



Pasadena Water & Power

Energy Roadmap Event II PWP 2014 IRP Update

Public Meeting
October 16, 2014





Welcome!

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- **Agenda**
 - > 6:00 – Welcome
 - > 6:05 – Introduction
 - Video
 - Energy Future Surveys
 - Review from Last Meeting
 - IRP Process & Objectives
 - > 6:20 – Top Resource Portfolios – B&V
 - > 6:50 – Discussion/Questions
 - > 7:20 – Conclusion
 - Raffle/Tour



Energy Roadmap Video

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Energy Future Survey Comments

www.surveymonkey.com/s/PWP_Energy_Future2014





Pretty Consistent on Some Topics

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Why is Burbank so much cheaper than Pasadena?

TOO MUCH \$

The cost is too high.

Lower the rates.

Rates are high & bills are not transparent

Rates

All new development must pay for all their infrastructure costs and pay their fair share of all energy costs

If we reduce electric bill by solar, who picks up the deficiencies for the city tax level?

It is very important to save money where possible while balancing the need to be environmental stewards



Diversity of Opinion On Others!

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Renewables

100% locally & renewably

100%

80%

Green power should be customers choice and installed at point of use

Renewables cost more & raise rates. Please stick to the minimum requirements.

I like 75% minimum. Our lives depend on it.

The higher the percentage the better if it can be done with good results

Most renewables are not dependable. That is expensive.

Green power is not necessarily reliable power

60% or greater. Give Pasadena a "green" brand.

40% by 2020, then increase 10% every 5 years to 60-65%

I object to PWP increasing its renewable target above 33% given the big impact on rates that this implies.

45% by 2020. Steadily decreasing price makes this achievable.

Meet state law but maintain low cost for all customers

Why not more?

As much as possible, as soon as possible

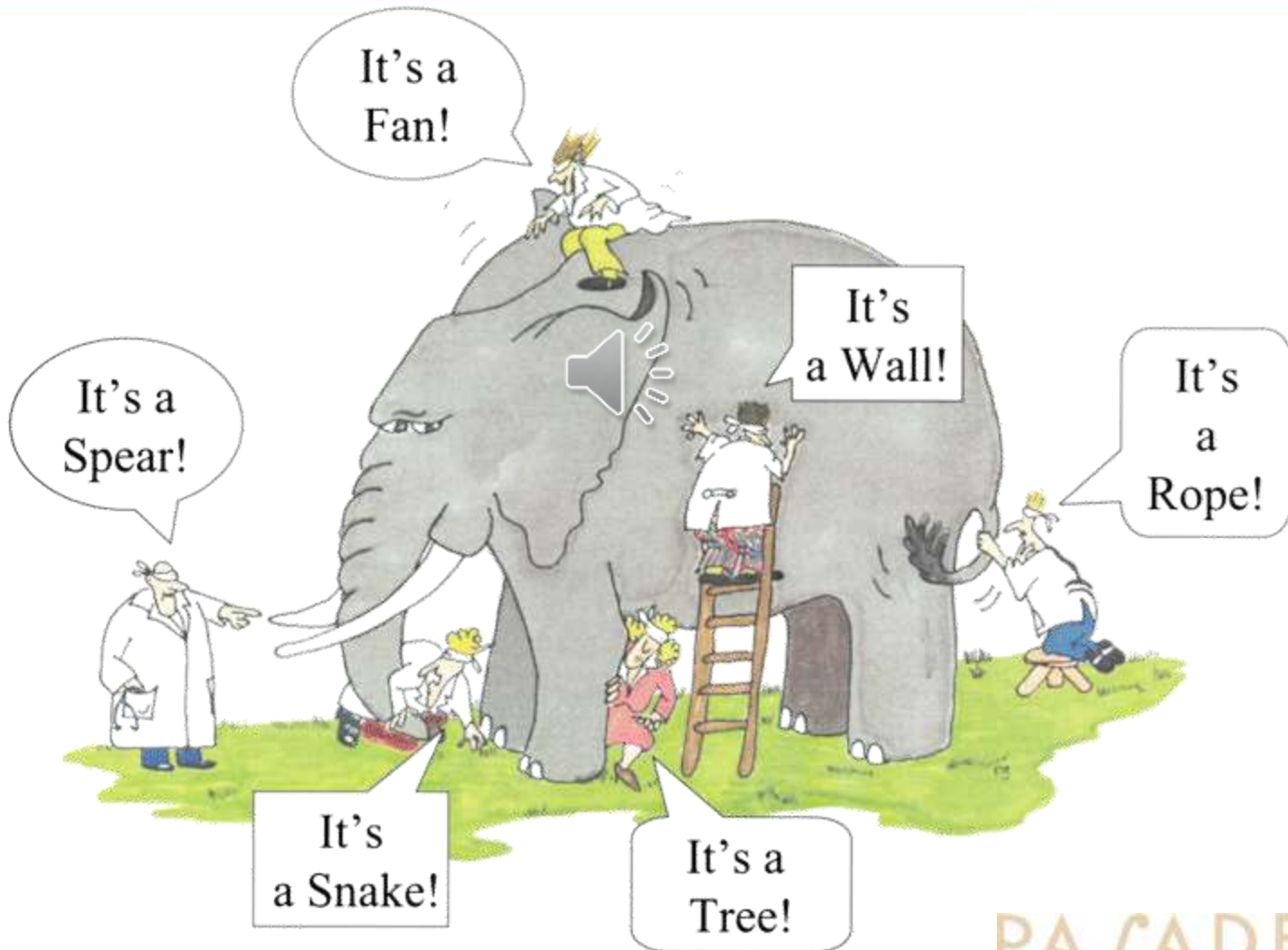
10%

Pasadena should not buy into the state law. It is a pipe dream . . . Continue to purchase power from inexpensive & reliable sources. . . Sue the state for forcing on us a requirement that is impossible to accomplish and is not necessary.



It reminds me of a story . . .

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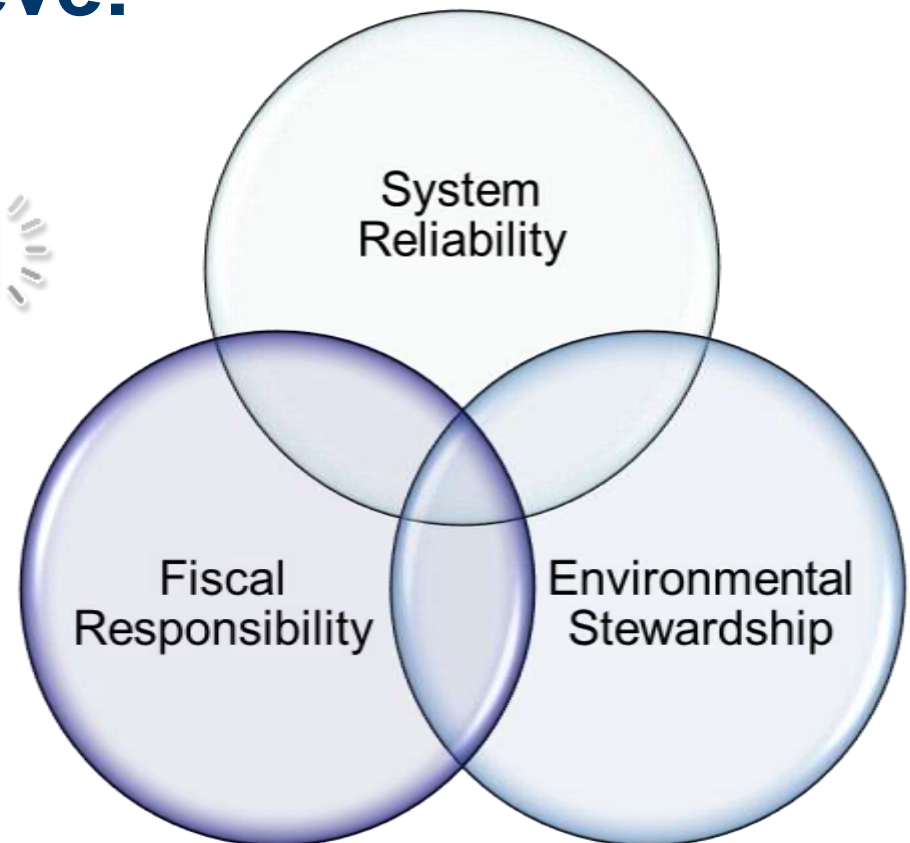


2014 IRP Update Review

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IRP “Objective Function” is to optimize the PWP portfolio to achieve:

- A twenty-year (2015 – 2034) strategy that will balance the goals of:
 - > System Reliability,
 - > Fiscal Responsibility, and
 - > Environmental Stewardship.



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What are we looking for?

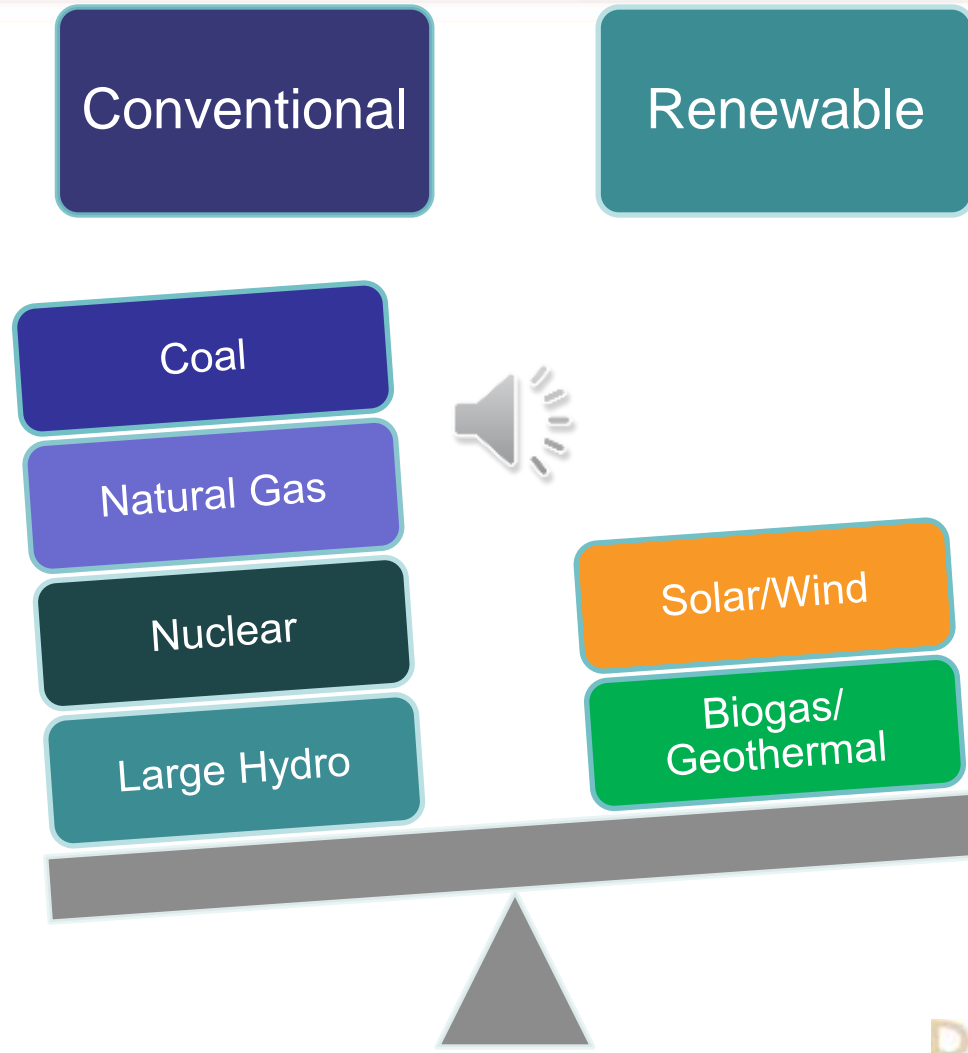
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- Our requirements and goals for future portfolios include:
 - > Serve future loads reliably and at reasonable cost
 - > Comply with all applicable contracts, laws and regulations
 - > Manage risk through resource diversity
 - > Efficiently reduce the environmental impact of meeting Pasadena's power supply needs
 - > Provide transparency in expected power-related costs for customers



Current Resource Mix

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Current Cost of Some PWP Resources

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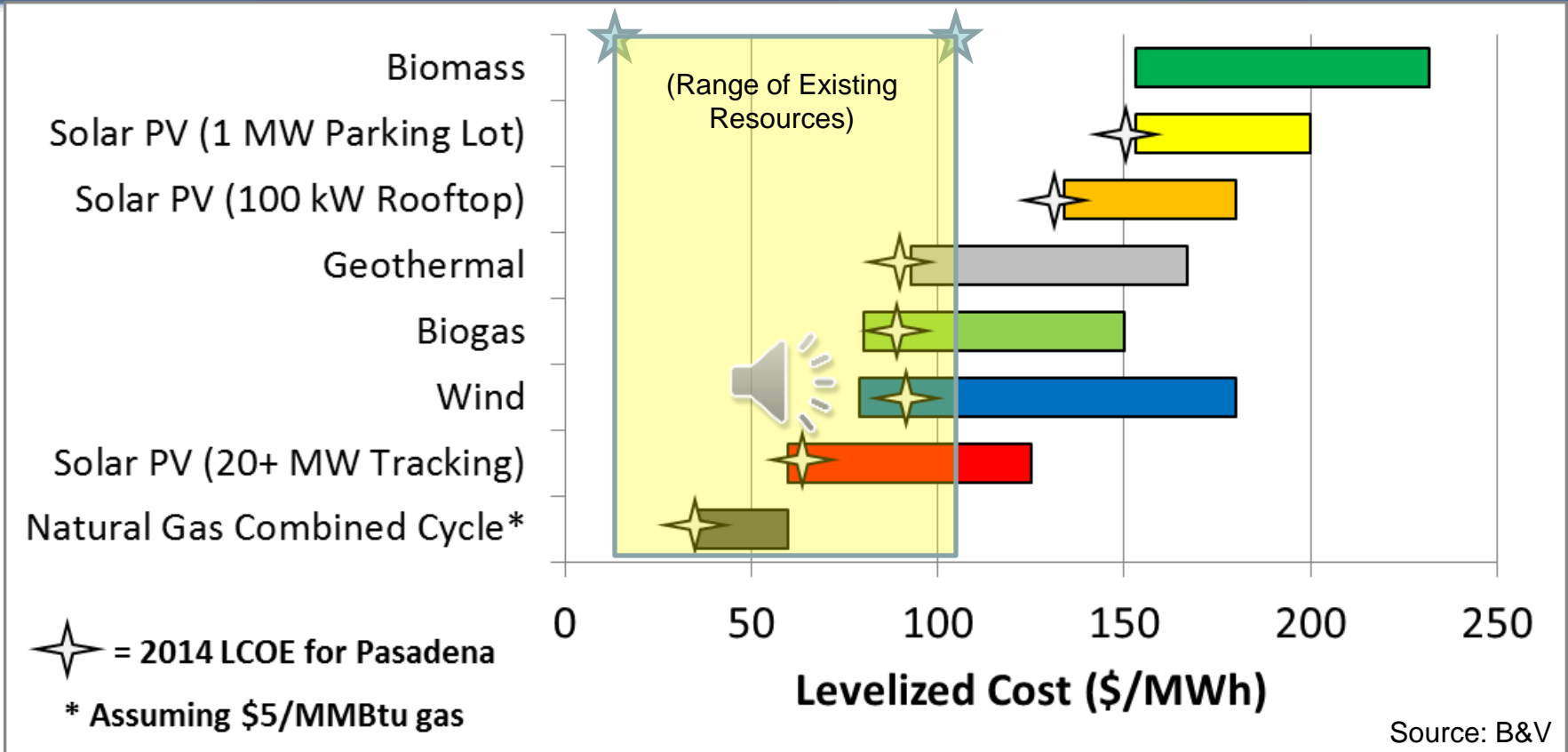
Project	Type	Avg. Cost* (\$/MWh)	Notes
Magnolia	Biomethane	\$104.57	Includes RECs
IPP @ Min. Load	Coal	\$89.68	
IPP @ 80% Load	Coal	\$64.05	
Glenarm	Natural Gas	\$60.53	Fuel only (no O&M)
Magnolia	Natural Gas	\$59.99	
Palo Verde	Nuclear	\$55.60	
Market – On Peak	Unspecified	\$53.11	
Market – Off Peak	Unspecified	\$44.46	
Hoover	Hydro	\$17.20	

* Estimates based on 2015 PWP budget



Comparison of California Renewable Resource Options

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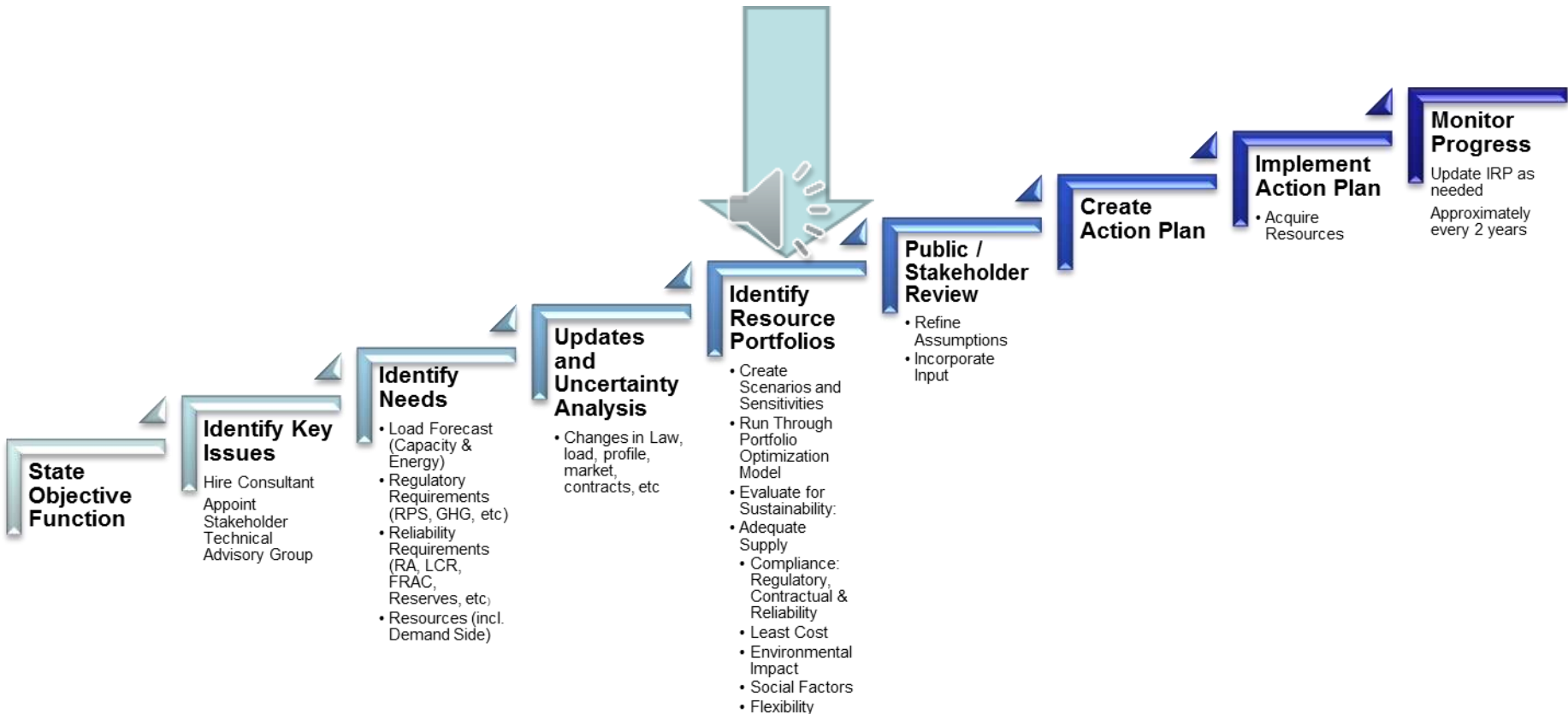
- There is a range of 2014 levelized costs for each technology, depending on location/resource quality
- These ranges reflect resources in California



IRP Process

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We Are Here



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Next Steps

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- Finish modeling portfolios/scenarios
- Analyze early IPP retirement options
- Run sensitivities implementing loading order
 - > Energy efficiency
 - > Demand-side management 
 - > Local solar
- Calculate costs & estimate bill impacts
- Publish draft IRP for public comment
- Incorporate comments and revise draft IRP
- Revised IRP to public hearing/City Council



BLACK & VEATCH

PORTFOLIO MODELING





QUESTIONS & ANSWERS
DISCUSSION



Please Stay Involved!

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- **Website:** www.PWPweb.com/IRP
 - > View the full length (19 minute) video
 - > Look up definitions in our glossary
 - > Sign up for our email distribution list
 - > Questions and Answers (coming soon!)
- **Email Us:** WPD_IRP@CityofPasadena.net
- **Facebook:** <https://www.facebook.com/PasadenaWaterandPower> 
- **Twitter:** @PWPnews 
- **Survey:** https://www.surveymonkey.com/s/PWP_Energy_Future2014



Conclusion

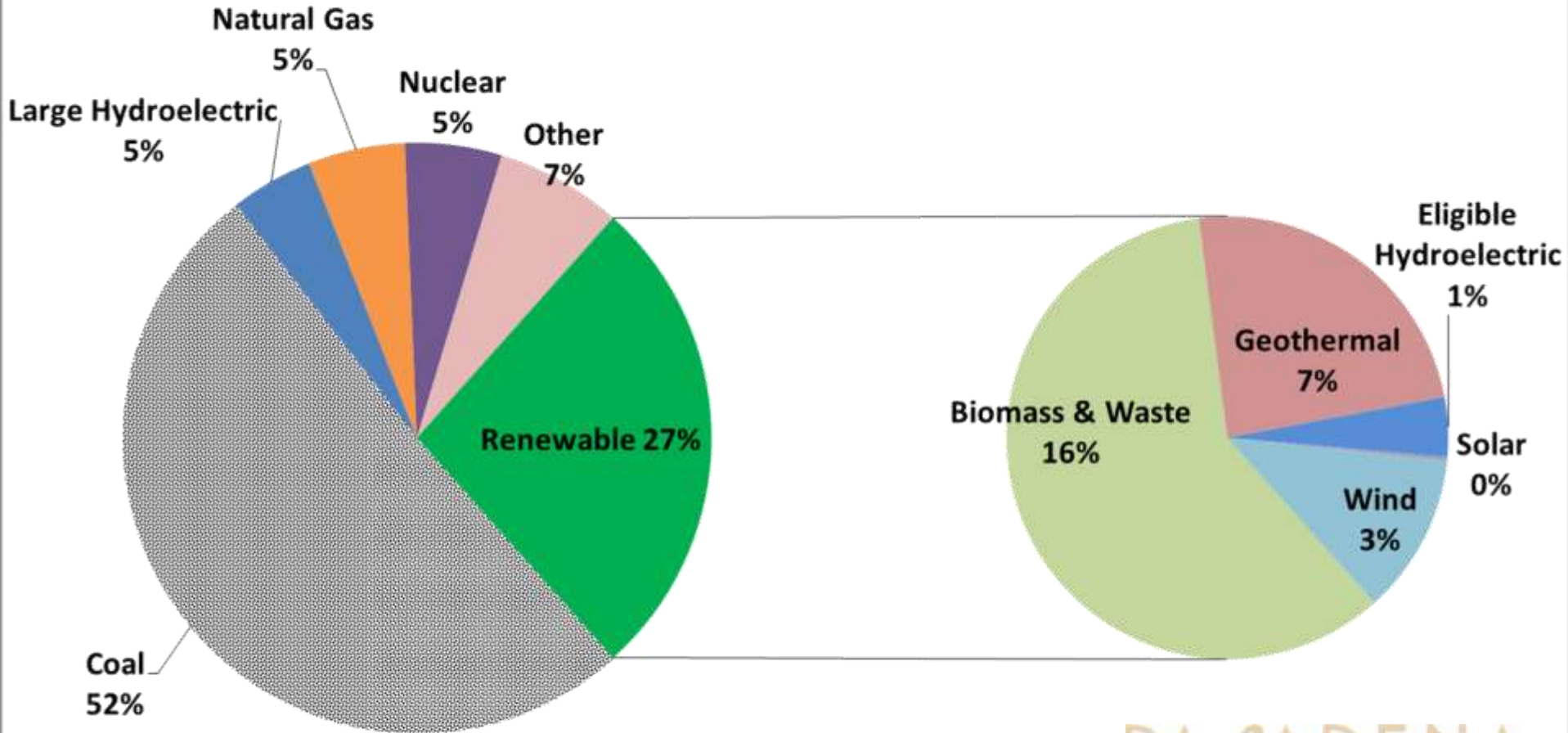
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PWP's Current Power Supply Mix

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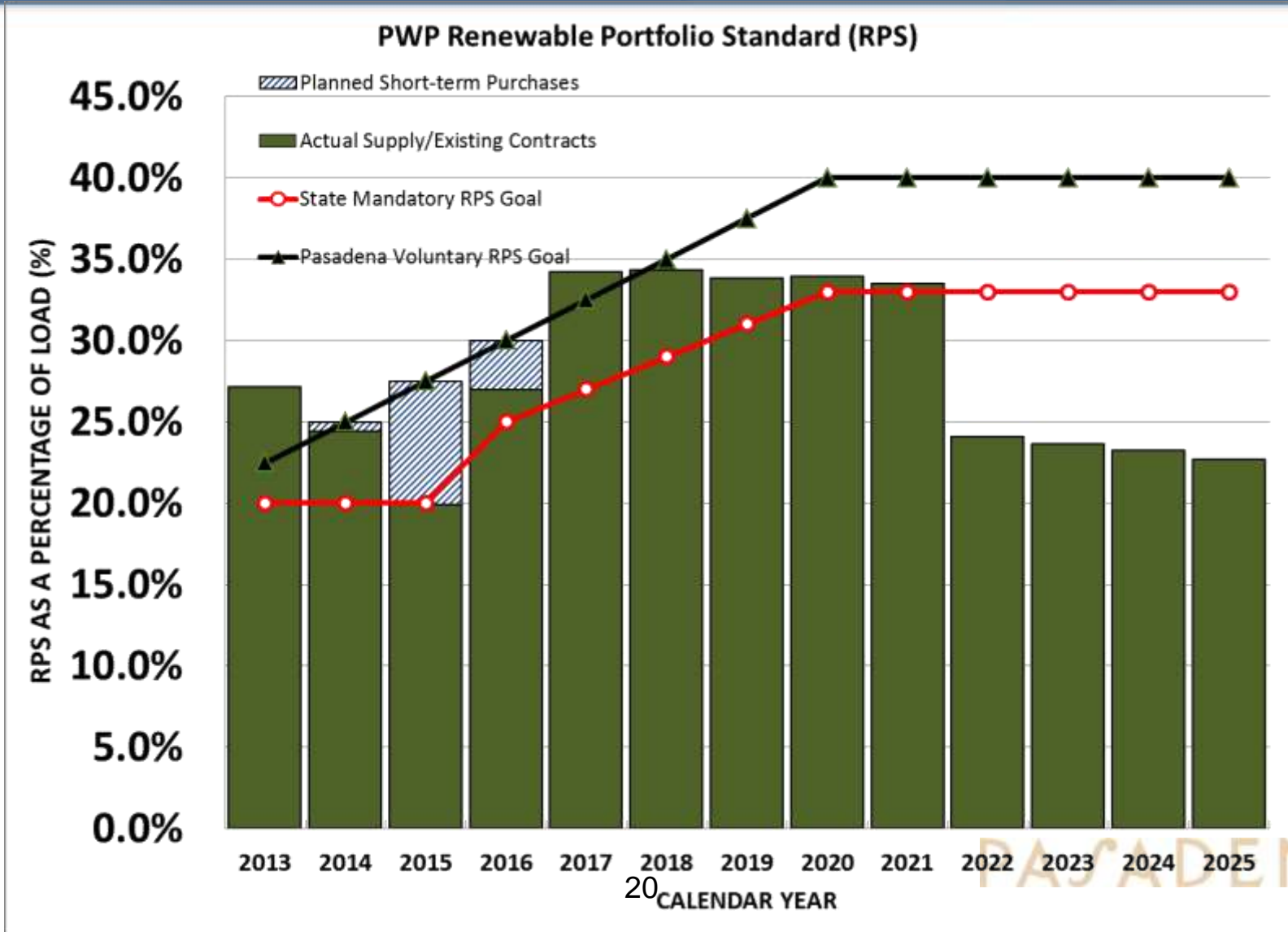
PWP 2013 Power Supply Content





Renewable Energy Progress

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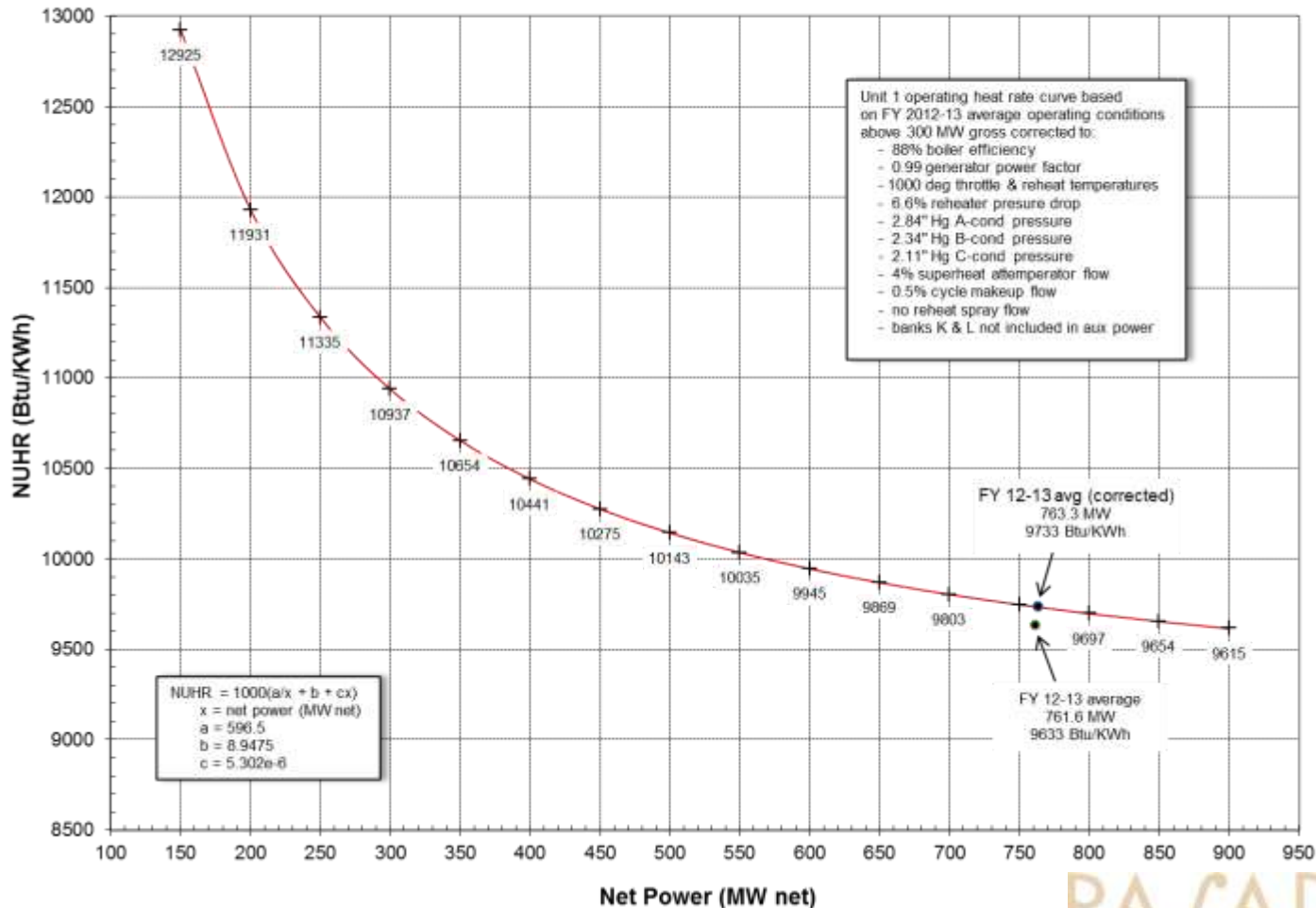
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IPP Minimum Load Impacts – U1

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INTERMOUNTAIN GENERATING STATION - Unit 1 FY 2012-13 Corrected Operating Net Unit Heat Rate Curve



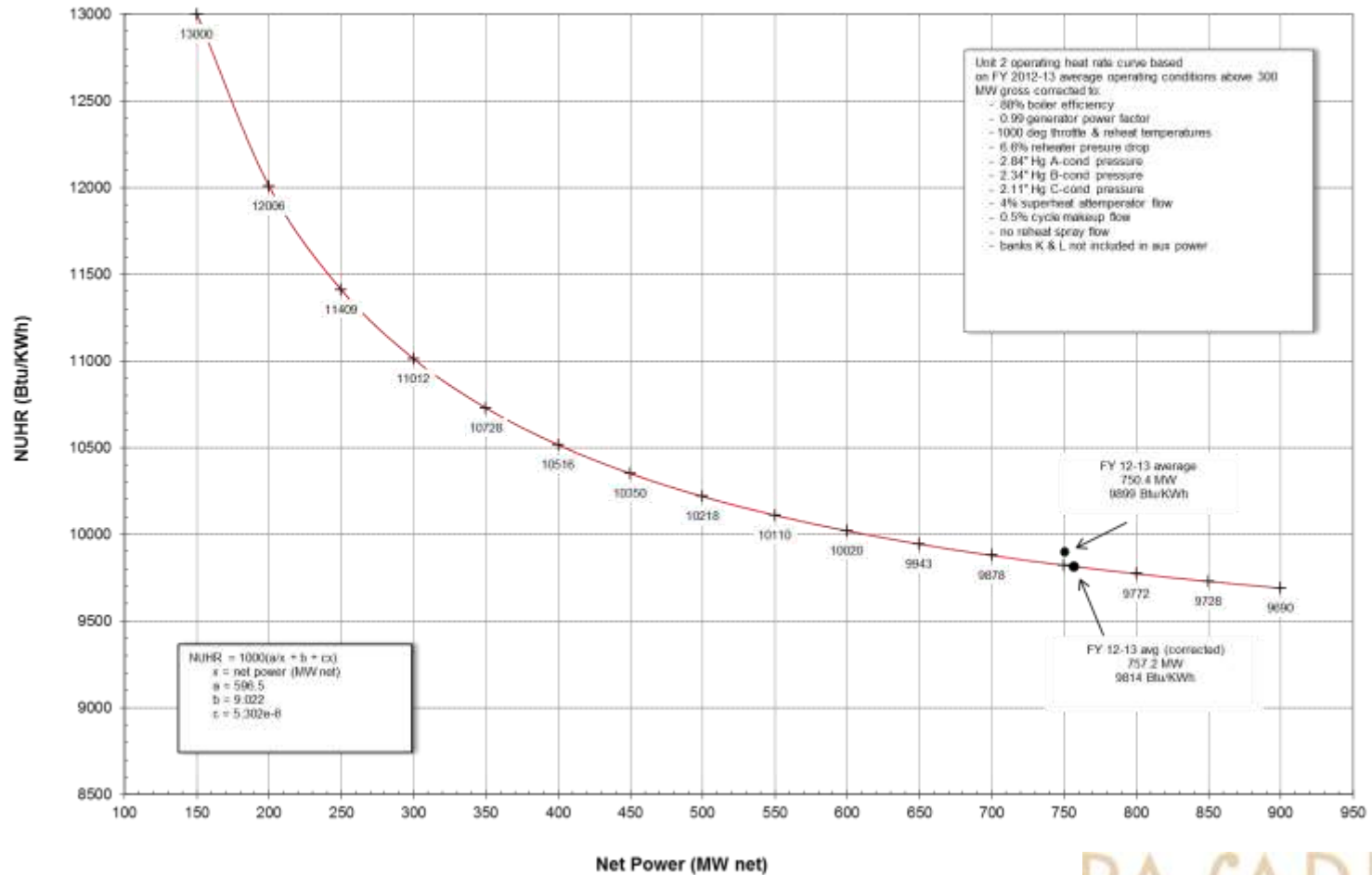
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IPP Minimum Load Impacts – U2

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INTERMOUNTAIN GENERATING STATION - Unit 2
FY 2012-13 Corrected Operating Net Unit Heat Rate Curve





IPP U1 Costs of Reduced Load Operation

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Net Unit Load	NUHR	Fuel Cost	Increased HR	Additional Cost
(MW)	(Btu/KWh)	(\$/MWh)	(Btu/KWh)	(\$/MWh)
900	9,615	\$18.26	0	\$0.00
850	9,654	\$18.33	39	\$0.07
800	9,697	\$18.42	82	\$0.16
750	9,747	\$18.51	132	\$0.25
700	9,803	\$18.62	188	\$0.36
650	9,869	\$18.74	254	\$0.48
600	9,945	\$18.89	330	\$0.63
550	10,035	\$19.06	420	\$0.80
500	10,143	\$19.26	528	\$1.00
450	10,275	\$19.51	660	\$1.25
400	10,441	\$19.83	826	\$1.57
350	10,654	\$20.23	1,039	\$1.97
300	10,937	\$20.77	1,322	\$2.51
250	11,335	\$21.52	1,720	\$3.27
200	11,931	\$22.66	2,316	\$4.40

*Based on 2012-13 Unit 1 operating heat rate curves using \$42.50/ton fuel cost and 11,190 Btu/lb average coal HHV.



IPP U2 Costs of Reduced Load Operation

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Net Unit Load	NUHR	Fuel Cost	Increased HR	Additional Cost
(MW)	(Btu/KWh)	(\$/MWh)	(Btu/KWh)	(\$/MWh)
900	9,690	\$18.40	0	\$0.00
850	9,728	\$18.47	39	\$0.07
800	9,772	\$18.56	82	\$0.16
750	9,821	\$18.65	132	\$0.25
700	9,878	\$18.76	188	\$0.36
650	9,943	\$18.88	254	\$0.48
600	10,020	\$19.03	330	\$0.63
550	10,110	\$19.20	420	\$0.80
500	10,218	\$19.40	528	\$1.00
450	10,350	\$19.66	660	\$1.25
400	10,516	\$19.97	826	\$1.57
350	10,728	\$20.37	1,039	\$1.97
300	11,012	\$20.91	1,322	\$2.51
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