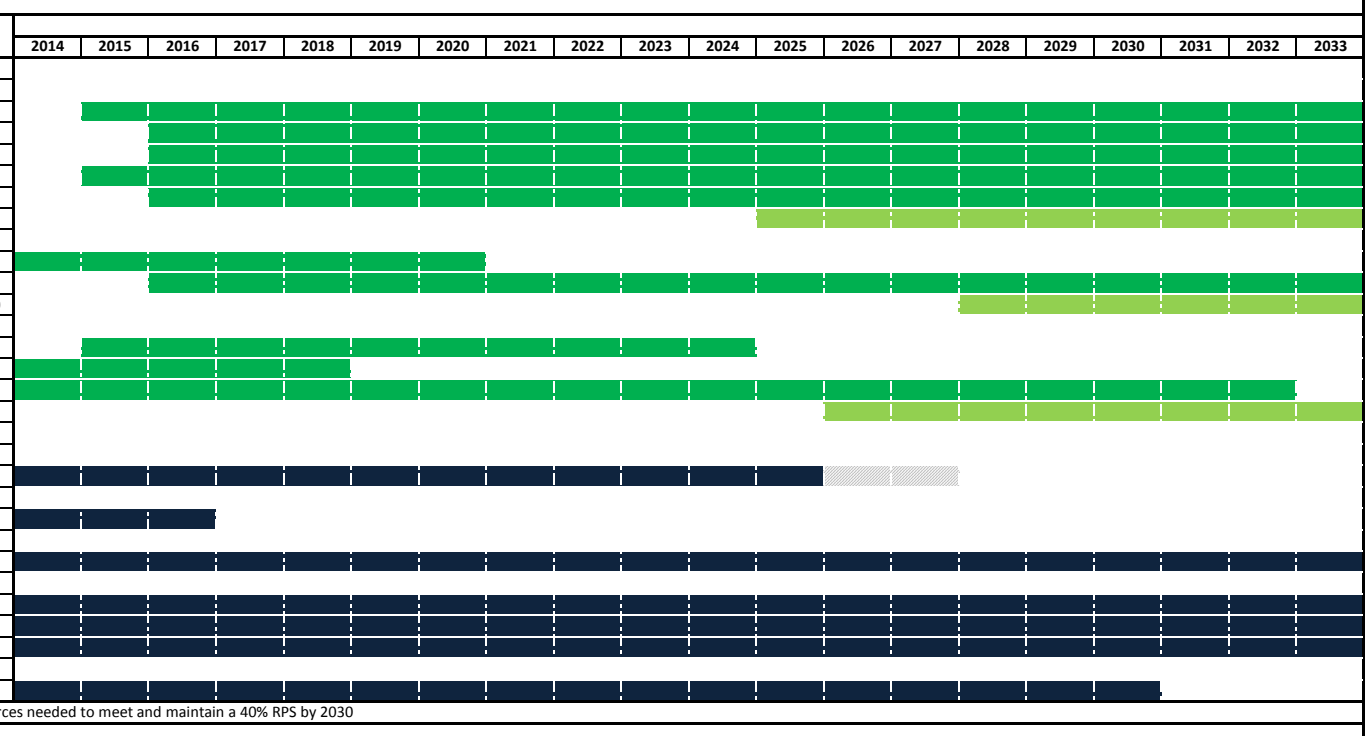
Riverside Public Utilities 2014 IRP

Least Cost, Least Risk IRP Scenario: 40% RPS by 2030, IPP 2025, Hedged Market Purchases for IPP Replacement

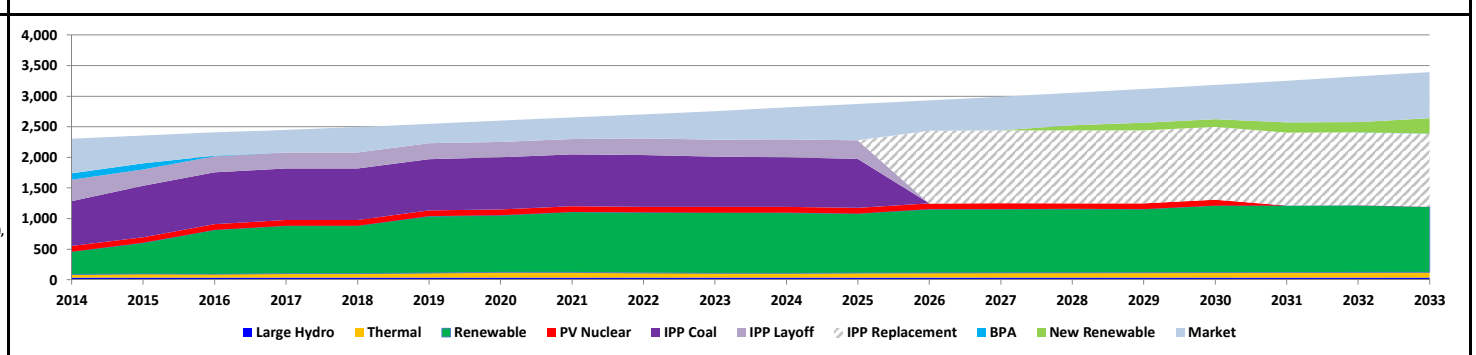
Resources	Name Plate (MW)
Renewable	
Solar	
AP North Lake	20
S.Power	20
Kingbird B	14
Columbia II	11
Tequesquite	7
IRP Solar*	20/40
Geothermal	
Salton Sea 5	46
CalEnergy Expansion	20/40/86
IRP Geothermal*	10/15/20/30
Wind	
Cabazon	39
Wintec	1.3
WKN	6
IRP Wind*	20
Conventional	
Coal	
Intermountain (IPP)	136
Exchange	
BPA-2	15/60
Large Hydro	
Hoover	20-30
Natural Gas	
Clearwater	28.5
RERC 1-4	194
Springs	36
Nuclear	
Palo Verde	12



*Hypothetical future renewable resources needed to meet and maintain a 40% RPS by 2030

RPU Resource Energy (GWh / year)

(For Least Cost, Least Risk IRP Scenario: 40% RPS by 2030, IPP 2025, Hedged Market Purchases for IPP Replacement)



Projected RPU System Peaks, RA Needs and Firm Capacity (MW)

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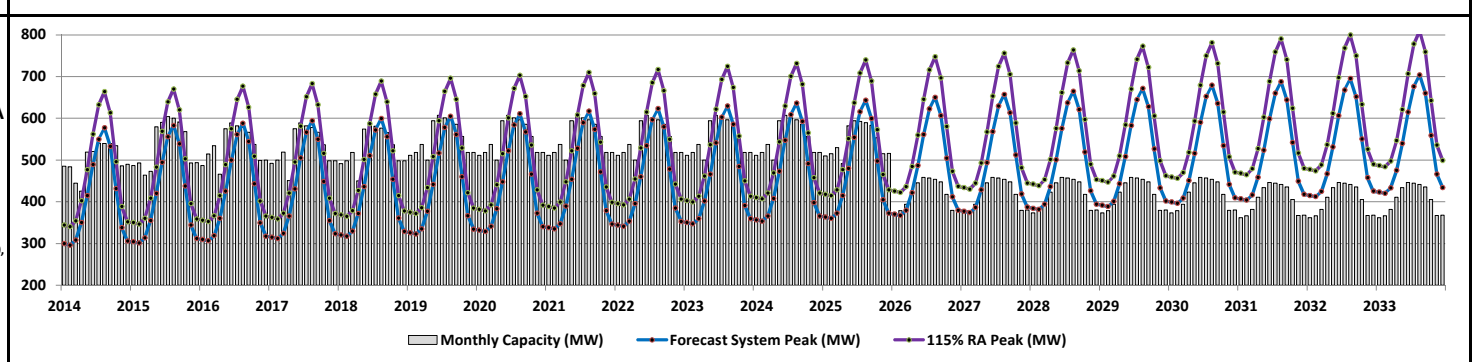

Forecasted Annual Renewable Energy Purchases (GWh / year)

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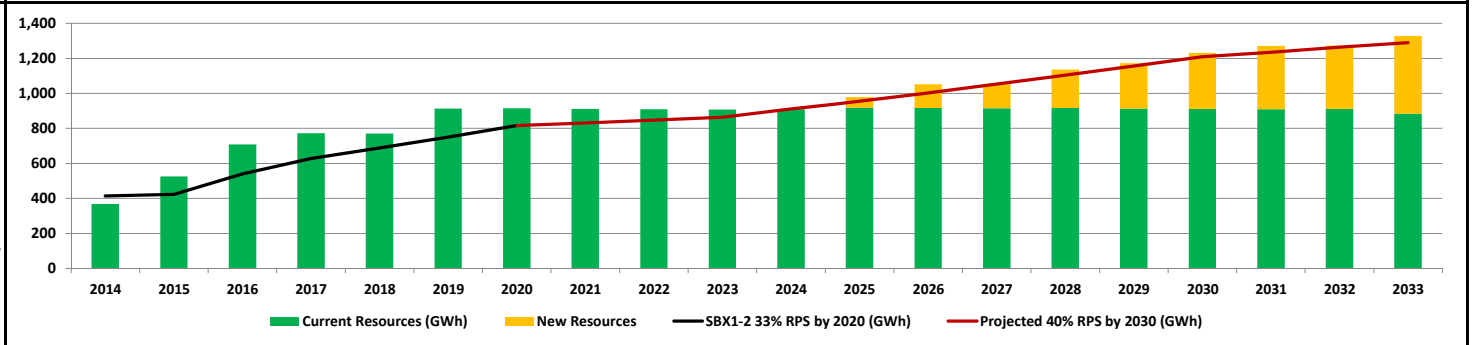

CO2 Emissions (Thousand Metric Tons)

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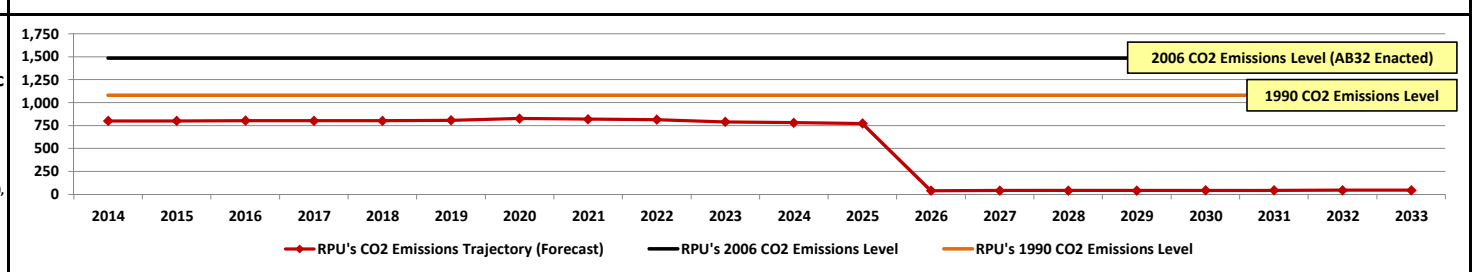
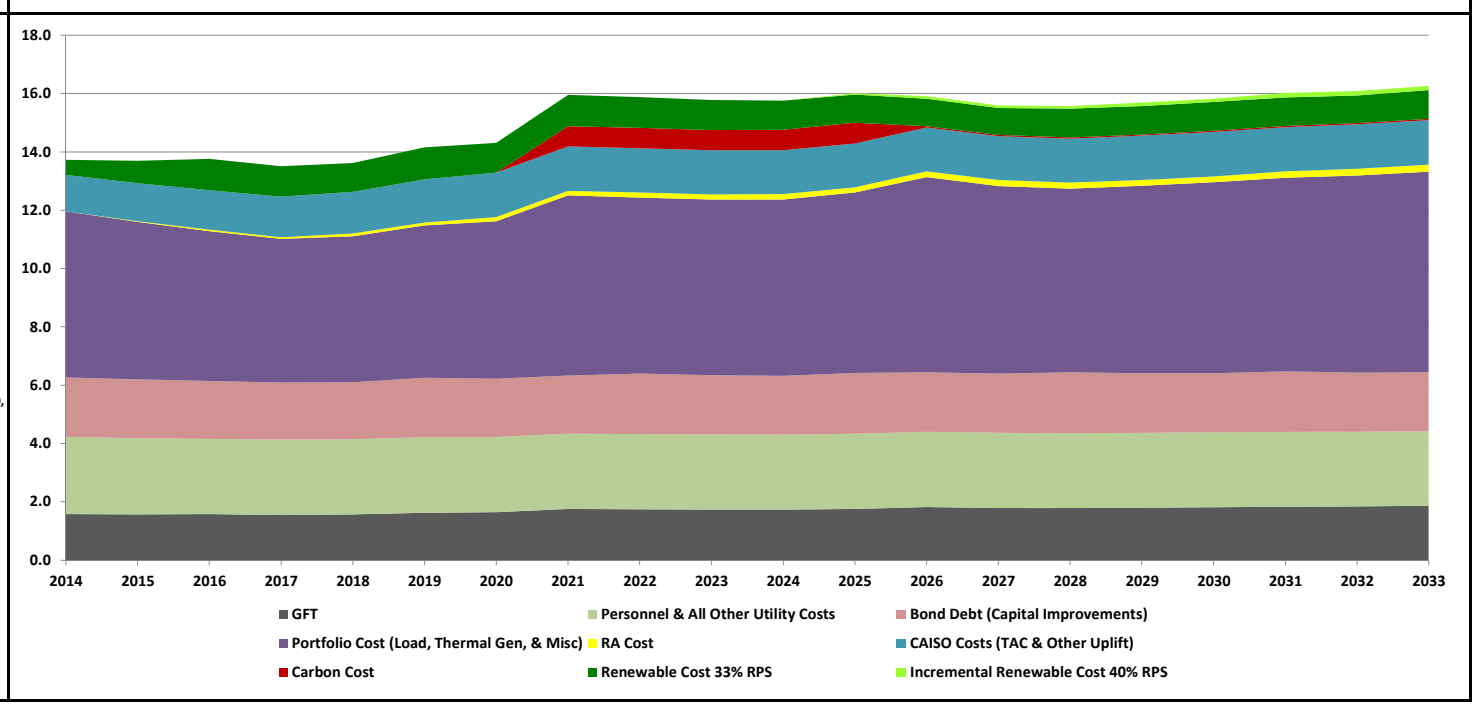


Cost of Service Components (Cents/kWh)

(For Least Cost, Least Risk IRP Scenario: 40% RPS by 2030, IPP 2025, Hedged Market Purchases for IPP Replacement)



2014 IRP Fact Sheet

The IRP is used to guide decision making as Riverside 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.

RPU Energy & Peak Demand Forecast (Chapter 2)

- The primary growth drivers of Riverside's load and system peak are increasing employment and continued economic expansion.
- The IRP considers annual growth in energy at 0.5% and 2.4% and system peak at 0.5% and 1.1%.

RPU Generation and Transmission Resources (Chapter 3)

- Riverside's resource portfolio is currently undergoing a transformation, transitioning away from nuclear and coal towards more renewable resources.
- Riverside currently has 103MW of active renewable resources and an additional 147MW under contract that will come online within the next 5 years.

RPU Existing Electric System (Chapter 4)

- Riverside's electrical interconnection with the California transmission grid is established at Southern California Edison's Vista Substation.
- Riverside's electrical system is comprised of 15 separate substations linked by 91 circuit miles of 69kV lines and 6.5 circuit miles of 33 kV lines.
- Riverside continues to pursue upgrades to its electric system, such as the recently completed Subtransmission Project (STP), which has improved distribution losses, as well as the proposed Riverside Transmission Reliability Project (RTRP), which will provide Riverside with a second interconnection to the California transmission grid.

Important Legislative and Regulatory Mandates and CAISO Initiatives (Chapter 5)

The primary mandates and initiatives impacting Riverside's planning process for its future portfolio include:

- SB X1-2: Renewable Portfolio Standard (RPS)
- AB 32: California GHG Reduction Mandate
- SB 1368: Emission Performance Standard
- AB 2514: Energy Storage
- AB 2021: Energy Efficiency (EE) / Demand Side Management (DSM)
- Energy Imbalance Market (EIM) Initiative
- FERC Order 764: 15 Minute Market Initiative
- Flexible Resource Adequacy Criteria & Enhanced Must Offer Obligation (FRAC/MOO & MIC)
- New and future CAISO initiatives, resulting in rapidly increasing Resource Adequacy (RA) and ISO-uplift cost from renewable integration issues and grid stability concerns, are the most significant intermediate term risk.

Energy Efficiency (EE) and Demand Side Management (DSM) Programs (Chapter 6)

- Riverside is committed to meeting the annual energy efficiency / conservation goals established through AB 2021 for energy and demand reduction and offers its customers a variety of programs and rebates to encourage energy savings.

Intermediate Term (Five-Year Forward) Power Resource Forecasts (Chapter 8)

- Riverside is on target to reach a 37% to 39% RPS by 2019.
- Achieving a 40% RPS by 2020 is definitely possible.
- Capacity and RA needs are manageable (provided no significant changes).
- About 85% of Riverside's load is naturally hedged via long-term contracts.
- Cost-at-Risk (CAR) for Riverside's open energy positions is ~ 2% to 4% of budget.
- Riverside has sufficient carbon allowances through 2020 to cover expected GHG emissions.
- Power Resource project budgets are stable through FY17/18.

Long Term Portfolio Analyses (Chapter 10)

- Load growth significantly impacts (10%-13%) future cost of service (~ 2.0¢/kWh).
- Early IPP termination could result in ~ 4% cost of service impact (~ 0.6¢/kWh to 0.7¢/kWh), if fixed costs extend beyond retirement date.
- Loss of Carbon allowances (2020 and beyond) results in ~ 7% cost of service impact (~ 1.0¢/kWh to 1.1¢/kWh).
- Risk levels decrease moderately under weak load growth and higher RPS scenarios.
- Risk levels increase substantially when unhedged market purchases replace IPP energy.
- Current portfolio is highly robust to adverse market price shocks, and future portfolio remains robust provided RPU effectively hedges IPP replacement energy.

Alternative Portfolio Analyses: Additional IPP Replacement Options (Chapter 11)

Scenario	Capacity (MW)	Location	Description	Dispatch Flexibility	Permitting challenge
Baseline	150	n/a market	Forward hedged market power contracts	None	n/a (None)
Alternative A1	100	Riverside, CA	GE LMS-100 NG SC	High	High
Alternative A2	46.5	Riverside, CA	ICE Wartsila SC	High	High
Alternative B	50	Delta, UT	IPP Repower NG CC	Moderate	Moderate
Alternative C	75	CA	Baseload renewable PPA	Low	Low
Alternative D	150	CA (CAISO)	1/1/16 Tolling contract	Moderate	Low

- Forward market hedges are currently our least cost option.
- IPP Repower project next most cost effective solution-but not by wide margin; RPU should preserve this replacement option.
- New local generation offers additional unquantified value, but additional studies needed to better understand and quantify these attributes.
- 75MW Renewable scenario (60% RPS) – difficult to implement (need to maintain diversity of technology & geographic location, and a slight further reduction in base-load renewable pricing).
- Early tolling option - not a viable alternative, given the current (considerable) uncertainty of IPP contract end-date and associated cost uncertainty for post-2020 Carbon allowances.

Alternative Portfolio Analyses: A Higher RPS Mandate (Chapter 12)

- 40% RPS has minimal impact on future cost of service (~ 1% to 2%/yr., v.s. 33% RPS scenario).
- 50% RPS could have a more significant impact on future cost of service (~2% to 7%/yr., v.s. 33% RPS scenario), depending upon future renewable energy prices.
- RPU should continue adding renewable energy assets in a very careful and strategic manner.
- RPU should minimize future renewable integration costs by finding/securing:
  - competitively priced, cost-effective energy storage options,
  - contracts with "firmed-up" delivery schedules,
  - long-term contracts (10+ years) that qualify under CEC RPS excess procurement rules.
- Maximize use of cost effective PCC-2 contracts and PCC-3 Renewable Energy Credits (RECs) (if/when needed).
- Maximize use of (expected) Historic Carryover credits.

Least Cost – Least Risk Forward Scenario (Chapter 14)

- 40% RPS by 2030 | IPP through 2025 | Hedged Market purchases for IPP replacement energy.

Summary and Major Findings (Chapter 14)

- Maintain maximum flexibility in the CAISO Markets.
- Search for additional cost-effective Energy Storage / Demand Side Management synergies.
- Work towards a 40% by 2020 RPS goal.
- Continue to examine all viable IPP replacement alternatives.
- Continue to monitor financial impacts of Solar PV penetration and EE adoption levels.
- Full IRP report available at **http://www.riversideca.gov/utilities/pdf/2015/RPU_2014IRP_revised_draft_forPUB_0219_2015.pdf**.