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PWP 2015 IRP Update

Item 18

June 22, 2015

Foundation – Earlier IRPs

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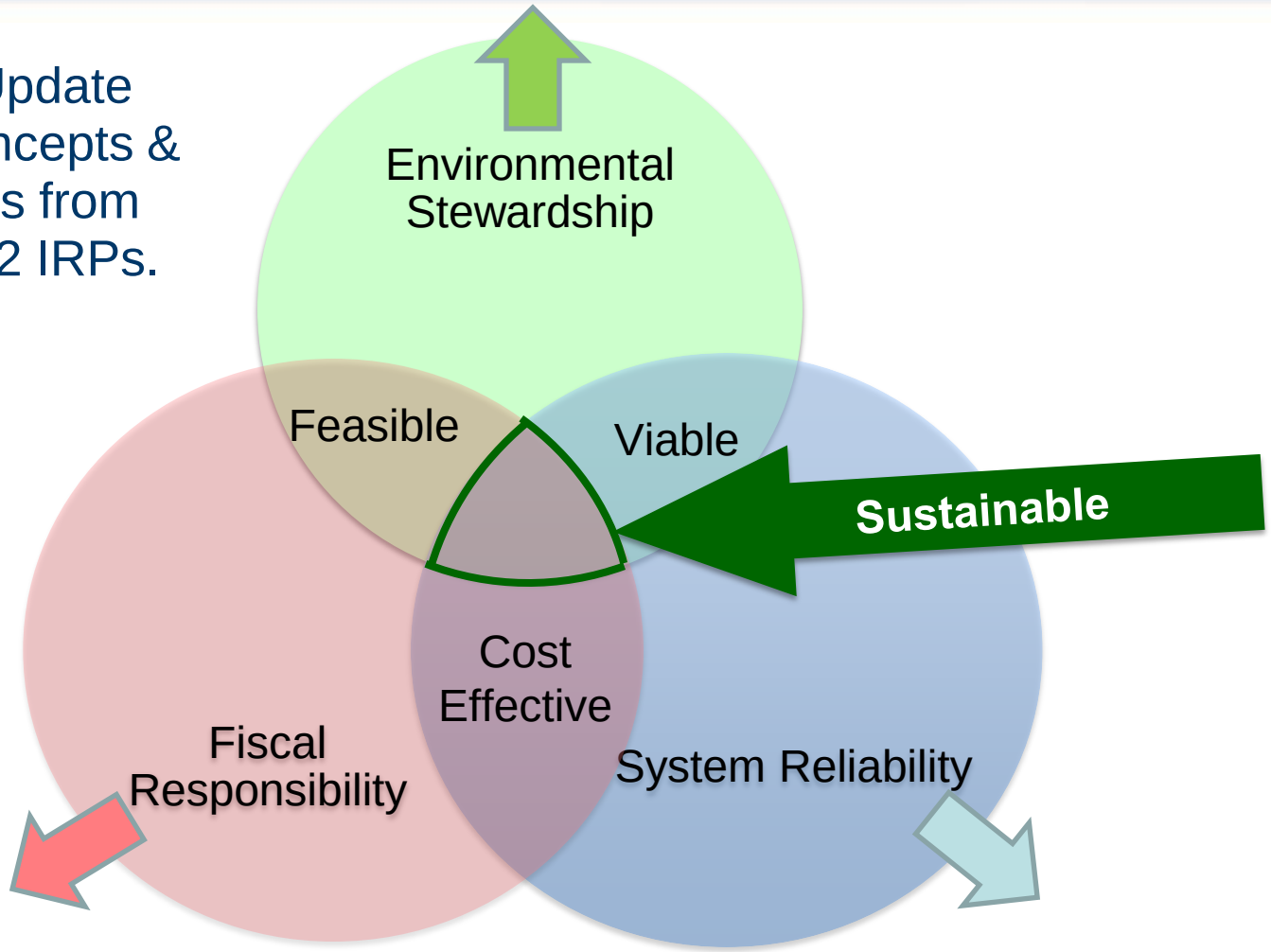
This IRP Update builds on concepts & action plans from 2009 & 2012 IRPs.



IRP Process

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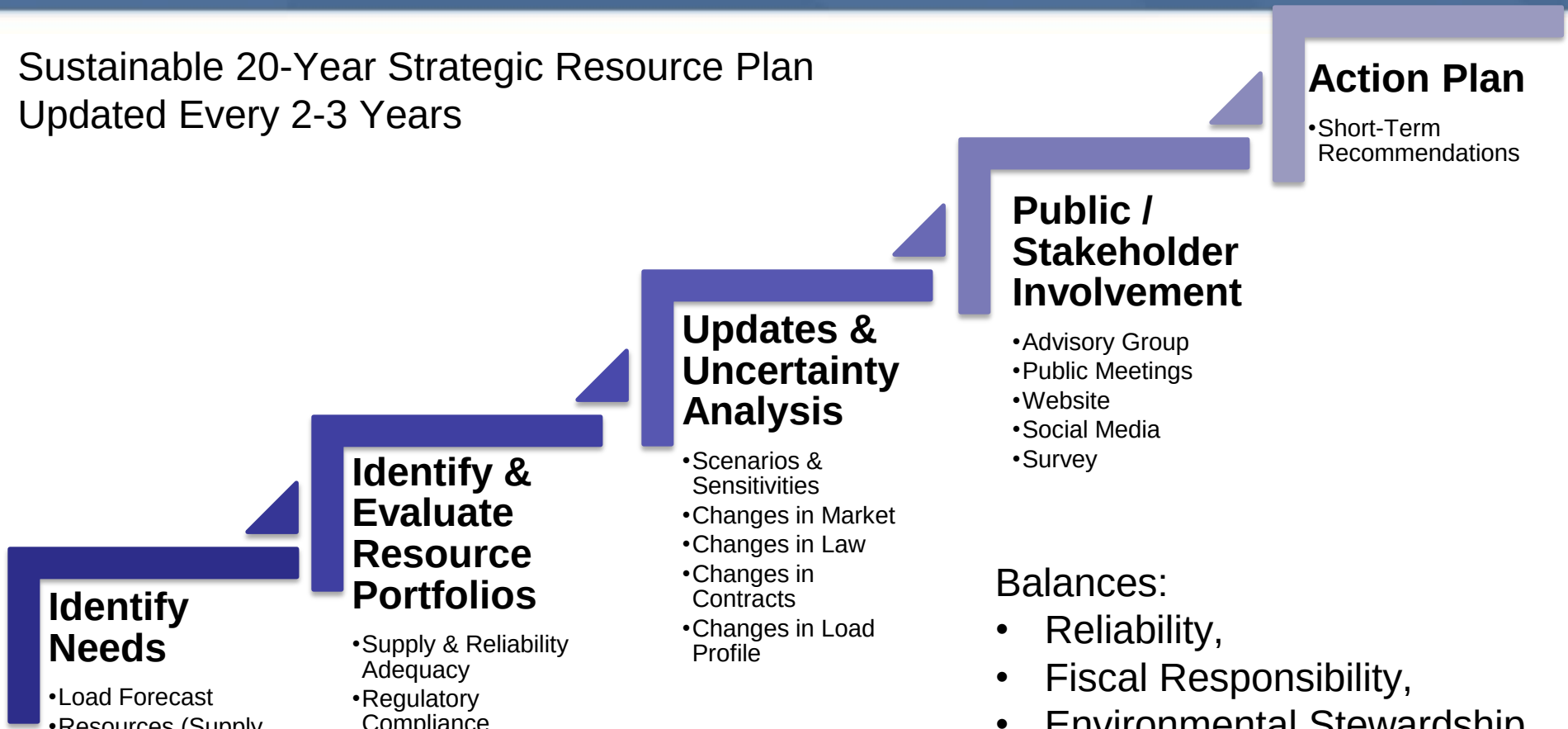
Sustainable 20-Year Strategic Resource Plan
Updated Every 2-3 Years



Balances:

- Reliability,
- Fiscal Responsibility,
- Environmental Stewardship

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Billed Sales Forecast

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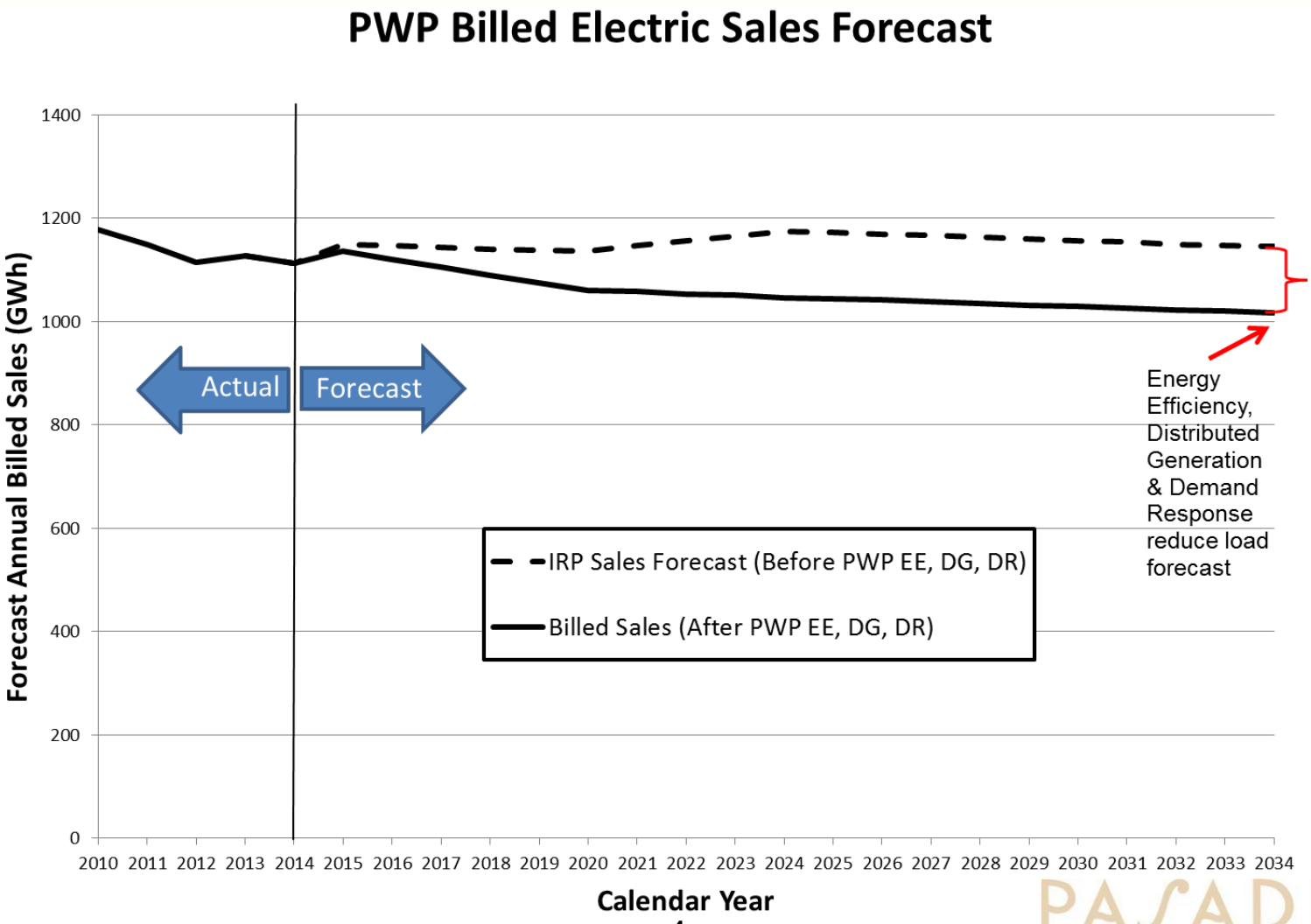

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Balancing Capacity/Energy

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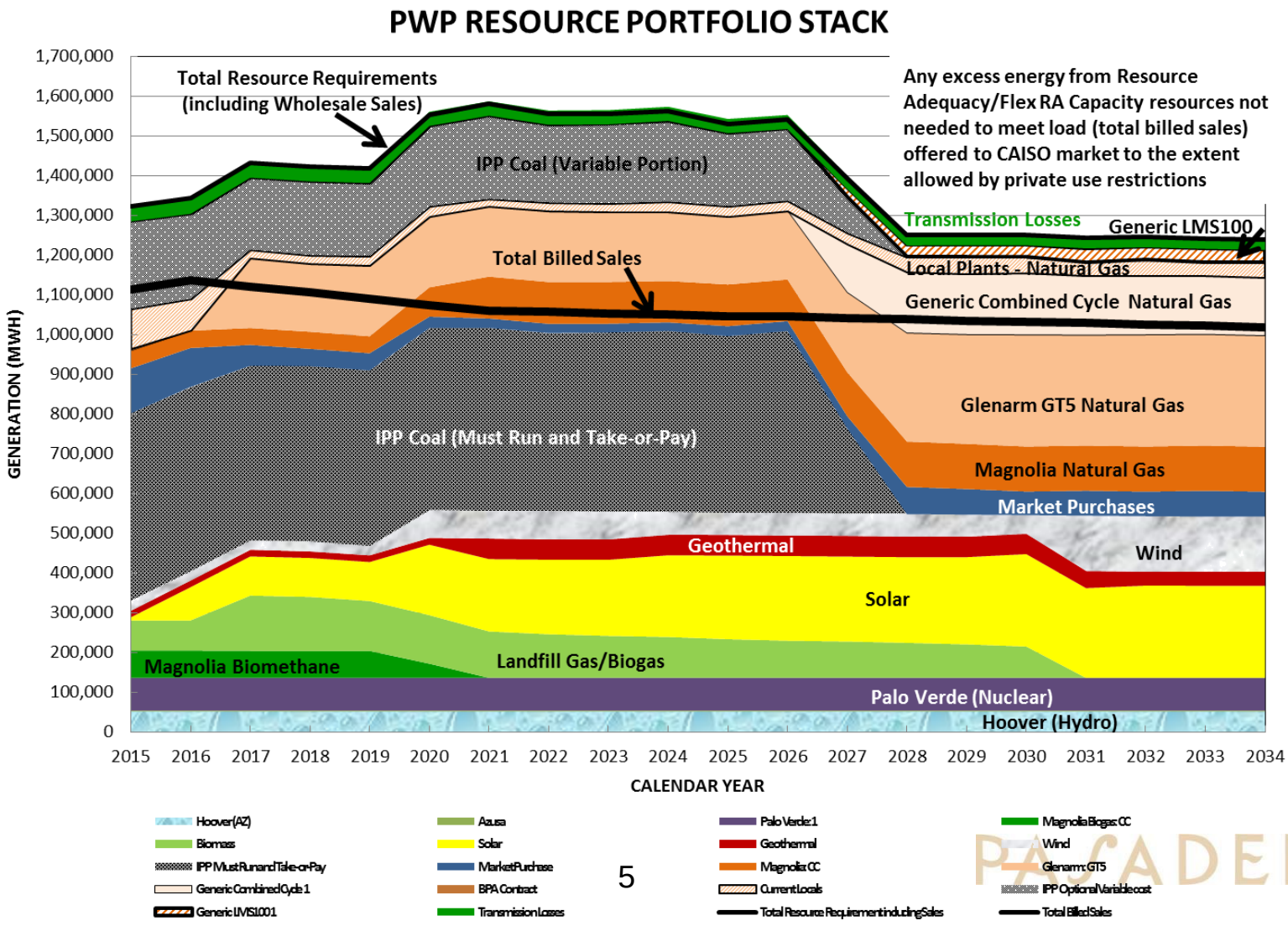

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RPS Progress

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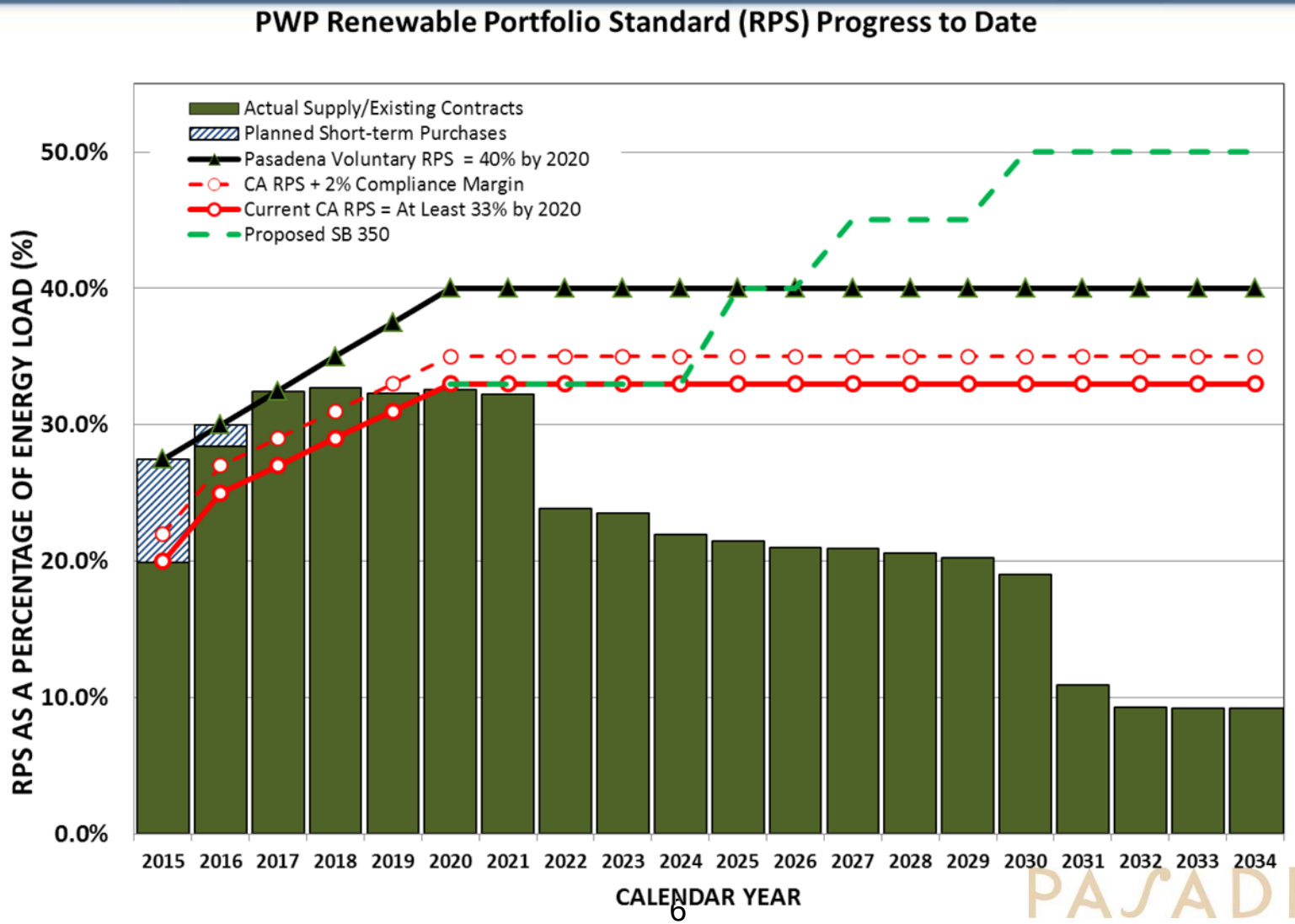

IRP Terminology

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Portfolios

Groups of Power Supply Resources

1
Stay the Course
(*Preferred Portfolio*)

2
IPP (Coal) Reduction
40% RPS (by 2020)

3
50% Renewable Portfolio Standard (by 2025)

4
70% Renewable Portfolio Standard (by 2030)

5
Carbon (GHG) Neutral (by 2030)

Scenarios

Sets of Market Assumptions

Base Case
B&V Energy Market Perspective

High Gas Prices

Low Gas Prices

"Green" Market Influence
Higher Carbon Pricing

Sensitivities

Basic Model Variations

Higher Energy Efficiency

IPP (Coal) Economic Dispatch
(slightly higher generation than Business As Usual)

IPP Early Retirement in 2025
(original contract expires in 2027)

Reducing IPP Generation
(under current contract)

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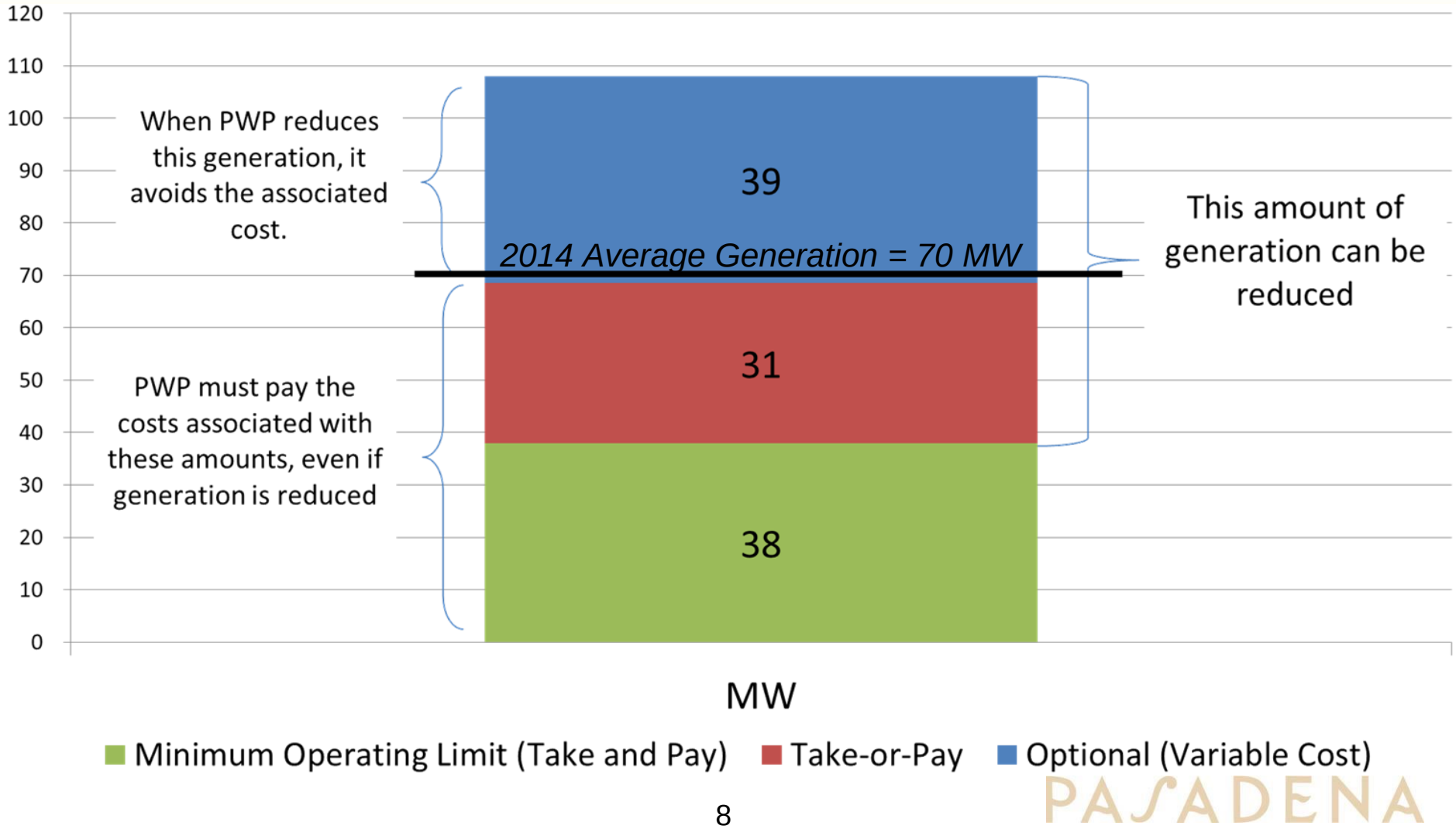

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Portfolio Cost Comparison

($2015)

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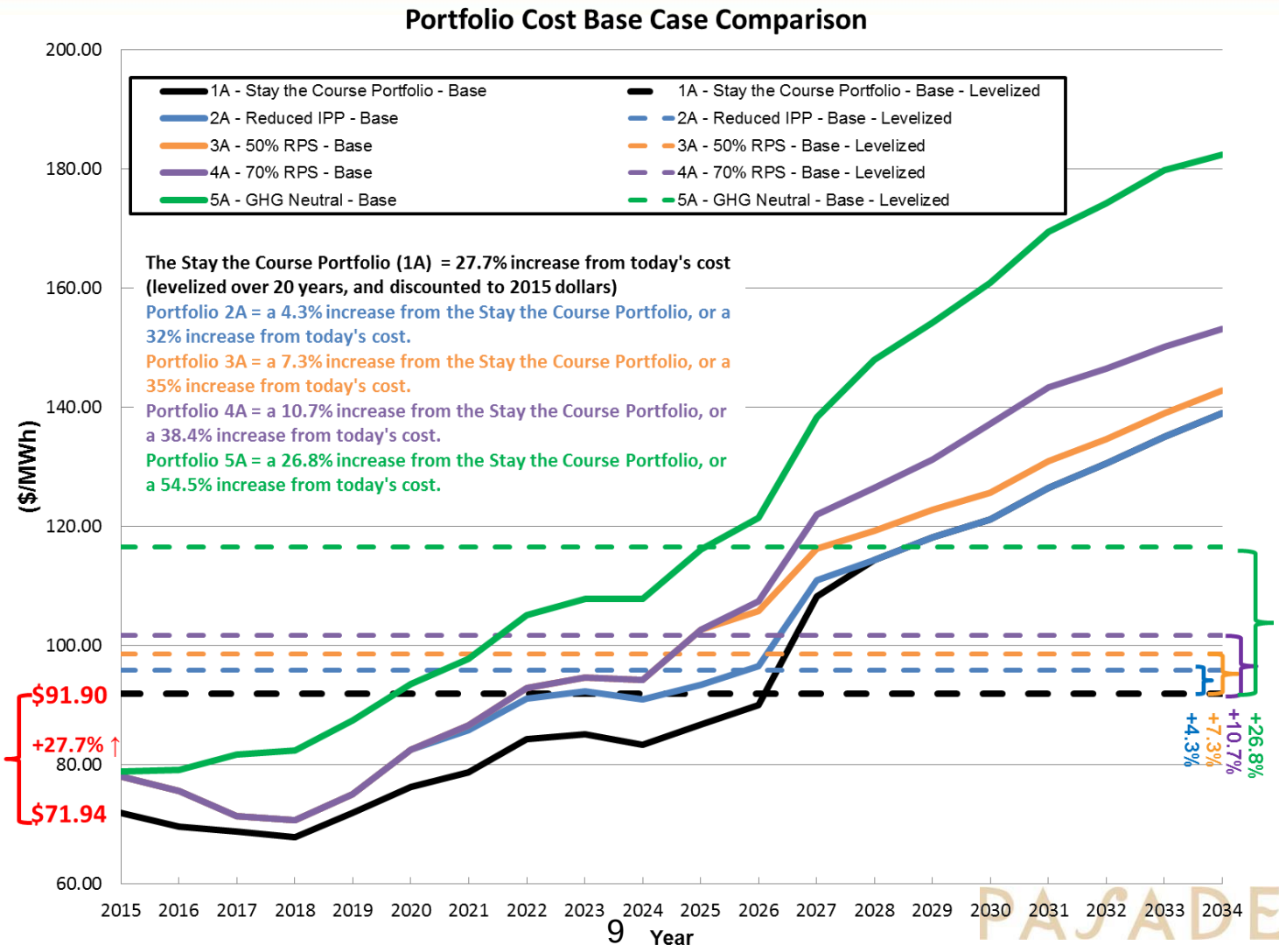

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Portfolio Cost Comparison

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PORTFOLIO	Expected Increase from Starting (Today's) Cost to 20-Year Levelized	Increase from Status Quo (2008) or Stay the Course (2015)	Total Portfolio Cost Increase
2008 IRP ($2008)	***28%***	***6%***	***34%***
1A – Stay the Course ($2015)	***27.7%***	***N/A***	***27.7%***
2A – Reduce IPP ($2015)	***27.7%***	***4.3%***	***32.0%***
3A – 50% RPS ($2015)	***27.7%***	***7.3%***	***35.0%***
4A – 70% RPS ($2015)	***27.7%***	***10.7%***	***38.4%***
5A – GHG Neutral ($2015)	***27.7%***	***26.8%***	***54.5%***

What Portion of PWP Costs Are We Addressing in the IRP?

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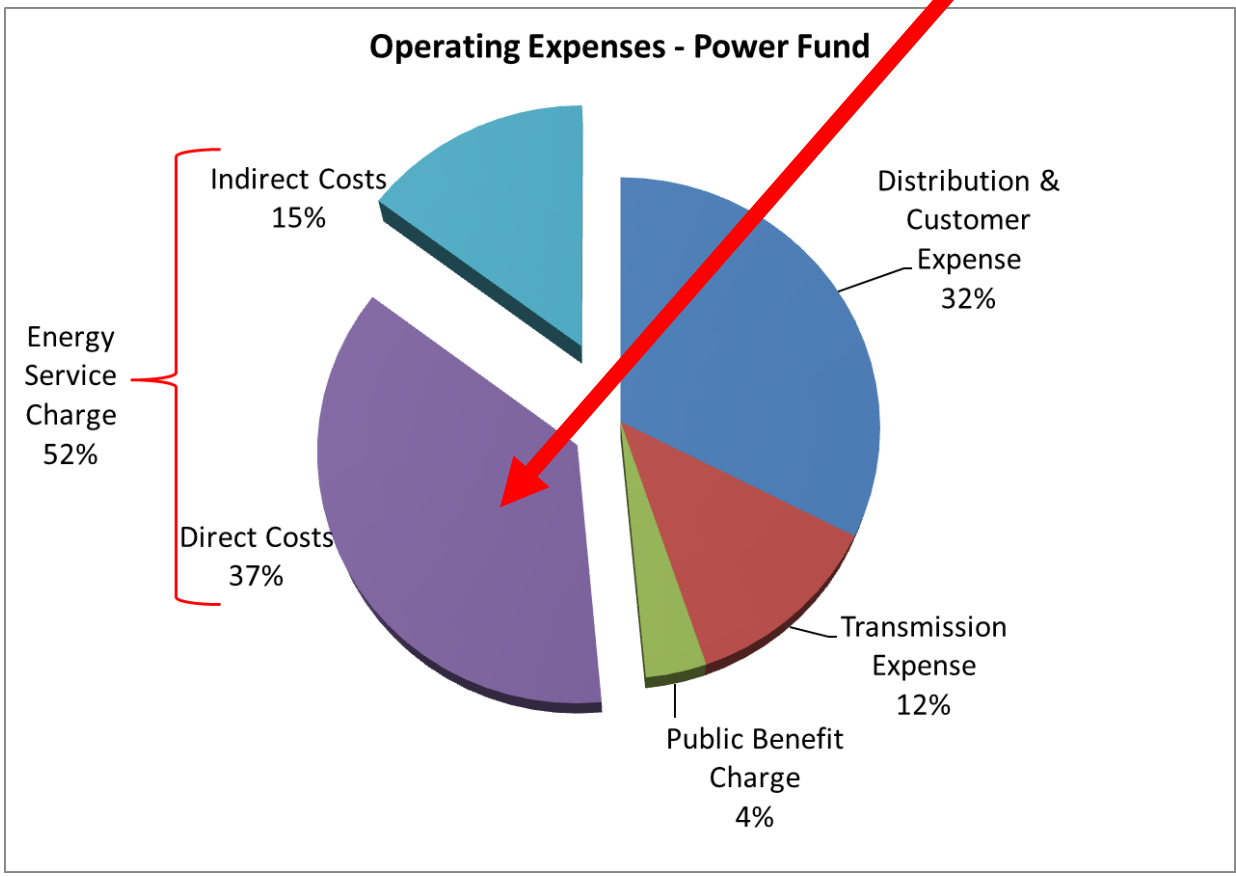
The IRP Modeling addresses <u>only</u> the **Direct Cost** component of the **Energy Service Charge**.

Analyses of the economic impact of various alternatives under the IRP on customer rates/bills assume that ***all other components of the power bill and rate structure remain unchanged from FY2017.***

It is reasonable to assume that there will be increases in these other components as well over the next 20 years.* It is very difficult to accurately predict all components of rates over a 20 year horizon.



** For example, the CAISO is forecasting significant increases in its transmission access charge.*

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Estimated Impact of Direct Electricity Cost Only – Monthly Residential Bill (by Usage)

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Assumes no changes to other cost components or rate structure from FY 2017 approved rates

Portfolio	Portfolio Name	500 kWh	1000 kWh
Current Annual Average Monthly Bill – As of March 2015		**$84.95**	**$189.78**
	20-Year Levelized (2015$)		
1	**Stay the Course (*Preferred Portfolio*)** Economic IPP Dispatch + carbon premium 40% RPS by 2020	**$96.31**	**$216.03**
2	**Reduced IPP Output** Reduce IPP to Min starting in 2015 40% RPS by 2020	**$100.77**	**$224.93**
3	**Blended – 50% RPS** Reduce IPP to Min starting in 2015 50% RPS by 2025 (Solar/Wind/Base Mix)	**$102.01**	**$227.42**
4	**Blended – 70% RPS** Reduce IPP to Min starting in 2015 50% RPS by 2025 & 70% by 2030 (Solar/Wind/Base Mix)	**$103.47**	**$230.34**
5	**Carbon (GHG) Neutral** Starting in 2015: Reduce IPP to Min, no power market purchases, natural gas plants burn 100% biomethane. 50% RPS by 2025 & 100% Carbon-Free by 2030 (e.g., 88% Renewable and 12% existing large hydro/nuclear)	**$110.24**	**$243.88**

Estimated Impact of Direct Electricity Cost Changes on Monthly General Service Bill (by Usage)

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Assumes no changes to other cost components or rate structure from FY 2017 approved rates

Portfolio	Portfolio Name	2,000 kWh	10,000 kWh	50,000 kWh	100,000 kWh
Current Annual Average Monthly Bill – As of March 2015		**$327**	**$1,664**	**$7,563**	**$14,875**
	20-Year Levelized (2015$)				
1	**Stay the Course** (*Preferred Portfolio*) Economic IPP Dispatch + carbon premium 40% RPS by 2020	**$372**	**$1,898**	**$8,630**	**$16,965**
2	**Reduced IPP Output** Reduce IPP to Min starting in 2015 40% RPS by 2020	**$390**	**$1,988**	**$9,081**	**$17,847**
3	**Blended – 50% RPS** Reduce IPP to Min starting in 2015 50% RPS by 2025 (Solar/Wind/Base Mix)	**$395**	**$2,014**	**$9,208**	**$18,093**
4	**Blended – 70% RPS** Reduce IPP to Min starting in 2015 50% RPS by 2025 & 70% by 2030 (Solar/Wind/Base Mix)	**$401**	**$2,043**	**$9,355**	**$18,382**
5	**Carbon (GHG) Neutral** Starting in 2015: Reduce IPP to Min, no power market purchases, natural gas plants burn 100% biomethane. 50% RPS by 2025 & 100% Carbon-Free by 2030 (e.g., 88% Renewable and 12% existing large hydro/nuclear)	**$427**	**$2,181**	**$10,042**	**$19,722**

Stakeholder Technical Advisory Group

Pasadena Water & Power

Member	Representing
Margaret McAustin	Pasadena City Council / MSC
George Falardeau	Art Center College of Design
Brian Killett	Citizens Climate Lobby
Paul Little	Chamber of Commerce
Dennis Murphy	Pasadena Resident
John Onderdonk	Cal Tech
Tom Romeyn	Huntington Hospital
Reuben Smith	Pasadena City College
Morey Wolfson	Environmental Advisory Commission
Michael Beck	Pasadena City Manager
Julie Gutierrez	Pasadena Asst. City Manager
Laura Dahl	Pasadena Planning Dept.
Phyllis Currie	PWP General Manager
Eric Klinkner	PWP Asst. General Manager (alt)
Sandra Ell	Environmental Adv. Commission (alt)
Pedro Pizarro	Cal Tech Board (first few meetings)

Customer and Stakeholder Involvement

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- Stakeholder Technical Advisory Group
  - 15 members appointed by Mayor
  - 8 meetings
- MSC and EAC Briefings
- 3 Open Public Meetings
- Electronic Updates
  - PWP Website
  - Email
  - Social Media
- Survey
- Video

Some Key Customer Survey Observations

- Top Priorities:
  - Reliability
  - Low Cost
  - Environmental Responsibility
- Everything is a Priority!
- Higher RPS Supported by Many
- Cost/Rates = Major Concern
- Coal = Major Concern
- Many Interesting & Valuable Comments. See at www.pwpweb.com/irp

Key Issues/Changes

Pasadena Water & Power

- CAISO Reliability Requirements
  - > Local & Flexible Resource Adequacy Capacity (“FRAC”)
- Energy Imbalance Market (“EIM”)
- The “Duck Curve”
  - > Changing Net Load Profile alters timing of “peak” and “off-peak” loads/prices
  - > Over-generation
  - > Need for fast-ramping, flexible resources
- Retail Load
  - > Increasing penetration of distributed generation (e.g., rooftop solar, microgrids) which reduce load, and EV charging would increase load
  - > Change hourly and seasonal shape and load factor
- Cap-and-Trade
  - > Will it continue past 2020, or be replaced by federal carbon tax or some other program?

Key Issues/Changes (con't)

- GHG Emission Levels
  - > 1990 levels by 2020 (AB32 – The Global Warming Solutions Act)
  - > 80% GHG reduction below 1990 levels by 2050 (Schwarzenegger's Executive Order S-3-05)
  - > 40% GHG reduction below 1990 levels by 2030 (Brown's Executive Order B-30-15, issued 4-29-15)
- California's RPS
  - > At least 33% by 2020 (AB32)
  - > Brown's "Golden State Standards (aka: the 50/50/50 plan): 50% RPS by 2030
- Renewable Resources and Energy Storage
  - > Costs expected to continue to decline
  - > Technology still evolving
  - > Tax incentives, legislative changes and reliability requirements uncertain
- Intermountain Power Project Contract

Intermountain Power Project ("IPP")

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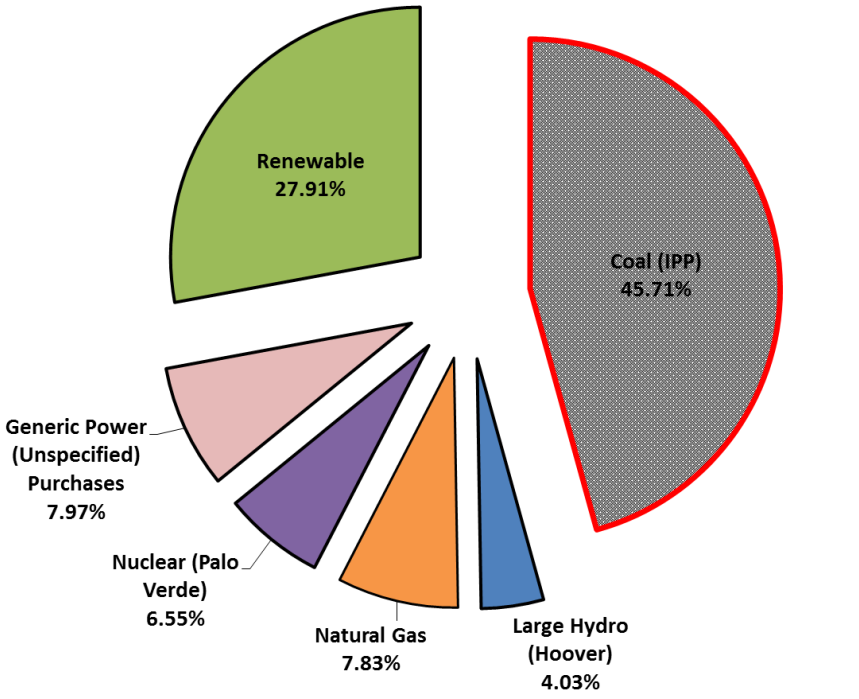
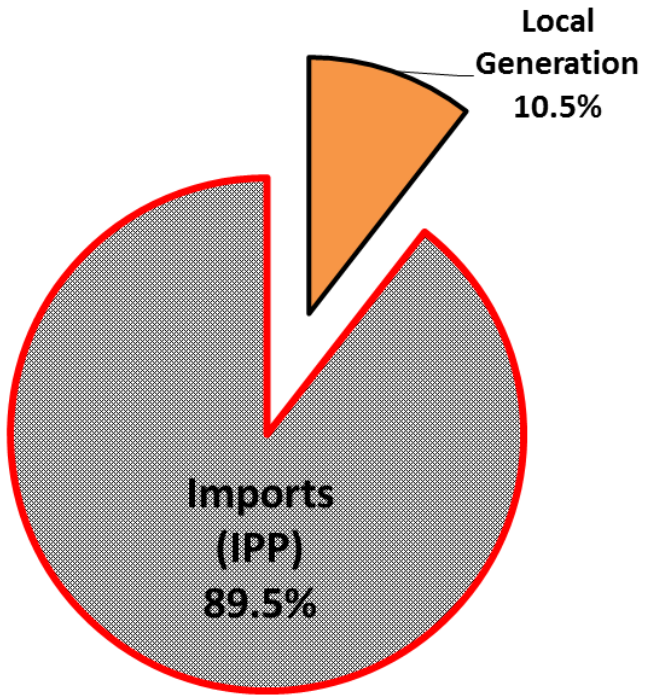


IPP Coal As a Percentage of PWP 2014 Generation

** Percentages using current CARB GHG reporting methodology for electric utilities*

IPP is the largest contributor of GHG emissions in the PWP generation portfolio.*



IPP As a Percentage of PWP 2014 GHG Emissions*

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Recommendations

- GHG reduction of at least 60% from 1990 levels by 2030 (to approx. 367,500 MT)
  - > Eliminate coal fired generation no later than 6/16/2027.
    - Preserve IPP related transmission rights.
    - Have an option to reduce or opt out of any IPP natural gas repowering no later than 2019.
    - Until IPP is repowered, reduce IPP coal-fired generation when operationally & economically practicable.

Recommendations (con't)

Pasadena Water & Power

- Continue to acquire all cost-effective and viable energy efficiency.
  - > At least 1% of annual net energy load (12,750 MWh/year) and 0.7% of annual peak demand 2.3 MW/year) through 2023.
  - > Update recommendations to City Council in 2017.
- Continue to acquire cost effective renewable energy.
  - > Renewable Portfolio Standard Policy & Annual Procurement Plan
  - > Pasadena target = 40% RPS by 2020
  - > State target = at least 33% RPS by 2020; may increase to 50% RPS by 2030
- Support local renewable energy resources and community solar efforts.
  - > Establish Feed-in Tariff by the end of 2016.
  - > Launch a Community Solar pilot project by the end of 2016.

Recommendations (con't)

- Continue to ensure reliability and flexibility to respond to electric industry changes.
  - > Explore and procure viable, cost-effective new technologies and efficient conventional technologies as needed to meet reliability and flexibility requirements.
    - Including distributed generation and energy storage.
- Preserve existing local generation.
  - > Evaluate repair and/or replacement options for Glenarm Unit 2.

Why "Stay the Course?"

Pasadena Water & Power

- **Reaffirms Pasadena's Aggressive 2012 IRP Commitments**
- **Achieves a 60% GHG Reduction from 1990 Levels by 2030**
  - > Ahead of California statewide goal to reduce GHG 40% by 2030 under Governor Brown's Executive Order B-30-15
- **Meets or Exceeds All of PWP's Current Requirements**
  - > Legal, Regulatory, Reliability and Environmental
- **Provides Flexibility to Adapt to Changing Conditions**
- **Least Cost Option Considered**

Preferred Portfolio: Stay the Course = 60% GHG Reduction by 2030

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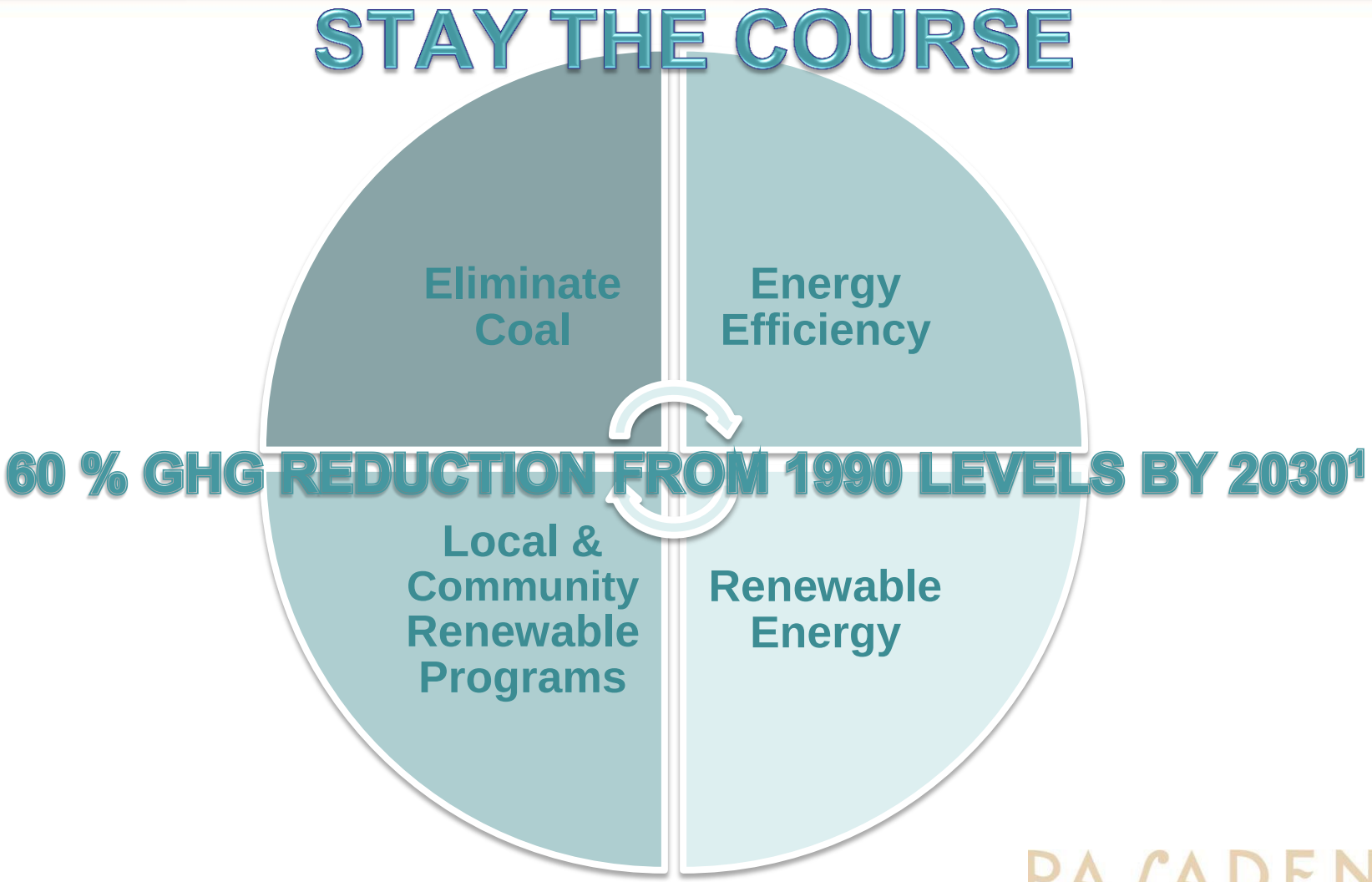

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[1] *Statewide GHG targets are 40% reduction by 2030 & 80% by 2050 from from 1990 levels.*