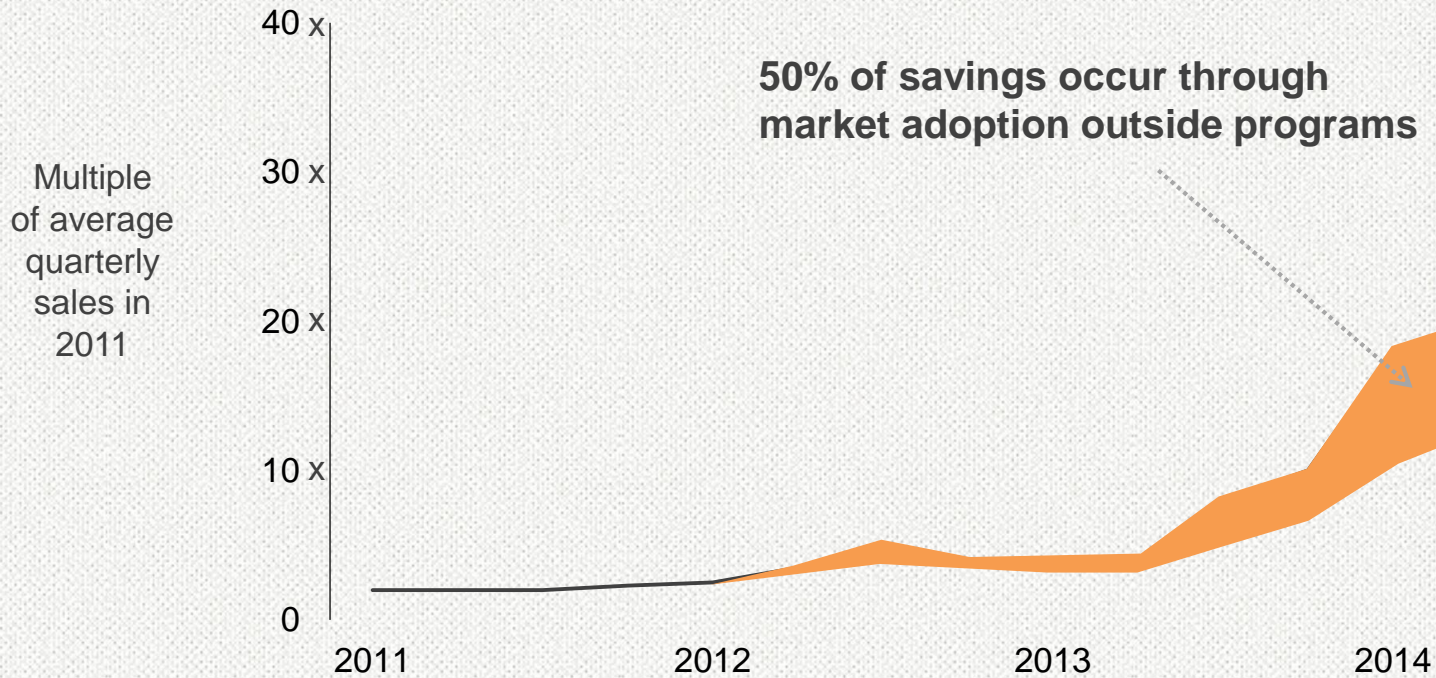


## EFFICIENT LIGHTING

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- Lighting is the most important source of savings
  - 60% of City Light's programmatic achievement
- BPA estimates that utility programs touch roughly one half of all efficient bulbs
- In City Light's service territory, this could be ~5 aMW annually from lighting alone occurring outside of programs
  - This is largely due to the rapidly changing LED market since 2011

# LED EXAMPLE





# HVAC EXAMPLE



## HVAC EXAMPLE

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- HVAC programs are much different
- Slower market with less technology change
- Utility programs only account for 10-12% of heat pump sales in the region

## 2015 SUMMARY

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- Economic growth expected to continue, yet does so below historical trend
- Local labor markets moderating after recovery from recent downturn
- Rapid growth in residential construction not expected to be sustainable in long-term
- Large amount of high-rise commercial buildings not yet completed
- 20-year average annual growth rate  $\approx 0.4\%$

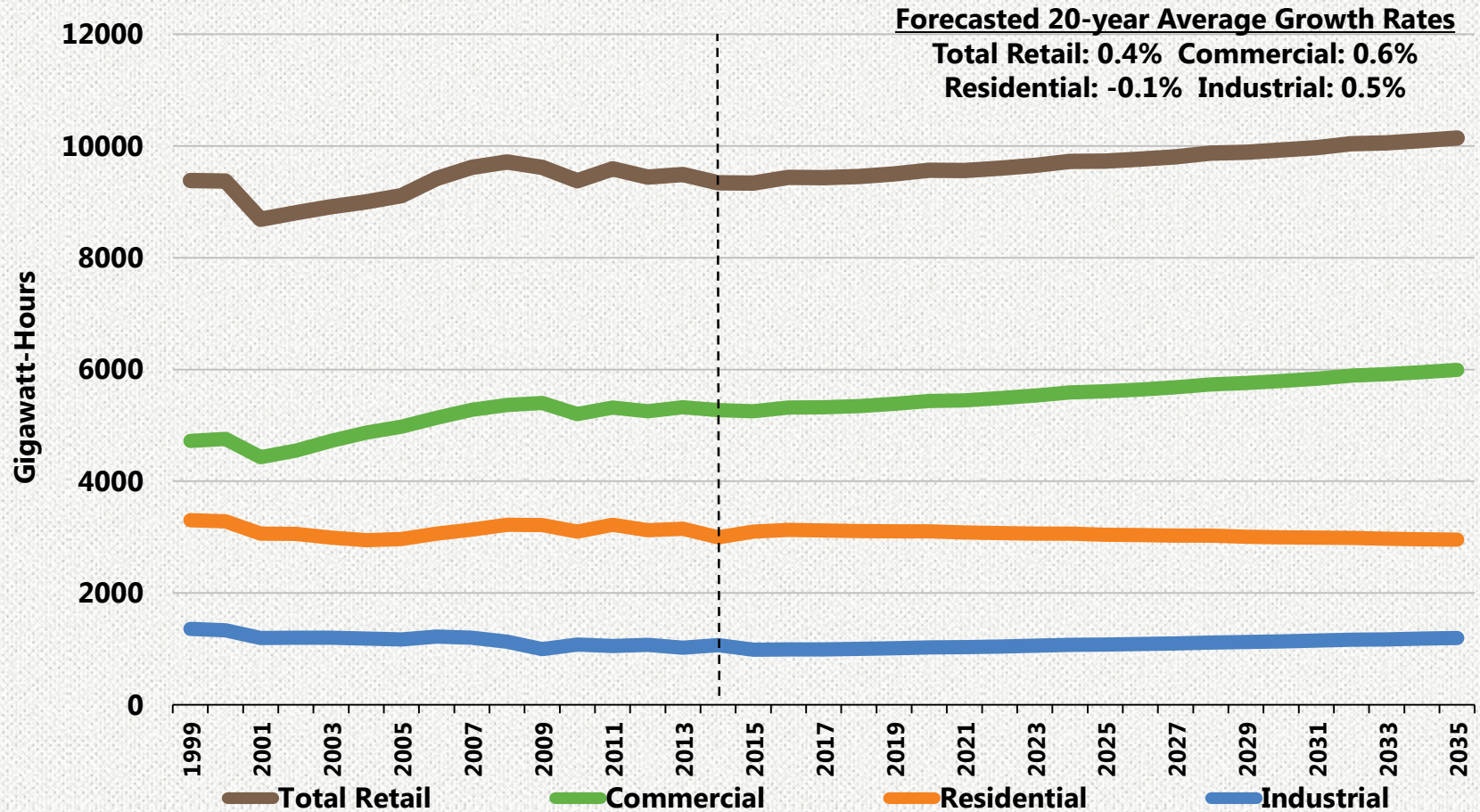


## WHERE IS LOAD GOING IN THE FUTURE?

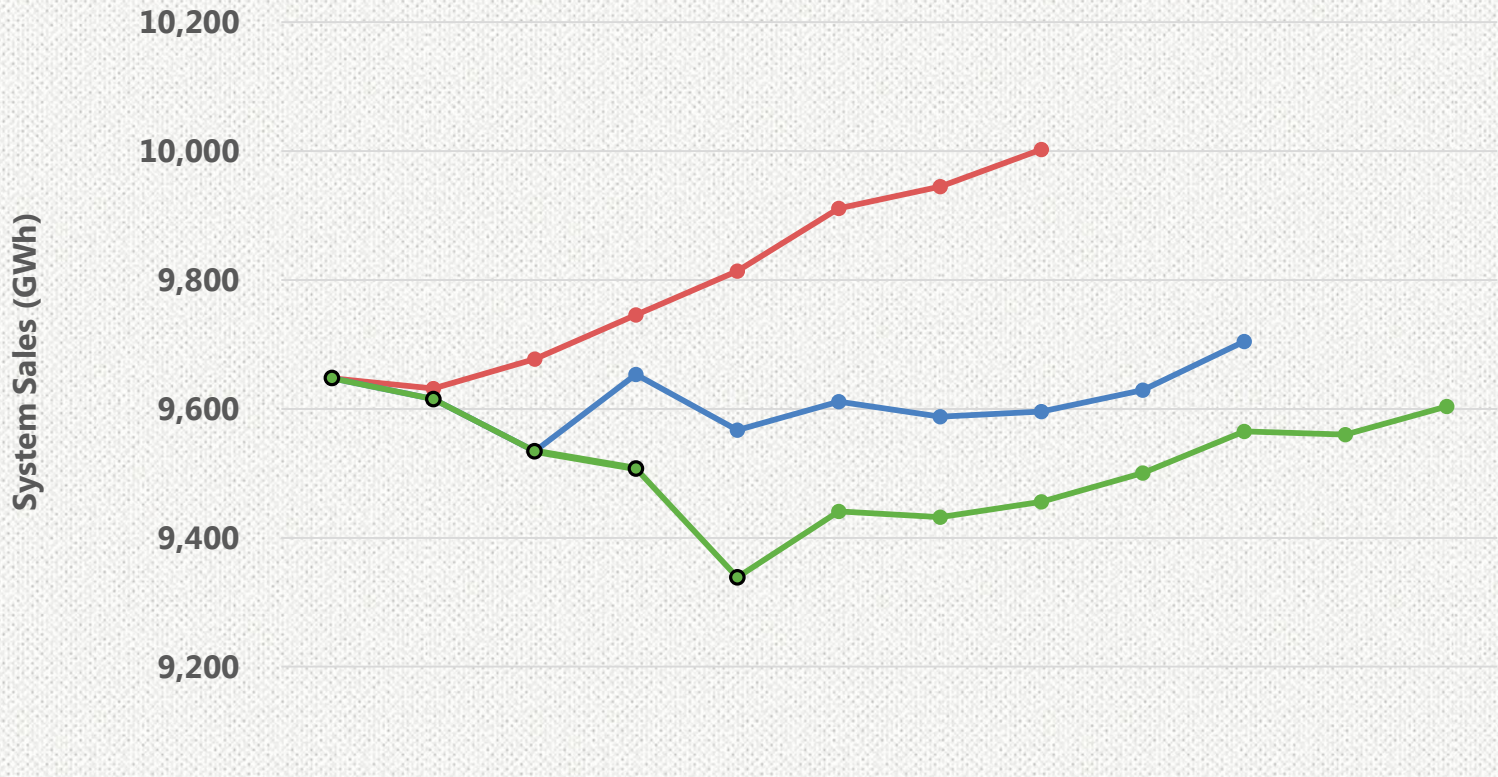
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- City Light's customers are changing the way they use electricity
  - ▼ Customers have embraced conservation with large long lasting effects
  - ▼ Distributed generation is reducing load the utility is paid for (not consumption)
  - ▲ Plug loads are increasing significantly
  - ▲ Large surge in commercial real estate
  - ▲ Electric vehicles and battery storage will increase consumption

# LOAD HISTORY & FORECAST BY CUSTOMER CLASS



# TOTAL SYSTEM SALES FORECAST



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Adopted 2012 SP	9,648	9,632	9,677	9,746	9,814	9,911	9,945	10,003				
2014 Adopted Plan (2013 LF)	9,648	9,615	9,534	9,653	9,567	9,611	9,588	9,596	9,629	9,705		
2016 Plan Update (2015 LF)	9,648	9,615	9,534	9,507	9,339	9,441	9,432	9,456	9,501	9,565	9,560	9,604



# CITY LIGHT

## OUR VISION

To set the standard—to deliver the best customer service experience of any utility in the nation.

## OUR MISSION

Seattle City Light is dedicated to exceeding our customers' expectations in producing and delivering environmentally responsible, safe, low-cost and reliable power.

## OUR VALUES

Excellence, Accountability, Trust and Stewardship.

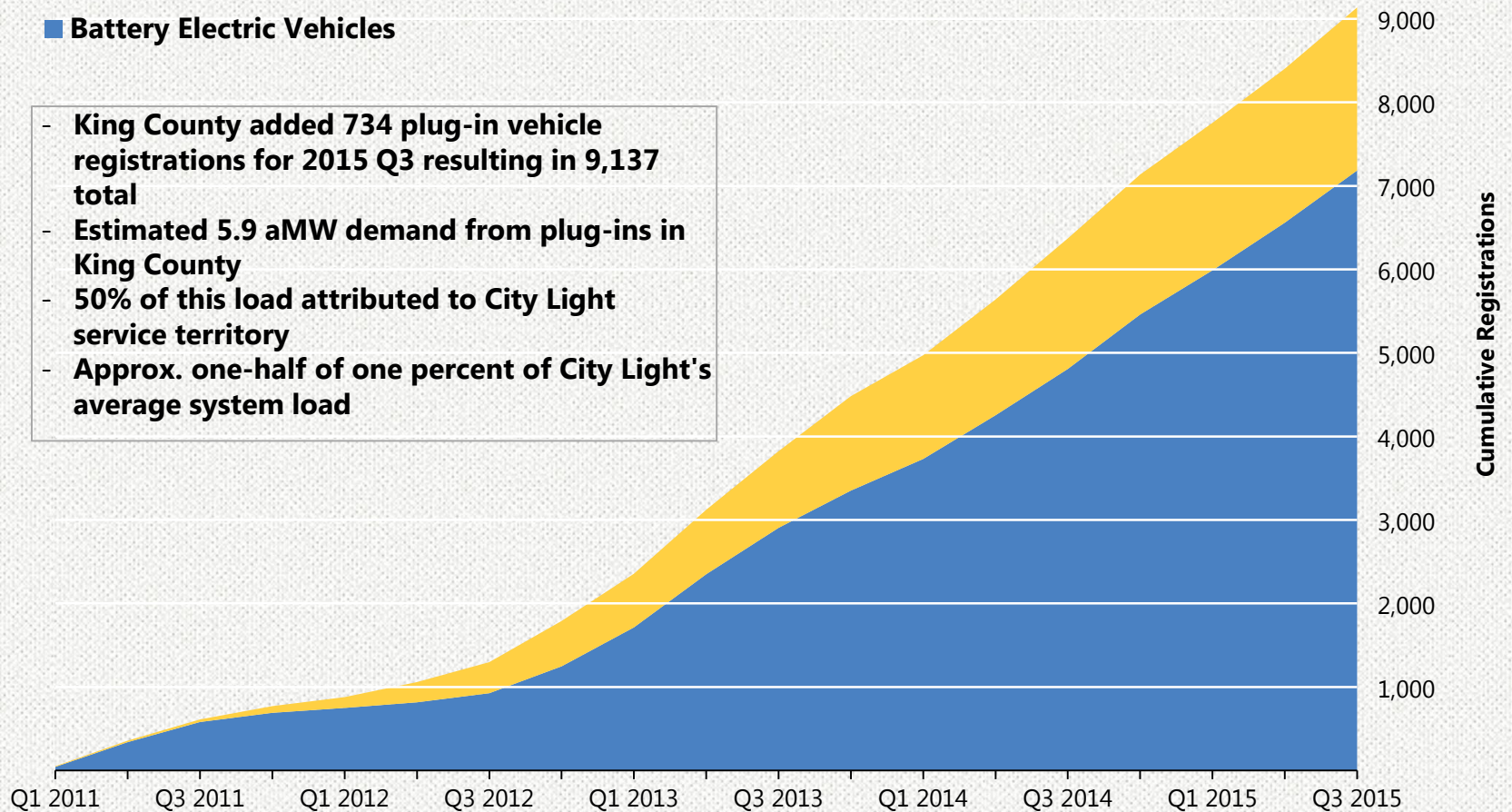


# KING COUNTY GRID-UTILIZING VEHICLE CUMULATIVE REGISTRATIONS

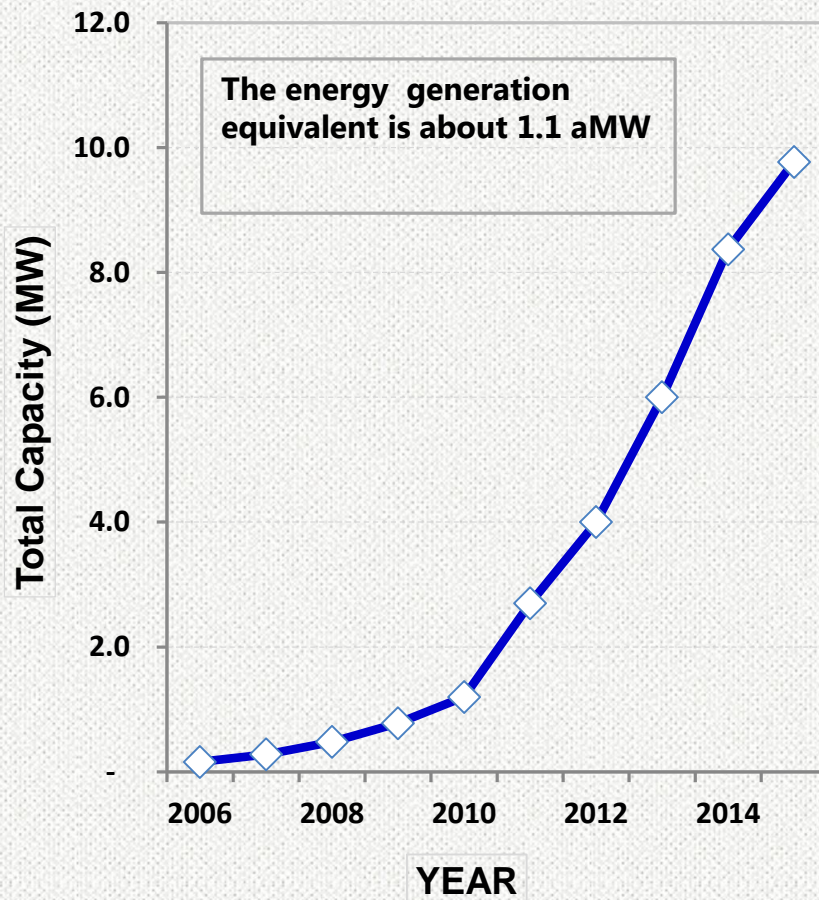
■ Plug-In Hybrid Electric Vehicles

■ Battery Electric Vehicles

- King County added 734 plug-in vehicle registrations for 2015 Q3 resulting in 9,137 total
- Estimated 5.9 aMW demand from plug-ins in King County
- 50% of this load attributed to City Light service territory
- Approx. one-half of one percent of City Light's average system load



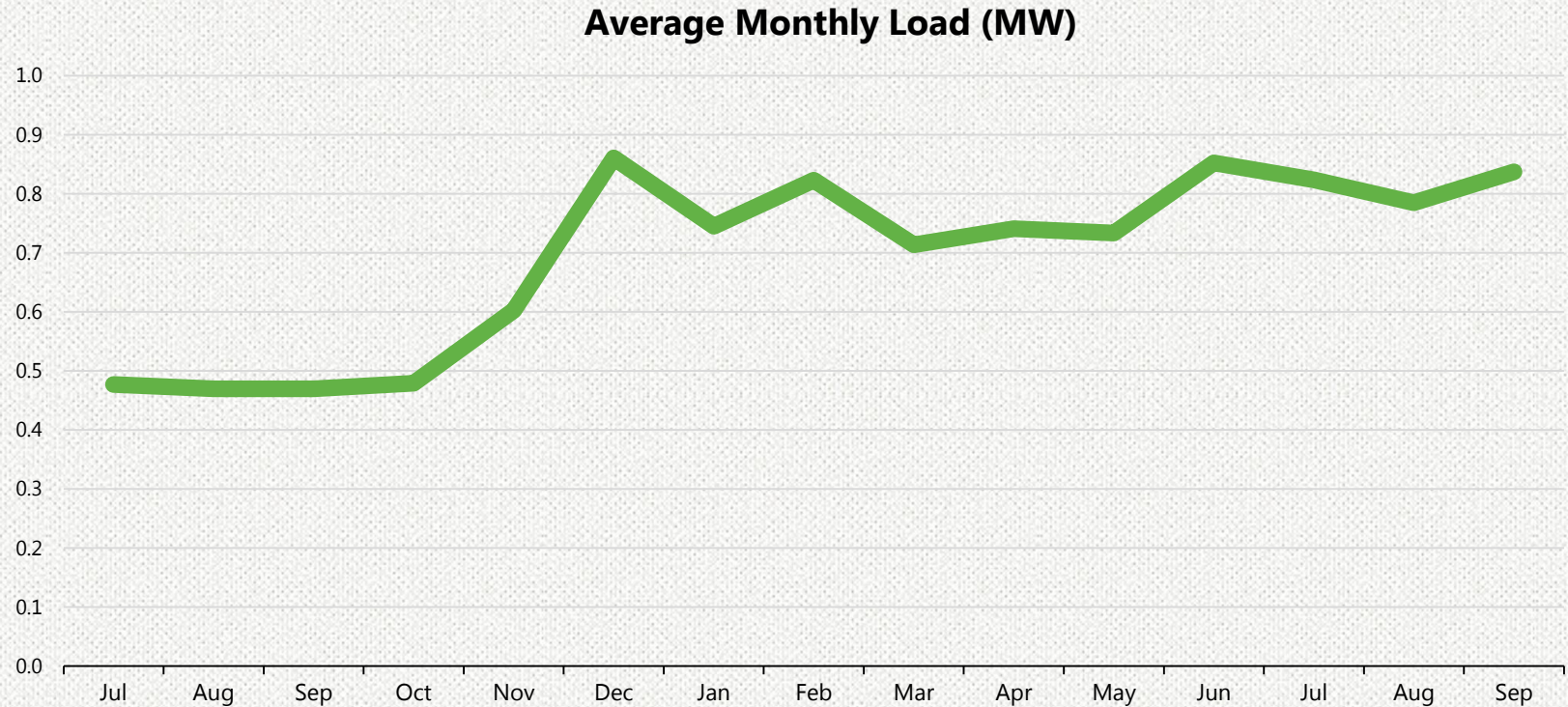
# DISTRIBUTED ROOFTOP SOLAR INSTALLATIONS CUMULATIVE TOTAL SYSTEM CAPACITY



- Installations total approximately 0.08% of retail load
- Residential and community solar

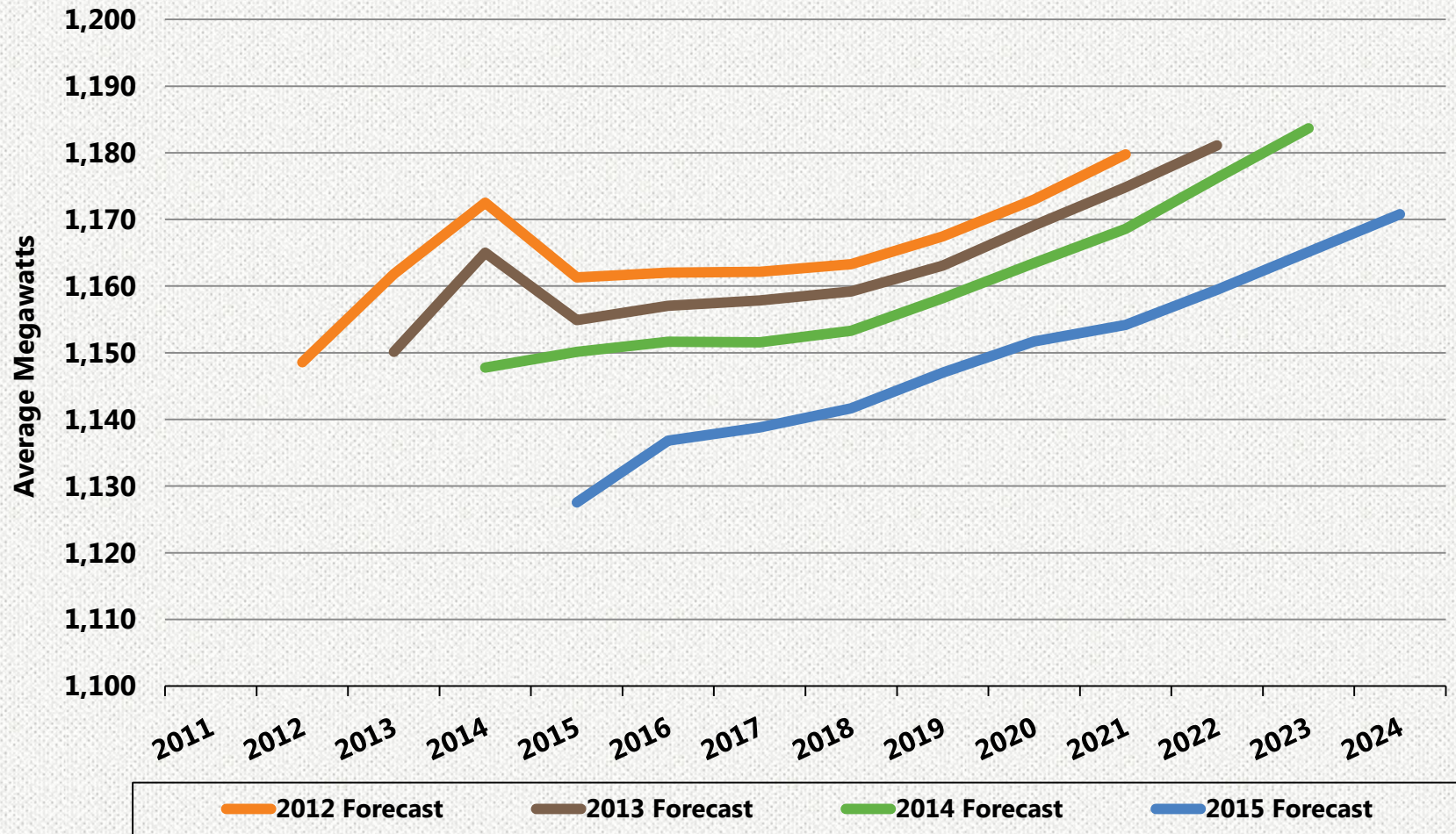


# I-502 COMPLIANT CANNABIS PRODUCERS AVERAGE MONTHLY LOAD



- **Estimated 0.84MW from seventeen I-502 compliant cannabis producers in Seattle.**
- **Due to the infancy of this customer base, current data are very rough estimates.**

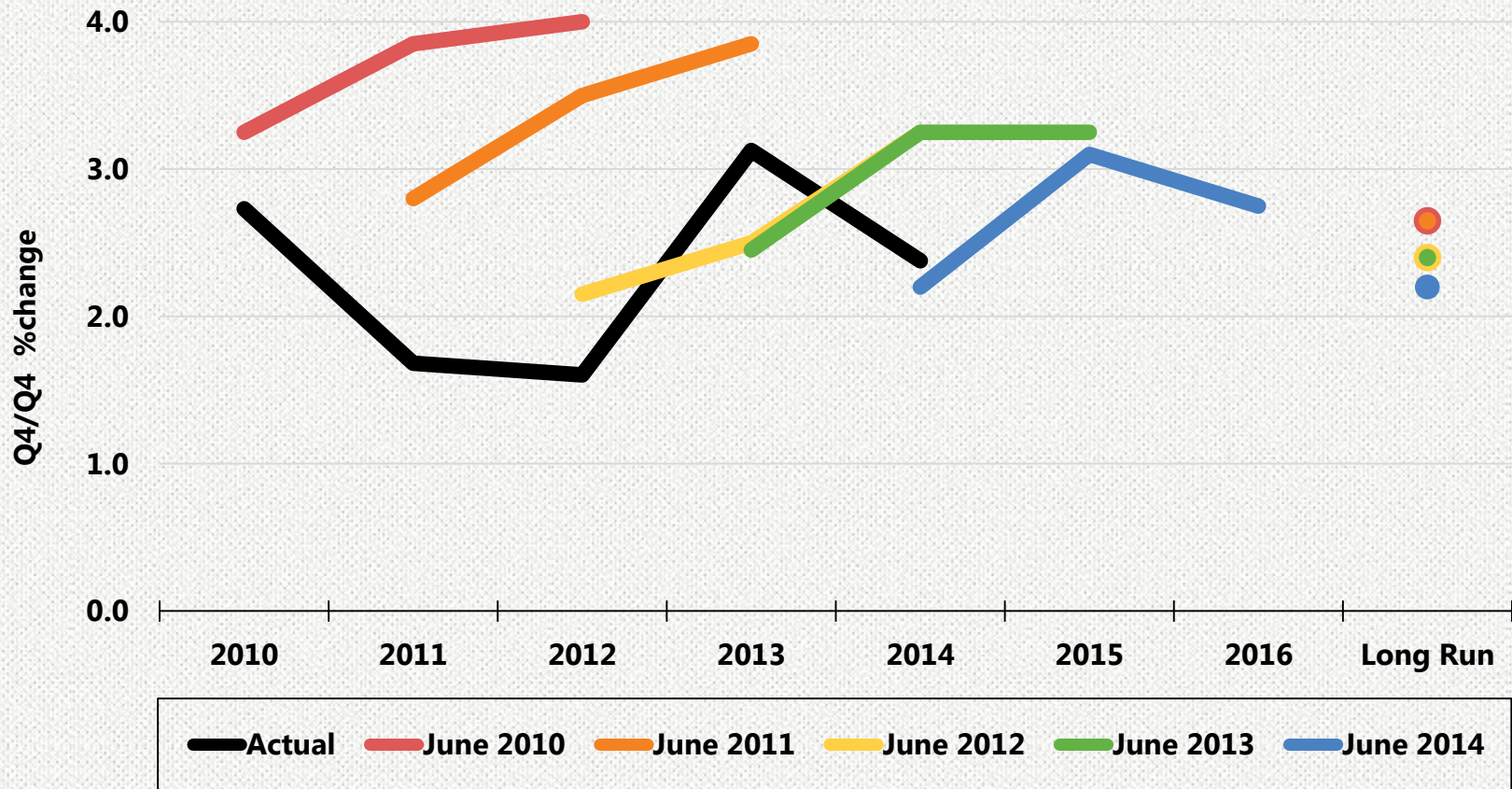
# COMPARISON OF RECENT LOAD FORECASTS





# ECONOMIC GROWTH PROJECTIONS FOR THE U.S.

## FOMC REAL GDP FORECAST



## WHAT'S NEXT?

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- Customer loads are changing – We need to understand why
- This is a regional problem and we are working with regional players to understand the causes
- Last end-use load study occurred before:
  - Personal computers were popular
  - Cable and satellite set top boxes were in common use
  - Most common plug loads were not yet invented

## WHAT'S NEXT?

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- A bottom up investigation will look at issues affecting load including:
  - Building code & appliance standards
  - Large scale construction
  - Over-achievement of energy conservation
  - Reduced usage due to real rate increases
  - Appliance loss to natural gas fuel
  - While small so far effects of DG Solar, EV's, cannabis production, etc. need study