RIVERSIDE PUBLIC UTILITIES

UTILITY 2.0

ELECTRIC INFRASTRUCTURE – POWER SUPPLY

JULY 29, 2015

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Employee Appreciation

Significant contributions were made by:

Bob Tang	Scott Lesch
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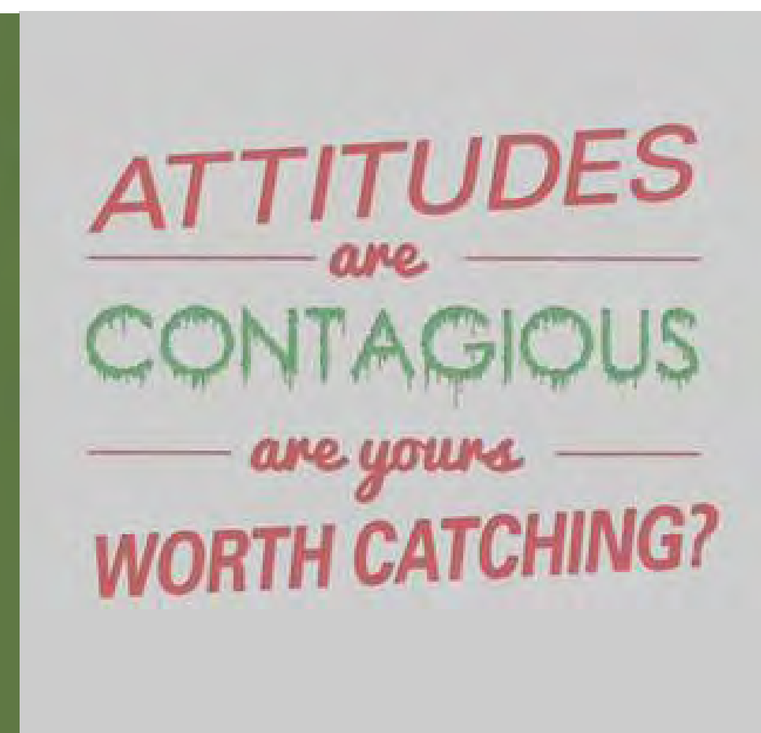

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EXECUTIVE SUMMARY

THRIVING FINANCIALLY

ADVANCED TECHNOLOGIES

ROAD MAPS – INFRASTRUCTURE IMPROVEMENT – ELECTRIC - POWER SUPPLY GOALS

INFRASTRUCTURE IMPROVEMENT

- Address limited infrastructure.
- Improve system safety and reliability.
- Increase the use of technology to inform future planning and increase conservation.

THE PLANS

- RECYCLED WATER
- WATER INFRASTRUCTURE
- INTEGRATED WATER
- WORKFORCE DEVELOPMENT
- FACILITIES PLAN
- RPS POWER IMPLEMENTATION
- INTEGRATED POWER RESOURCES
- ELECTRIC INFRASTRUCTURE
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- FIBER BUSINESS
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- CONSERVATION AND EFFICIENCY
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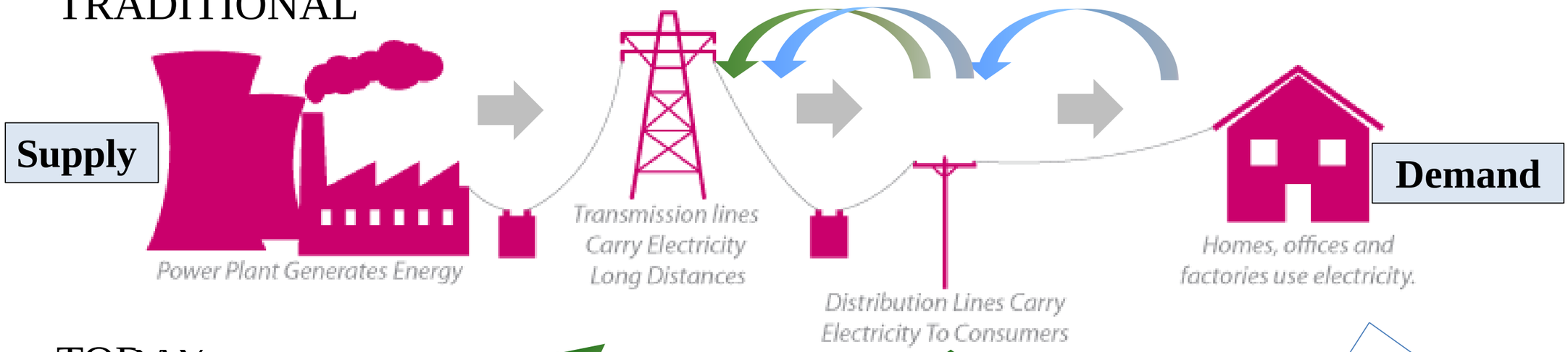
Utility 2.0

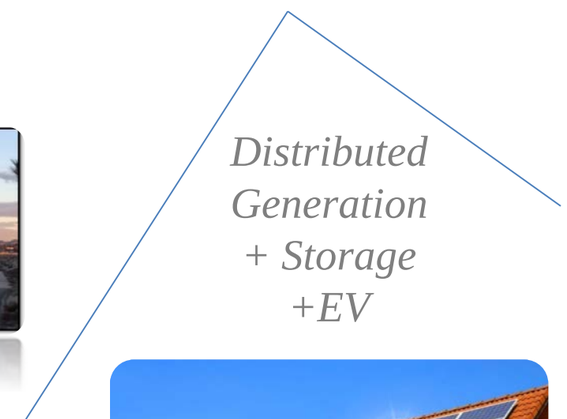
TRADITIONAL



TODAY

Renewable Generation

Local Generation

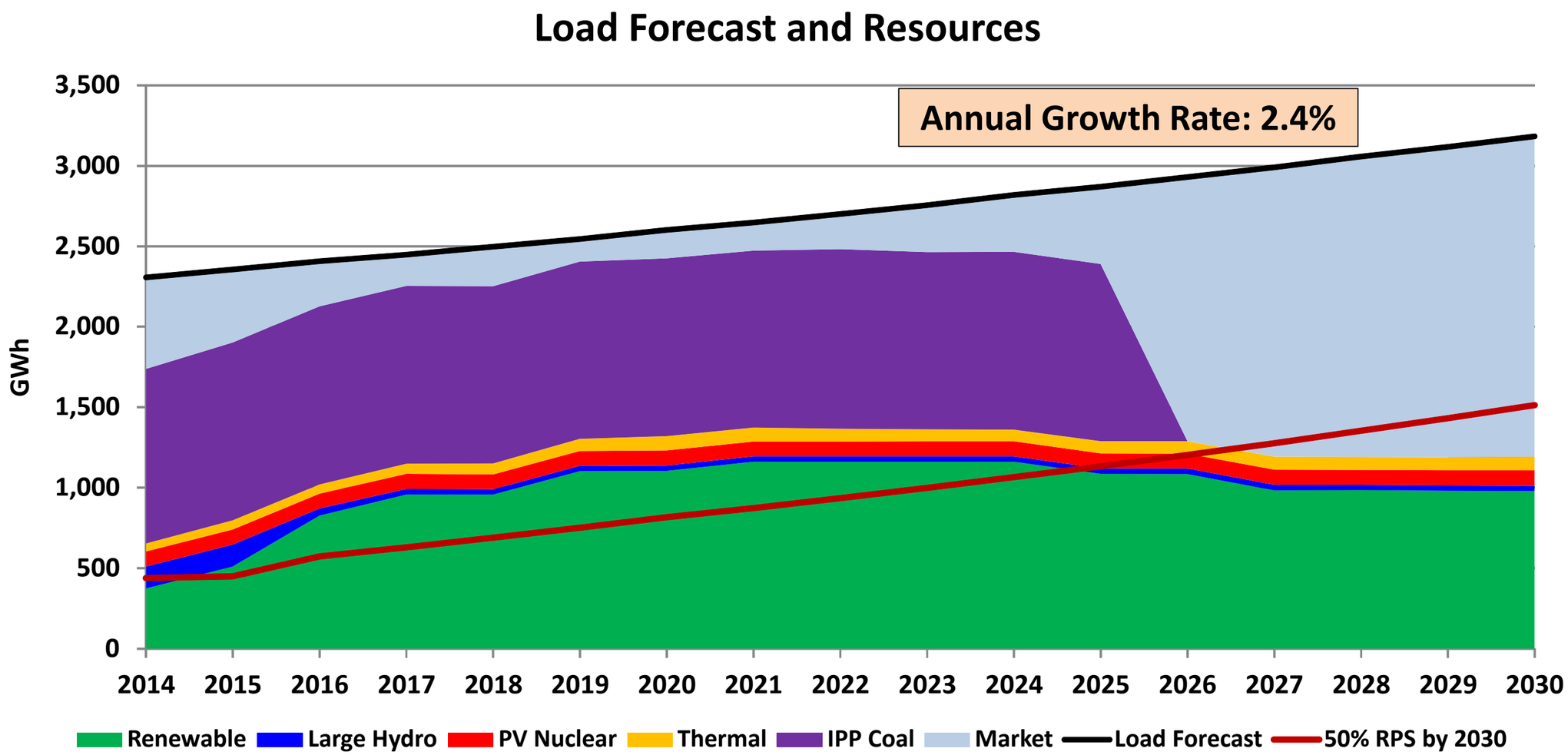


FUTURE

More Renewable Generation

Energy Storage

Balancing Customer Demand & Power Needs

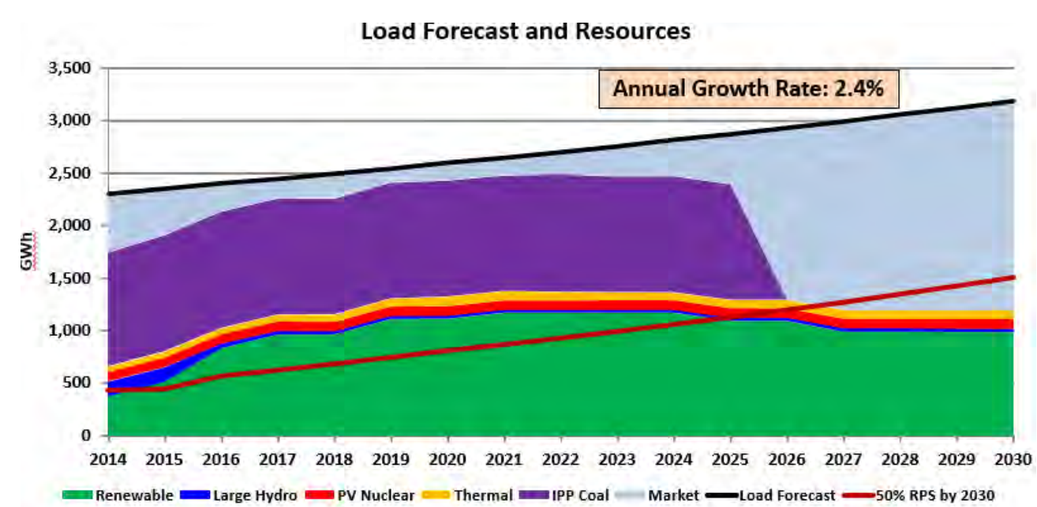


THE BIG PICTURE – 3 Major Issues of Today…

1. How will we replace IPP

2. How will we meet our RPS

3. How will we integrate demand and supply



WORKFORCE DEVELOPMENT

INFRASTRUCTURE IMPROVEMENT - SUPPLY

POWER MARKET HISTORY

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ADVANCED TECHNOLOGIES

Evolution of CA. Power Market

HISTORICAL PAST (CY 1977- 1997) → **PAST (CY 1998-2008)** → **PRESENT (CY 2009-2015)** → **FUTURE (CY 2016-2030)**

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Evolution of CA. Power Market

HISTORICAL PAST (CY 1977- 1997) → **PAST (CY 1998-2008)** → **PRESENT (CY 2009-2015)** → **FUTURE (CY 2016-2030)**

HISTORICAL PAST:

Geography – Local Markets with SCE
Operation Model – SCE → ← Riverside; Bilateral Power Transactions
Contractual Arrangements – Integrated Operations Agreement (IOA) 150 pages
Power Supply Cost - $105 million
TRR Revenue – N/A
Product Complexity –
- Energy ; Demand

Settlements:
- Only 2 Charge Codes to settle every month
Staffing – Low - **19 FTE's**

Evolution of CA. Power Market

HISTORICAL PAST (CY 1977- 1997) → **PAST (CY 1998-2008)** → **PRESENT (CY 2009-2015)** → **FUTURE (CY 2016-2030)**

PAST:

Geography – CA Market
Operation Model – Power Transactions through CAISO; approx. 10 zones
Contractual Arrangements – Tariff 1,000 pages
Power Supply Cost – $151 million
TRR Revenue – $105 million
Product Complexity –
- Energy; Demand
- **~10 pricing points**
- **Hourly and Zonal differentiated prices**
- **Ancillary Services:**
  - **Regulation Down; Regulation Up**
  - **Spin; Non Spin**

Settlements:
- **Approx. 65 charge codes**
- **Absolute Value of Charges: $~$64 million**

Staffing – Significantly increased **– 33 FTE's**

Evolution of CA. Power Market

HISTORICAL PAST (CY 1977- 1997) → **PAST (CY 1998-2008)** → **PRESENT (CY 2009-2015)** → **FUTURE (CY 2016-2030)**

PRESENT:

Geography – Sub Regional Markets
Operation Model – Power Transactions through CAISO; approx. 3,000 Nodes
Contractual Arrangements – MRTU Tariff : 5,000 pages
Power Supply Cost - $138 million
TRR Revenue – $185 million
Product Complexity –
- Energy; Demand
- **~3,000 Pricing Points**
- Hourly and Zonal differentiated prices
- Ancillary Services
- **Resource Adequacy**
- **Flexible Capacity**
- **5-15 minute settlements at each node**
- **Dynamic Scheduling**

Settlements:
- **Over 80 charge codes**
- **Absolute Value of charges = ~$138million**

Staffing – Increased **to 37 FTE's**

Evolution of CA. Power Market

HISTORICAL PAST (CY 1977- 1997) → **PAST (CY 1998-2008)** → **PRESENT (CY 2009-2015)** → **FUTURE (CY 2016-2030)**

FUTURE:

Geography – Regional Centralized Markets
Operation Model – EVOLVING - more complex, more Distributed Power Grid?

Data, Data, Data, Data

Contractual Arrangements –
- CAISO Tariff: Approx. 5,000+ pages
- Distribution Grid Tariff – TBD

Power Supply Cost - $188 million
TRR Revenue – $334 million
Product Complexity – Continue to EVOLVE in complexity
Potential Emergence of Distributed Power Grid:
- **DG resources**
- **Micro-grids**
- **Demand Response**
- **Electric Vehicle (EV)**
- **Energy Storage**

Staffing – Increased to 37 FTE's

ROAD MAPS – INFRASTRUCTURE IMPROVEMENT – ELECTRIC - POWER SUPPLY

WORKFORCE DEVELOPMENT

INFRASTRUCTURE IMPROVEMENT - SUPPLY

VIRTUAL TOUR

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ADVANCED TECHNOLOGIES

Virtual Tour – Generation (decommissioned)

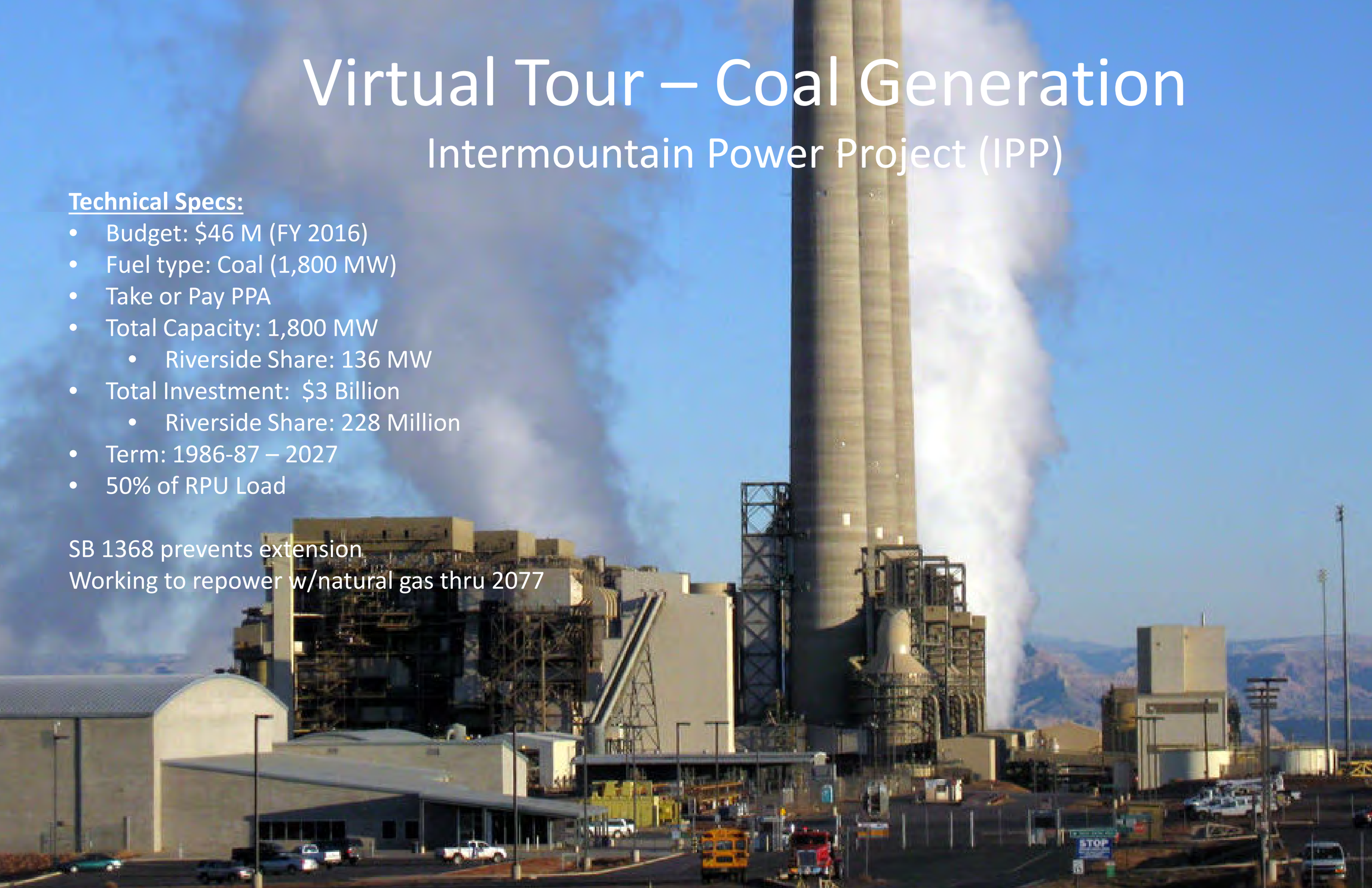
San Onofre Nuclear Generating Station (SONGS)

Technical Specs:

- Budget: approx. $18 M
- Fuel type: Nuclear (3,150 MW)
- Jointly Owned Project
- Riverside Share:
  - 1.79% or 38.5 MW
- Term: 1983/84 – 2024
- Riverside Investment: $165 M
- 14% of RPU Load
- June 7, 2013 – SCE unilaterally decides to shutdown SONGS
- Decommissioning Agreement approved by PUB/CC
- Decommissioning fully funded $76 M

Virtual Tour – Coal Generation

Intermountain Power Project (IPP)



Technical Specs:

- Budget: $46 M (FY 2016)
- Fuel type: Coal (1,800 MW)
- Take or Pay PPA
- Total Capacity: 1,800 MW
  - Riverside Share: 136 MW
- Total Investment: $3 Billion
  - Riverside Share: 228 Million
- Term: 1986-87 – 2027
- 50% of RPU Load

SB 1368 prevents extension
Working to repower w/natural gas thru 2077

Virtual Tour – Transmission

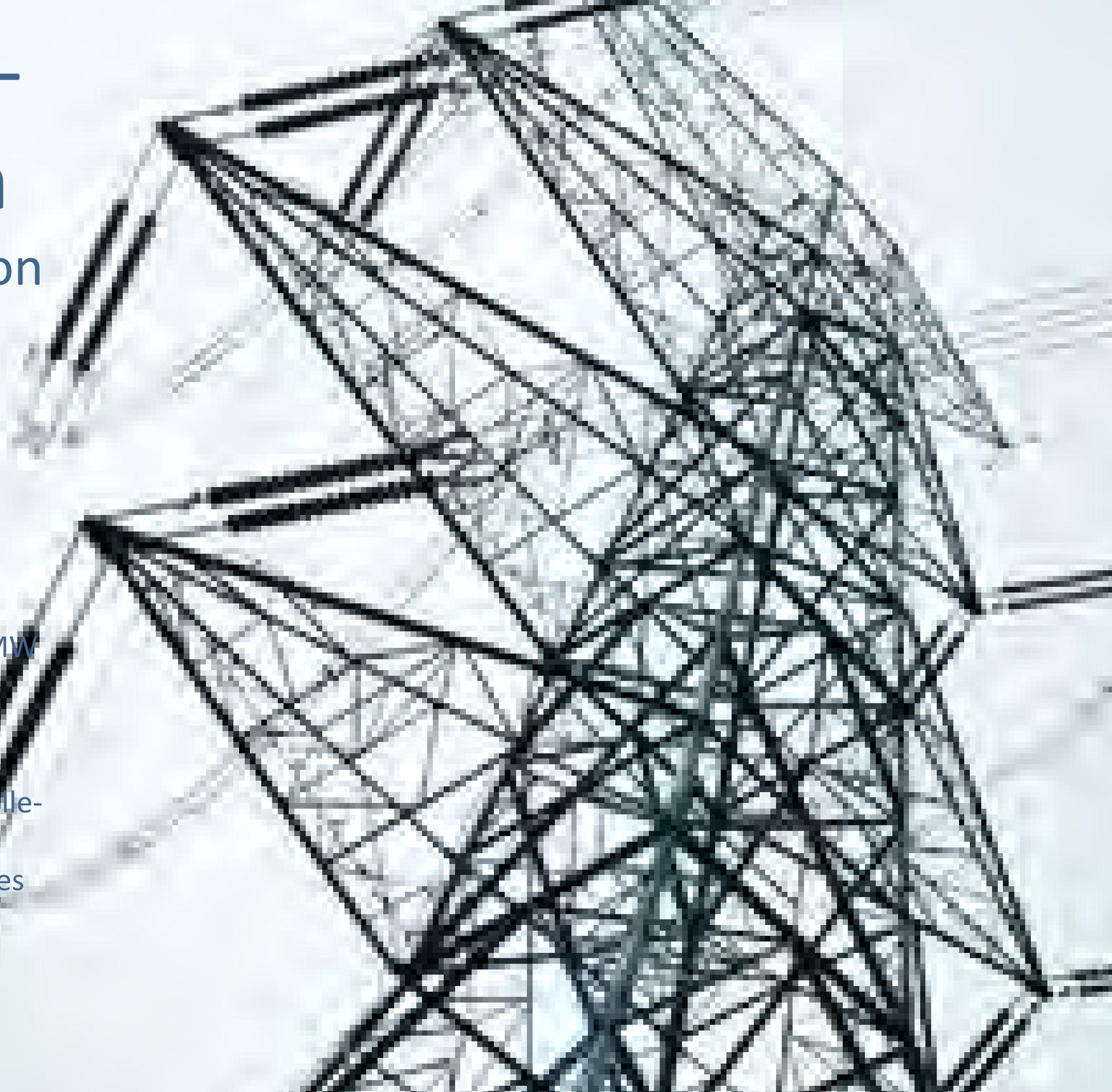
Southern Transmission System (SCPPA)

Technical Specs:

- Budget: $12 M (FY 2016)
- 256 mile transmission line
- Take or Pay Contract
- Transmission Capacity: 1,923 MW
  - SCPPA Share: 352 MW
  - Riverside Share: 18 MW
- Total Investment: $57 M
  - Riverside Share: $2.3 M
- AC transmission line from Westwing Substation in Phoenix to Marketplace Substation near Boulder City, Nevada

Virtual Tour – Transmission

Northern Transmission System (NTS)

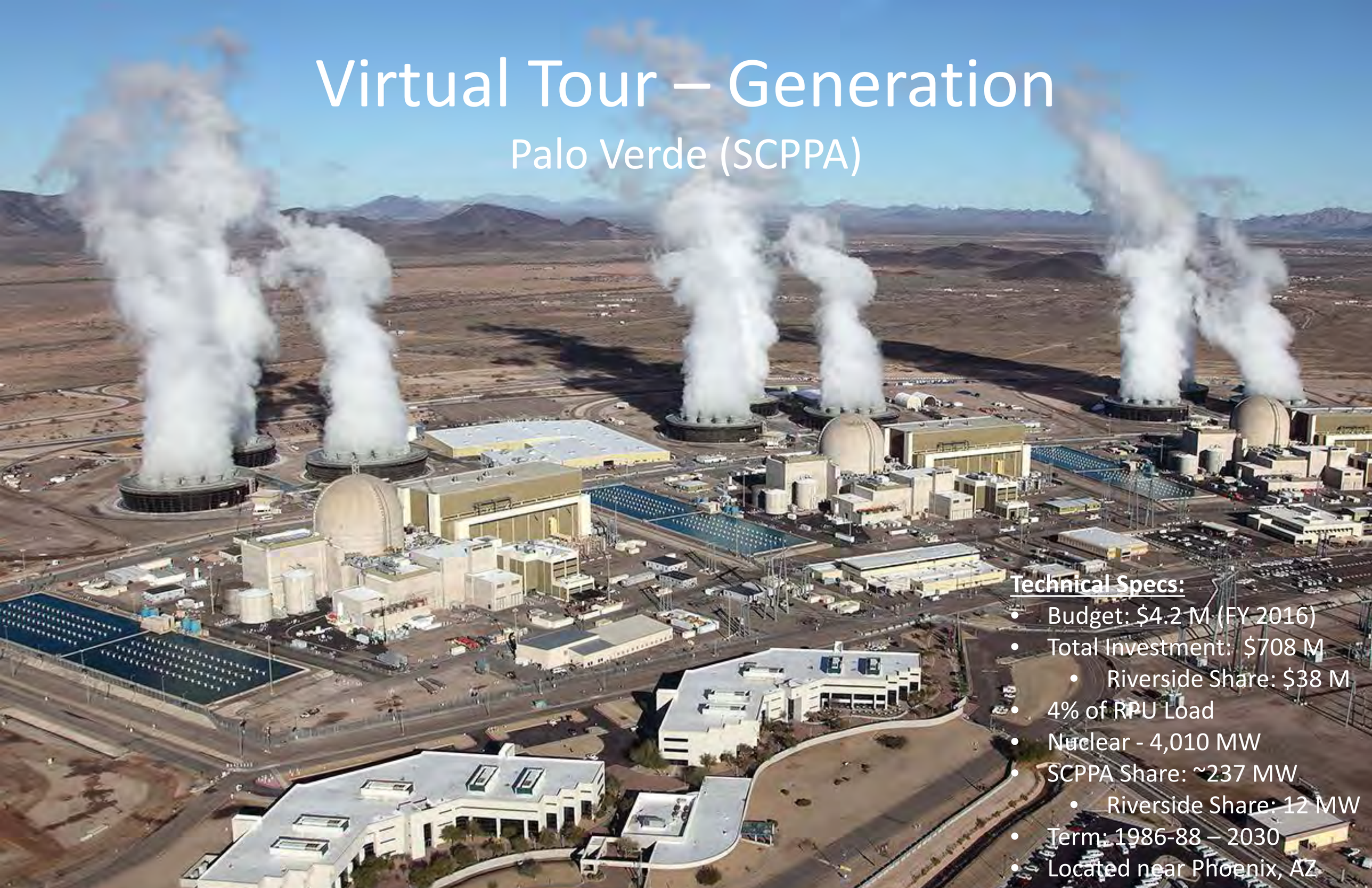


Technical Specs:

- Budget: $1.7 M (FY 2016)
- Project funded through bonds issued by the Intermountain Power Agency (IPA)
- 50 mile transmission line
- Transmission Capacity: 1,923 MW
  - Riverside Share: 157 MW thru a settlement with LADWP for transmission from Adelanto to Victorville-Lugo
- Two 345kV AC transmission lines from IPP Generation Station to Mona, Utah

Virtual Tour – Generation

Palo Verde (SCPPA)



Technical Specs:

- Budget: $4.2 M (FY 2016)
- Total Investment: $708 M
  - Riverside Share: $38 M
- 4% of RPU Load
- Nuclear - 4,010 MW
- SCPPA Share: ~237 MW
  - Riverside Share: 12 MW
- Term: 1986-88 – 2030
- Located near Phoenix, AZ

Virtual Tour – Generation

Hoover (SCPPA)

Technical Specs:

- Budget: $1.2 M (FY 2016)
- Fuel type: Large Hydro (1,951 MW)
- Take or Pay PPA
- SCPPA Share: 94 MW
  - Riverside Share: 30 MW
- Term: 1986 – 2017
- Hoover Power Allocation Act of 2011 extends to 2077
- Total Investment: $21 M
  - Riverside Share: $7 M
- 1% of RPU Load
- PUB/CC approval of new contact – mid 2016

Virtual Tour – Transmission

Mead-Phoenix Project (SCPPA)

Technical Specs:

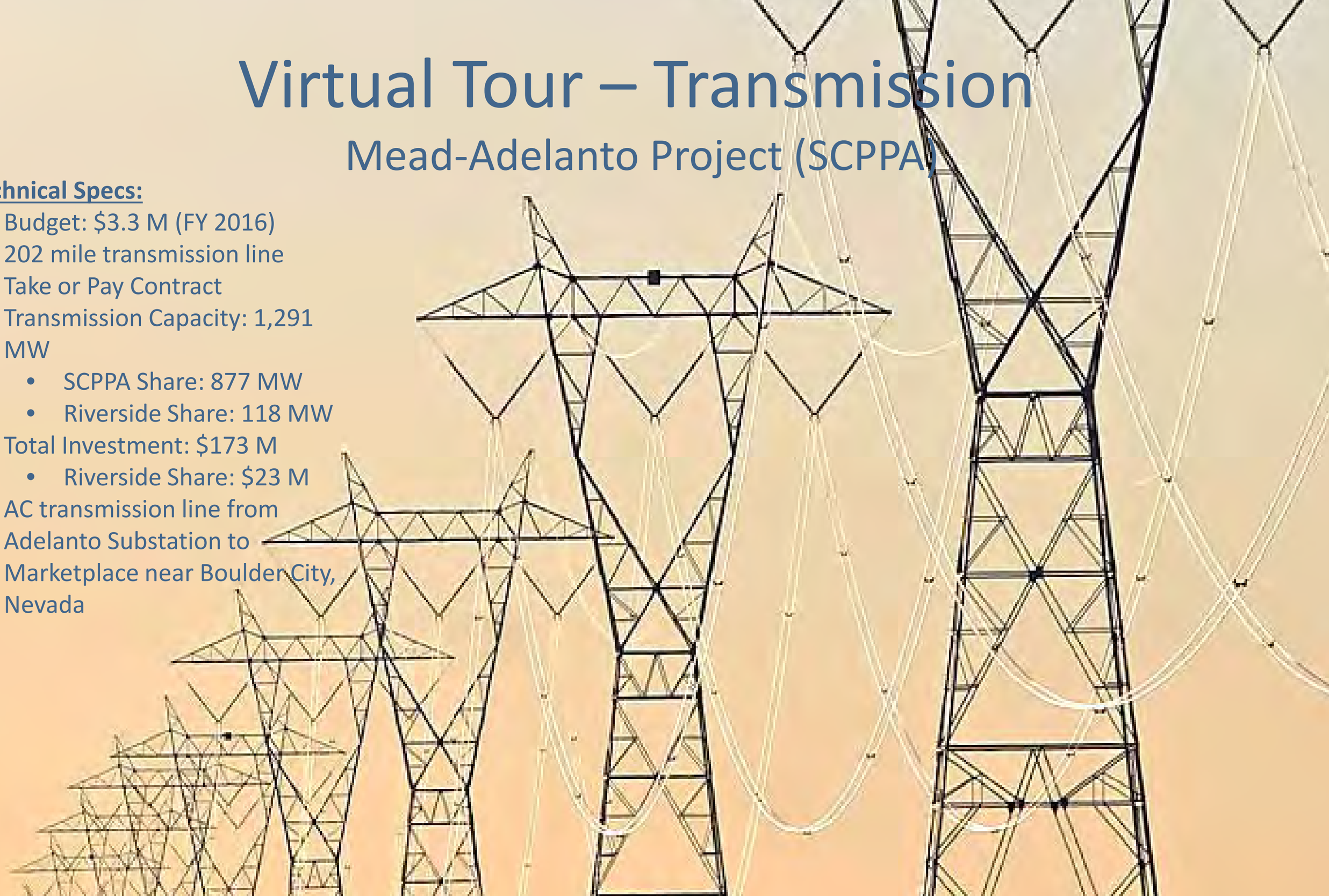
- Budget: $300,000 (FY 2016)
- 256 mile transmission line
- Take or Pay Contract
- Transmission Capacity: 1,923 MW
  - SCPPA Share: 352 MW
  - Riverside Share: 18 MW
- Total Investment: $57 M
  - Riverside Share: $2.3 M
- AC transmission line from Westwing Substation in Phoenix to Marketplace Substation near Boulder City, Nevada

Virtual Tour – Transmission

Mead-Adelanto Project (SCPPA)

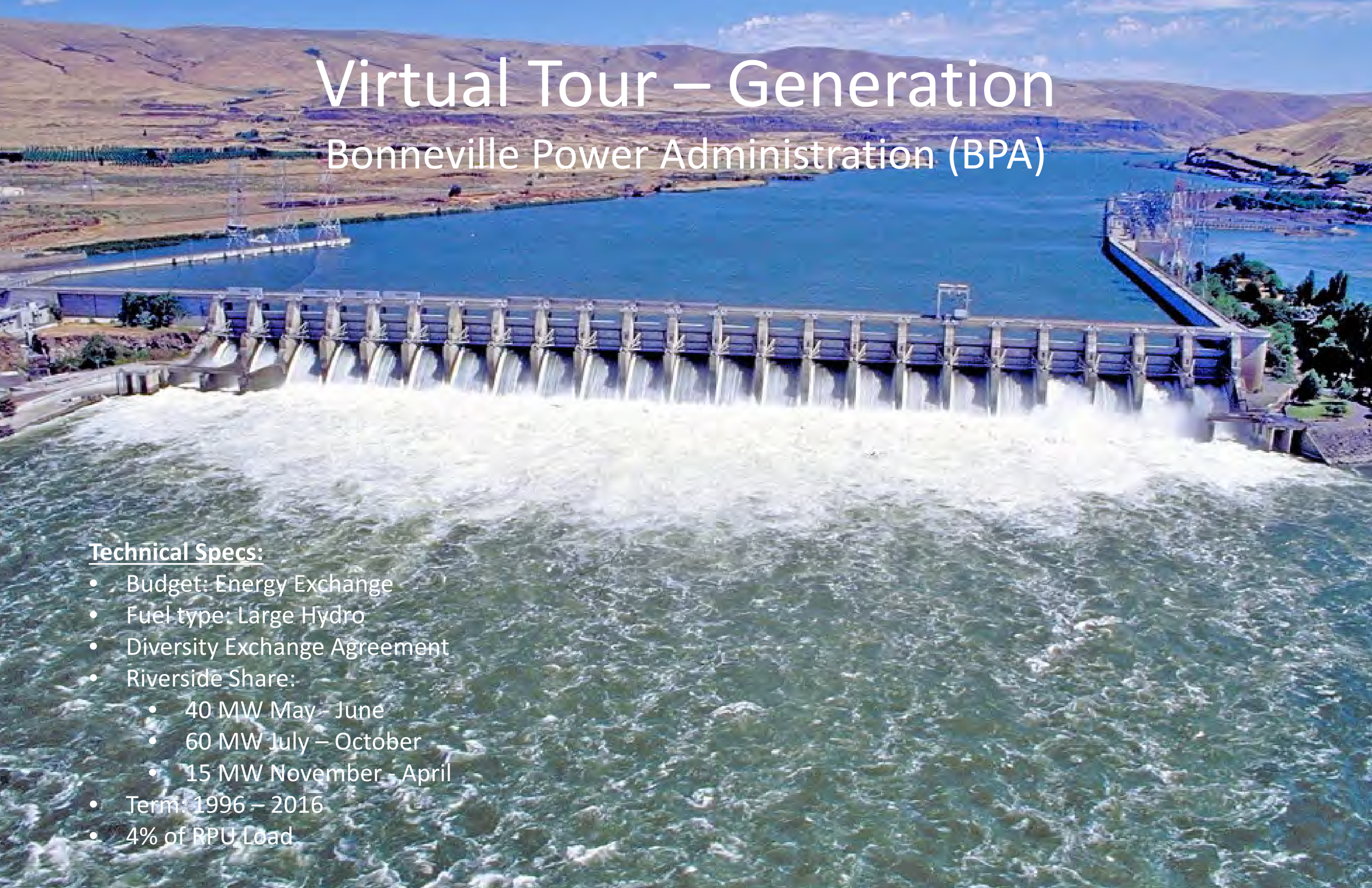
Technical Specs:

- Budget: $3.3 M (FY 2016)
- 202 mile transmission line
- Take or Pay Contract
- Transmission Capacity: 1,291 MW
  - SCPPA Share: 877 MW
  - Riverside Share: 118 MW
- Total Investment: $173 M
  - Riverside Share: $23 M
- AC transmission line from Adelanto Substation to Marketplace near Boulder City, Nevada



Virtual Tour – Generation

Bonneville Power Administration (BPA)



Technical Specs:

- Budget: Energy Exchange
- Fuel type: Large Hydro
- Diversity Exchange Agreement
- Riverside Share:
  - 40 MW May - June
  - 60 MW July – October
  - 15 MW November - April
- Term: 1996 – 2016
- 4% of RPU Load

Energy Crisis –Lessons Learned

2000-2001 CA Energy Crisis

- Investing in reliability
- PUB Goal—Add local Generation
- **$280 M investment in 268 MW Total**

- 14 of 21 FTEs are Veterans
- 80 Years of Service
  - 9 navy
  - 4 marines
  - 1 army

Virtual Tour – Internal Generation

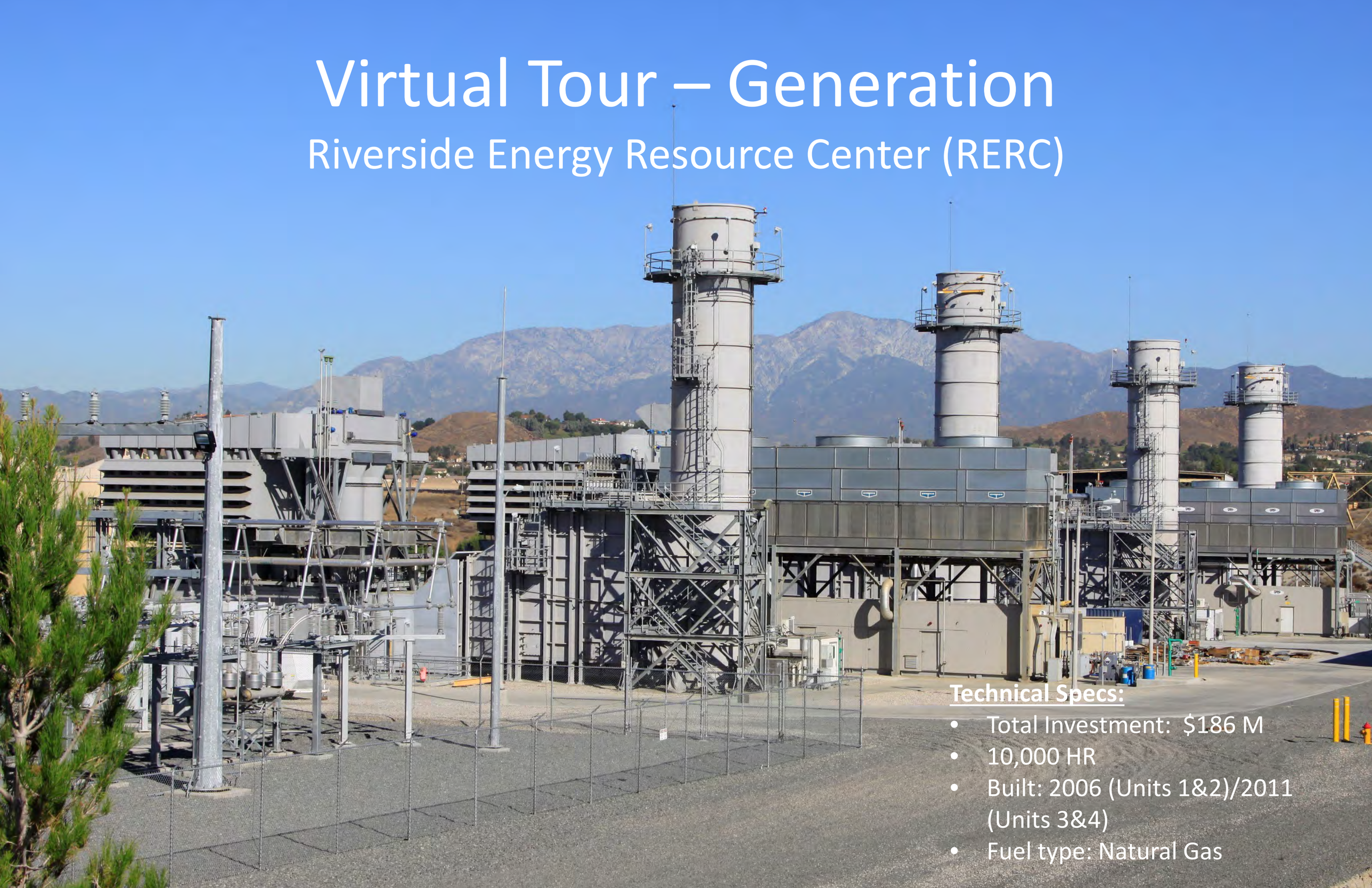
Springs

Technical Specs:

- Total Investment: $46 M
- 14,000 HR
- Built: 2003
- Fuel type: Natural Gas
- Four 10 MW Units (40 MW)

Virtual Tour – Generation

Riverside Energy Resource Center (RERC)



Technical Specs:

- Total Investment: $186 M
- 10,000 HR
- Built: 2006 (Units 1&2)/2011 (Units 3&4)
- Fuel type: Natural Gas

Virtual Tour – Internal Generation

Clearwater (Corona)

Technical Specs:

- Total Investment: $48 M
- 8,600 HR
- Riverside Purchased in 2010
- Fuel type:
  - Natural Gas Cogeneration
  - Combustion (Gas) turbine, HRSG and steam turbine

Virtual Tour – Geo Thermal Generation

Salton Sea

Technical Specs:

- Budget: $24.6 M (FY 2016)
- Take and Pay Renewable PPA
- Riverside Share:
  - 46 MW until 2016
  - 66 MW until 2019
  - 86 MW until 2039
- Term:
  - 2003 – 2020 Unit 5
  - 2017 – 2039 Portfolio
- 15.6% of 2016 RPU Load
- 21.2% of 2019 RPU Load
- 27.0% of 2020 RPU Load

Virtual Tour – Renewable

Wintec, Wagner, and Cabazon

Technical Specs:

- Budget: $5.9 M (FY 2016)
- Fuel type: Wind
- Renewable PPA
- Riverside Share:
  - 1.3 MW Wintec
  - 6.0 MW WKN
  - 39.0 MW Cabazon
- Term:
  - 2003 – 2018 Wintec
  - 2012 – 2032 WKN
  - 2015 – 2024 Cabazon
- 4% of RPU Load

Virtual Tour – Renewable

Columbia II (SCPPA)

Technical Specs:

- Budget: $2.3 M (FY 2016)
- Fuel type: Solar PV
- Renewable PPA
- SCPPA Project capacity of 15MW:
  - Riverside Share: 11.1 MW
  - Other SCPPA participants are Pasadena and Azusa.
- Term: 20 years expiring in 2034
- 1.46% of RPU Load
- Project Owned and Operated by Dominion

Virtual Tour – Renewables (Under Development)

Tequesquite Landfill Solar Project

Technical Specs:

- Budget: $1.2 M (FY 2017)
- Utility Scale (inside RPU)
- Fuel type: Solar PV
- Renewable PPA
- Project Size: 7.5 MW
- Term: 2016 – 2040
- Currently under construction with COD scheduled for September 2015.
- Project Owned and Operated by SunPower.

Virtual Tour – Renewables (Under Development)

AP North Lake

Technical Specs:

- Budget: $4.7 M (FY 2017)
- Utility Scale located in Hemet, CA
- Fuel type: Solar PV
- Renewable PPA
- Project Size: 20 MW
- Term: 25 years expiring in 2040
- Currently under construction with COD scheduled for July 2015.
- 2.42% of RPU Load
- Project Owned and Operated by SunEdison

ROAD MAPS – INFRASTRUCTURE IMPROVEMENT – ELECTRIC – POWER SUPPLY

WORKFORCE DEVELOPMENT

INFRASTRUCTURE IMPROVEMENT - SUPPLY

PLANNING FOR TOMORROW

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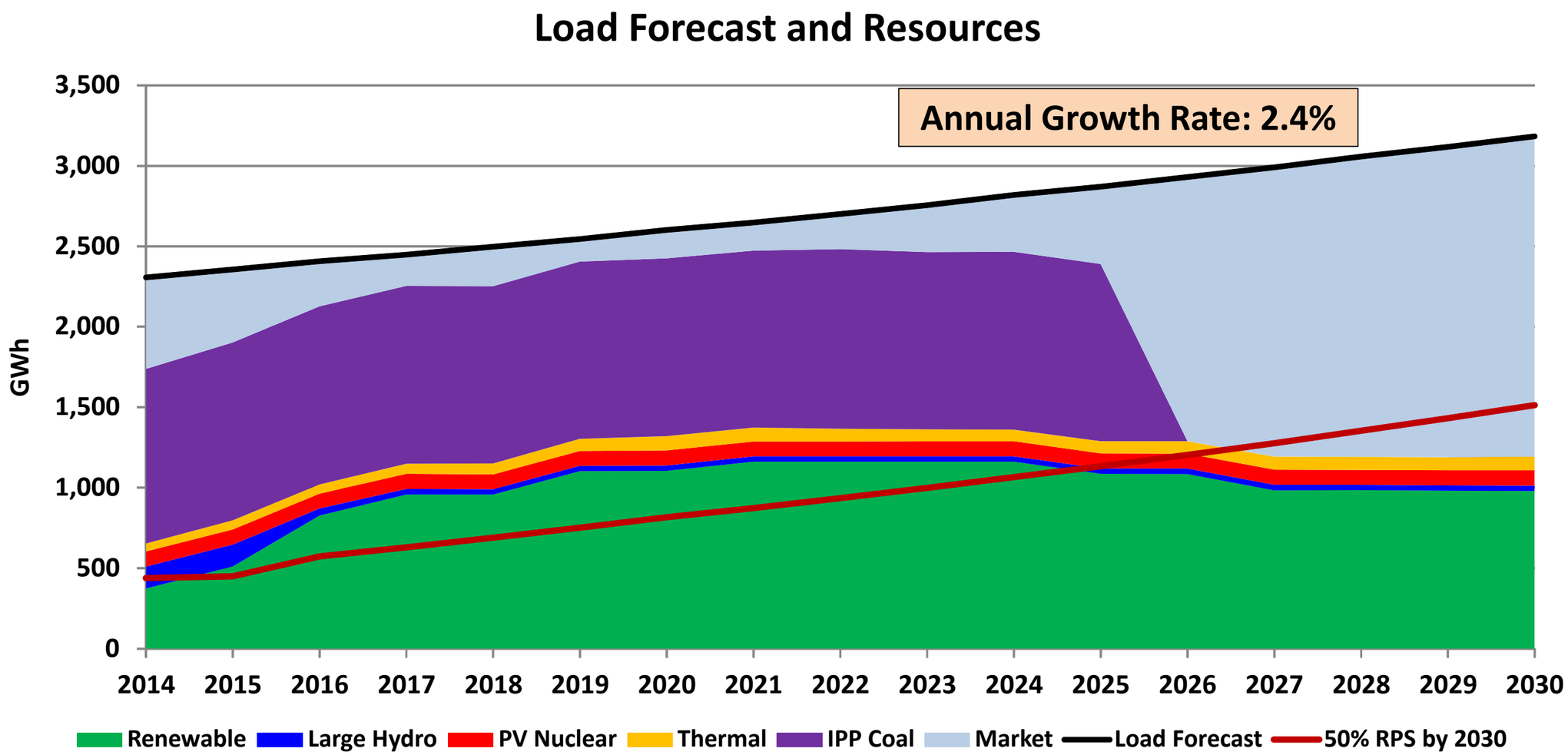
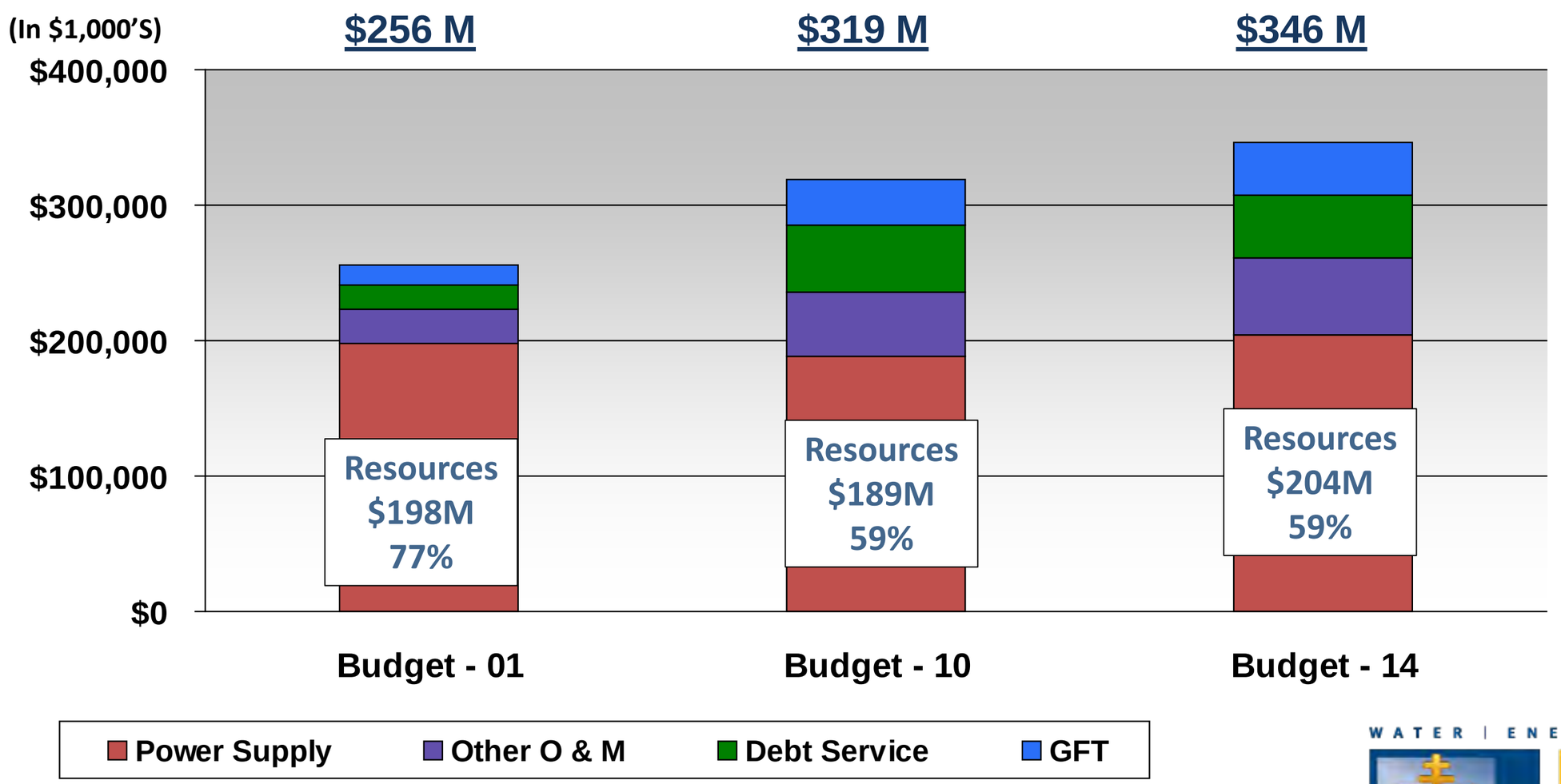
ADVANCED TECHNOLOGIES

Balancing Customer Demand & Power Needs



Electric Utility - Budget Comparison 2001-2014



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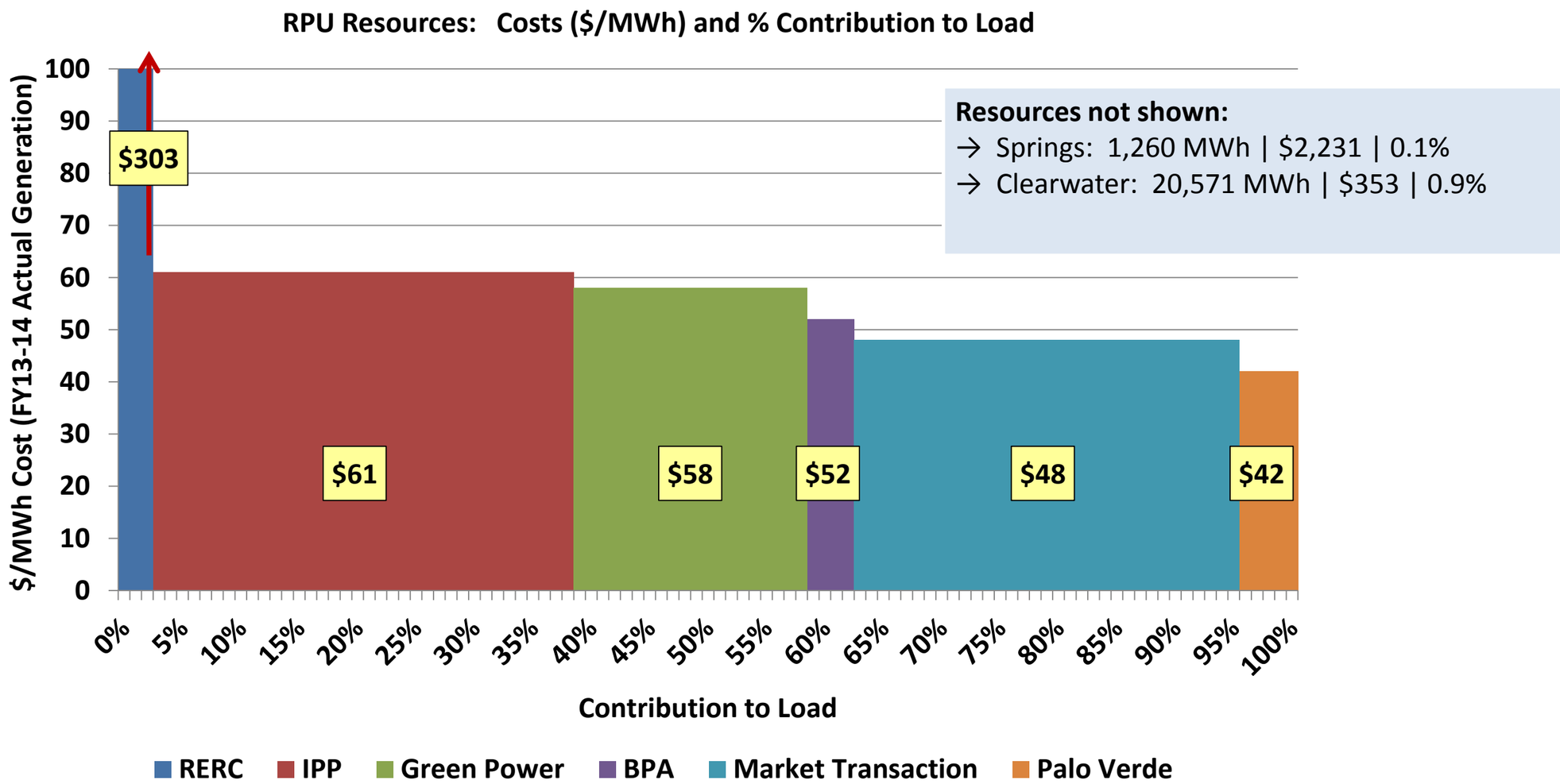
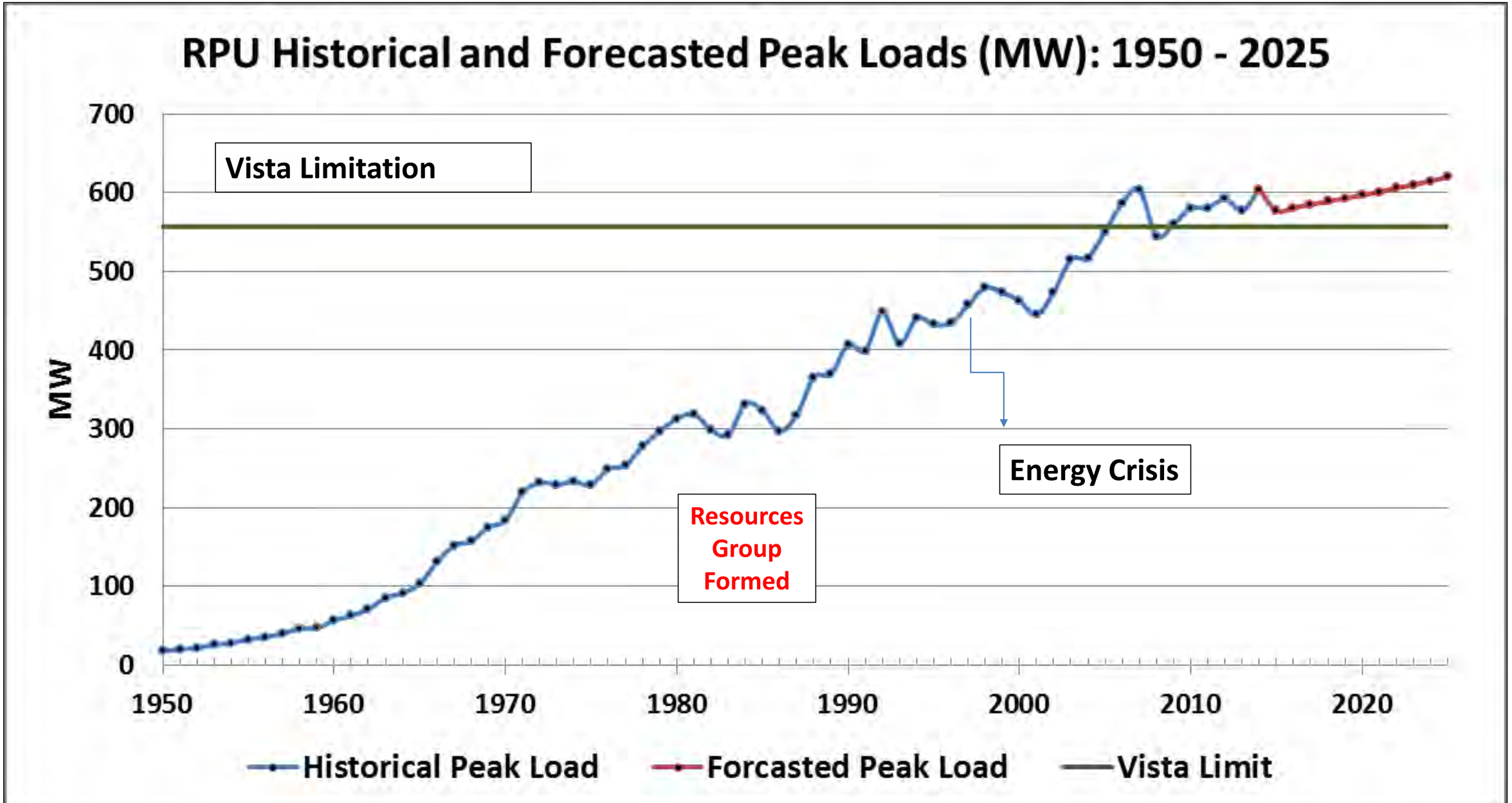
RPU Resource costs ($/MWh) and % Contribution to Load

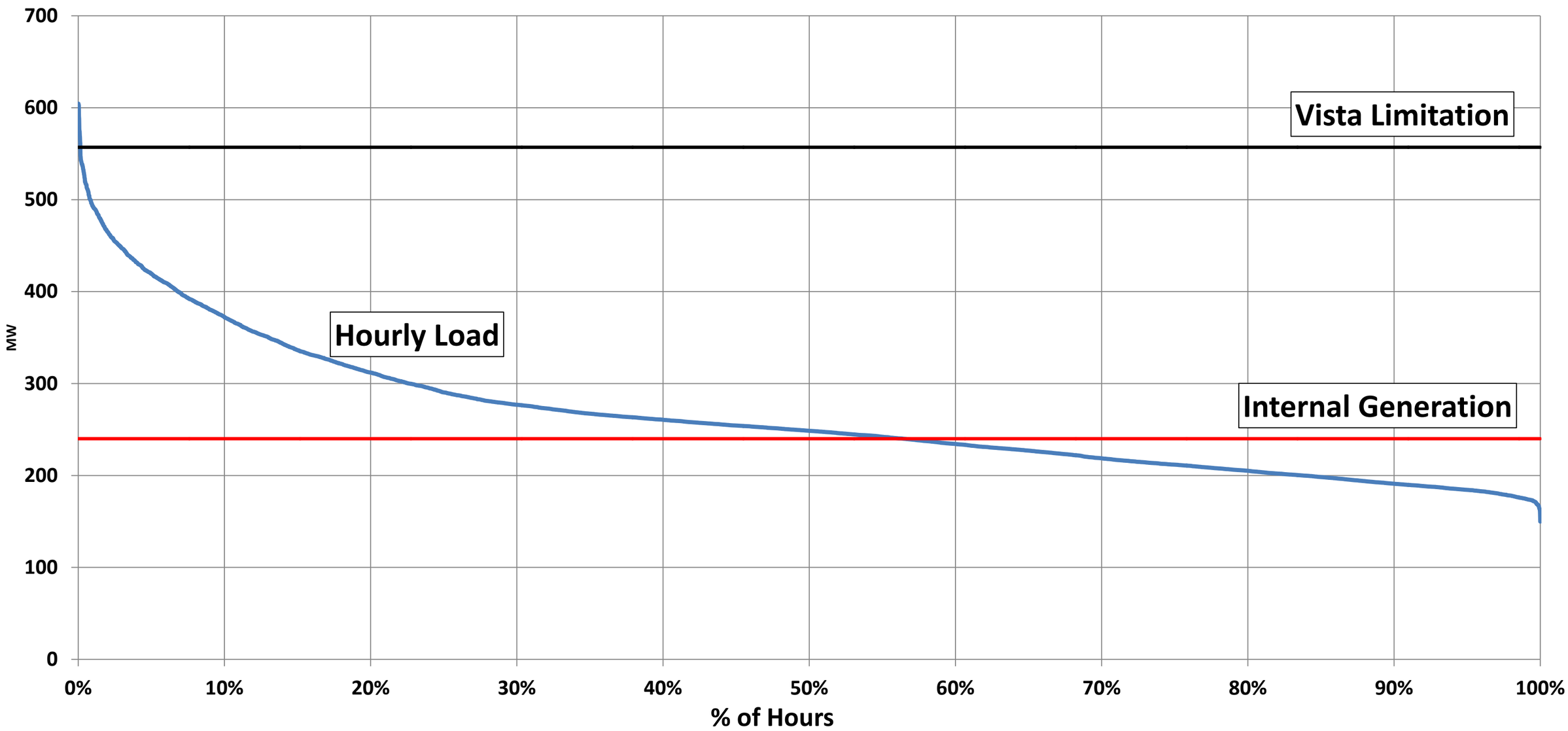


RPU's Power Needs Continues to Grow

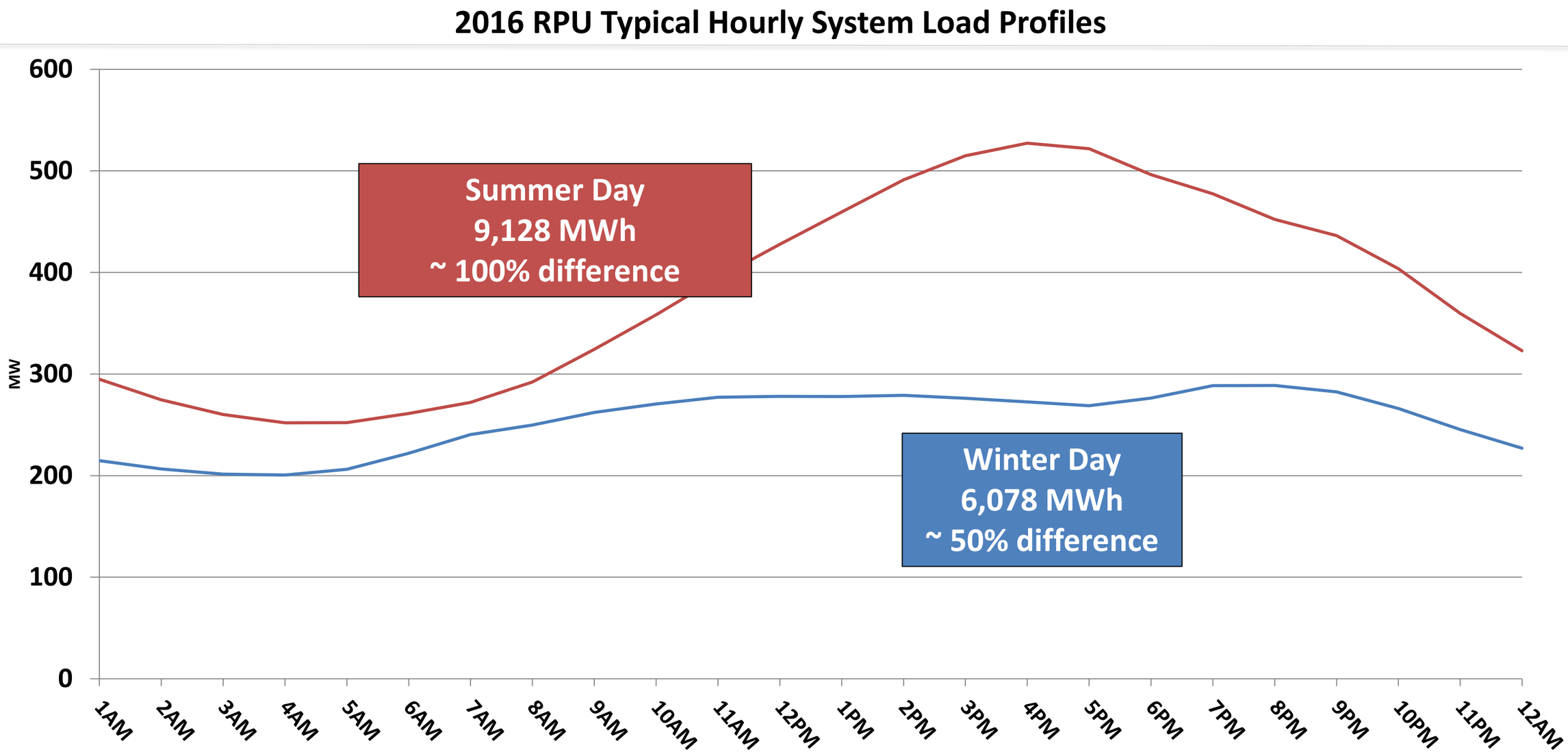


Customer Usage

Load Duration Curve for 2014



What the load looks like on different days



Planning -- Bringing it Together…

<u>What is an Integrated Resource Plan (IRP)?</u>

The IRP is used to guide decision making as RPU plans to meet its forecasted annual peak and energy demand (along with an appropriate reserve margin), using a combination of supply-side and demand-side resources over a period into the future.

- Work the plan or the plan won't work
- Periodic updates are required

Alphabet Soup of Mandates… More to Come??

Issues impacting RPU's planning process for future resource portfolio

- **2006 - AB 32: California GHG Reduction Mandate**
- **2006 - SB 1368: Emission Performance Standard**
- 2006 - AB 2021: EE/DSM
- 2010 - AB 2514: Energy Storage
- 2011 - SB X1-2: Renewable Portfolio Standard (RPS)
- 2011 - Distributed Generation (DG): Governor's executive directive
- 2013 - Flexible Resource Adequacy Criteria/Enhanced Must Offer Oblig. (FRAC/MOO & MIC)
- 2014 - CAISO/CPUC Joint Reliability Framework
- 2014 - Energy Imbalance Market (EIM) Initiative
- 2014 - FERC Order 764: 15 Minute Market Initiative
- 2015 – AB 350 (50% RPS, 50% more EE, 50% Transportation Electrification)
- 2015 – SB 32 – AB 32 Phase II
- More to come???

WIP ---Rules are frequently revised, requiring RPU engagement

Riverside's Renewable Procurement Early Adoption

- **PUB/City Council – EARLY ACTIONS**
  - Oct 2002 - PUB Strategic Plan - Add 25 MW renewables
  - 2003 - PUB/CC Adopt 15% RPS goal by 2015
  - 2003 & later: RECs, geothermal, landfill gas, wind, etc.,
  - 2007/2008 - PUB/CC revised RPS goal
    - 20% by 2010; 25% by 2015; 33% by 2020
- **2011 - First POU mandate (33% by 2020) CA SB X1-2**
- **Early action credit – Historic carryover (762,000 MWhs)**

Early Actions—today's value $11.8 million

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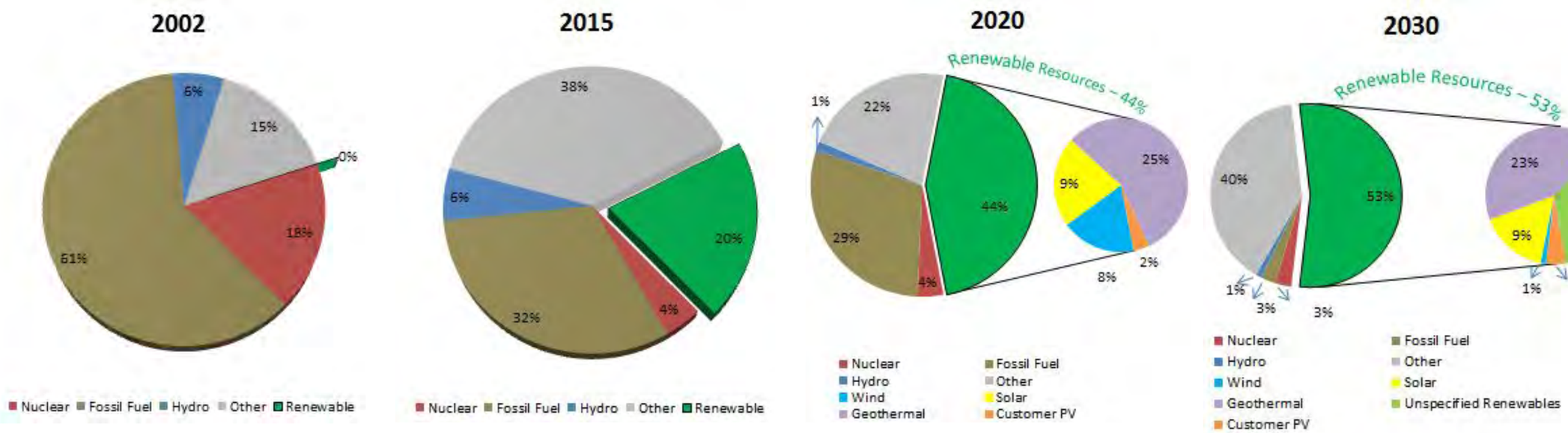
Securing a Reliable, Sustainable Energy Future

PAST (CY 1995-2002) → **PRESENT (CY 2003-2015)** → **MED. TERM FUTURE (CY 2016-2025)** → **LONG TERM FUTURE (CY 2026-2030)**



Securing a Reliable, Sustainable Energy Future

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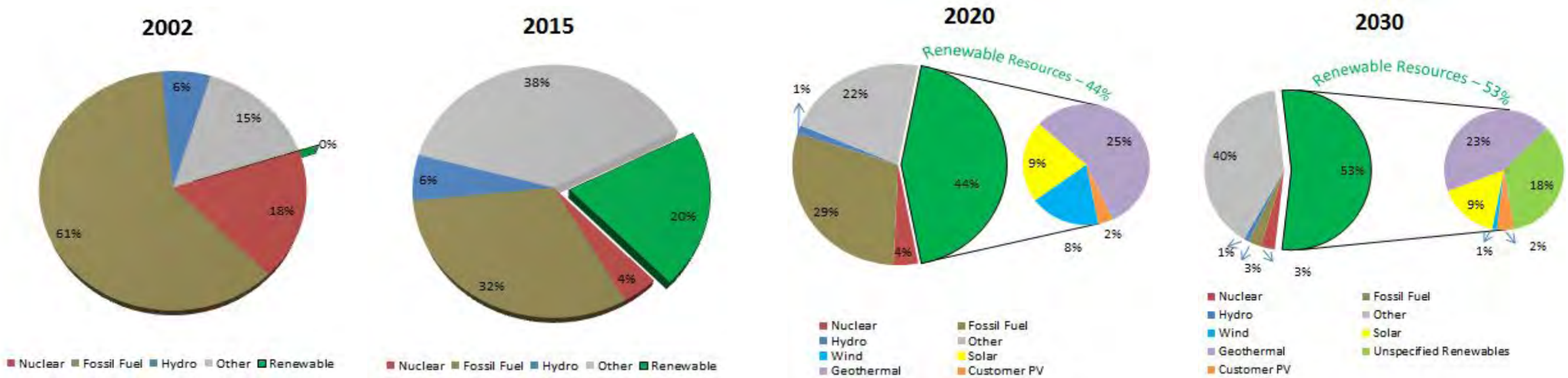

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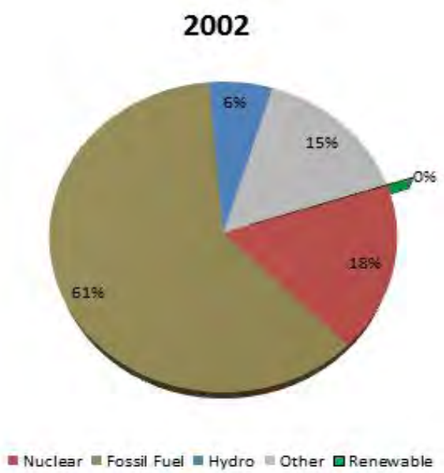

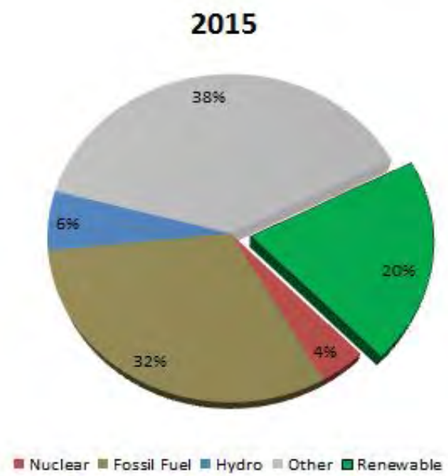

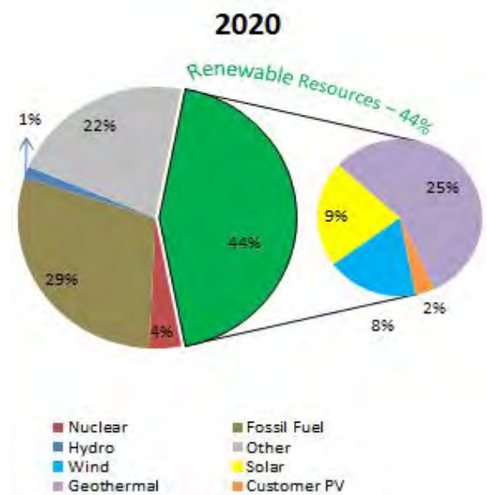

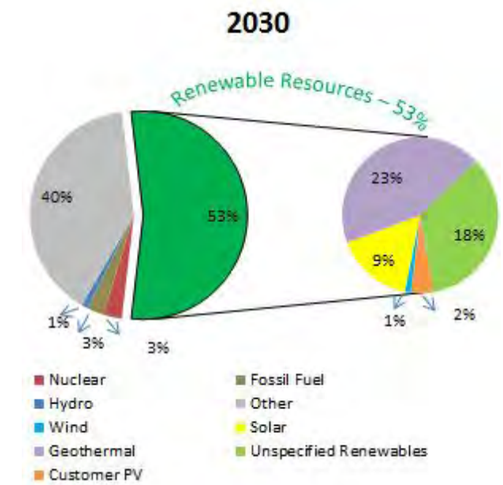

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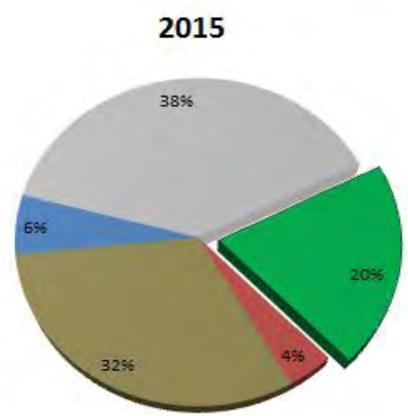
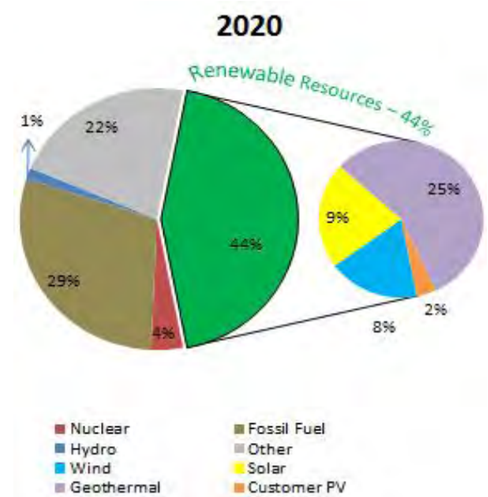
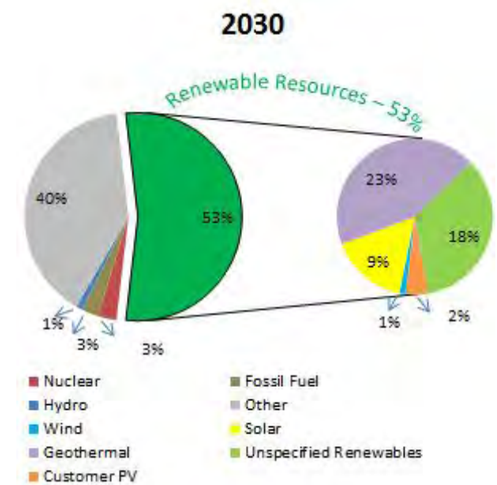
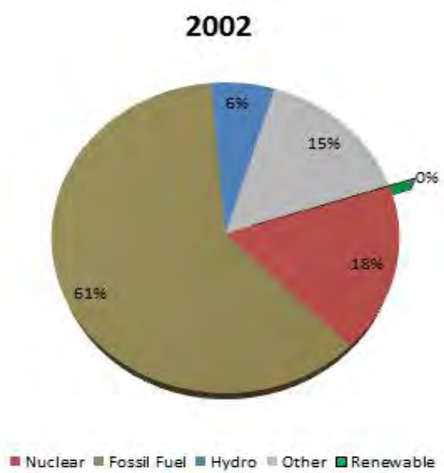


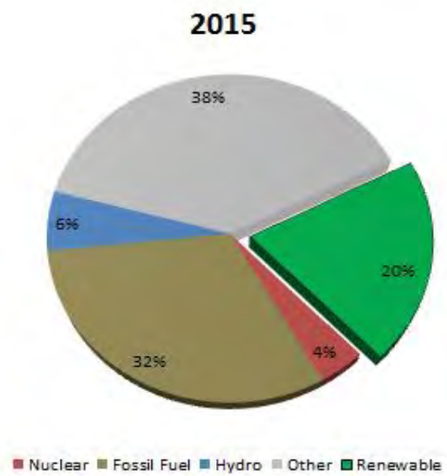


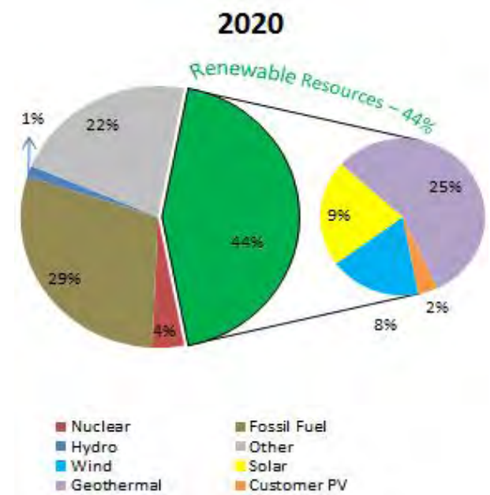


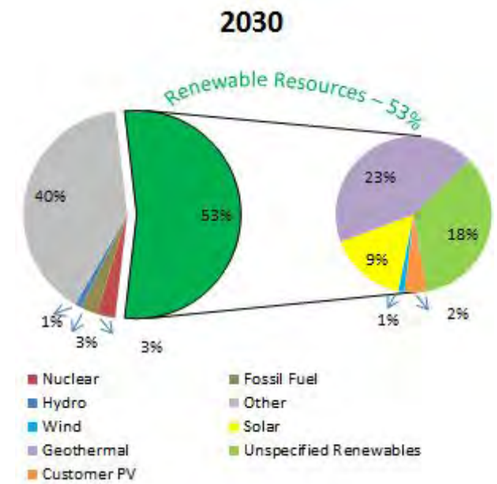
Securing a Reliable, Sustainable Energy Future

PAST (CY 1977- 2002) → **PRESENT (CY 2003-2015)** → **MED. TERM FUTURE (CY 2015-2020)** → **LONG TERM FUTURE (CY 2021-2030)**

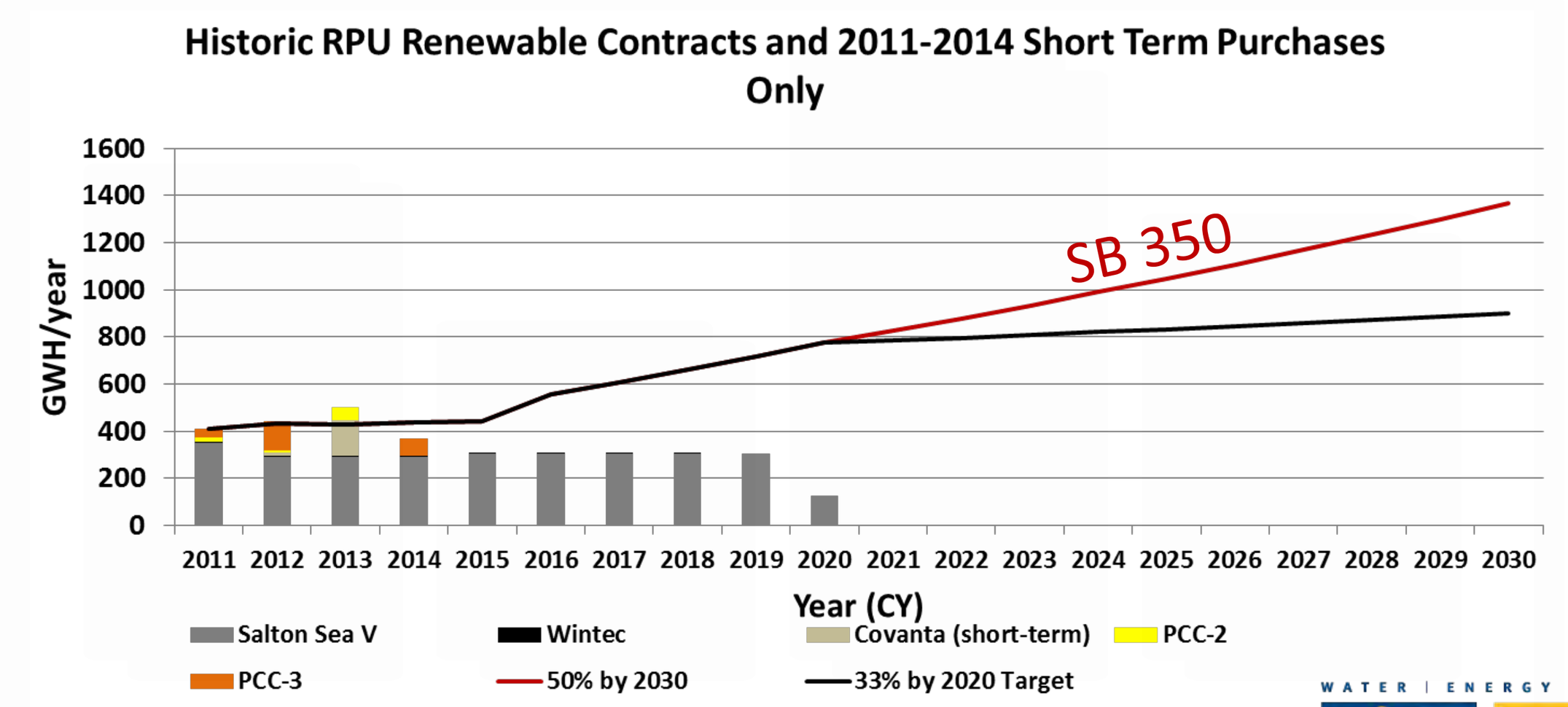








2011 – RPS Outlook



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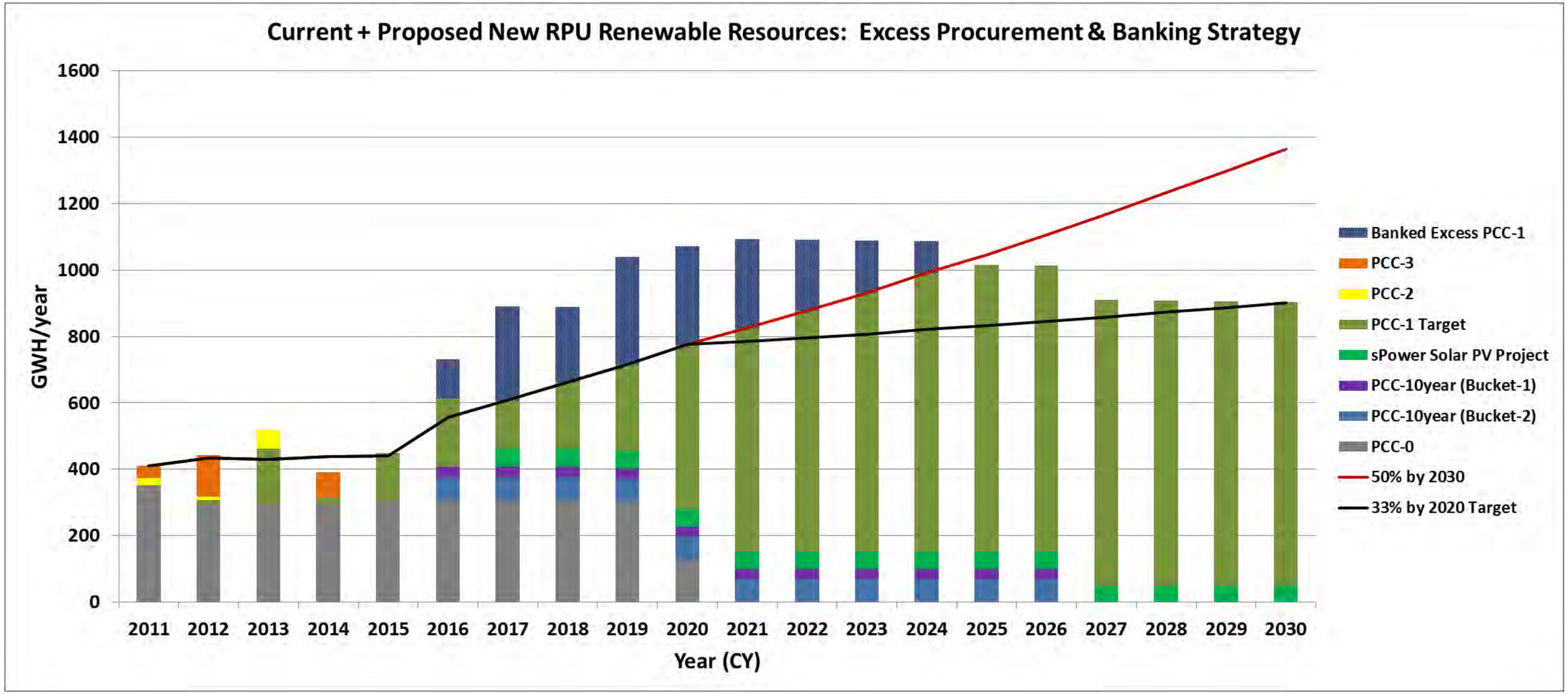
CITY OF RIVERSIDE PUBLIC UTILITIES

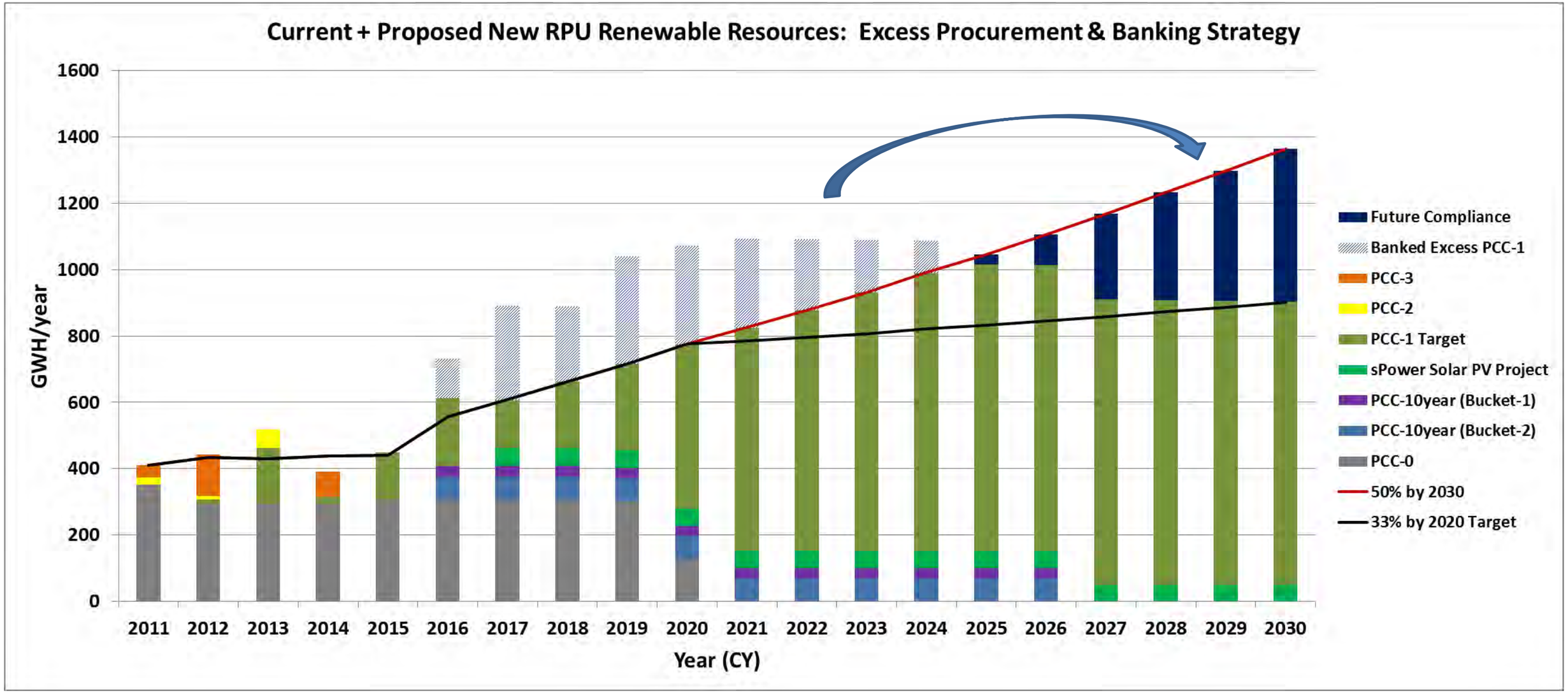
318 MW Renewable Resource Procurements Since 2012

Project	MW	COD	Type	End	PUB/CC	Contract Value
WKN Wind	6	2013	Wind	2032	2012	$27,771,000
Columbia II	11	2014	Solar PV	2034	2013	$39,259,000
Clearwater	14	2014	Solar PV	N/A	2013	N/A
Cabazon	39	2014	Wind	2025	2013	$29,472,000
North Lake	20	2015	Solar PV	2040	2012	$124,673,000
Kingbird B	14	2015	Solar PV	2035	2013	$46,750,000
Tequesquite	7.5	2015	Solar PV	2040	2014	$36,662,000
Silverado (Amended)	20	2016	Solar PV	2041	2014	$70,538,000
Cal Energy (Portfolio)	Up to 86	Various	Geothermal	2039	2013	$1,205,661,000
sPower	25	2016	Solar PV	2036	2015	$64,876,000
Iberdrola	Up to 75	2016	Wind	2027	2015	$64,357,000
					Total:	***$1,710,018,000***

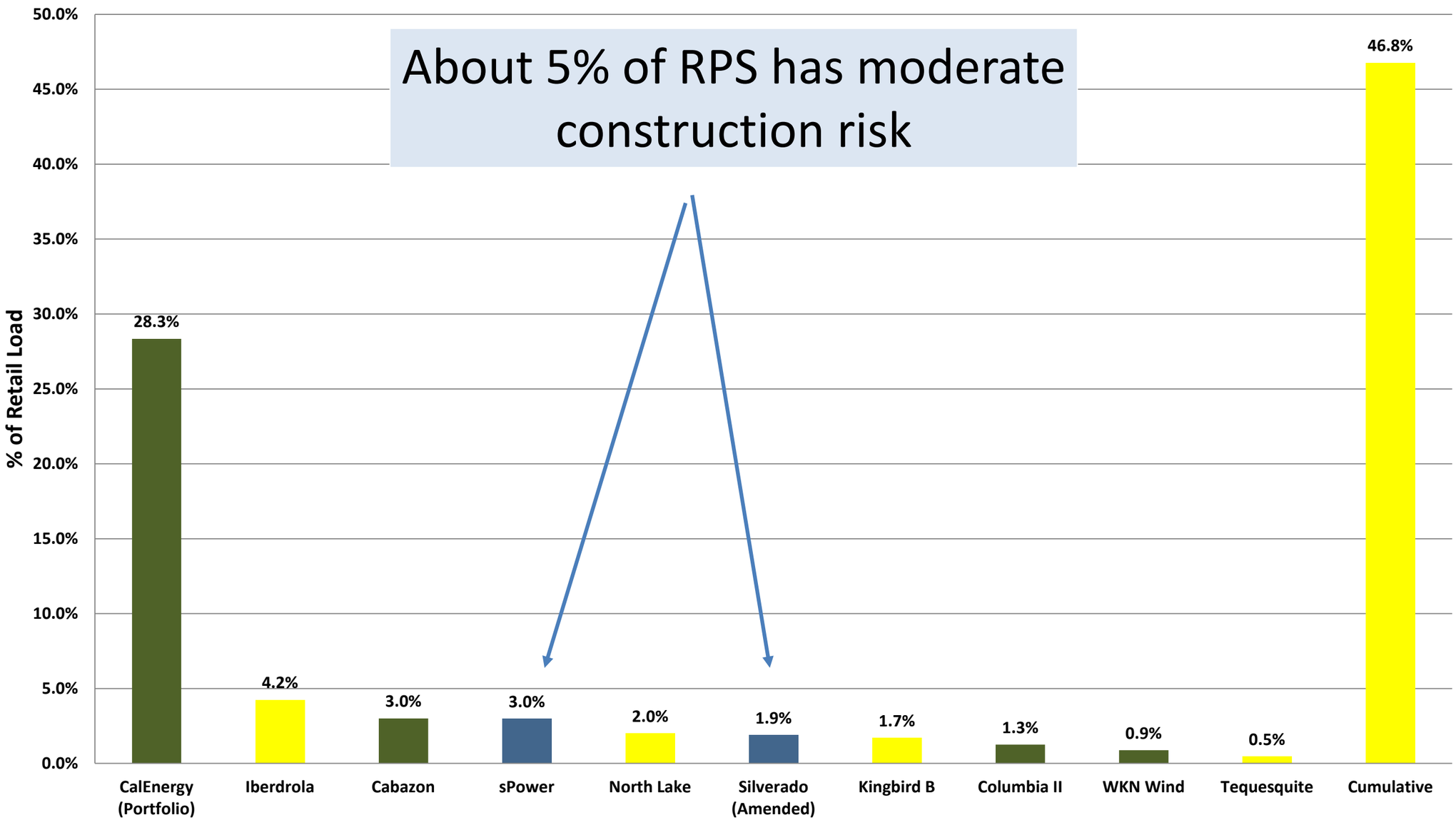
RPU's Current PCC-1 Excess Procurement Can Be "Banked"



“Banked” Excess - Used to Satisfy Future Compliance Obligations



Renewable Power - 2021



ROAD MAPS – INFRASTRUCTURE IMPROVEMENT – ELECTRIC – POWER SUPPLY

WORKFORCE DEVELOPMENT

INFRASTRUCTURE IMPROVEMENT – SUPPLY

IRP FINDINGS

–

THRIVING FINANCIALLY

ADVANCED TECHNOLOGIES

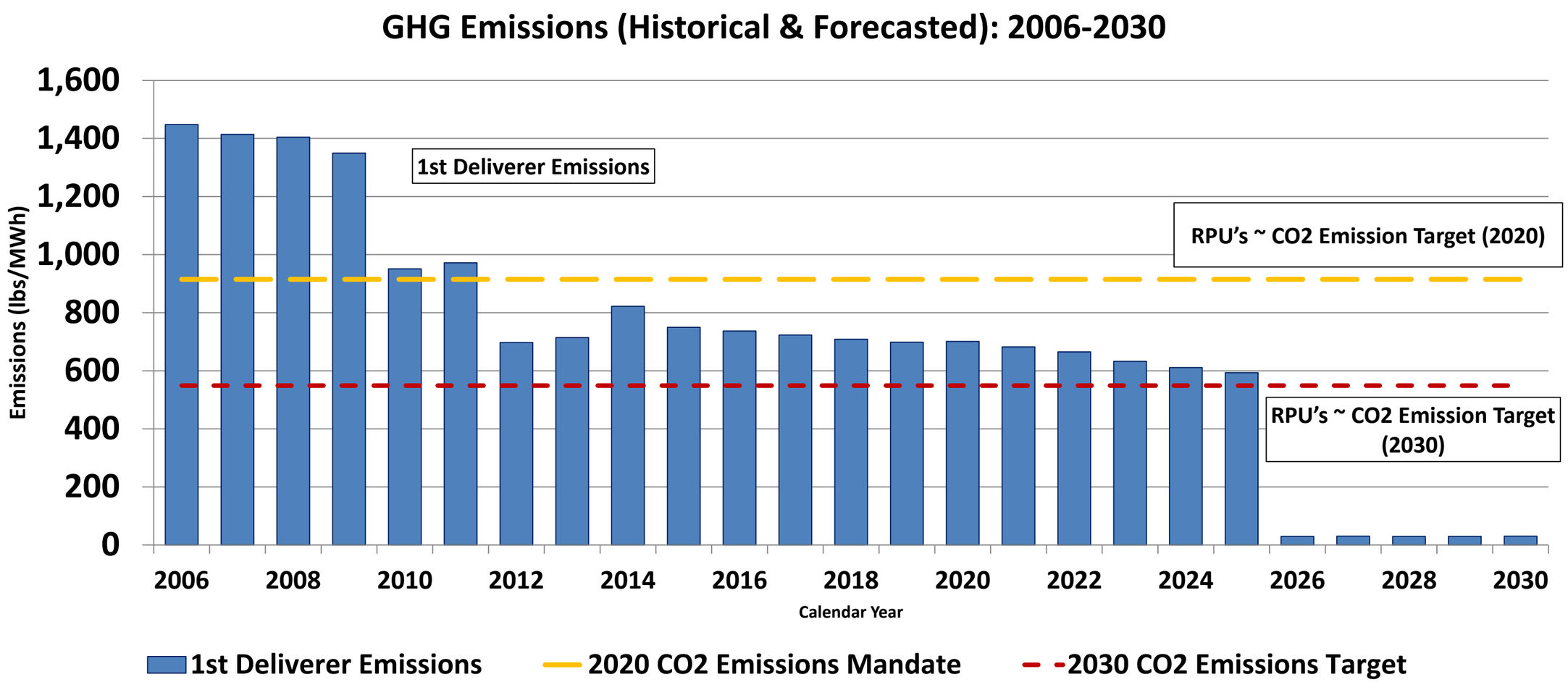
Finding (IRP): Renewable Mandates Will Likely Continue

Work towards 40% RPS by 2020

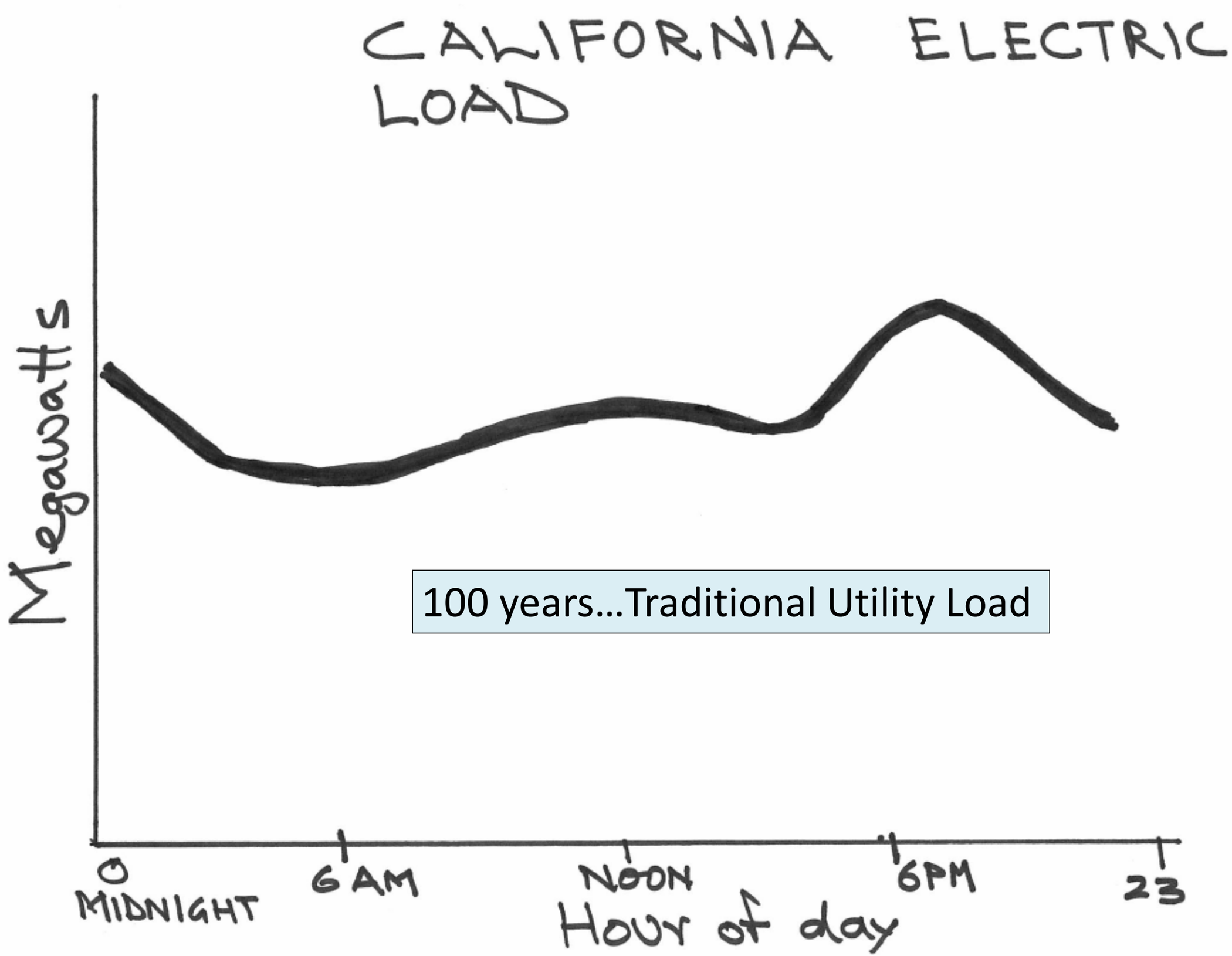
- Maximize cost-effective renewable procurement
- Ensure procurements meet “excess procurement” (no regrets) criteria

Executive Order – 50% RPS… mandated soon

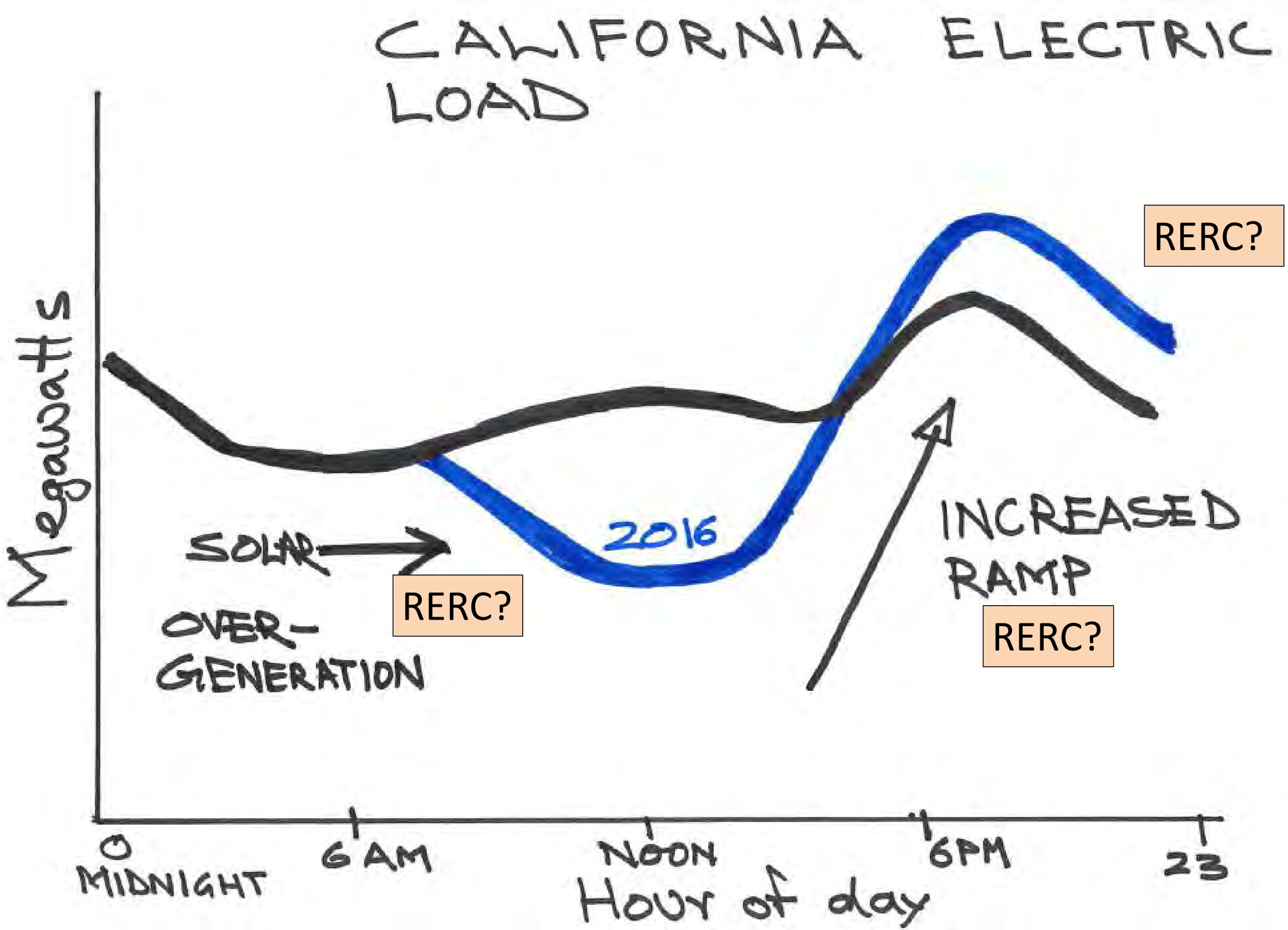
RPU's GHG Emission Profiles

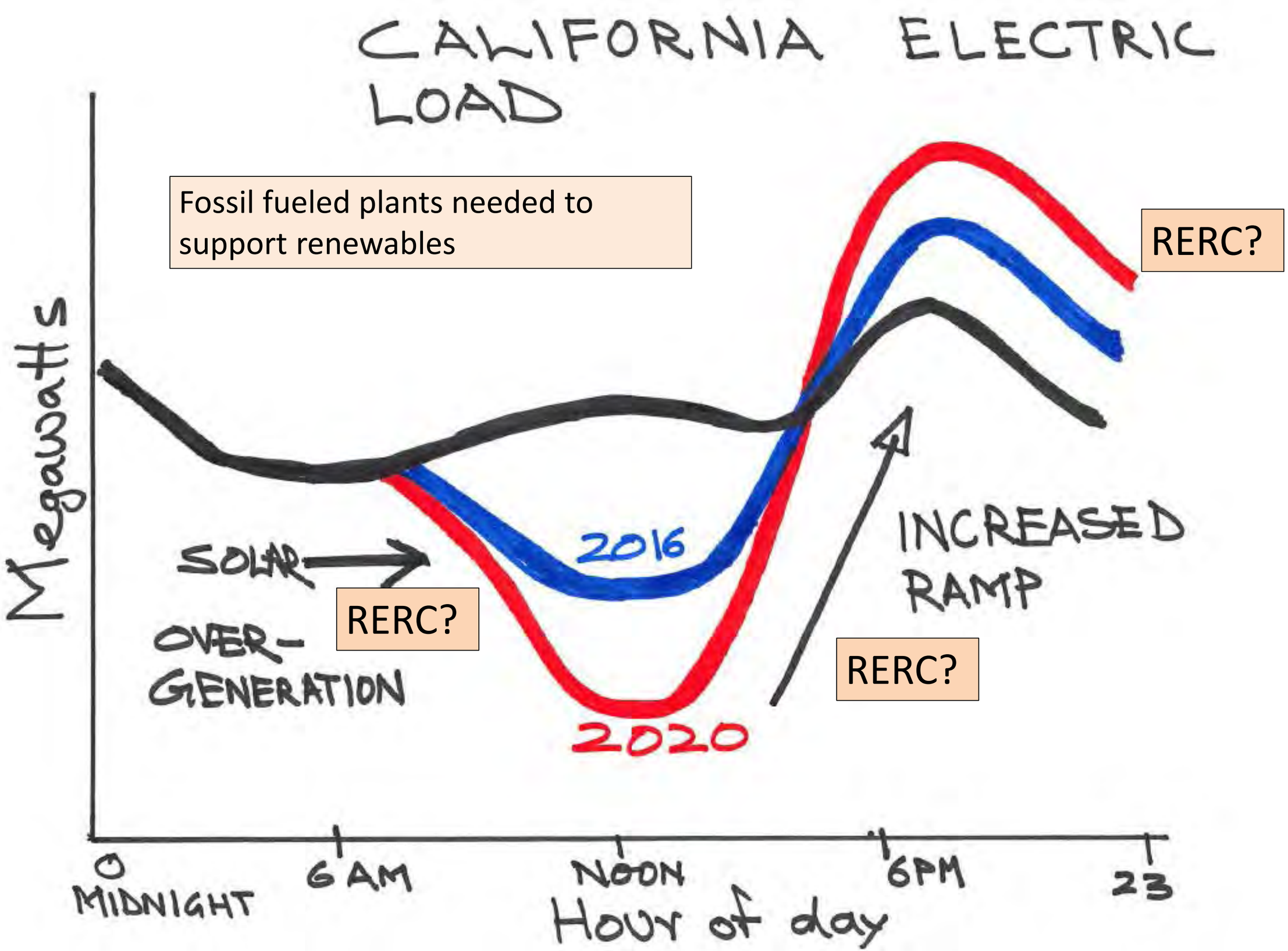


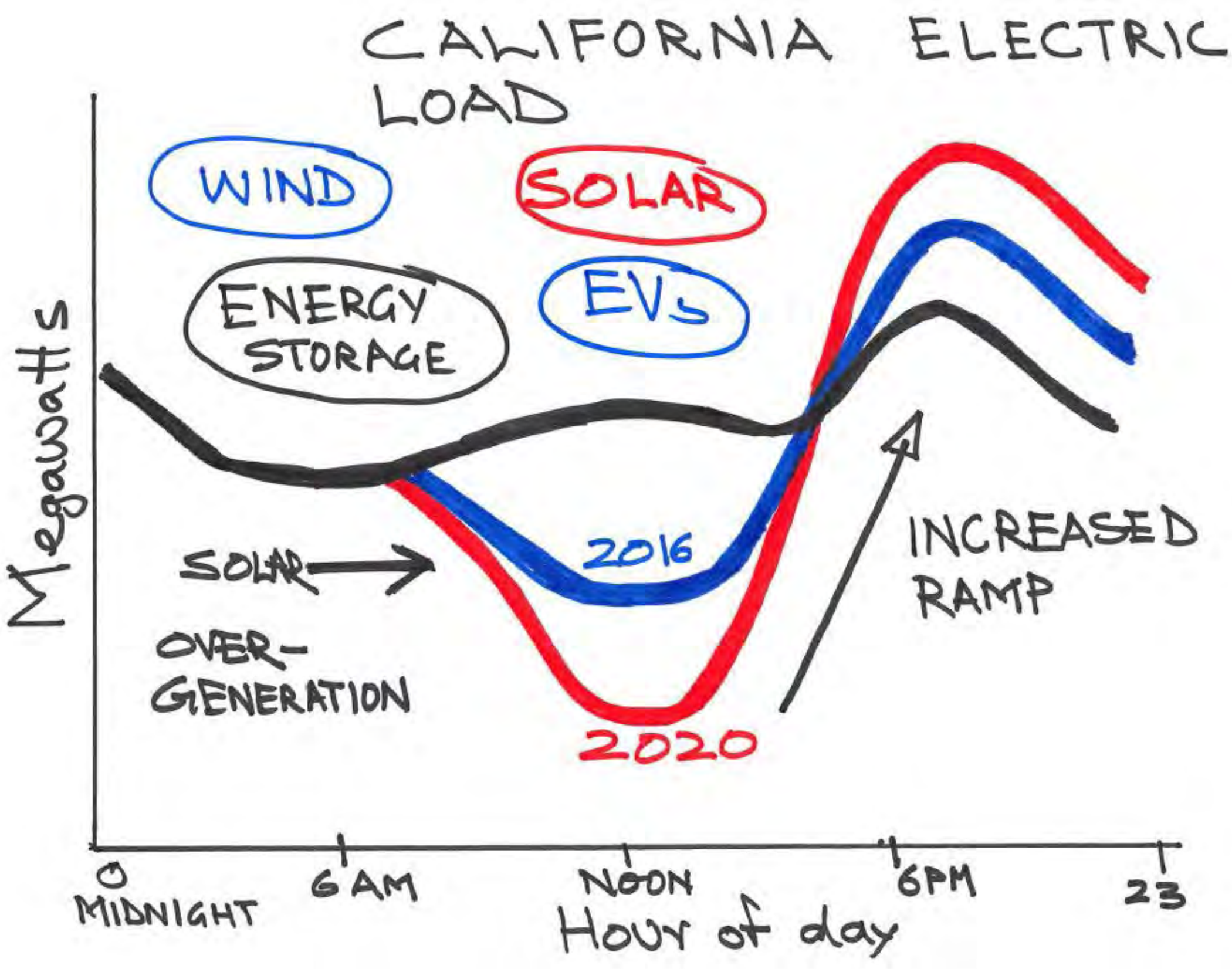
- RPU actively reducing GHG emissions profile since 2008
- Continue reducing GHG footprint, at least through 2020
- Most significant reduction when IPP contract terminates



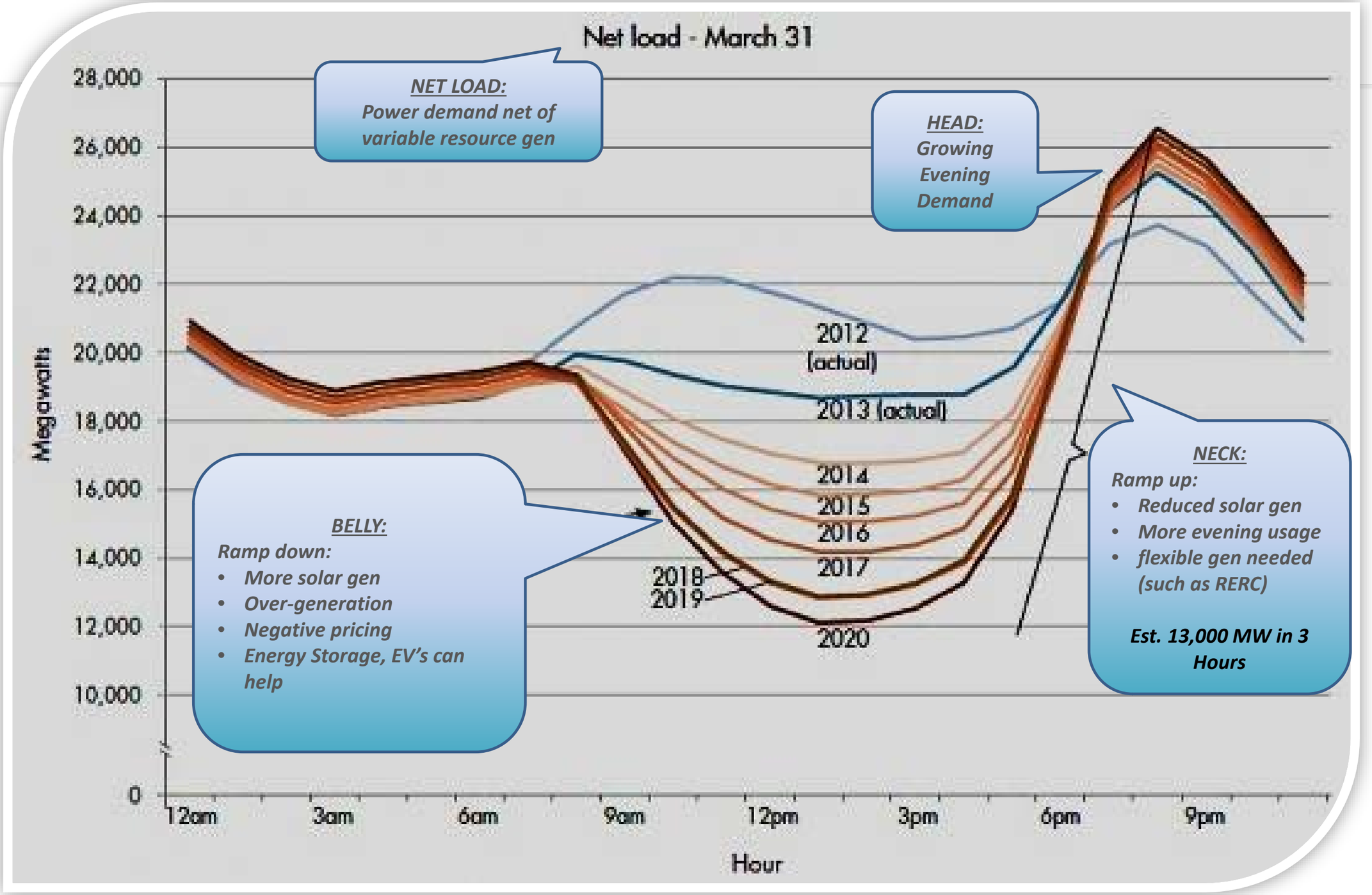
100 years…Traditional Utility Load


CALIFORNIA ELECTRIC LOAD
RERC?
Megawatts
2016
SOLAR
RERC?
OVER-GENERATION
INCREASED RAMP
RERC?
0 MIDNIGHT
6AM
NOON
6PM
23
Hour of day


CALIFORNIA ELECTRIC LOAD
Fossil fueled plants needed to support renewables
RERC?
Megawatts
SOLAR
RERC?
OVER-GENERATION
2016
2020
INCREASED RAMP
RERC?
0 MIDNIGHT
6 AM
NOON
6PM
23
Hour of day


CALIFORNIA ELECTRIC LOAD
WIND
SOLAR
ENERGY STORAGE
EVs
Megawatts
SOLAR
OVER-GENERATION
2016
2020
INCREASED RAMP
0
MIDNIGHT
6AM
NOON
6PM
23
Hour of day

UTILITY 2.0 - CAISO "Duck Curve "



ROAD MAPS – INFRASTRUCTURE IMPROVEMENT – ELECTRIC – POWER SUPPLY

WORKFORCE DEVELOPMENT

INFRASTRUCTURE IMPROVEMENT – SUPPLY

IRP FINDINGS

–

THRIVING FINANCIALLY

ADVANCED TECHNOLOGIES

Finding (IRP): Future – More Integration of Demand & Supply Resources

Search for Energy Storage / Demand Side Management (DSM) synergies

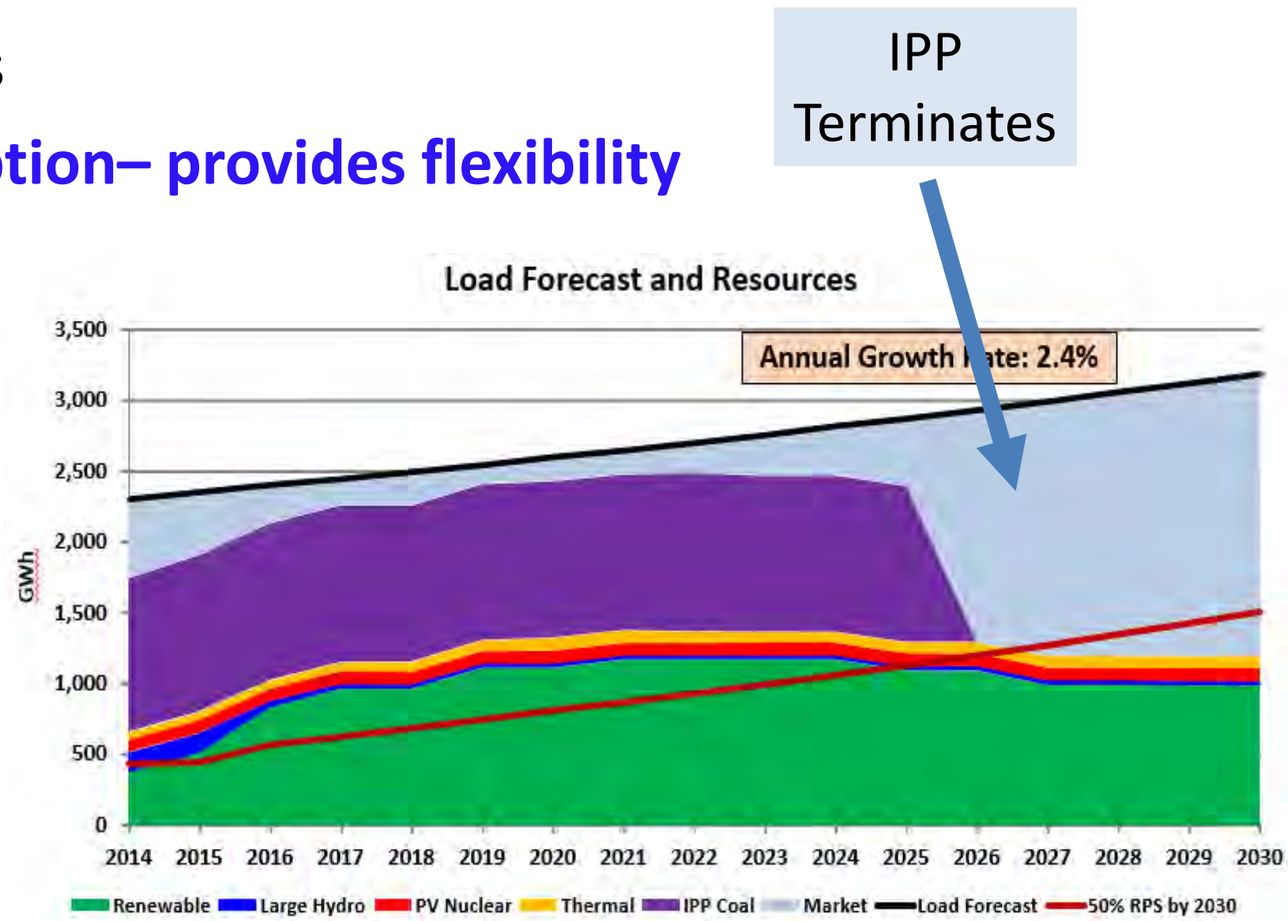
- Look at cost effectiveness for all RPU customers
- Demand response pilots, energy storage, DSM, DG
- Local Reliability considerations – RTRP, more generation

How Will Riverside Replace IPP???

(Expires 2027)

Project Consists of:

- City of Riverside ("COR") share 7.617% - 136 MW
- Provides 35 – 45% of energy needs
- **2019 Repower from coal to gas option– provides flexibility**



Additional IPP Replacement Options

(see Chapter 11 of RPU IRP)

Scenario	Capacity (MW)	Location	Description	Dispatch Flexibility	Permitting challenge	% Increase to Net COS in 2030
Baseline	150	n/a market	Forward hedged market power contracts	None	n/a (None)	-
Ext.Gen	50*	Delta, UT	IPP Repower NatG CC	Moderate	Moderate	0.0%
Int.Gen	46.5*	Riverside, CA	ICE Wartsila Units	High	High	2.3%
Int.Gen	100*	Riverside, CA	GE LMS-100 NatG SC	High	High	3.4%
Green Power	75*	CA	PPA for new base-load renewable asset	Low	Low	6.0%

* L/T power hedges added (total 150MW) for scenario comparison purposes
IRP Chapter 11 - Extensive information concerning each Alternative

ROAD MAPS – INFRASTRUCTURE IMPROVEMENT – ELECTRIC – POWER SUPPLY

WORKFORCE DEVELOPMENT

INFRASTRUCTURE IMPROVEMENT – SUPPLY

IRP FINDINGS

–

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ADVANCED TECHNOLOGIES

Finding (IRP): Future of IPP Offers Many Options

Continue to examine all viable IPP Alternatives

- Pursue multiple alternatives;
- Maximize future flexibility for reliability and regulatory mandates
- When rules stabilize, quantify ancillary services/benefits
- Follow up studies for local reliability benefits

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CITY OF RIVERSIDE PUBLIC UTILITIES

ROAD MAPS – INFRASTRUCTURE IMPROVEMENT – ELECTRIC – POWER SUPPLY

WORKFORCE DEVELOPMENT

INFRASTRUCTURE IMPROVEMENT – SUPPLY

IRP FINDINGS

–

THRIVING FINANCIALLY

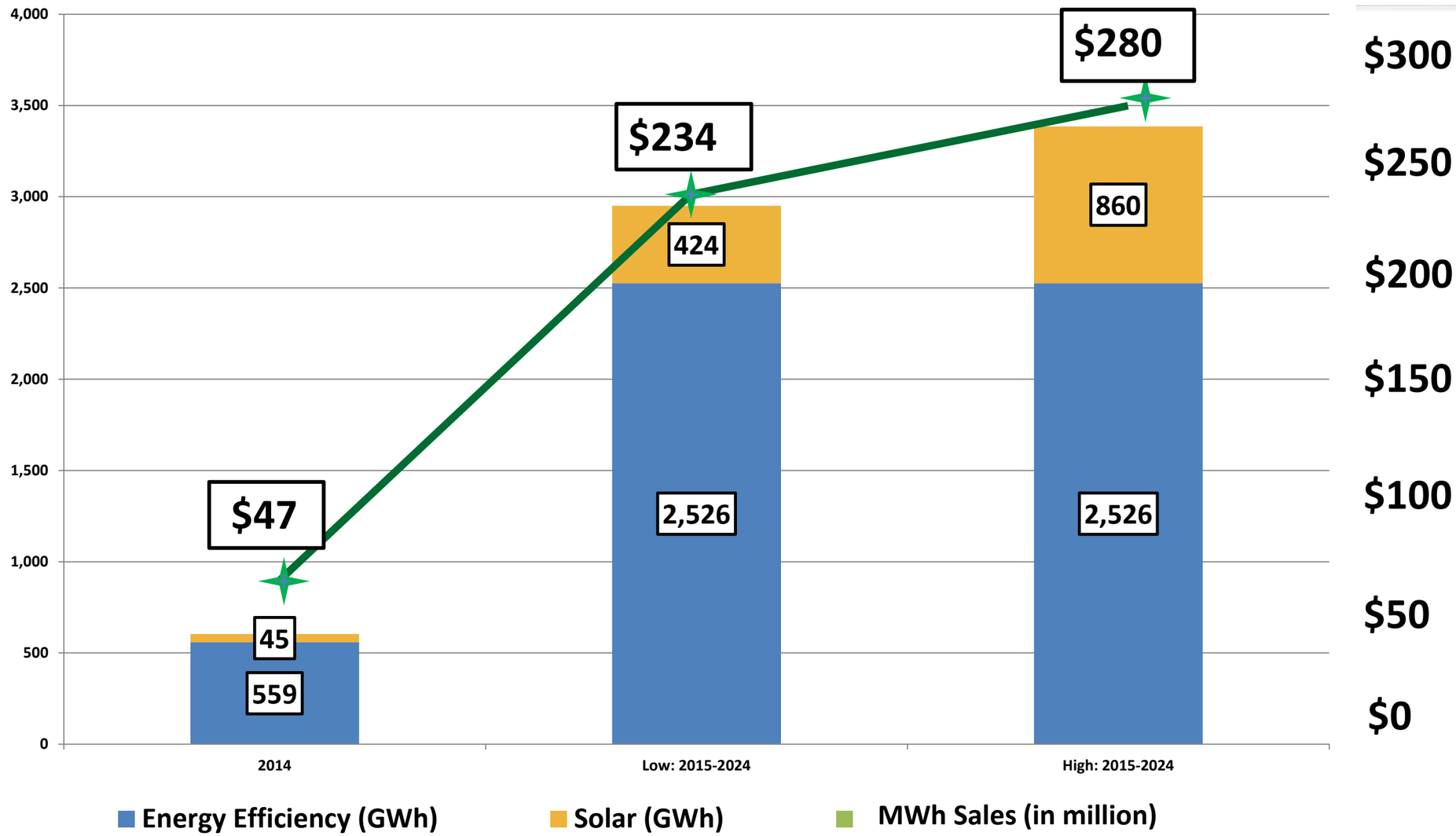
ADVANCED TECHNOLOGIES

Finding (IRP) – Material Effects of Solar and Energy Efficiency

Monitor Customer Solar PV penetration levels

- Current rate structure must change – fairness/equity
- Unbundled rates, time-or-use, adjustment clauses, etc.,
- Today -14MW; expect 33 MW by 2033
- Today's subsidy $10.70/yr; Expect $36/yr by 2033

Lost Revenues
Solar and EE Challenges w/Current Rates



ROAD MAPS – INFRASTRUCTURE IMPROVEMENT – ELECTRIC – POWER SUPPLY

WORKFORCE DEVELOPMENT

INFRASTRUCTURE IMPROVEMENT – SUPPLY

IRP FINDINGS

–

THRIVING FINANCIALLY

ADVANCED TECHNOLOGIES

Finding (IRP) : Future CAISO Markets Will be More Complex

Maintain flexibility in the CAISO Markets

- Participate in stakeholder processes (FRAC/MOO, Import Capacity, etc.)
- CAISO collaboration
- Alternatives to current operations
- Minimize cost exposure (RPS/ES/DG/ renewable integration costs)

WORKFORCE DEVELOPMENT

INFRASTRUCTURE IMPROVEMENT – SUPPLY

OTHER FINDINGS

THRIVING FINANCIALLY

ADVANCED TECHNOLOGIES

SONGS - NRC Decommissioning Requirements
Three Phases – (end date unknown)

Decommissioning Planning (2014-2015)	Major Decommissioning Activities (2014-2032)	License Termination (In Perpetuity or until permanent repository)
SONGS ceases operations and notifies NRC	Initiate activities, per the Post-shutdown Decommissioning Activities Report	Conduct final status survey and submit reports
Su **Done** t-shutdown Decommissioning Activities Report	NRC co **In Process** nspections	NRC conducts confirmatory surveys and reviews report
NRC reviews Post-shutdown Decommissioning Activities Report	Submit license termination plan	NRC approves final status survey report and modifies license
	activities	Dry Fuel Storage Part 50 license remains
	hnical and ws of license approves plan	

2014 $4.4B Funding:	2014$	%
SCE	$3.05B	91%
SDGE	$0.86B	97%
APU	$0.13B	118%
RPU	**$0.08B****	**100%**
Total	$4.1B	93%

** Per 2014 DCE-- future unknowns could impact funding levels

Recommendation—Significant Uncertainty - Keep funding decommissioning – restrict funds (internally)

R

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CITY OF RIVERSIDE PUBLIC UTILITIES

WORKFORCE DEVELOPMENT

INFRASTRUCTURE IMPROVEMENT – SUPPLY

OTHER FINDINGS

THRIVING FINANCIALLY

ADVANCED TECHNOLOGIES

Other Finding: Resources Already Uses Advanced Technology

Production Cost Modeling Software

Energy Platform software

(Hourly CAISO energy, pricing and CRR information)

Deal Capture and Settlement Suite Software

High end Analytical and Business Intelligence software

Best Practice - Expand analytical capability and make data available to other divisions

WORKFORCE DEVELOPMENT

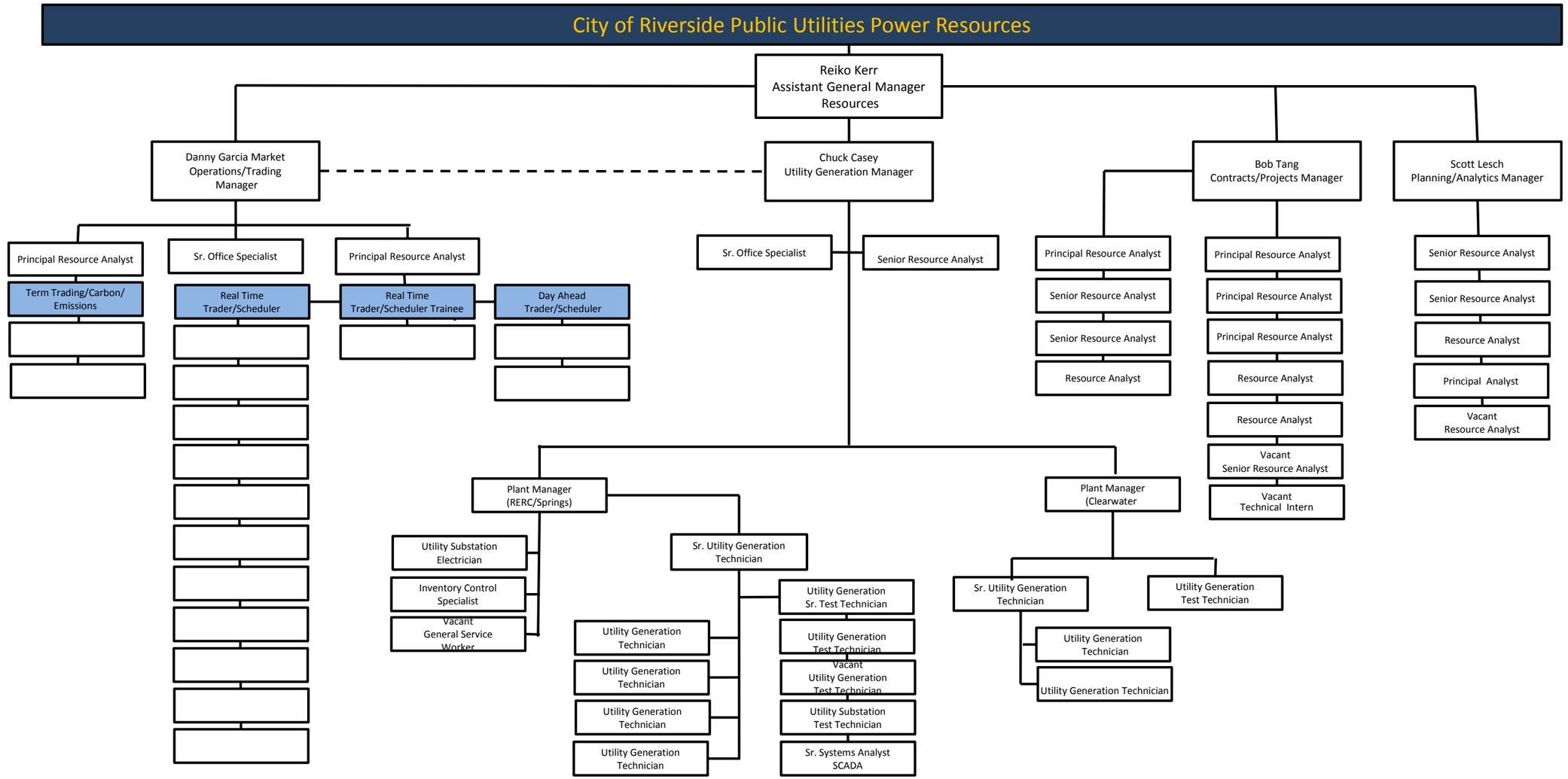
INFRASTRUCTURE IMPROVEMENT – SUPPLY

OTHER FINDINGS

THRIVING FINANCIALLY

ADVANCED TECHNOLOGIES

Other Finding: Resources has Workforce Challenges

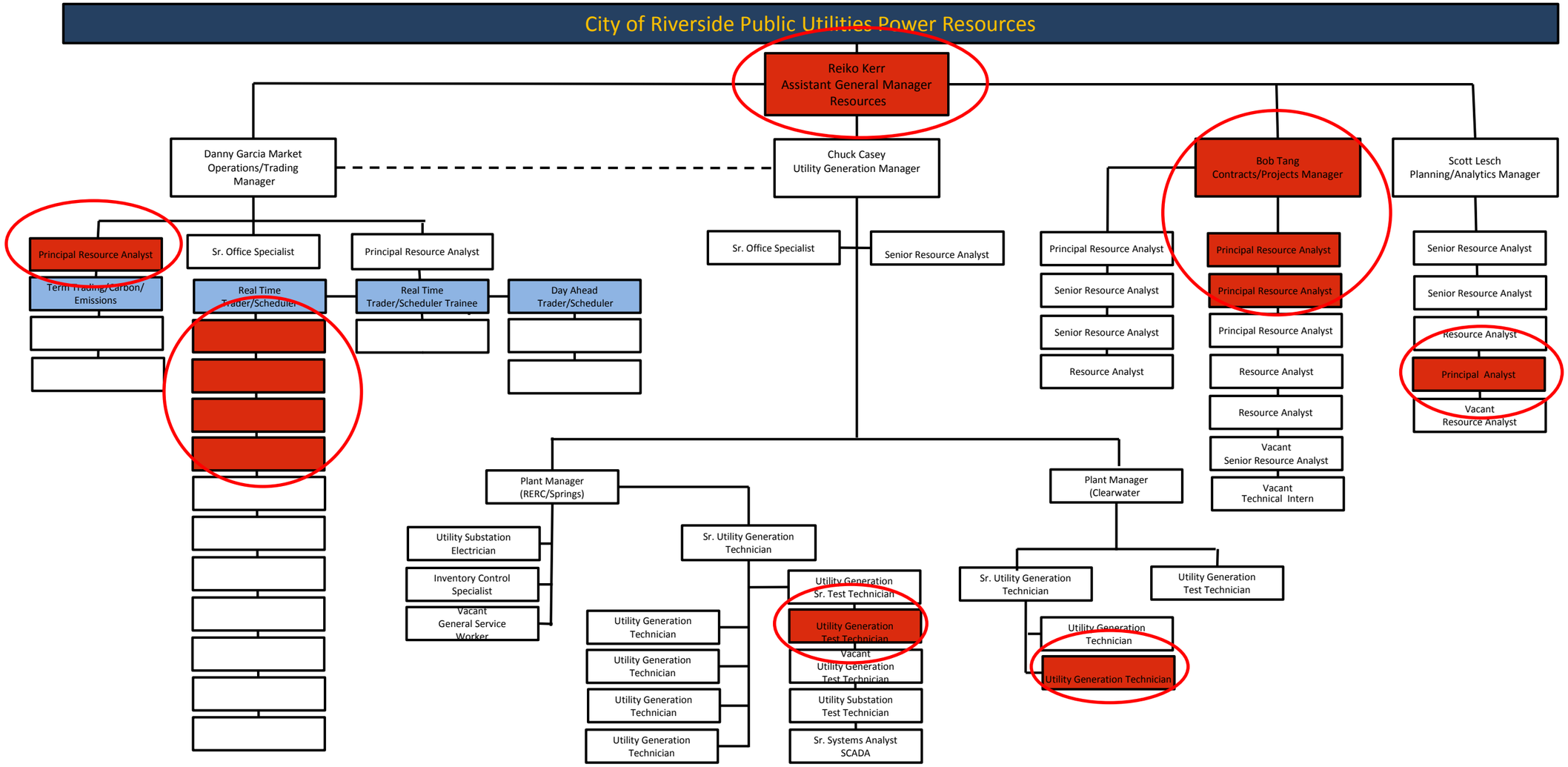


Legend
- Eligible for Retirement (12)
- Near Retirement (12)
- Future Stars/vacancies

- **Pending retirements of Resource Managers & Principals**
- **Retaining well trained staff is/will be a primary challenge**
- **Expanding analytical capabilities Department wide**

Updated 7/9/2015

Other Finding: Resources has Workforce Challenges



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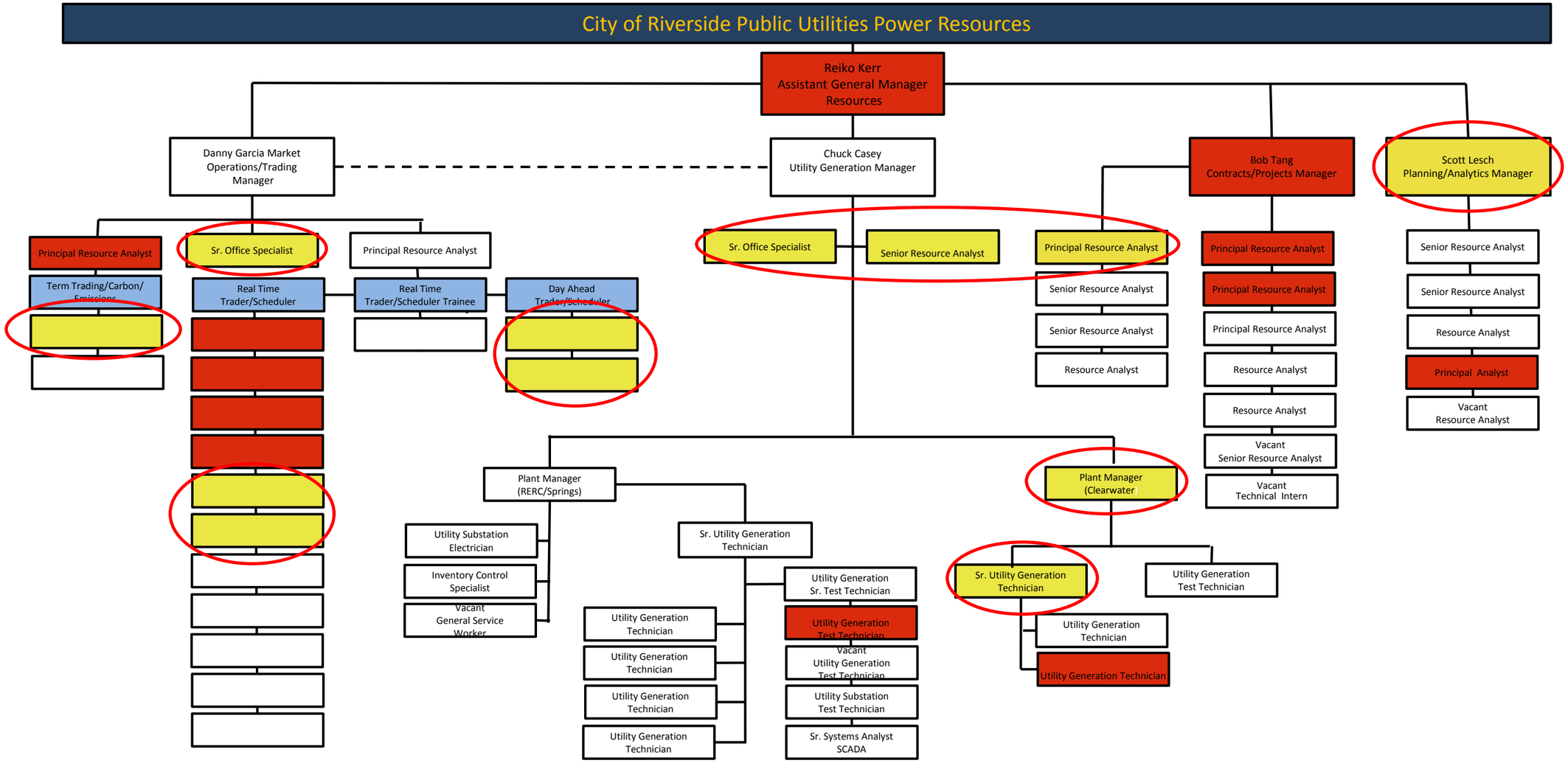

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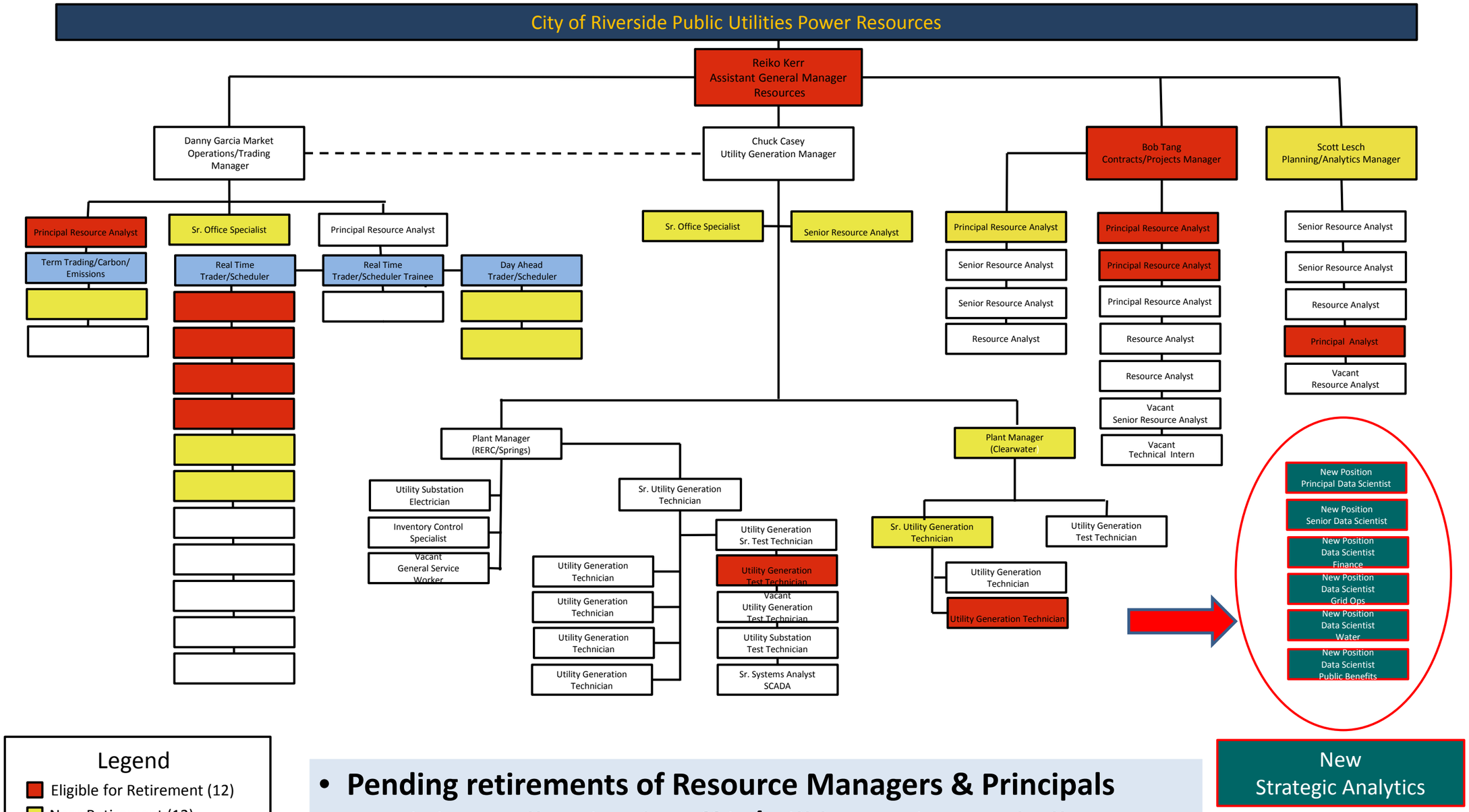

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Updated 7/9/2015

ROAD MAPS – INFRASTRUCTURE IMPROVEMENT – ELECTRIC – POWER SUPPLY

WORKFORCE DEVELOPMENT

INFRASTRUCTURE IMPROVEMENT – SUPPLY

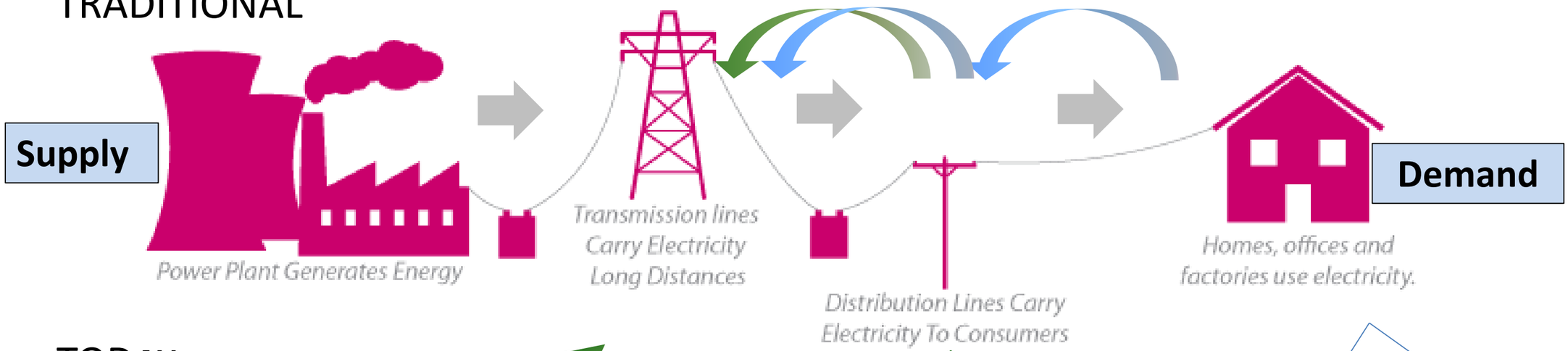
OPTIONS

THRIVING FINANCIALLY

ADVANCED TECHNOLOGIES

Utility 2.0

TRADITIONAL



TODAY

Renewable Generation

Local Generation

Distributed
Generation
+ Storage
+EV

FUTURE

More Renewable Generation

Energy Storage

THE BIG PICTURE:
Critical Issues - Future Direction

How will we replace IPP

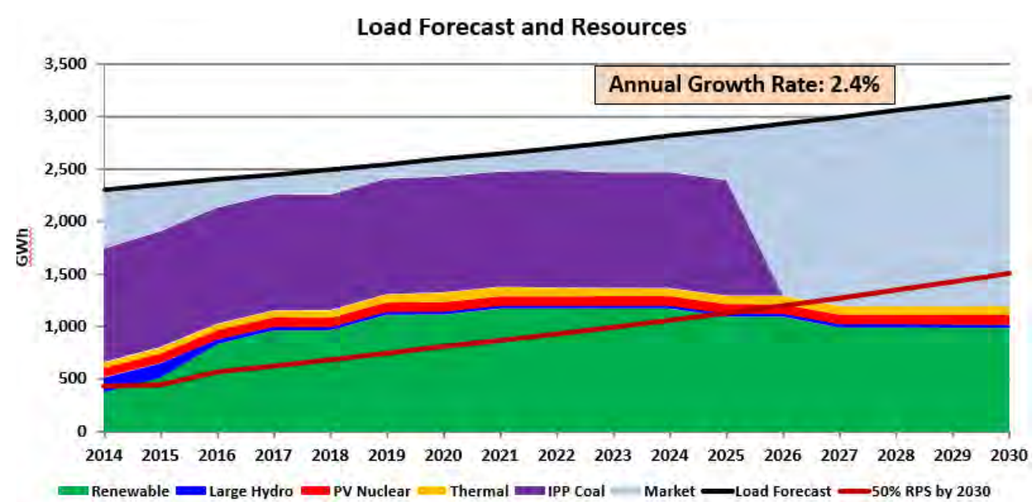
- **Explore all options, remain engaged**

How will we meet our RPS

- **On Track to meet 50% by 2030**

How will we integrate demand and supply

- **Work-in-Process - Collaboration, analytics, communication, advanced technology**
- **RTRP, DG, more generation, local reliability**



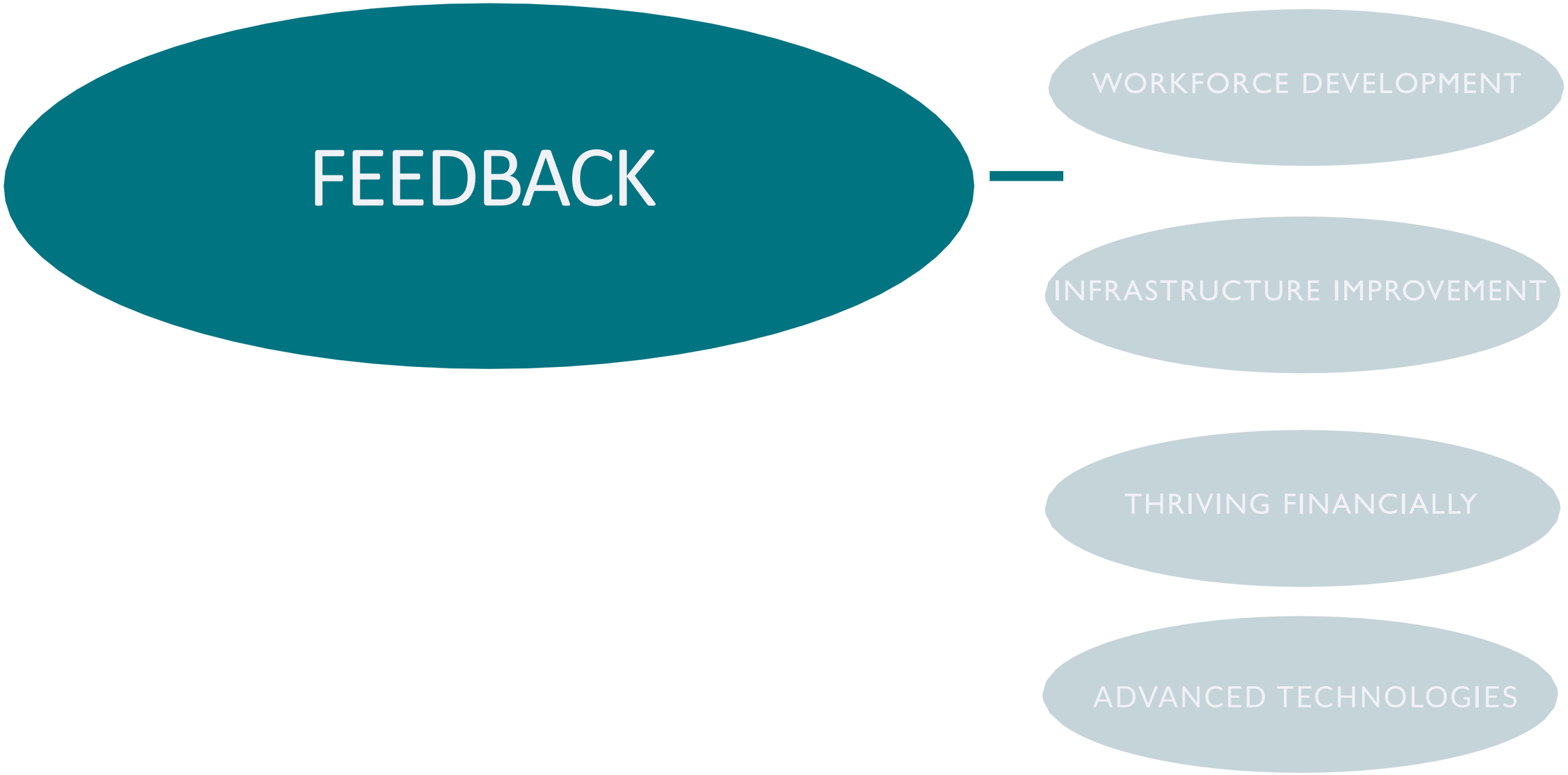
Future Options & Direction

Status	ISSUE	ACTION REQUIRED
■	Intermountain Power Project	Maintain flexibility – 2019 exit option
■	Renewable Portfolio Standard (RPS)	Increase RPS targets to 50% by 2030; monitor development activity
■	San Onofre Nuclear Generating Station (SONGS)	Monitor decommissioning activity and projected costs
■	Integration Demand & Supply	ED, PB, Resources collaborations, RTRP, internal generation, local reliabilty
■	Analytic/Statistical Support	Expand Analytic team/support to other divisions
■	Regulatory	Remain engaged in Regulatory issues impacting RPU
■	CAISO	Remain engaged – Resolve FRAC/MOO & MIC, prepare for alternate operations
■	Solar	Address RPU integration challenges (rates, subsidy, etc.,)

■ In-Progress

■ On-going

ROAD MAPS –


FEEDBACK
WORKFORCE DEVELOPMENT
INFRASTRUCTURE IMPROVEMENT
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ADVANCED TECHNOLOGIES

Next Steps

- Incorporate Comments
- Formulate Detailed recommendations
- Review
- Report Back