FISCAL IMPACT:
Approval of the PWP 2015 Update to the IRP will have no immediate fiscal impact, and is essentially a continuation of current City policies. The IRP recommendations will, however, establish the policy guidance and framework to evaluate power resource and program choices with potential substantial cost implications for PWP and its electric ratepayers. Over a 20 year period, implementation of the recommended Stay-the-Course goals will result in an increase from today in PWP's average levelized portfolio energy cost. The increase in PWP's portfolio energy cost is passed to the customers through the electric rates.

Respectfully submitted,

PHYLLIS E. CURRIE
General Manager
Water and Power Department

Prepared by:

Leesa S. Nayudu
Resource Planning Manager
(Power Supply)

Approved by:

MICHAEL J. BECK
City Manager

Attachment 1: 2015 IRP Key Assumptions and Analysis
Attachment 2: Bill Impact Analysis

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2015 PWP Power IRP Update Attachment 1

Key Assumptions and Analysis

Progress Toward 2012 IRP Recommendations

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Recommendation	Target	Status
Renewable Energy: RPS	40% by 2020; Meet/exceed state mandated level of 33% by 2020	On Track; 28% for 2014; Well on our way to 40% by 2020
Renewable Energy: Local Solar	15 MW by 2020; 19 MW by 2024	Approximately 6.2 MW installed
Coal Power Displacement	Reduce coal purchases by at least 35 MW by 2016 (via power sale to non-California public entity buyers)	No willing/qualified buyers; Sales blocked by CARB Resource Shuffling Rules. Able to achieve some reduced output w/economic dispatch + additional carbon premium.
New Local Gas-Fired Generation	Replace Broadway power plant with a comparably sized new combined cycle plant by 2014	GT-5 Under Construction; Commercial Operation expected June 2016
Energy Savings	Incorporate adopted 2010 Energy Efficiency Goals	Adopted 2013 Energy Efficiency Goals: 12,750 MWh, 2.3 MW = ~ 1% per year (energy), 0.7% (demand)
Additional Demand Response	Additional 5 MW by 2012 through incentives and programs	None identified to date. Under review pending development of smart grid strategy.
GHG Emissions Reductions	25% by 2015; 40% by 2020 (from 2008 levels)	19.1% as of 2014
Upgrades of Existing Generation	Continue to maintain and upgrade Glenarm Units 1 and 2 to extend their lives through 2030	Unit 1 complete. Unit 2 still being evaluated. Separate staff recommendation pending.

PWP Power Supplies

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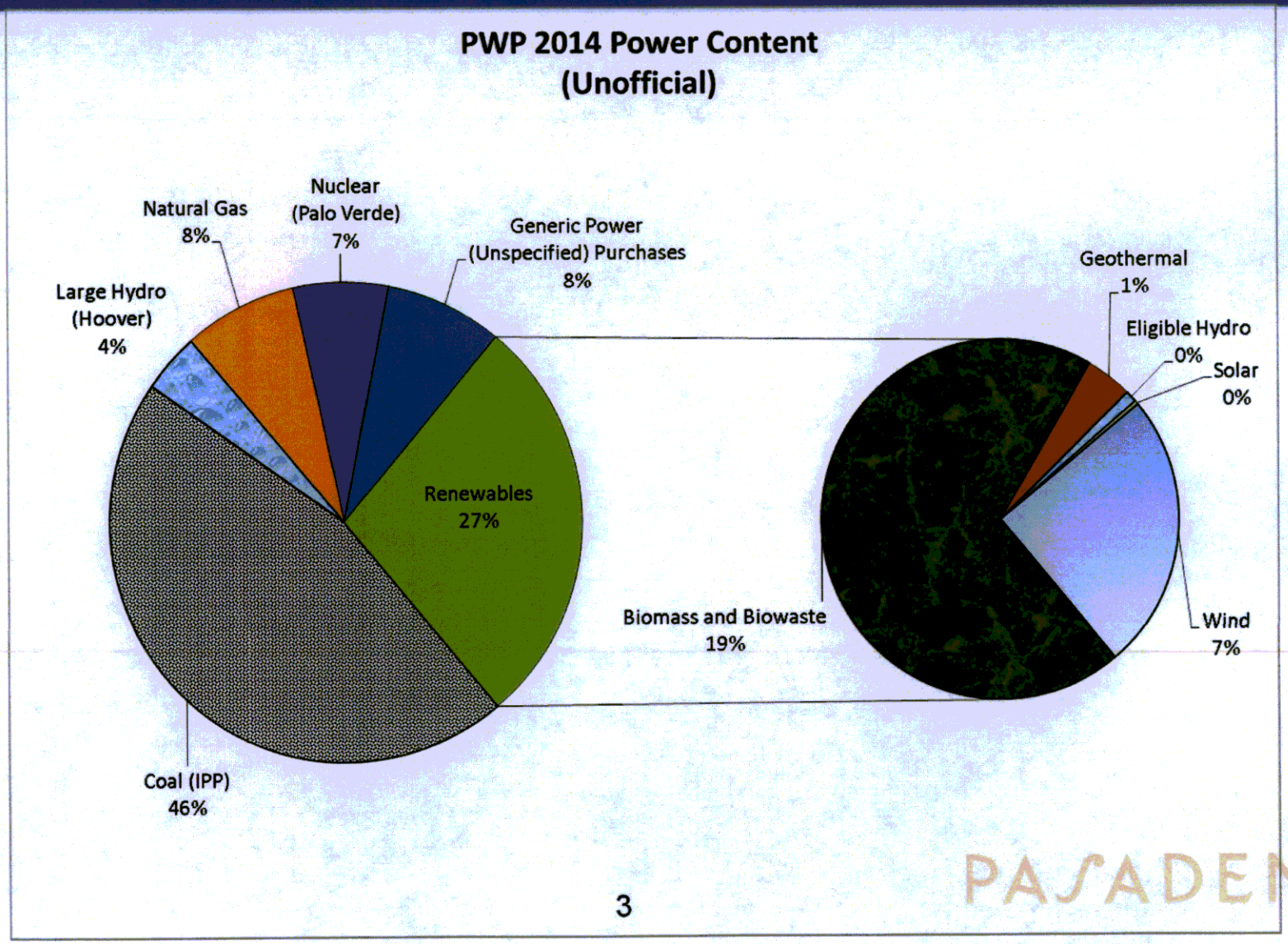

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Intermountain Power Project ("IPP")

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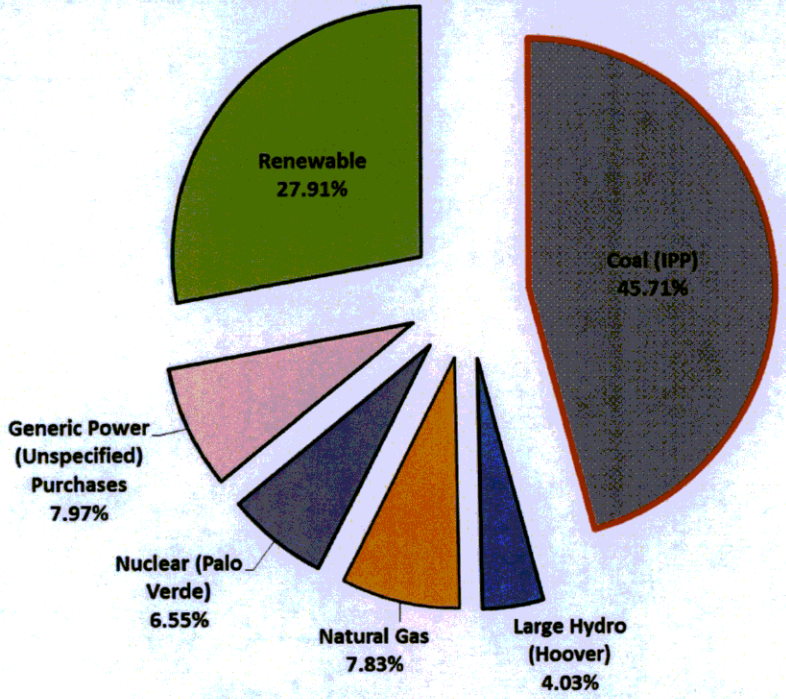
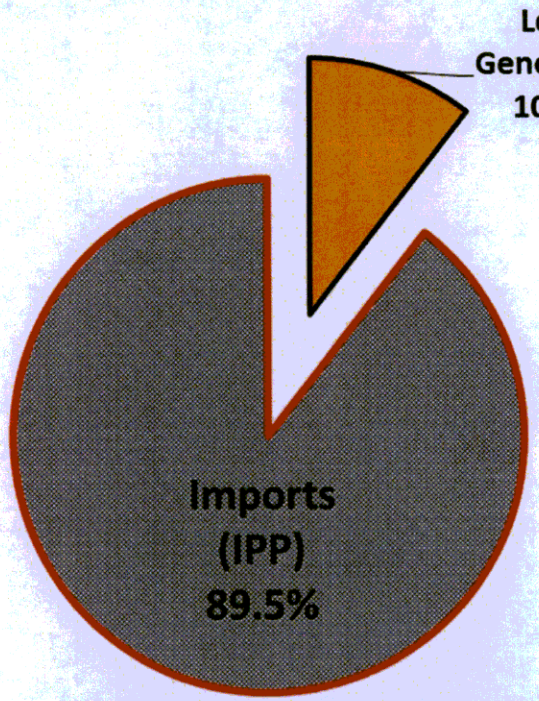


IPP Coal As a Percentage of PWP 2014 Generation

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



IPP As a Percentage of PWP 2014 GHG Emissions*

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

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Reducing IPP Generation
(under current contract)

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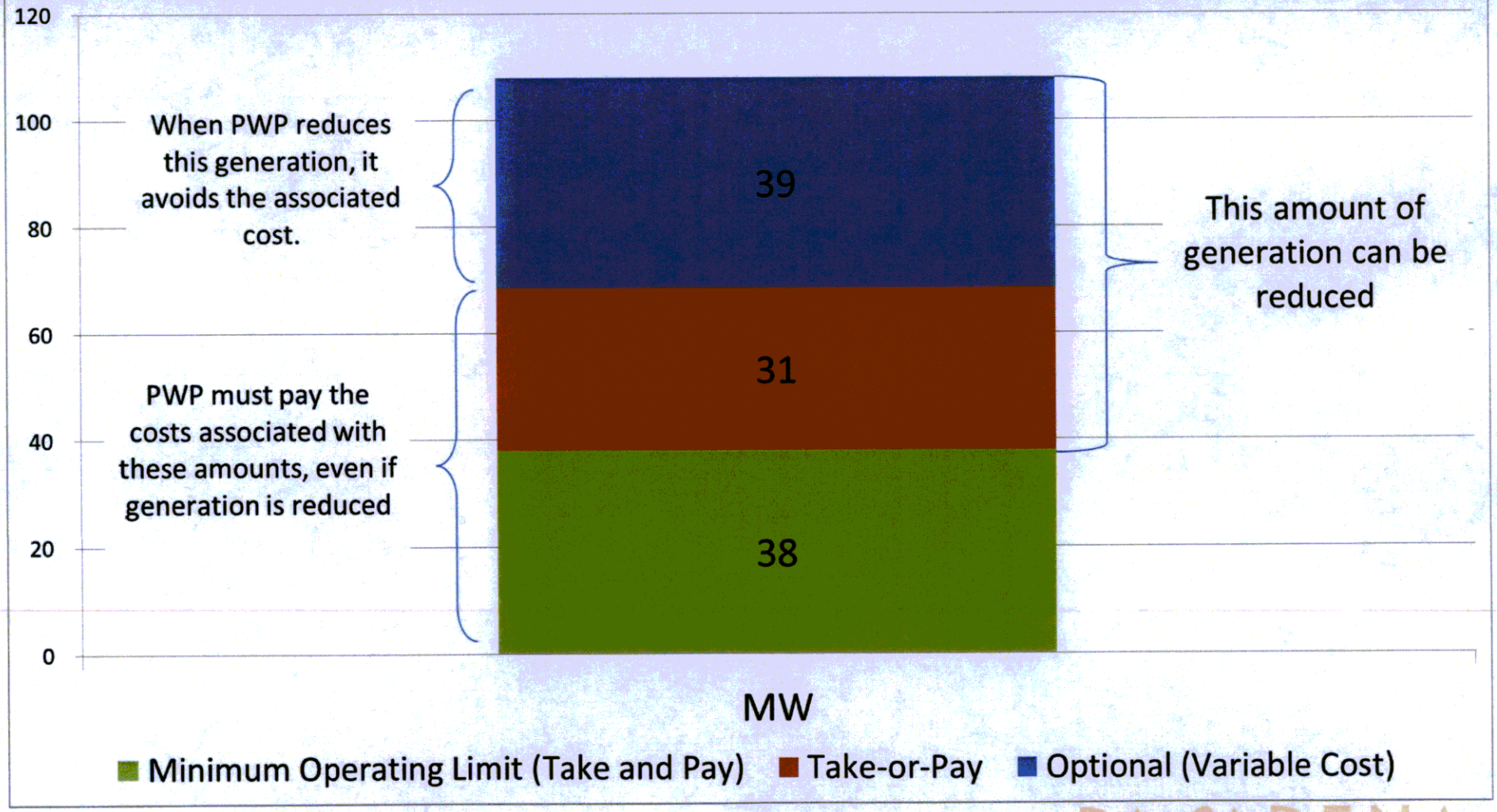

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IPP Power Sales Contract ("PSC")

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- Project consists of 2 – 900 MW coal-fired units and associated transmission facilities
- Power purchased by 36 separate public utilities
  - California participants are LADWP, Riverside, Anaheim, Burbank, Glendale, & Pasadena
  - Utah entities have assigned most of their power to California participants
- Current PSC expires June 15, 2027
- Intermountain Power Association ("IPA") proposes to amend and renew the contract
  - California entities cannot sign new coal contracts
  - Amendment would facilitate repowering with smaller natural gas plant and/or alternative
  - Coal fired generation would be repowered with natural gas and/or alternative by 2025 & participants would have option of renewing contracts to participate in repowering
  - Amendment does not require that IPA decommission the coal plant, but if it does, participants will pay decommissioning costs

PWP Carbon Emissions to Date

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Emission Source	2008	2009	2010	2011	2012	2013	2014
Local Generation	82,724	73,355	74,590	80,551	139,828	59,603	64,217
Imports (incl. IPP Coal)	672,321	666,596	629,755	642,935	514,443	536,241	546,314
Magnolia*	38,553	36,285	40,727	19,169	5,723	4,540	12,073
Net Market Purchases*	111,720	106,925	65,898	74,751	97,901	63,304	85,656
Total Emissions/ (2008 Method)	905,317	883,161	810,970	817,406	757,895	663,687	708,261
Reduction from 2008	N/A	2.4%	10.4%	9.7%	16.3%	26.7%	21.8%
Total Emissions/ (Current Method)	**755,045**	**739,951**	**704,345**	**723,486**	**654,271**	**595,844**	**610,531**
Reduction from 2008	**N/A**	**2.0%**	**6.7%**	**4.2%**	**13.3%**	**21.1%**	**19.1%**

*In 2008, Magnolia & Net Market Purchases were included in PWP Emissions. Current Method excludes them because they are counted by other entities (Burbank for Magnolia; Generation owners or first importers for CAISO market purchases). Switching from natural gas to biomethane at Magnolia produces RPS RECs but does not show up as PWP carbon emission reduction under current CARB methodology.

PWP Carbon Emissions vs. 1990

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1990 PWP Carbon Emissions (MT)	2014 Actual Emissions (MT)	40% Reduction (MT)	60% Reduction (MT)	80% Reduction (MT)
918,622	708,261	551,173	367,488	183,724

Base Case Portfolio GHG Comparison

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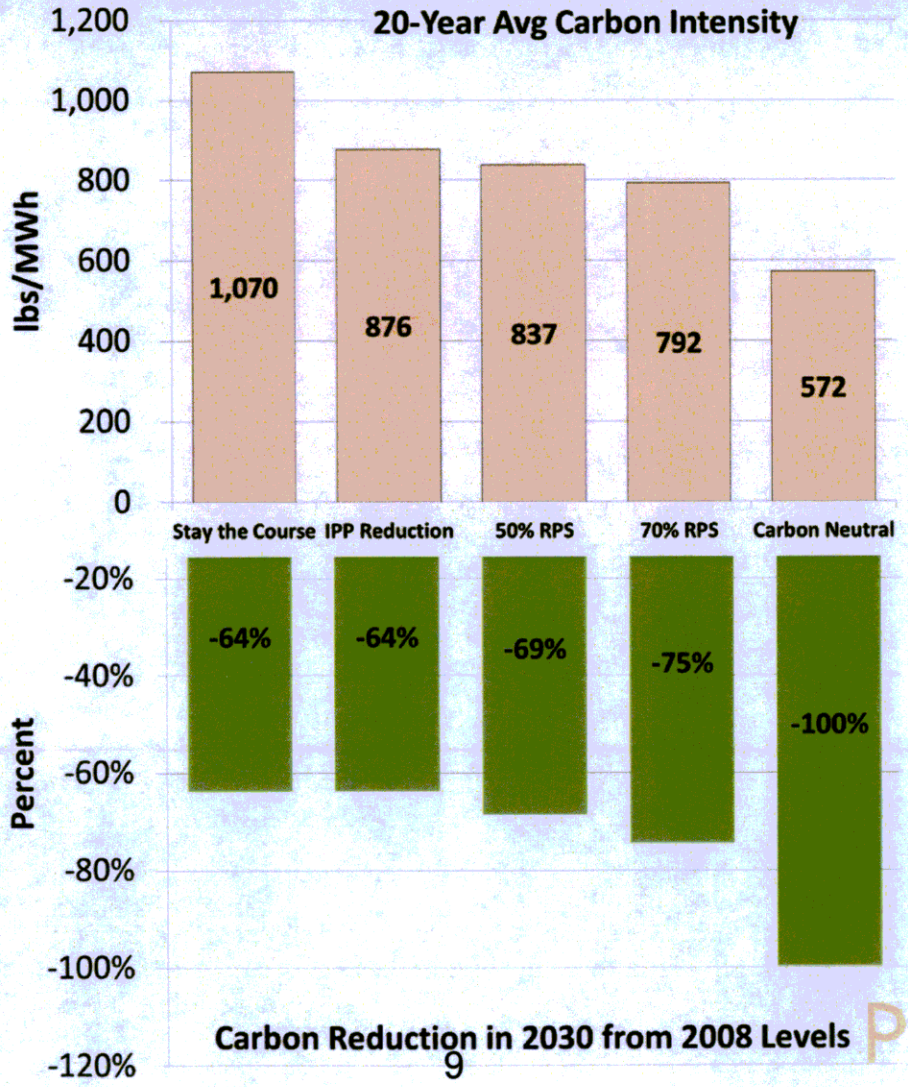
Carbon (GHG) Intensity = GHG Emissions / Sales



Average over 20 years

One-year (2030) GHG emissions compared to 2008

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Net GHG Emission Reduction Costs

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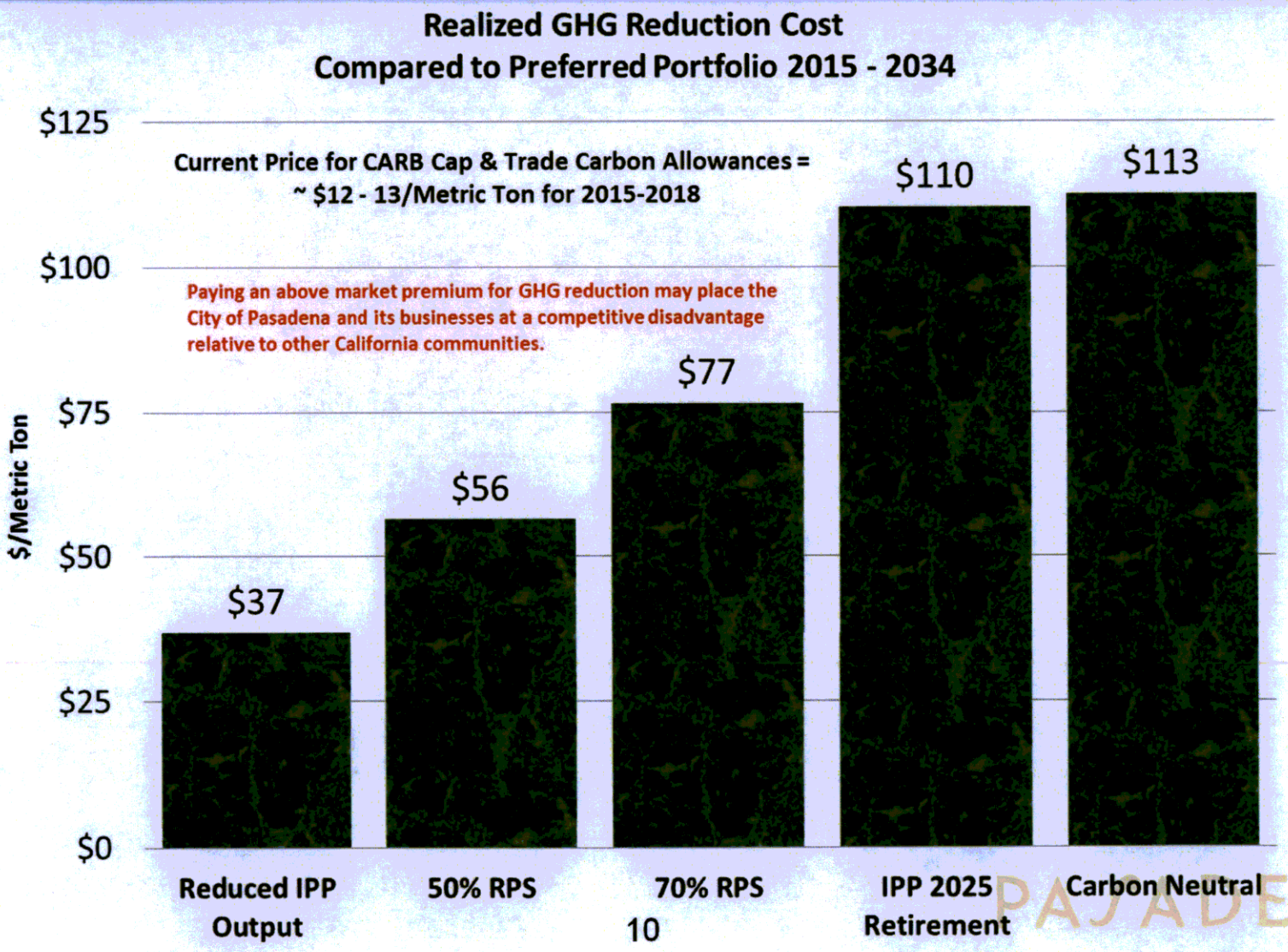

Average New Renewable Technology IRP Cost Assumptions

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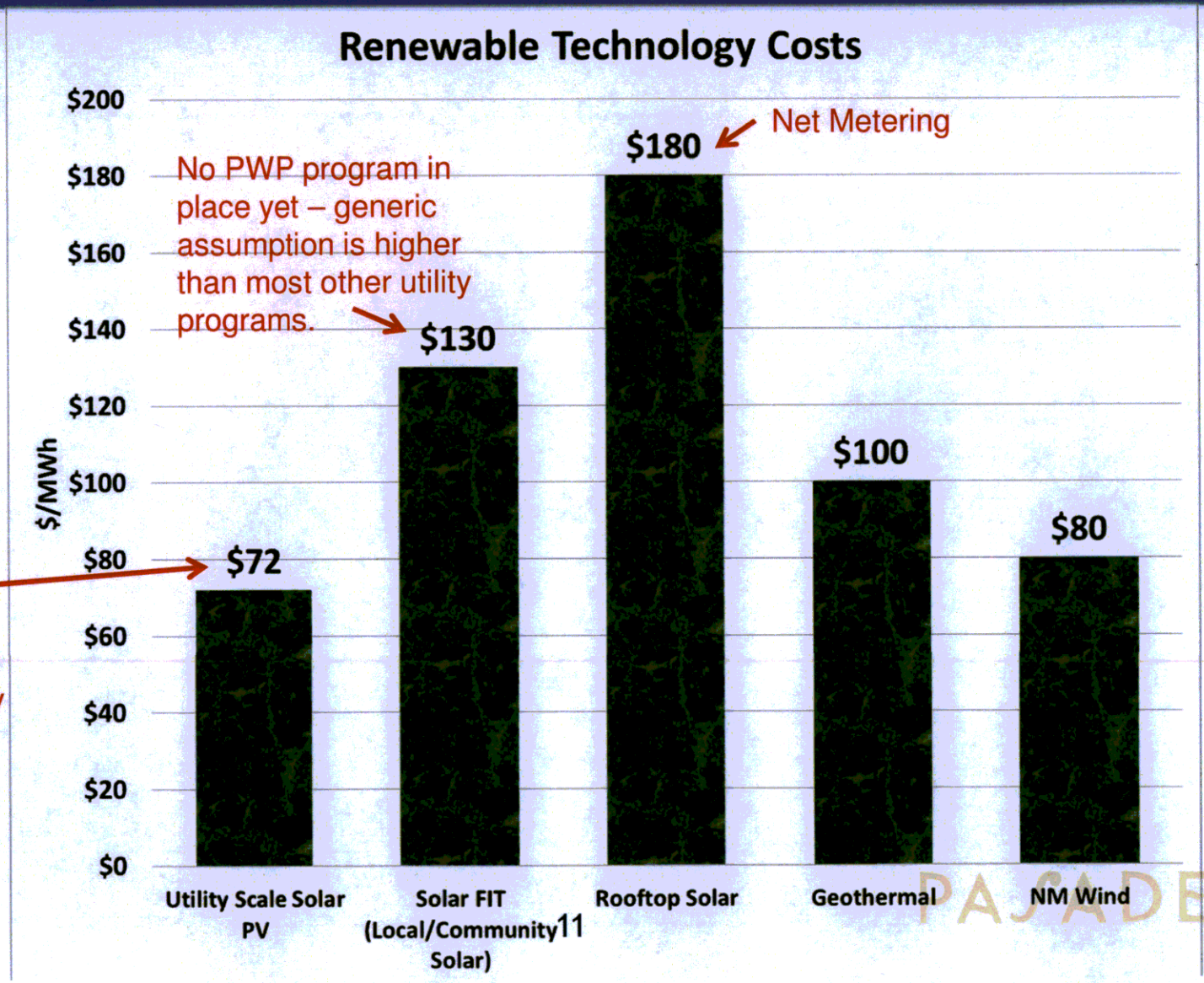

Average PWP Generation Cost by Resource

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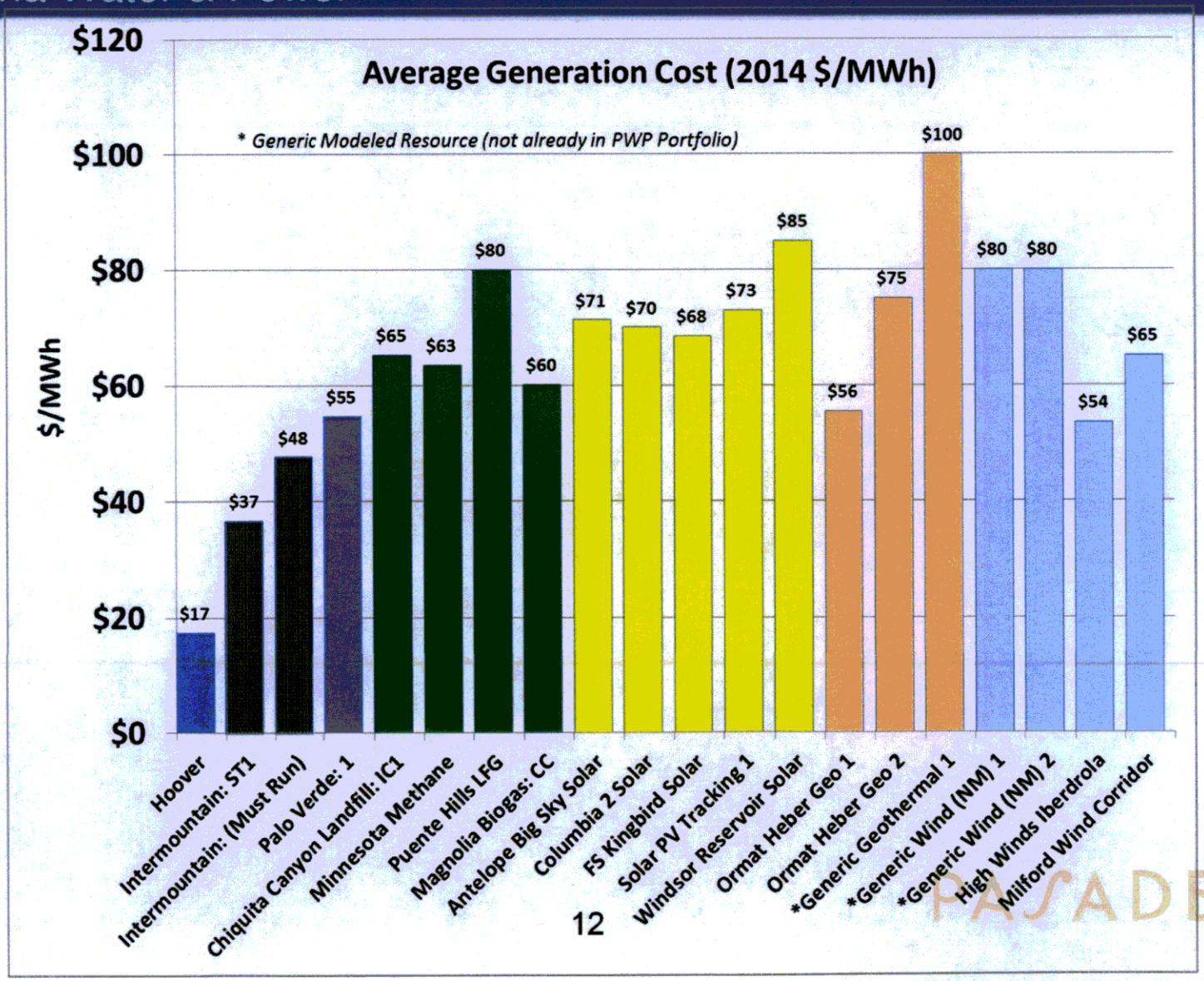

Expected PWP Gas-Fired Generation Cost

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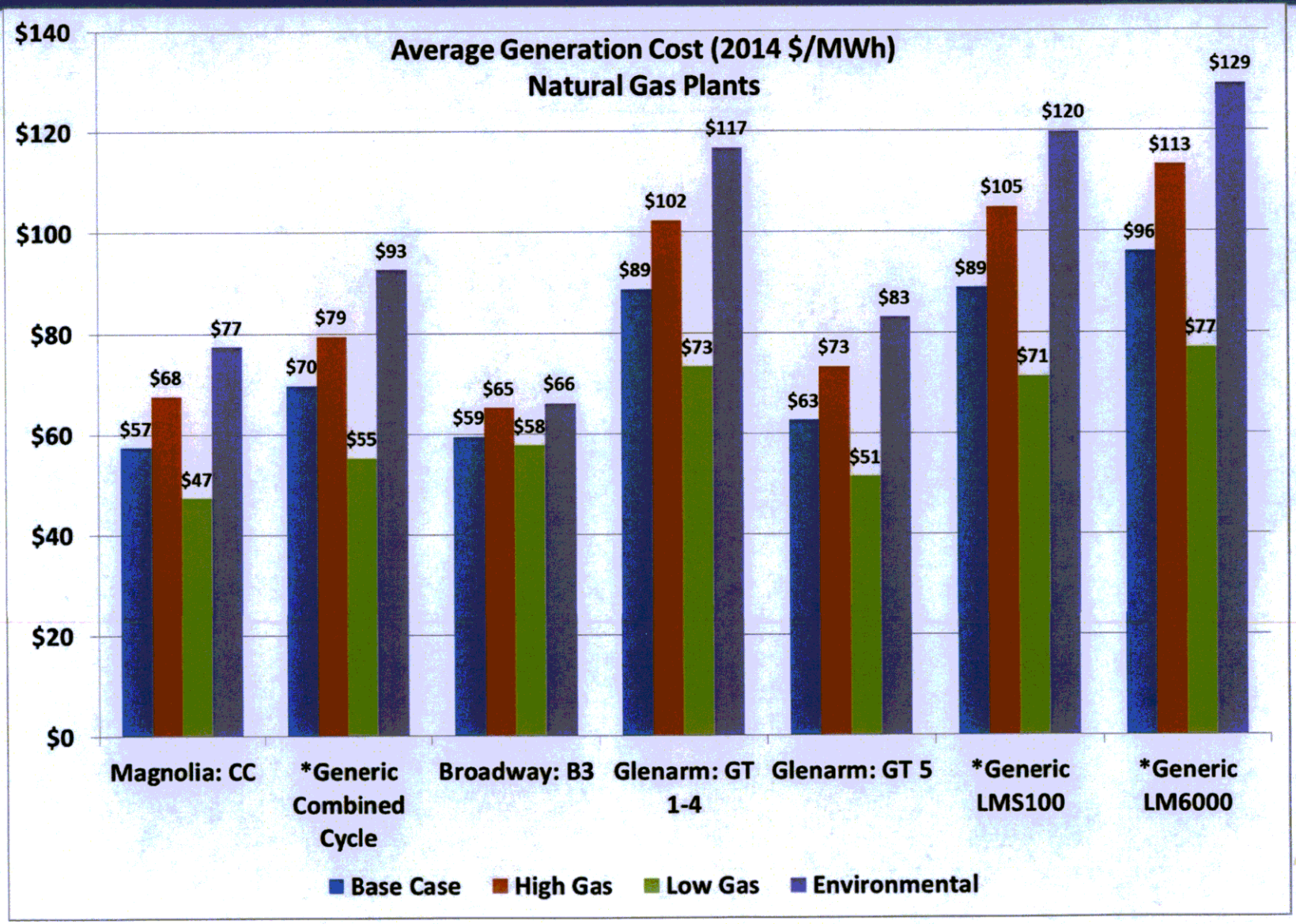

Assumptions – Natural Gas Prices

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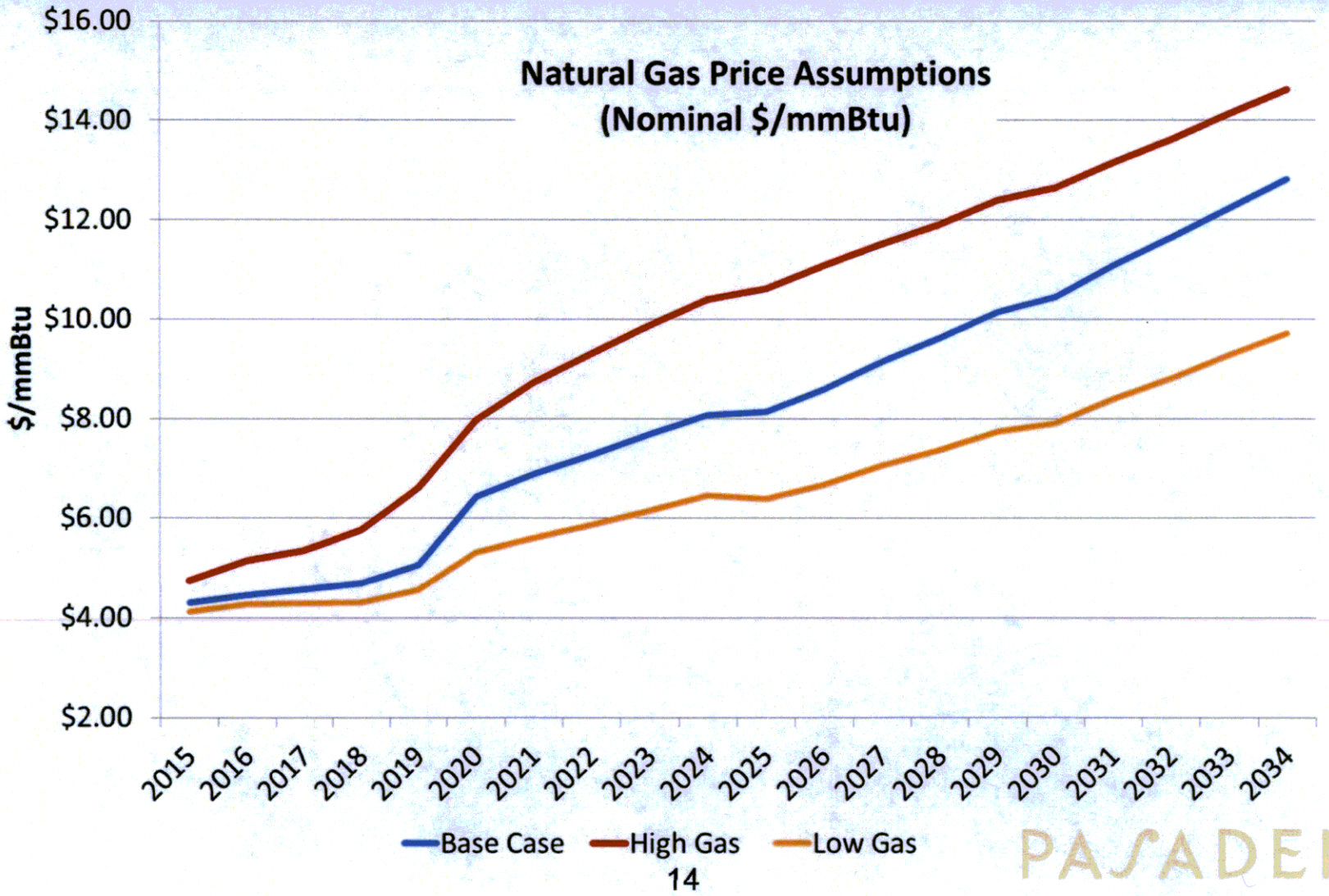

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Assumptions – Electricity Prices

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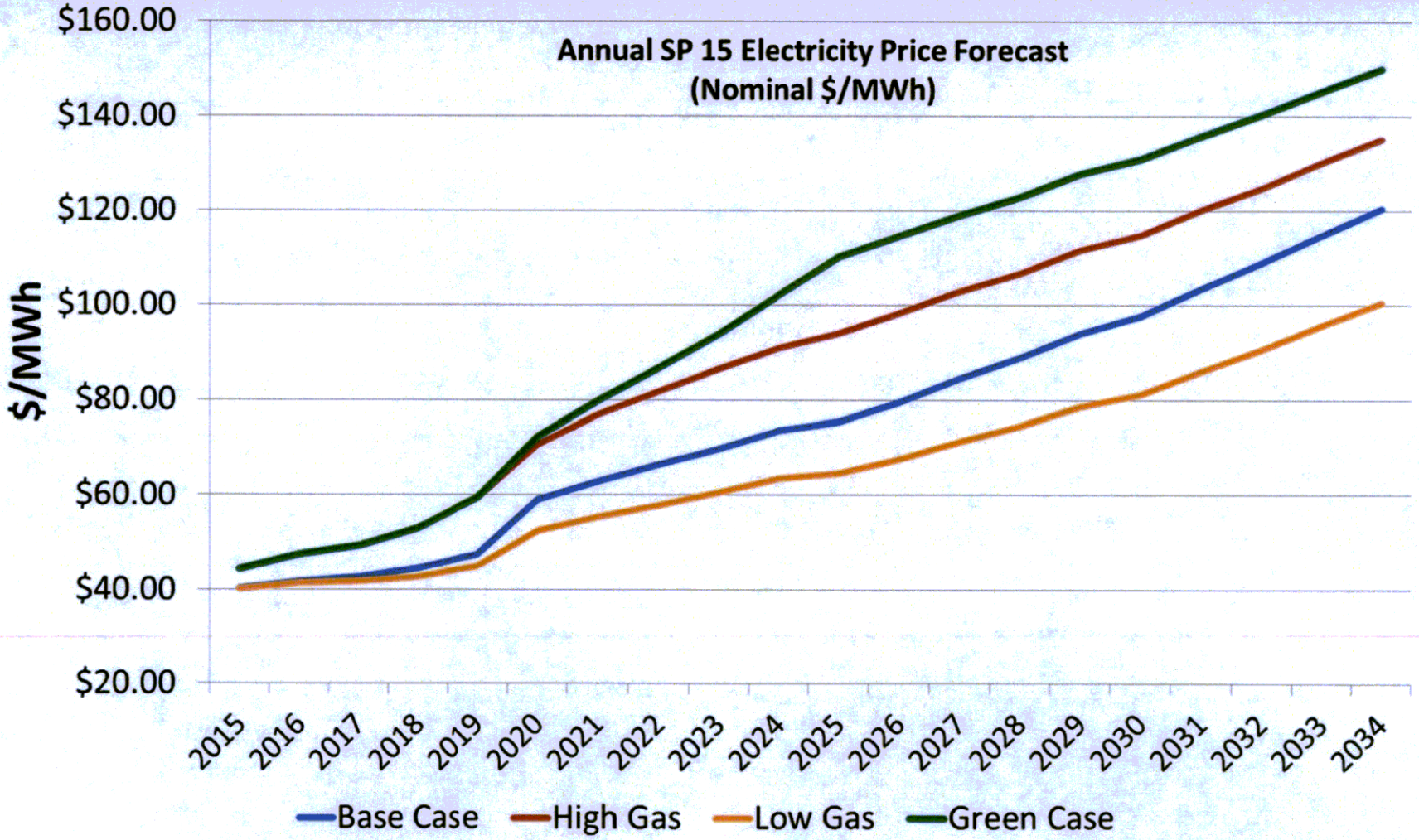

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Assumptions – Carbon Prices

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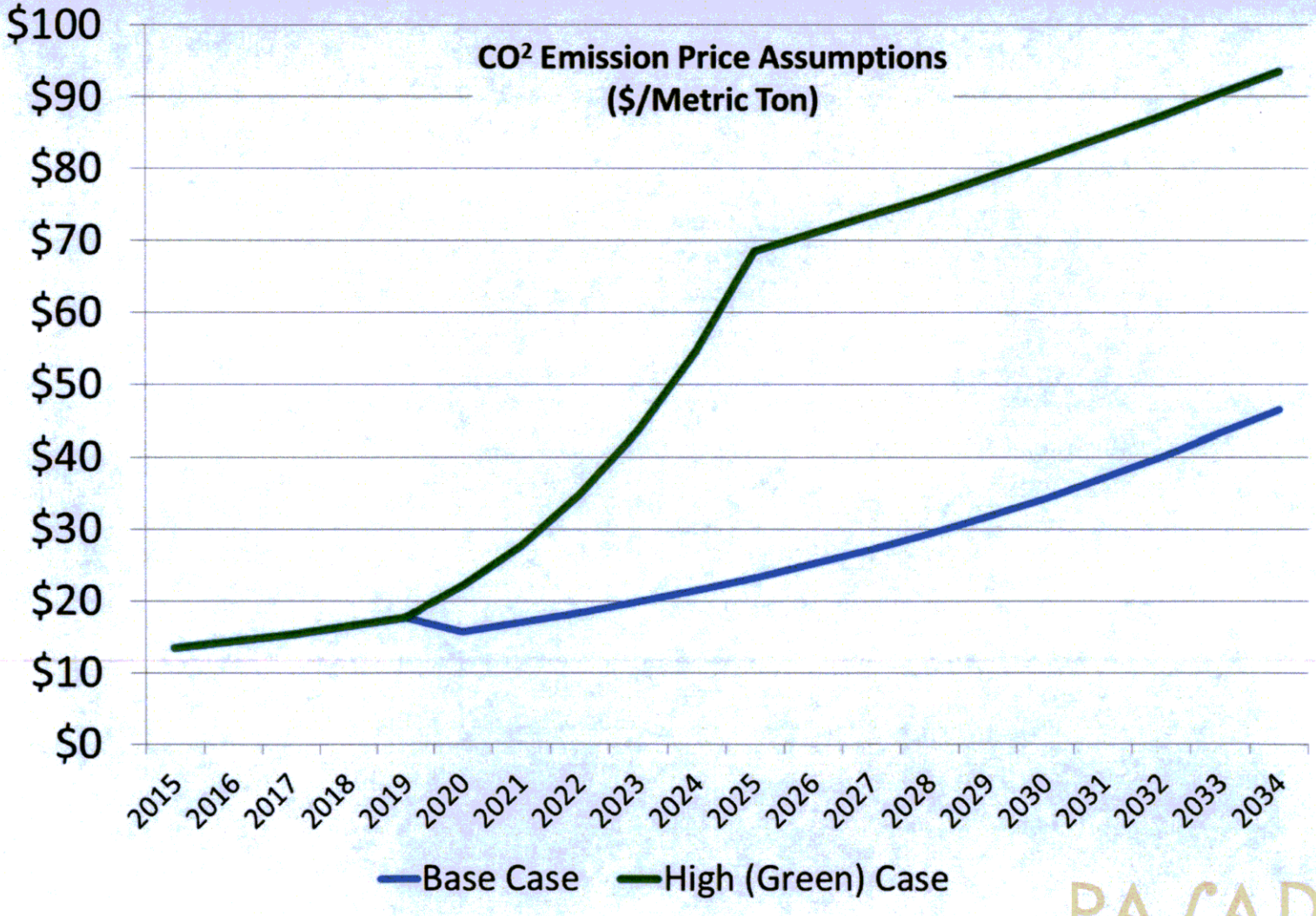

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Financial Terms

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- **Future Value/Present Value***: Money now is more valuable than money later on. If you have $1,000 and could get 10% interest on your money, $1,000 x 10% = $100 in a year. Your $1,000 now would have a *future value* of $1,100 by next year. $1,100 next year has a *present value* of $1,000 now.
  - The formula for Present Value is: $PV = FV / (1+r)^n$, where:
    PV is Present Value
    FV is Future Value
    r is the interest rate (as a decimal)
    n is the number of years
- **Levelized Cost**: The equal payments determined by taking the Present Value (adjusted for the cost of inflation or interest on money) today of a series of future payment obligations and dividing by the number of future payments in the period. It is different than the average or median payment.
  - For example: a series of ten annual payments starting with $1,000, and escalating at 3.5% per year would have a levelized payment of $1,162. The average payment would be $1,173. The median payment would be $1,168.
- **Discount Rate**: The risk-adjusted cost of borrowing money, used to determine the Present Value of a series of future cash flows. PWP has used a discount rate of 3.5% for its analysis in this IRP update.

* Pierce, Rod. "Present Value (PV)" Math Is Fun. Ed. Rod Pierce. 2 Aug 2014. 31 Mar 2015 <http://www.mathsisfun.com/money/present-value.html>

Balancing Capacity/Energy

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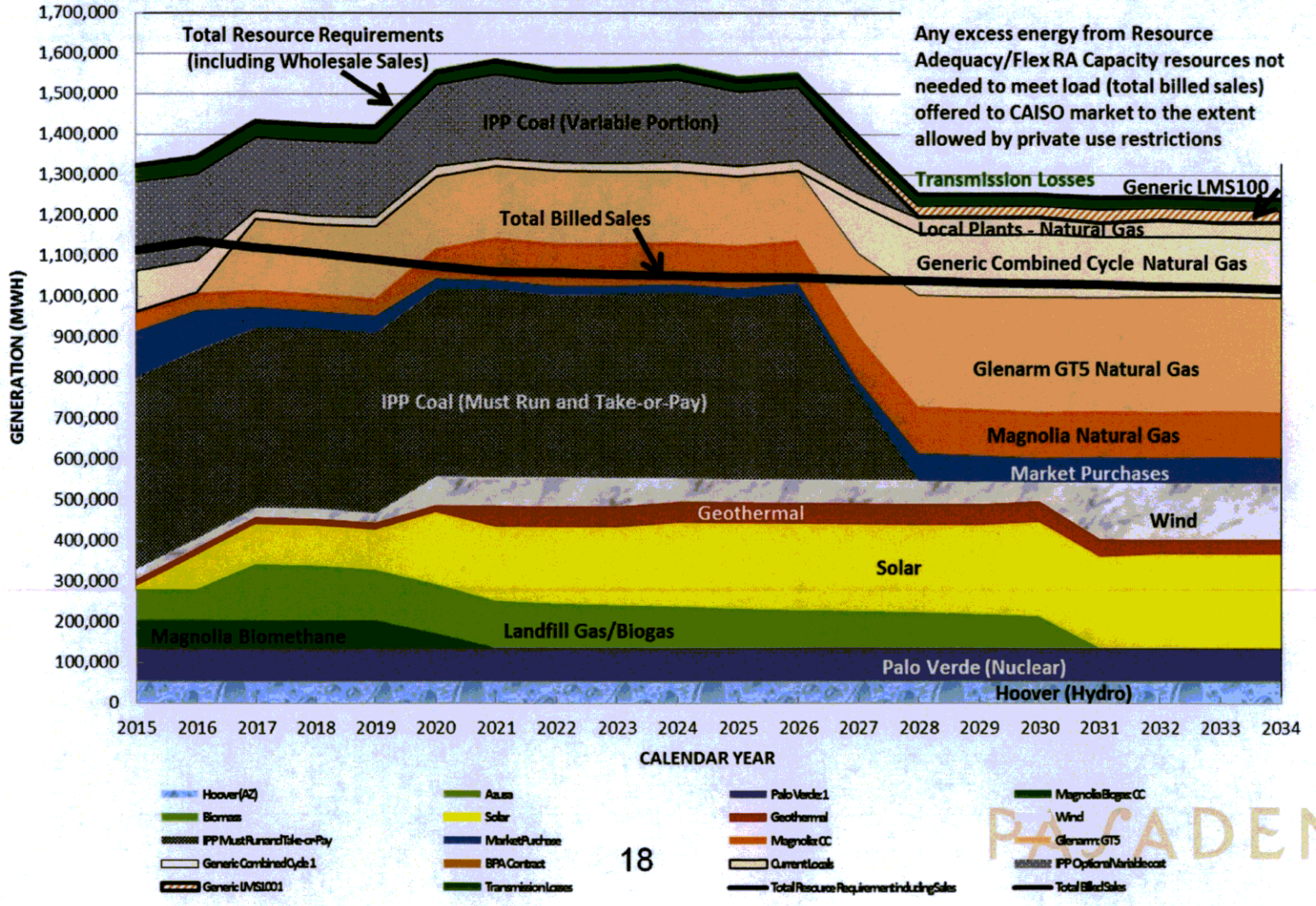
PWP RESOURCE PORTFOLIO STACK



2030 Total Power Supply Content Comparison by Portfolio

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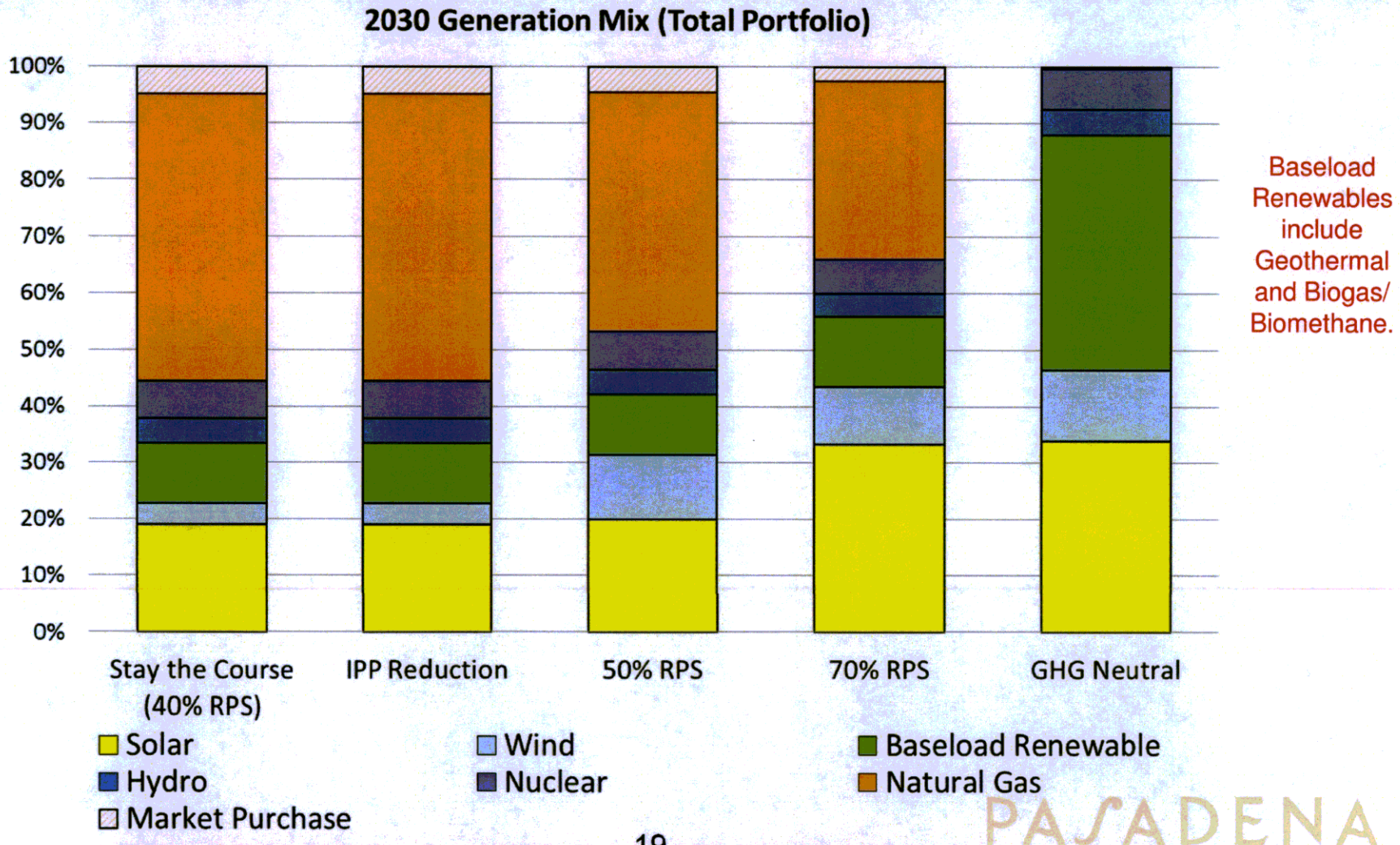

Baseload Renewables include Geothermal and Biogas/ Biomethane.

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NOTE: Renewable Portfolio Standard Percentages apply to Retail Sales Only. Additional generation may be part of legacy resources/contracts or required for reliability. Surplus energy is offered into wholesale market to the extent allowed by private use restrictions.

Power Supply Changes Over Time – Stay the Course

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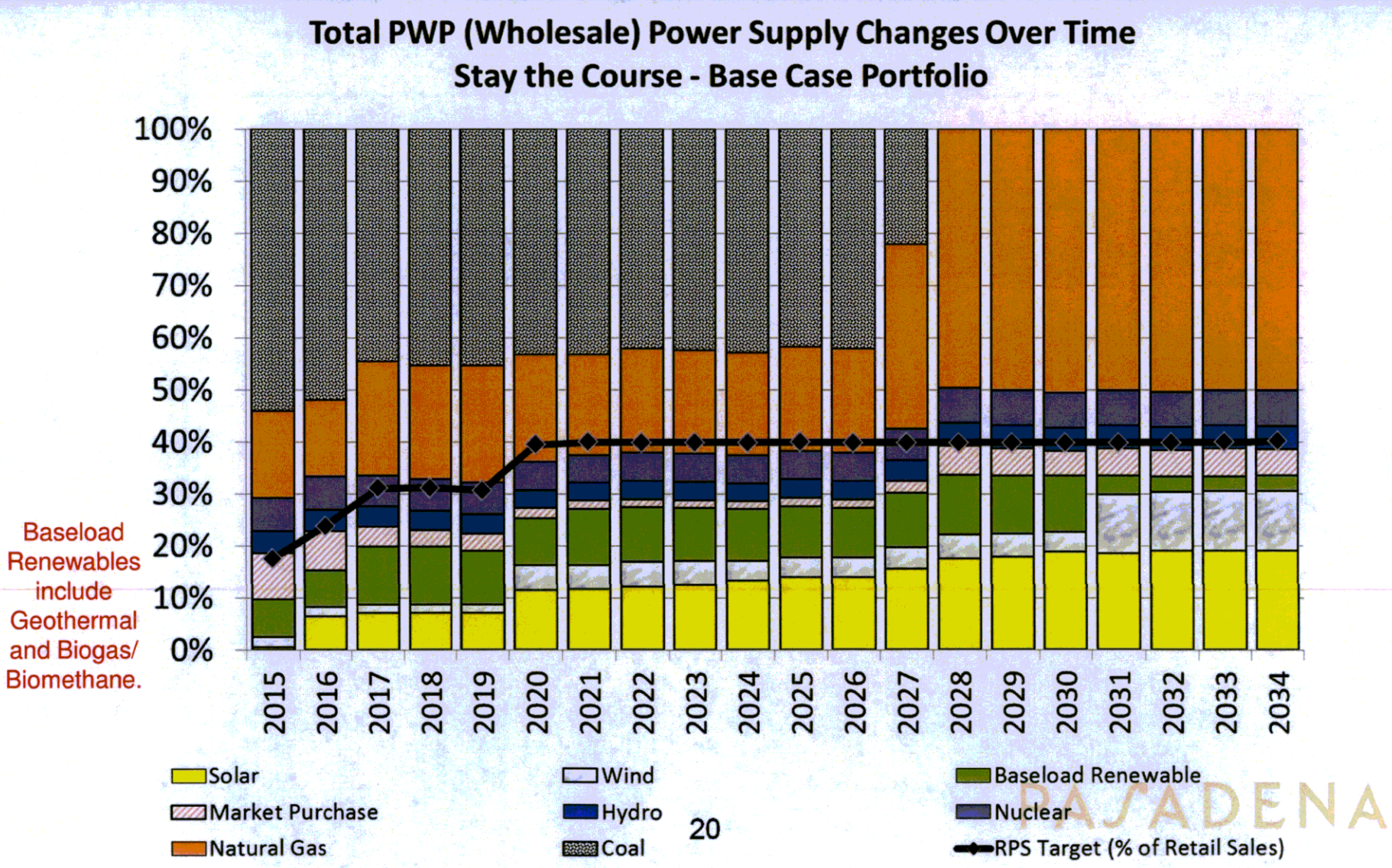

Power Supply Changes Over Time – IPP (Coal) Reduction

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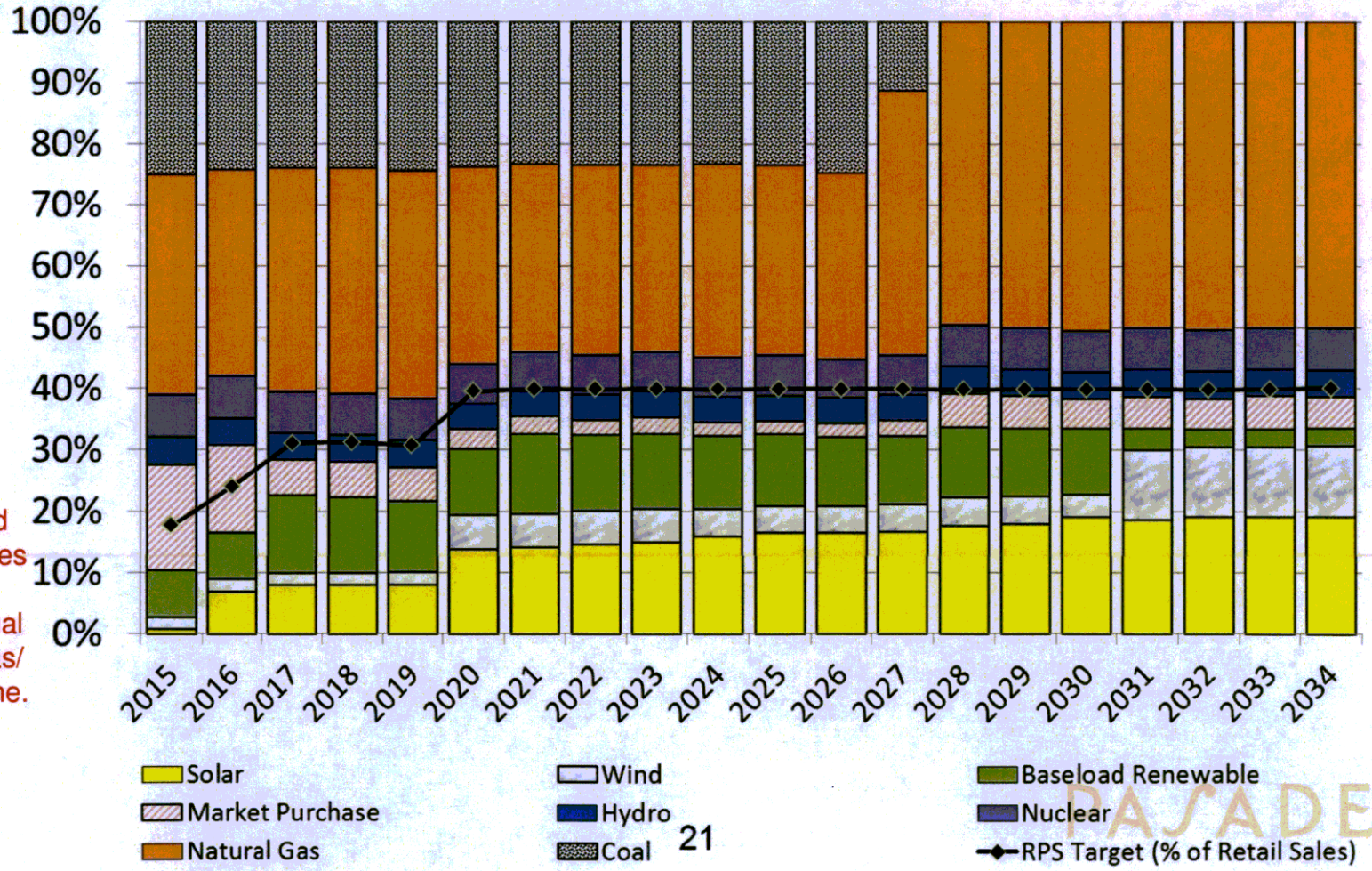
Total PWP (Wholesale) Power Supply Changes Over Time
IPP Reduction - Base Case Portfolio



Baseload Renewables include Geothermal and Biogas/ Biomethane.

Power Supply Changes Over Time – 50% Renewable Portfolio Standard

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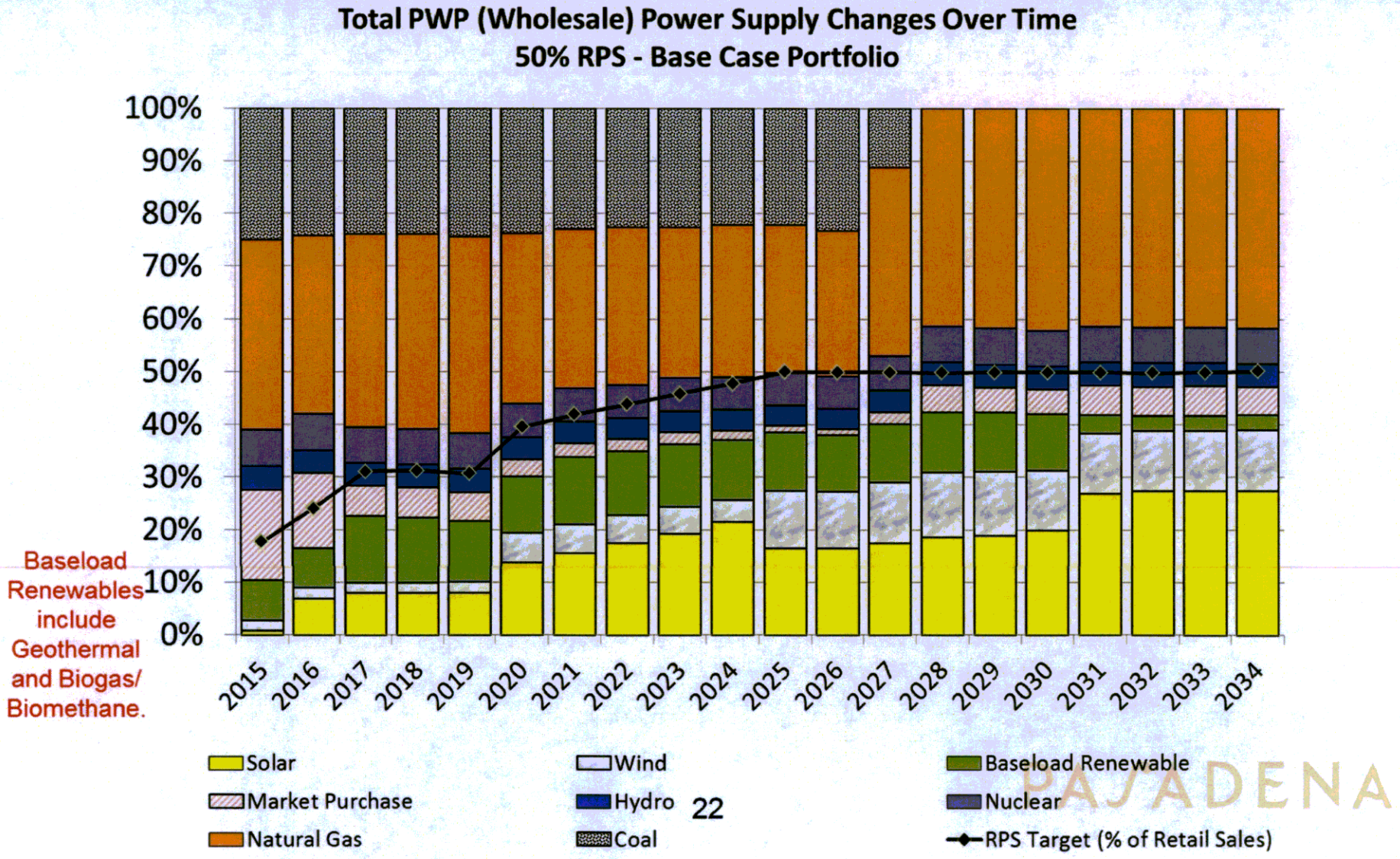

Power Supply Changes Over Time – 70% Renewable Portfolio Standard

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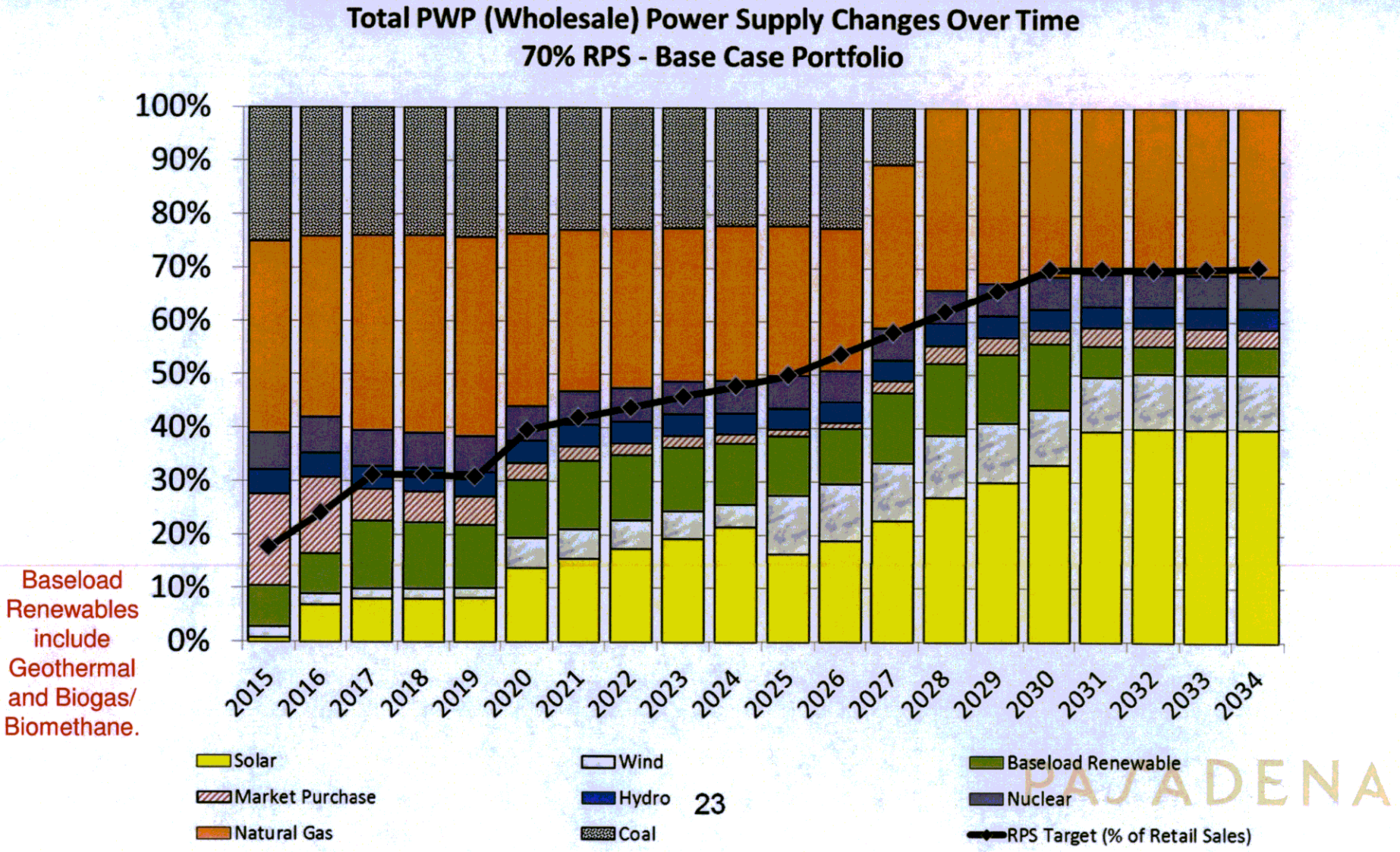

Power Supply Changes Over Time – GHG Neutral Portfolio

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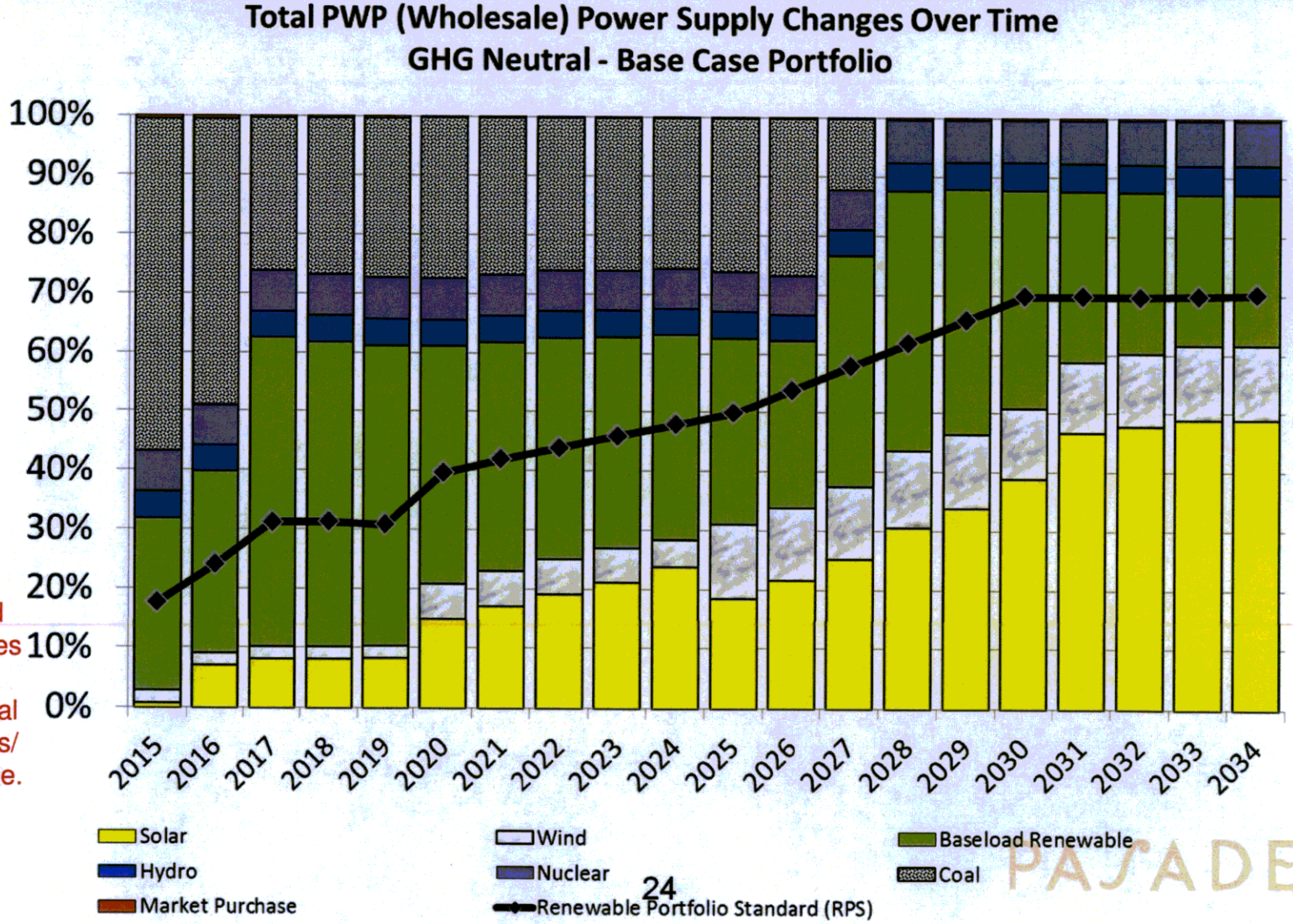

Baseload Renewables include Geothermal and Biogas/ Biomethane.