**EXHIBIT NO. ___(WJE-11HC)**
**DOCKET NO. UE-09___/UG-09___**
**2009 PSE GENERAL RATE CASE**
**WITNESS: W. JAMES ELSEA**

**BEFORE THE**
**WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION**

| | |
|---|---|
| **WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION,**<br><br>**Complainant,**<br><br>**v.**<br><br>**PUGET SOUND ENERGY, INC.,**<br><br>**Respondent.** | **Docket No. UE-09____**<br>**Docket No. UG-09____** |

# TENTH EXHIBIT (HIGHLY CONFIDENTIAL) TO THE PREFILED DIRECT TESTIMONY OF W. JAMES ELSEA ON BEHALF OF PUGET SOUND ENERGY, INC.

**REDACTED VERSION**

**MAY 8, 2009**

# Phase II Process

# Analysis Methods – Phase II

- Information requests and more in-depth qualitative analysis was performed on the Candidate Short List of projects.
- Projects were analyzed in four additional PSM scenarios:

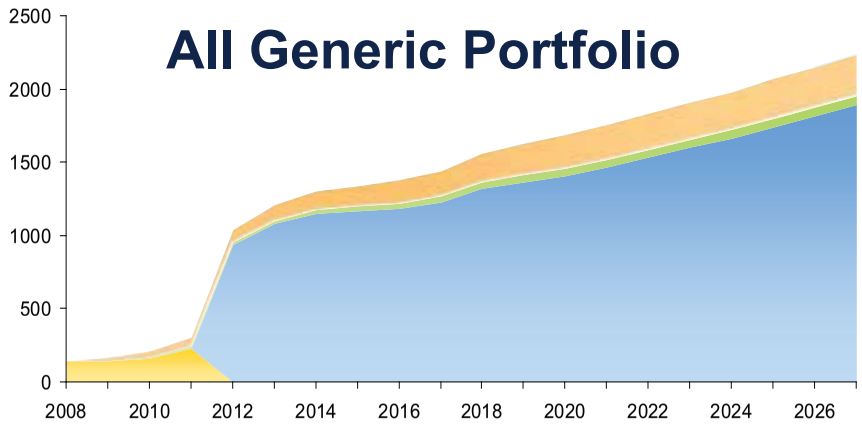
  Green World, High Capital Costs, Low Capital Costs, and Low Growth.
- Eight portfolios of projects were run in PSM to analyze their potential effect on each other.
- Monte Carlo (dynamic) analysis was used to evaluate risk by adjusting variables within PSM, including hydro and wind conditions.
  - Risk was evaluated as an average of the 10 worst trials from the 100 trials analyzed.

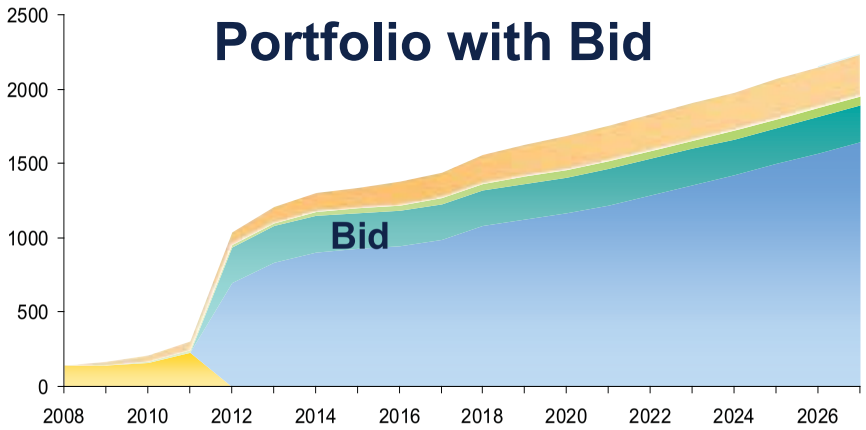
# PSM Updates - Phase II

- Generic resource capital costs
  - Wind: ~$2,100/ kW (Phase I) to ~$2,764/ kW in 2010 (Phase II), based on PSE's market knowledge
  - CCGT: ~$1,000/ kW (Phase I) to ~$1,330/ kW in 2010 (Phase II), based on PSE market surveys of Engineering firms, IOUs, and CCGT Developers.
- Imputed Debt
  - S&P modified the way it assesses imputed debt to a PPA. The modification lowers imputed debt costs applied to PPAs.
- Aurora Fundamentals Electric Market Price Forecast runs
  - Updated with most recent forward gas prices forecasts
- O&M Costs for Wind
- BPA Wind Integration Transmission Tariffs
- Emissions logic in PSM

# PSM Bid Evaluation Process

- Stand-Alone Analysis
- Portfolio Analysis
- RPS bids replace generic wind
- End-effects




## Favorable characteristics:

- Winter energy matching need and hourly shape matching load
- Efficient dispatch with low variable cost of fuel and transmission
- Cost effective in price scenarios

# PSM Scenarios Used in 2008 RFP Phase II

| PSM Scenarios | | | | | | |
|---|---|---|---|---|---|---|
| | | Current Trends (Reference) | Green World | Low Growth | Low Capital Cost | High Capital Cost |
| PSE Demand w/ Cons | | Base: 1.5% | Low: 1.3% | Low: 1.3% | Reference | Reference |
| Gas Price | | Forward Marks for 2008-2012, and Global Insight's long run fundamental forecast | Forward Marks for 2008- and Global Insight's long run high forecast | Forward marks for and Global Insight's long run low forecast | Reference | Reference |
| Coal Price | | Global Insight | Reference | Reference | Reference | Reference |
| Power Price | | Current Trends (Reference) | Green World | Low Growth | Reference | Reference |
| Generic Resource Cost $/KW | | PSE market based estimates with constant real costs for 20 years, Wind, CCCT and DF from private study | Reference | Reference | Wind and CCCT capital cost increasing at lower rate | Wind and CCCT capital Cost increasing at higher rate |
| Emissions (Nominal $/Ton) | CO2 | Lieberman-Warner Bill (ICF) Start in 2013<br>2013: $10.88<br>2020: $19.83<br>2027: $37.51 | Lieberman-Warner Bill (MIT) Start in 2013<br>2013: $46.19<br>2020: $72.25<br>2027: $113.01 | Reference | Reference | Reference |
| | SO2 | "Clear Skies" (Bush) Start in 2010<br>2010: $978<br>2020: $2105<br>2027: $3306 | "Clean Air Planning Act" (Carper)<br>2010: $1481<br>2020: $3191<br>2027: $5009 | Reference | Reference | Reference |
| | Nox | "Clear Skies" (Bush) Start in 2010<br>2010: $297<br>2020: $640<br>2027: $1006 | "Clean Air Planning Act" (Carper)<br>2010: $5742<br>2020: $1522<br>2027: $1809 | Reference | Reference | Reference |
| Production Tax Credits ($/MWh) | | $20: 2008-2010<br>$10: 2011-2013<br>For all eligible technologies | Reference | Reference | Reference | Reference |
| RPS | | Meet Current State RPS through 2027 | Reference | Reference | Reference | Reference |
| REC Value ($/MWh) | | 2008: $6<br>2009: $7<br>2010: 10%<br>2011-2027: Increase at same rate as wind capital cost | Reference | Reference | Reference | Reference |

- PSM scenarios are based on the 2007 IRP Report.
- Data in blue background was updated for RFP Phase II from the 2007 IRP values.



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# Quantitative Selection Metrics

***Levelized cost*** is the average annual cost per MWh produced during a 20-year period + end effects for each project.

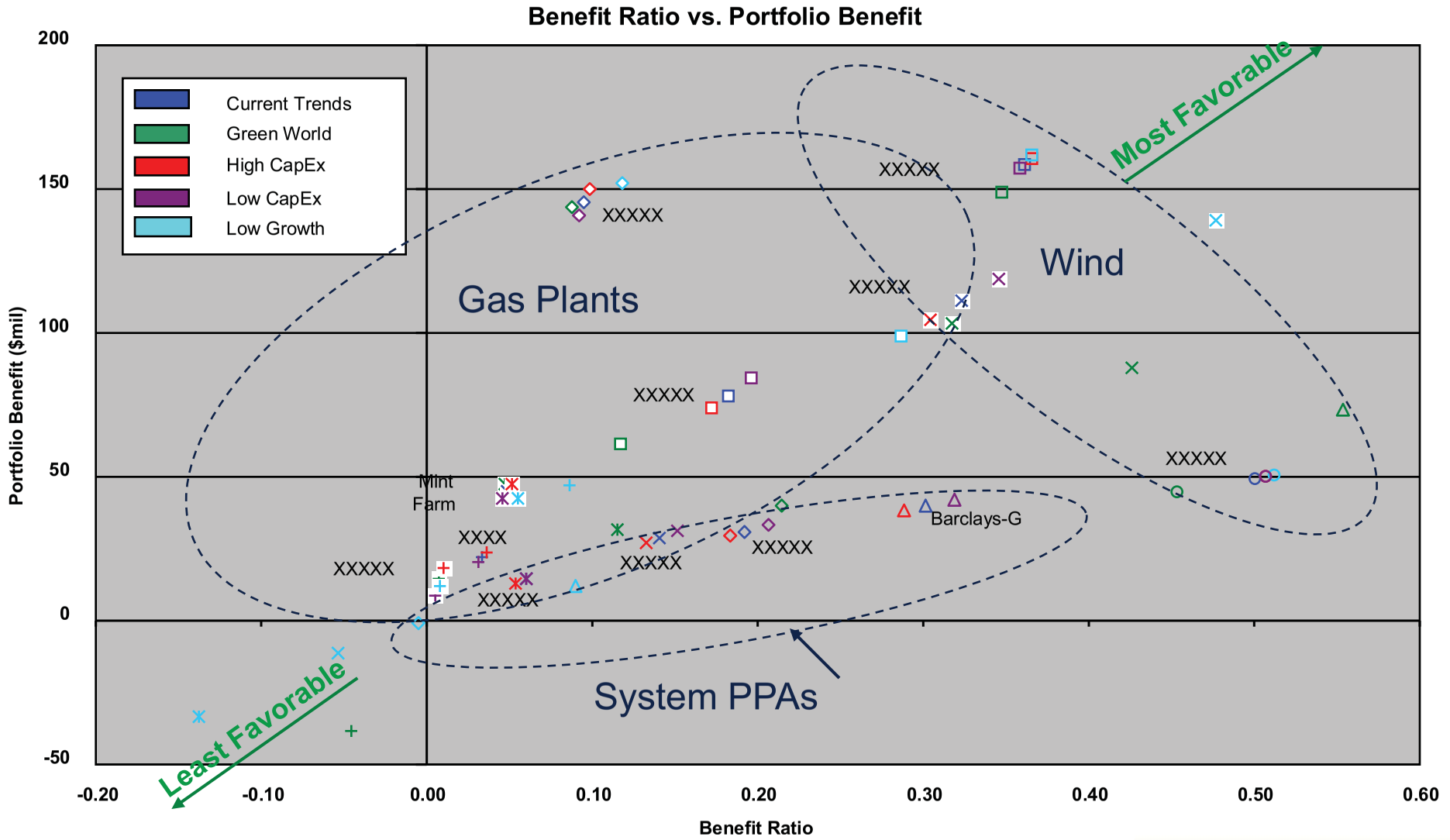
***Portfolio benefit*** is the 20-year present value of all portfolio benefits + end effects derived from each project in comparison to the 2007 IRP generic portfolio.

***Portfolio benefit ratio*** is the present value of portfolio benefits divided by the present value of the project revenue requirements

**PSE Discount Rate 8.4%**

# Phase II Quantitative Evaluation

# Phase II – Individual Projects: Static Results

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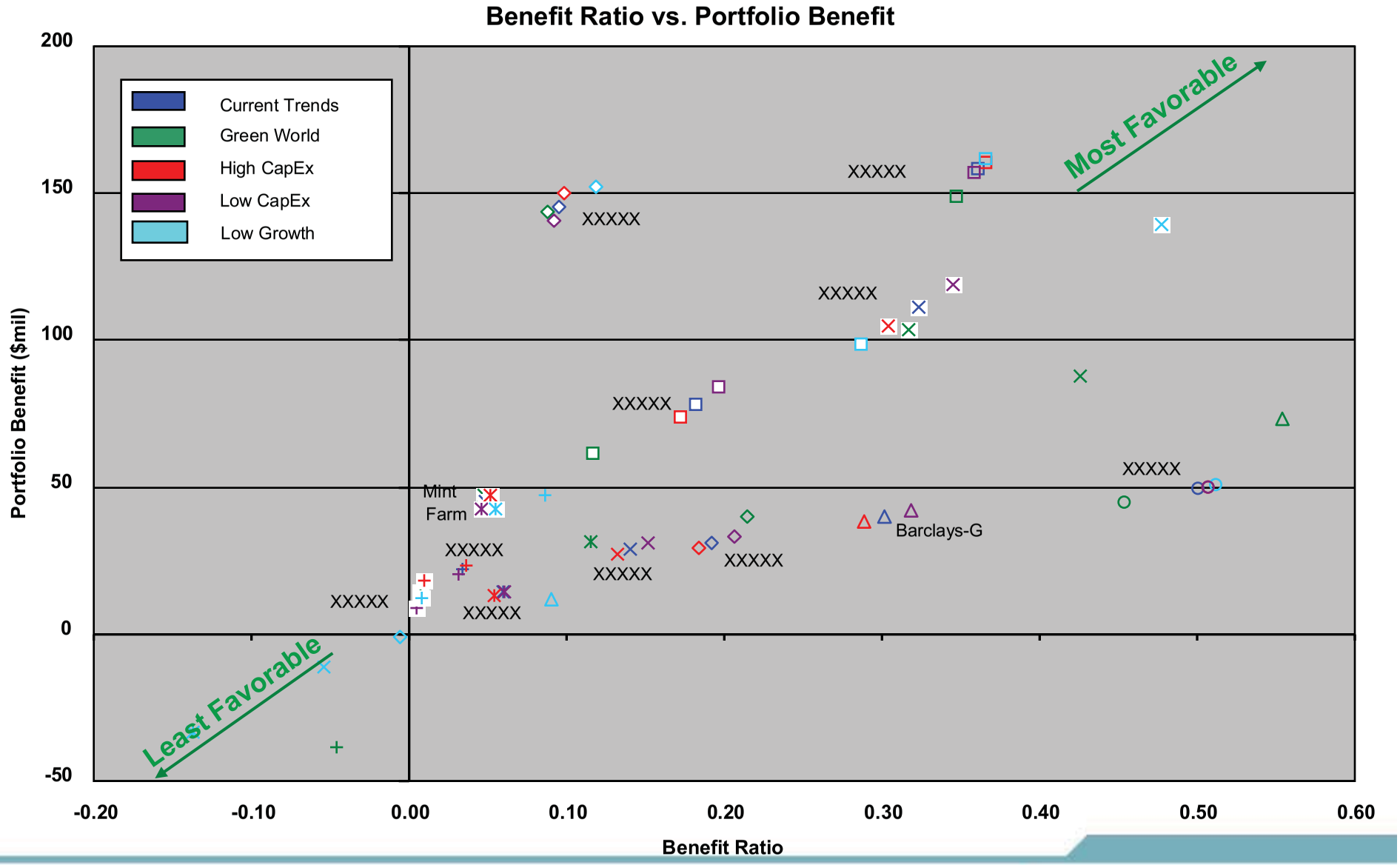
# Phase II – Individual Projects: Static Results

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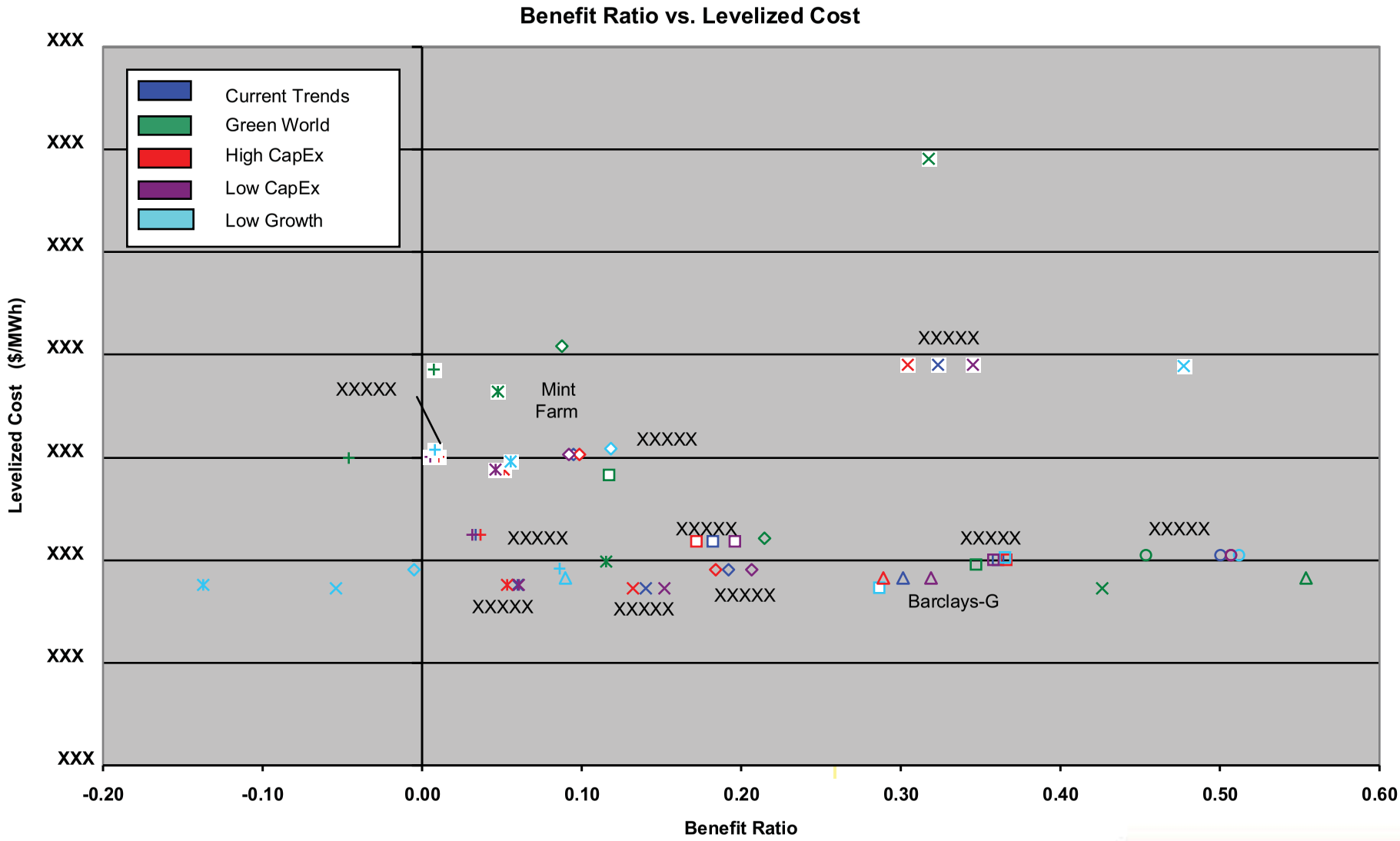
# Phase II – Individual Projects: Static Results

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# Phase II – Individual Projects: Levelized Cost

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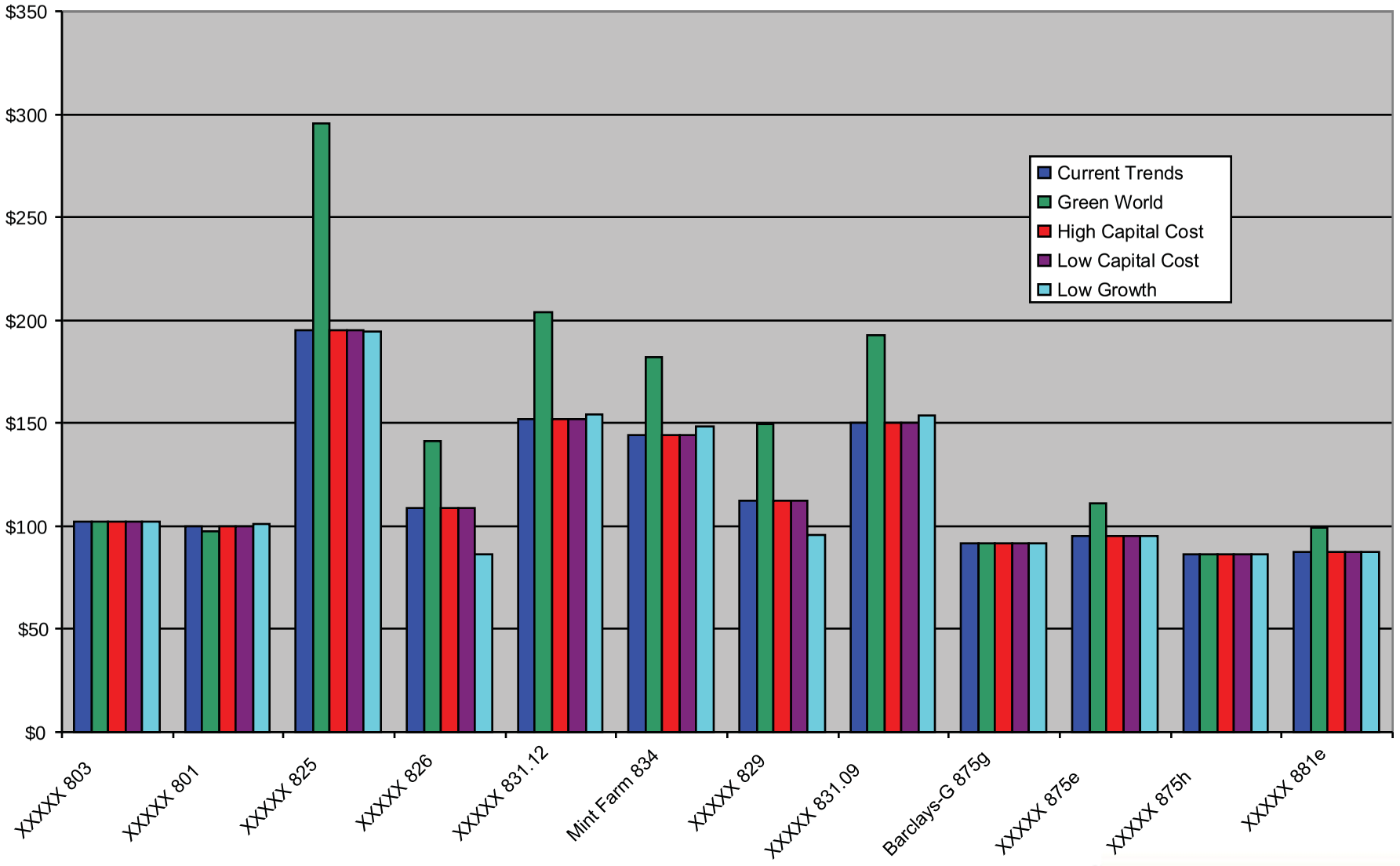




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# Phase II – Individual Projects: Portfolio Benefit

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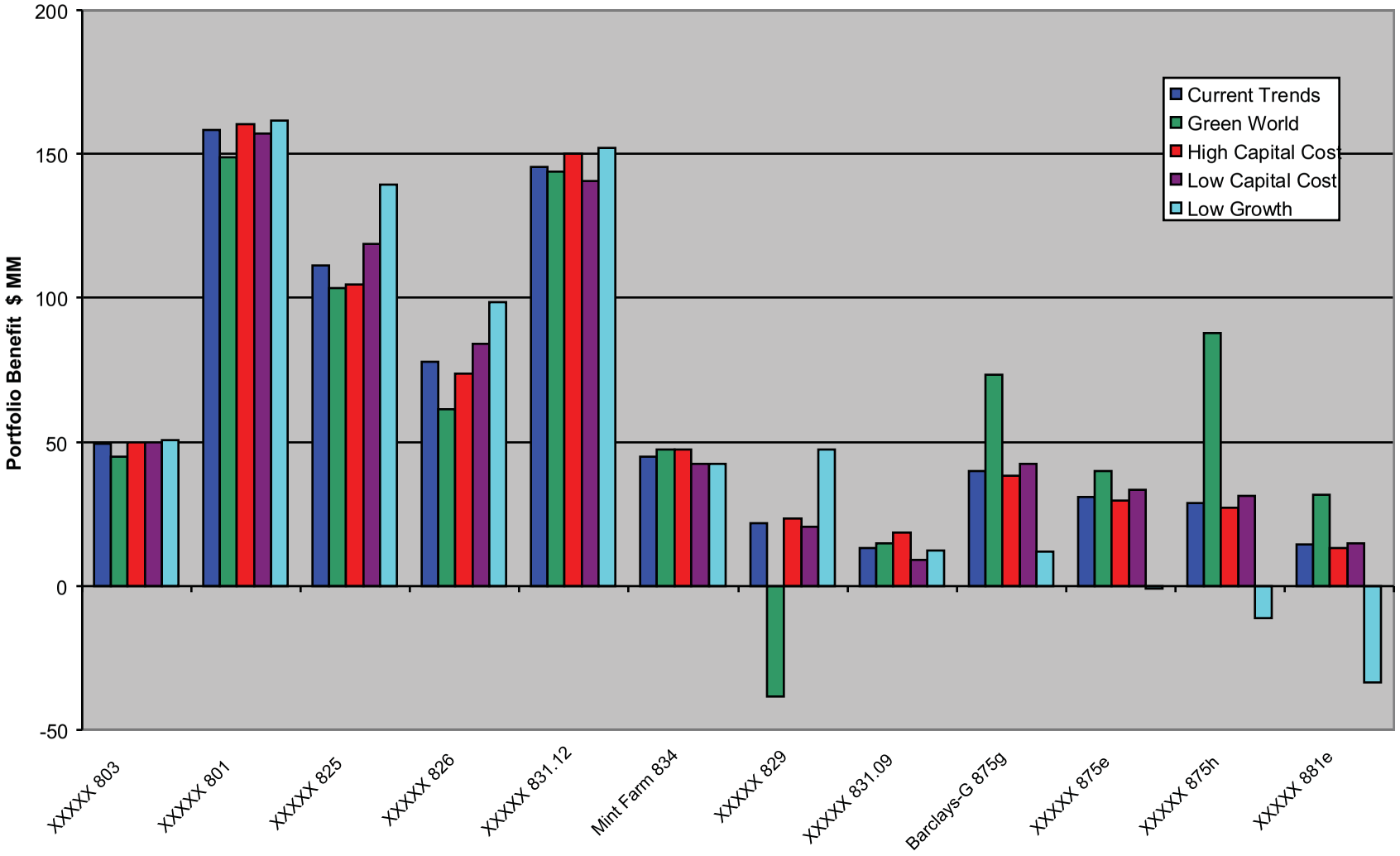




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# Phase II – Individual Projects: Benefit Ratio

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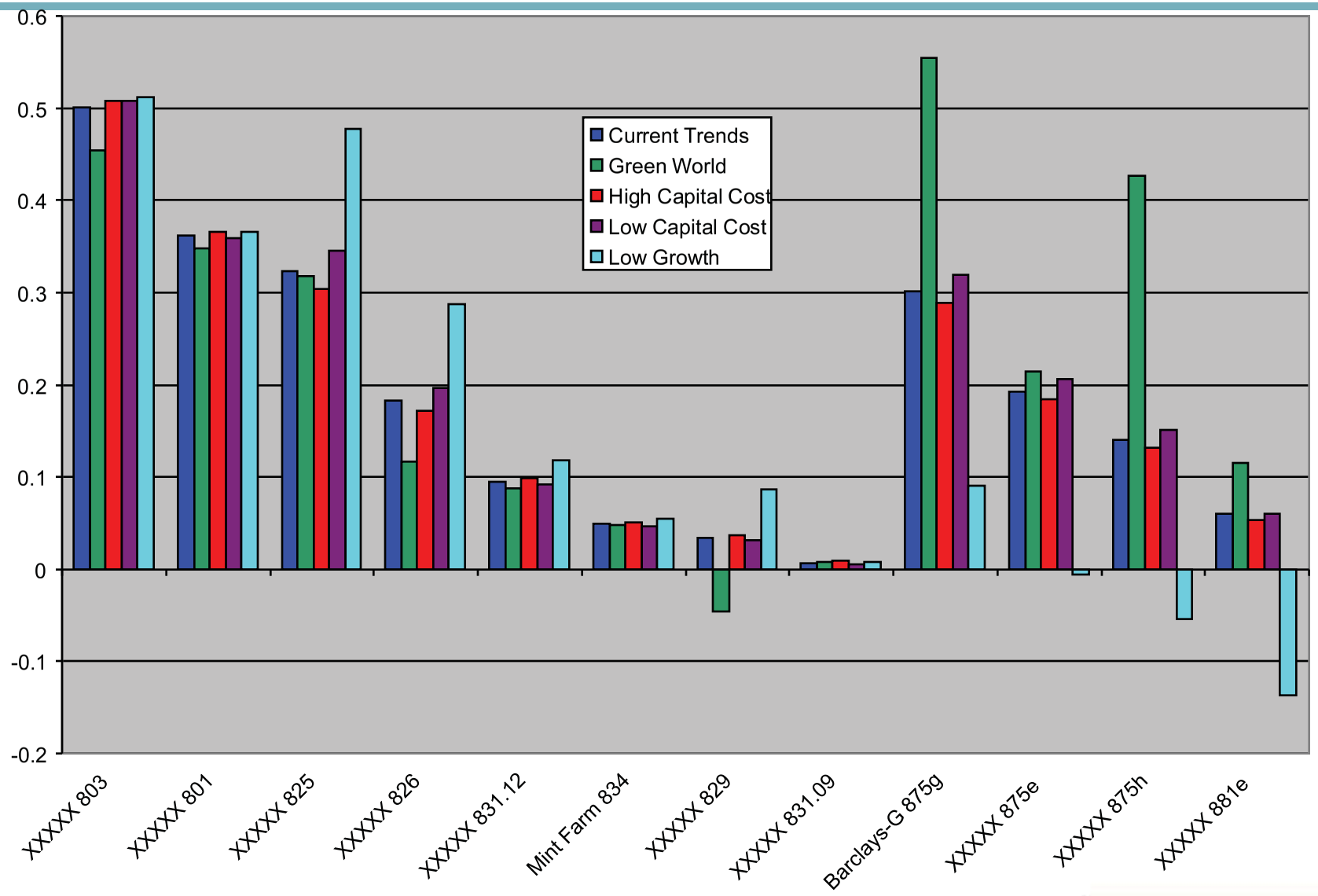




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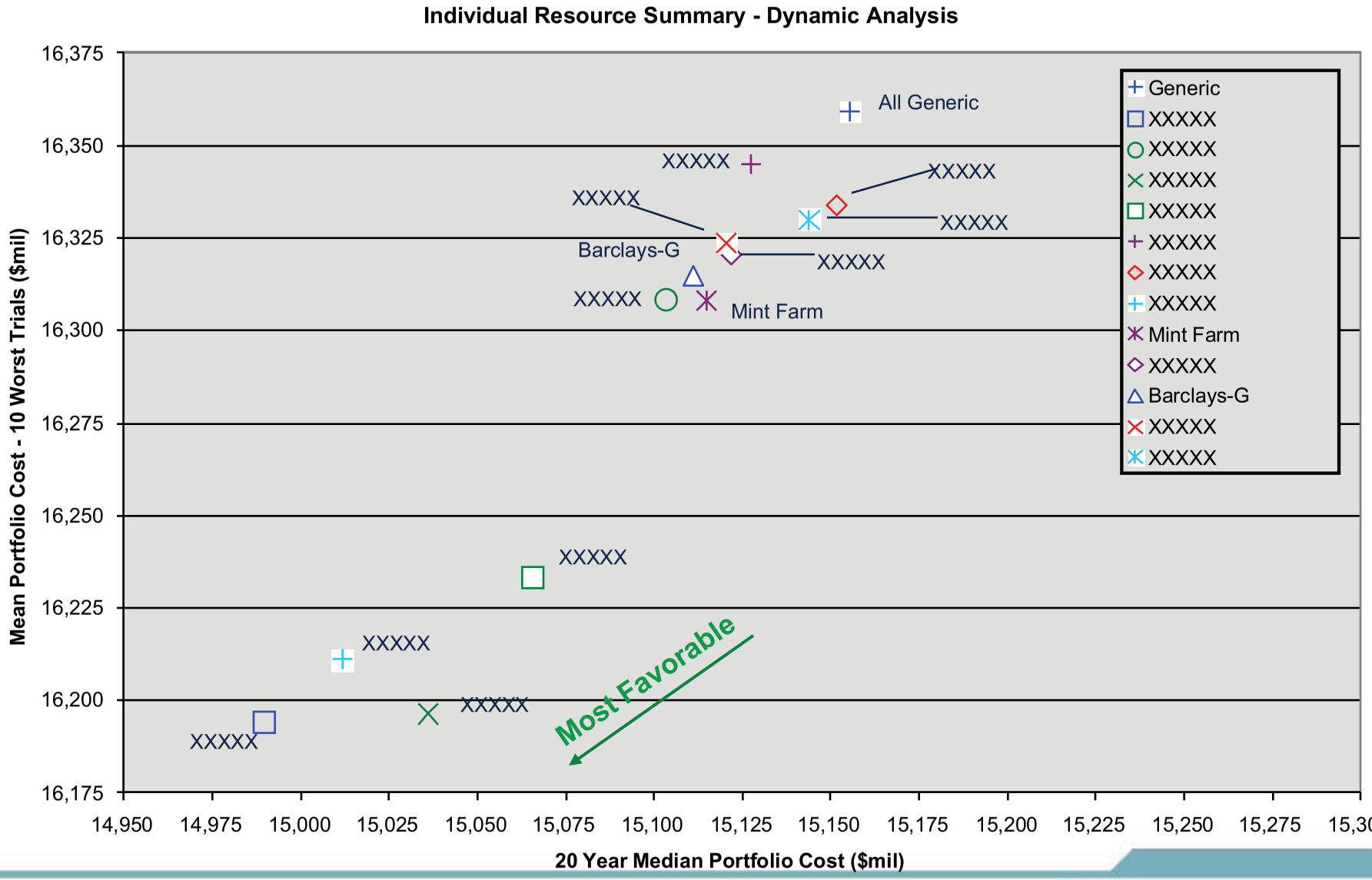
# Phase II – Individual Projects: Dynamic Results

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# Phase II – Portfolios: All Portfolios reduce cost

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| | Portfolios - Current Trends | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| | XXXXX XXXXX | XXXXX XXXXX | XXXXX XXXXX | XXXXX XXXXX | XXXXX XXXXX | XXXXX XXXXX | XXXXX XXXXX | XXXXX XXXXX | XXXXX XXXXX |
| | XXXXX XXXXX | XXXXX XXXXX | XXXXX XXXXX | XXXXX XXXXX | XXXXX XXXXX | XXXXX XXXXX | XXXXX XXXXX | XXXXX XXXXX | XXXXX XXXXX |
| | Mint Farm Own 2009 | | Mint Farm Own 2009 | Mint Farm Own 2009 | | Mint Farm Own 2009 | | | Mint Farm Own 2009 |
| | XXXXX XXXXX | XXXXX XXXXX | | | XXXXX XXXXX | | | | |
| | | XXXXX | XXXXX | XXXXX | | | XXXXX | XXXXX | |
| | | | | Barclays 4.5yr PPA | | | Barclays 4.5yr PPA | | Barclays 4.5yr PPA |
| **Total Cost ($bil)** | $14.9 | $14.8 | $15.0 | $14.9 | $15.0 | $15.1 | $15.0 | $15.0 | $15.0 |
| **Levelized Cost ($/MWh)** | $XXX | $XXX | $XXX | $XXX | $XXX | $XXX | $XXX | $XXX | $XXX |
| **Portfolio Benefit ($MM)** | $406.1 | $492.7 | $372.6 | $406.9 | $362.8 | $261.8 | $363.1 | $328.8 | $305.1 |
| **Benefit Ratio** | 0.14 | 0.20 | 0.21 | 0.21 | 0.18 | 0.18 | 0.36 | 0.37 | 0.19 |

- Portfolio 9 is the RFP 2008 Shortlist
- Portfolio 20-year NPV total costs range from $14.8 Billion to $15.1 Billion, a difference of less than 2%.(1)
- Variation of Portfolio Benefit across portfolios is less than $231 million over 20 years.

(1) 20-year NPV total costs are the fixed and variable costs of the all new resources in the portfolio and only the variable costs of the existing resources.



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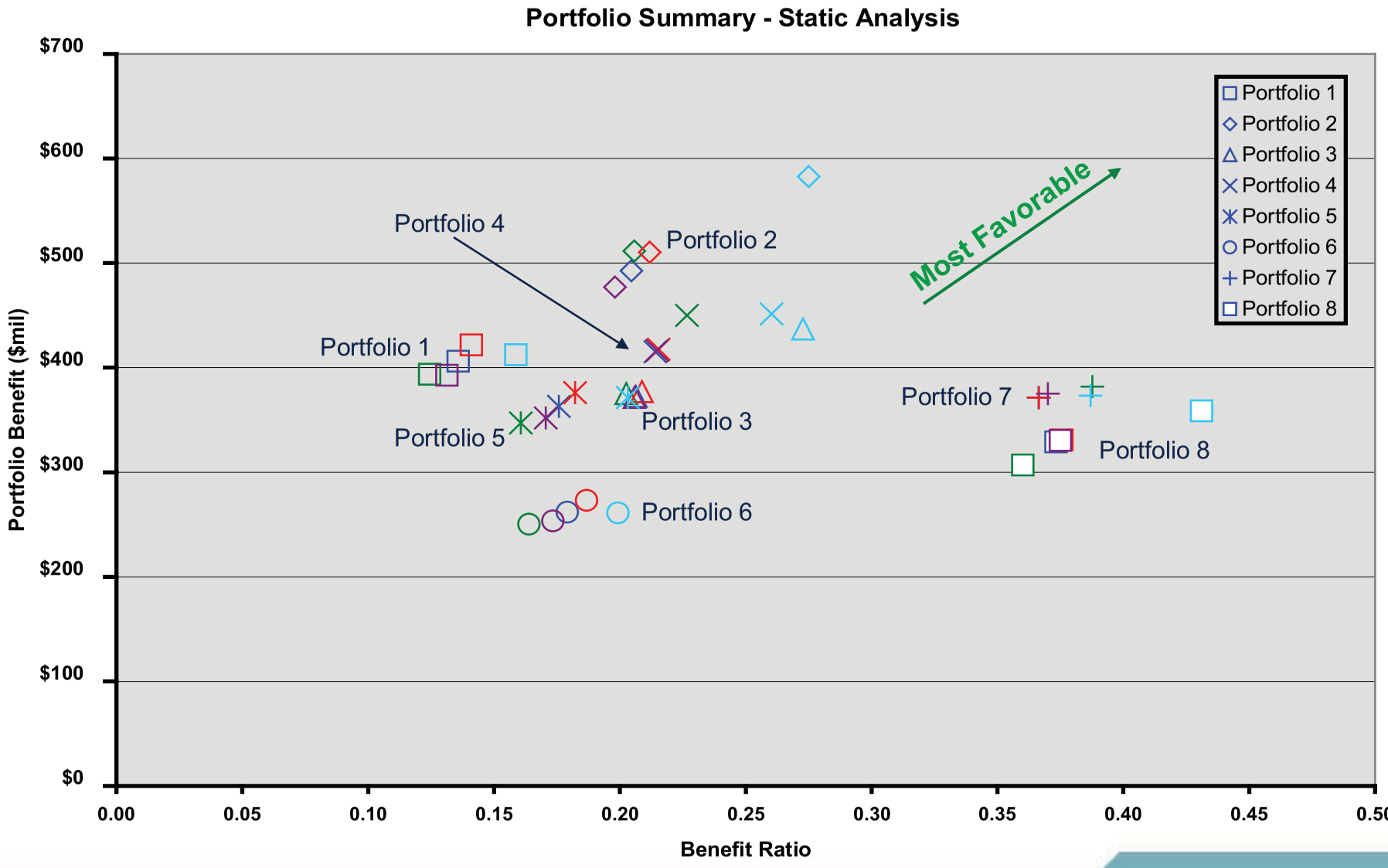
# Phase II – Portfolios: Static Results



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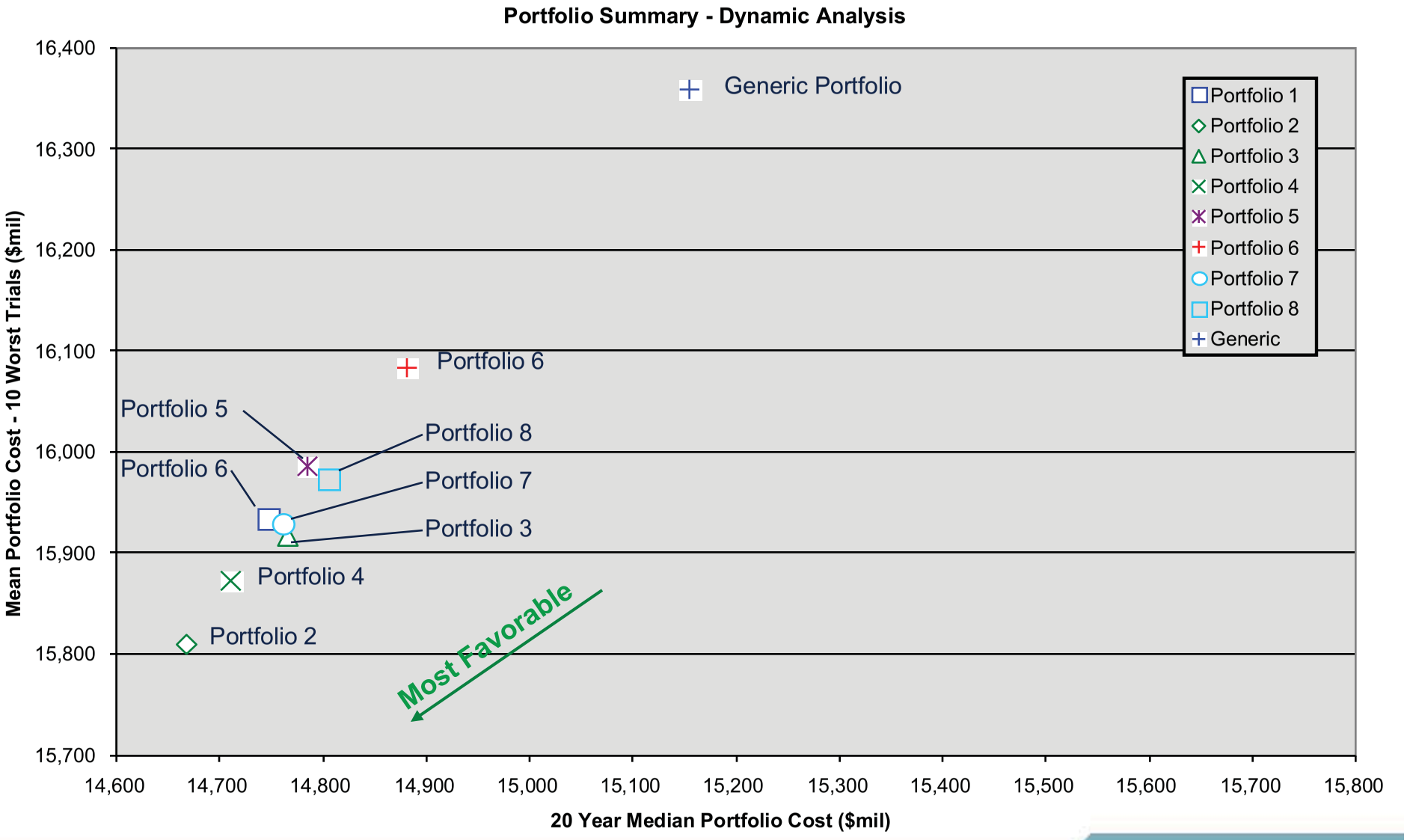
# Phase II – Portfolios: Dynamic Results



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# Phase II: Portfolio 3 in the Need Chart

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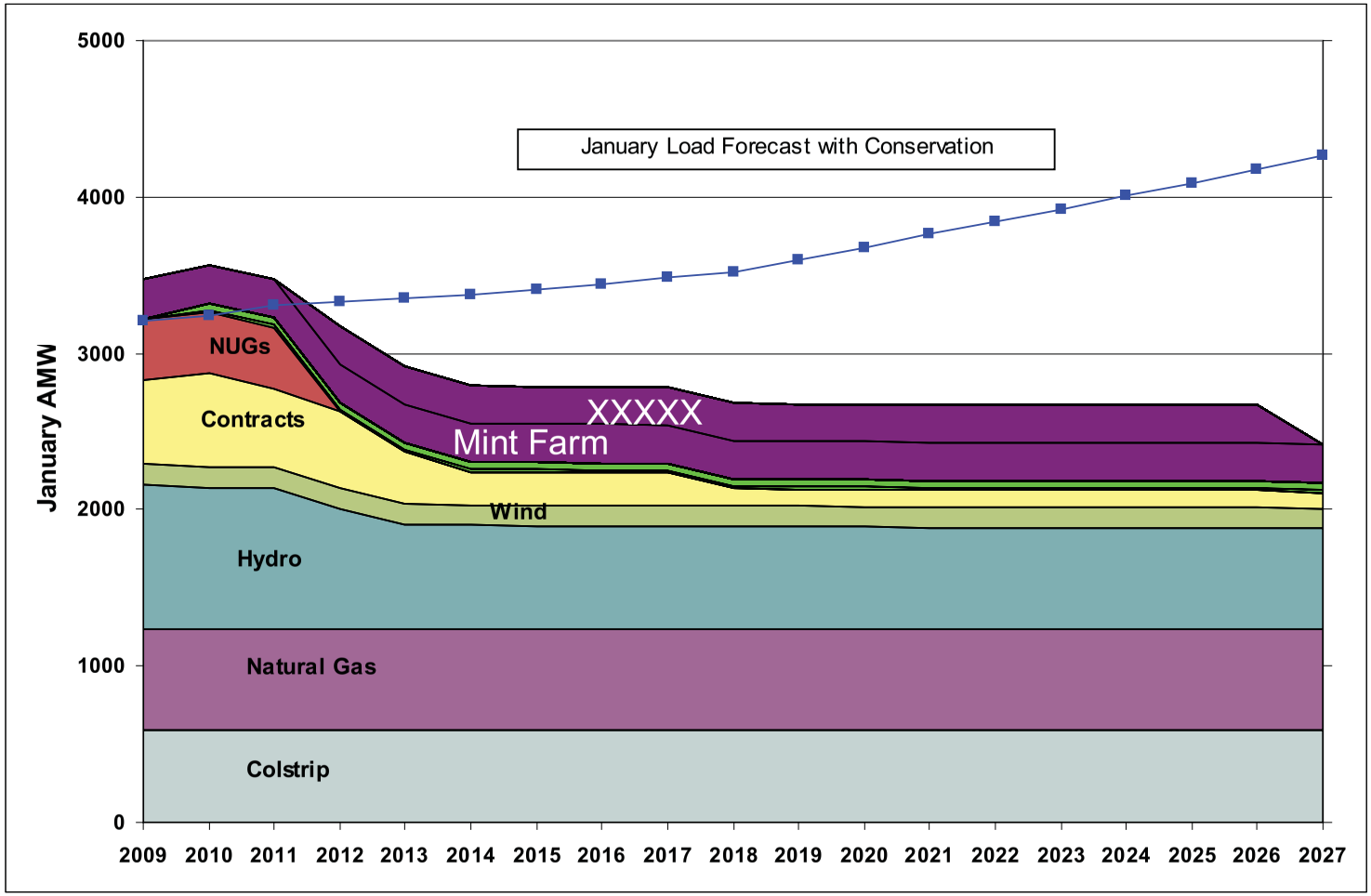




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# Phase II: Portfolio 2 in the Need Chart

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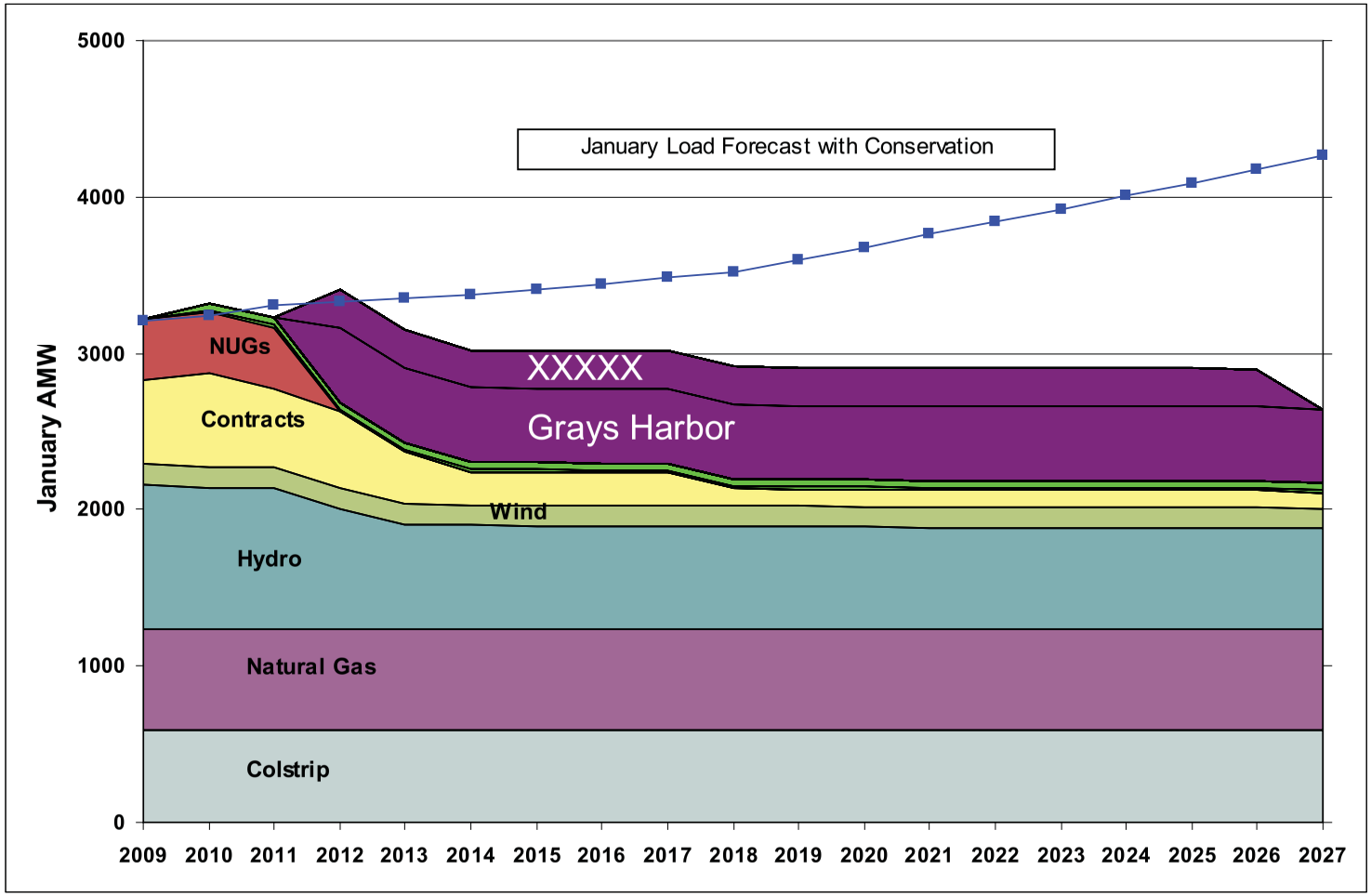

# Phase II: Portfolio 8 in the Need Chart

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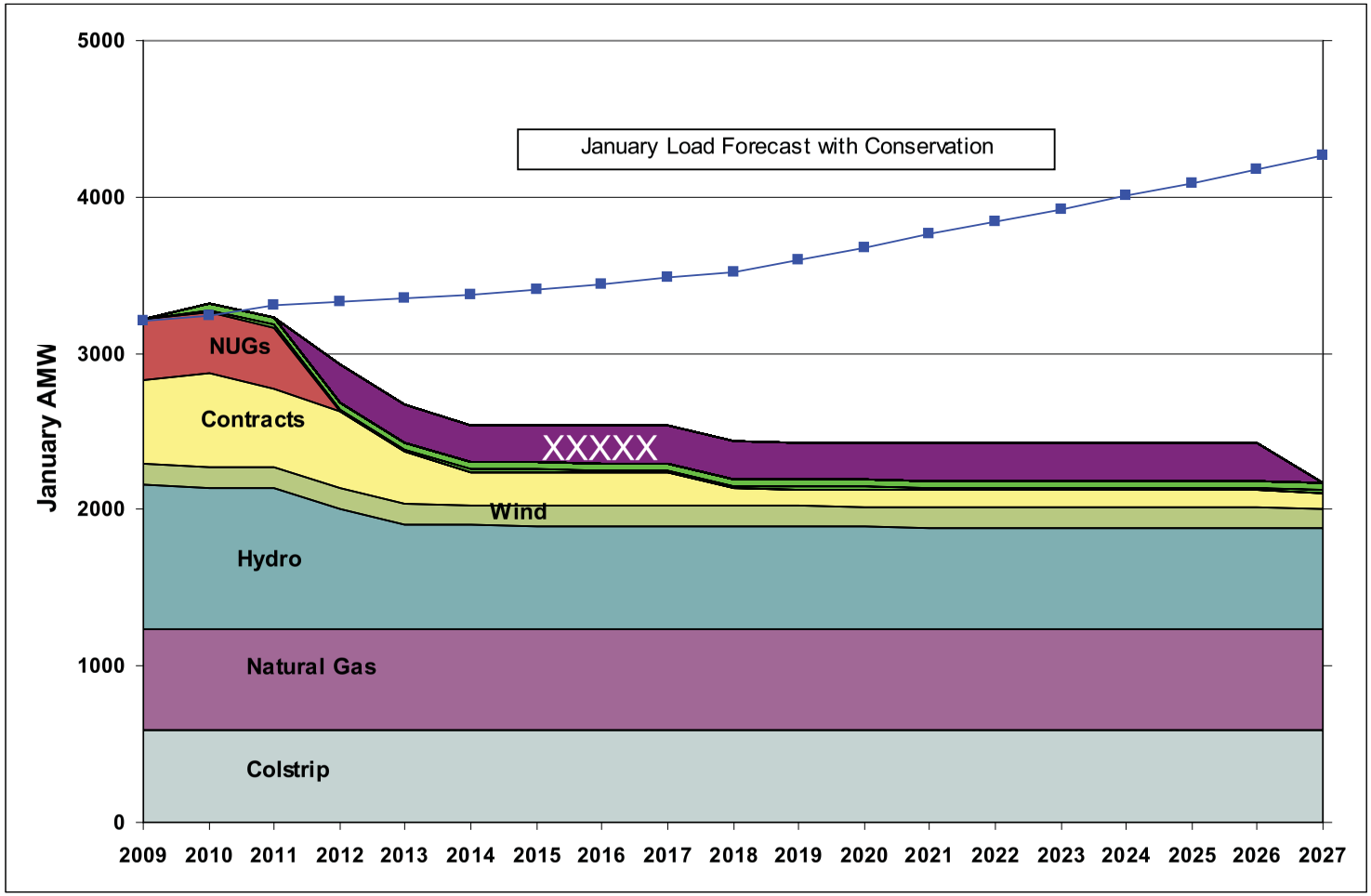




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# Summary Ranking - Wind Projects

| Code | Project Name | MW | Overall Ranking | Supporting Comments / Summary Findings | Levelized Cost Rank | Benefit Ratio Rank | Portfolio Benefit Rank | Scenario Dispersion Rank | Dynamic Analysis Rank |
|---|---|---|---|---|---|---|---|---|---|
| 801 | XXXXX | XXX | XXXX | XXXXX XXXXX | Best | Best | Best | Best | Best |
| 803 | XXXXX | XXX | XXXX | XXXXX XXXXX | Best | Best | Better | Best | Good |
| 804 | XXXXX | XXX | Offer withdrawn. | | | | | | |
| 809 | XXXXX | XXX | Offer withdrawn. | | | | | | |
| 809 | XXXXX | XXX | Offer withdrawn. | | | | | | |

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| KEY | |
|---|---|
| Best | Most Favorable |
| Better | Favorable |
| Good | Less Favorable |



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# Summary Ranking - Gas Projects

| Code | Project Name | MW | Overall Ranking | Supporting Comments / Summary Findings | Levelized Cost Rank | Benefit Ratio Rank | Portfolio Benefit Rank | Scenario Dispersion Rank | Dynamic Analysis Rank |
|---|---|---|---|---|---|---|---|---|---|
| 825 | XXXXX XXXXX | XXX | Medium | XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX | Good | Best | Best | Good | Best |
| 826 | XXXXX XXXXX | XXX | Low | XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX | Best | Better | Good | Good | Best |
| 829 | XXXXX XXXXX | XXX | Medium | XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX | Best | Good | Good | Good | Good |

REDACTED VERSION

KEY

| | |
|---|---|
| Best | Most Favorable |
| Better | Favorable |
| Good | Less Favorable |



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# Summary Ranking - Gas Projects Cont.

| Code | Project Name | MW | Overall Ranking | Supporting Comments / Summary Findings | Levelized Cost Rank | Benefit Ratio Rank | Portfolio Benefit Rank | Scenario Dispersion Rank | Dynamic Analysis Rank |
|---|---|---|---|---|---|---|---|---|---|
| 831 | XXXXX XXXXX | XXX | Low | XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX | Better | Good | Good | Best | Good |
| 831 | XXXXX XXXXX | 626 | High | XXXXX XXXXX XXXXX XXXXX | Better | Good | Best | Best | Best |
| 834 | Mint Farm Energy Center | 310 | Medium | Rates better than a generic gas. Moderate size makes us long in the near term. Resource Additions are lumpy length, at some point in time may be inevitable. | Better | Good | Good | Best | Good |

REDACTED VERSION

KEY

| | |
|---|---|
| Best | Most Favorable |
| Better | Favorable |
| Good | Less Favorable |



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# Summary Ranking - System PPAs

| Code | Product Name / Description | MW | Ranking | Supporting Comments / Summary Findings | Levelized Cost Rank | Benefit Ratio Rank | Portfolio Benefit Rank | Scenario Dispersion Rank | Dynamic Analysis Rank |
|---|---|---|---|---|---|---|---|---|---|
| 875e | XXXXX XXXXX | XXX | Low | XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX | Best | Better | Good | Good | Good |
| 875g | Fixed Price PPA, 4 yr, winter, ATC | 25-275* | Medium | Structure fits with our need. Competitive market pricing at time of bid. Will be repriced to current market and will change ranking results. Offers price certainty | Best | Best | Good | Good | Good |
| 875h | XXXXX XXXXX | XXX | Medium | XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX | Best | Better | Good | Good | Good |
| 881e | XXXXX XXXXX | XXX | Low | XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX | Best | Good | Good | Good | Good |

REDACTED VERSION

| KEY | |
|---|---|
| Best | Most Favorable |
| Better | Favorable |
| Good | Less Favorable |



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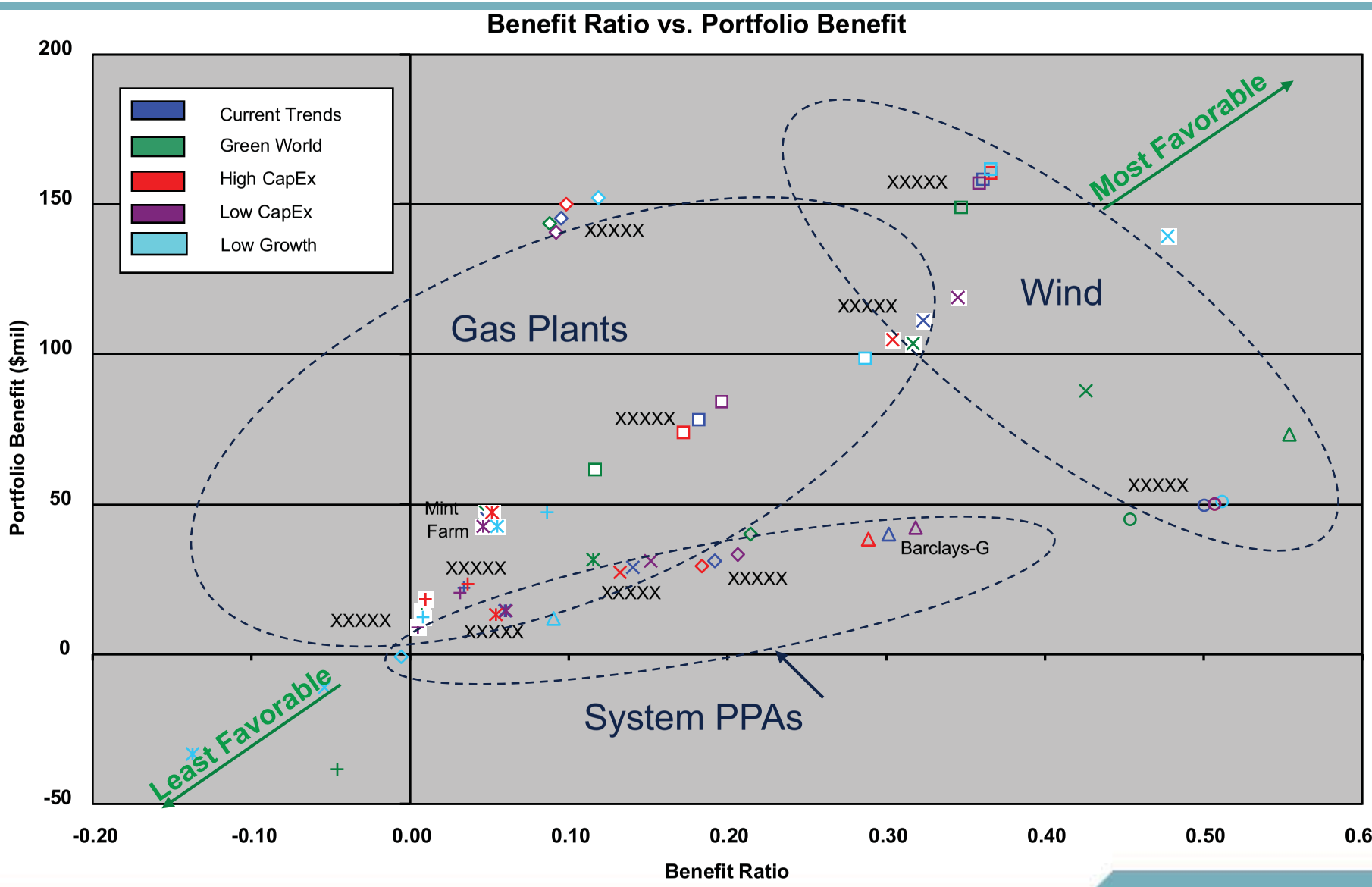
# Results

# All projects are favorable, need to look at risk

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# Key Takeaways

- Quantitatively, everything on the Phase I Candidate Short List evaluated favorably
- Qualitative analysis of risks and benefits complements the quantitative evaluation
- Projects selected for the Final Short List are executable and minimize risk

# RFP Results - Final Selections*

## Final Short List

| Project | Owner /Developer | Location | MW | Levelized Cost $/MWh | Portfolio Benefit $MM | Benefit Ratio | Status | Commercial Operation Date |
|---|---|---|---|---|---|---|---|---|
| XXXXX XXXXX | XXXXX | XXXXX | XXX | $XXX | $49.31 | 0.50 | XXXX | XXXX |
| XXXXX XXXXX | XXXXX | XXXXX | XXX | $XXX | $158.30 | 0.36 | XXXX | XXXX |
| Mint Farm Energy Center CCCT (ownership) | Wayzata Investment Partners | Longview, WA | 310 | $XXX | $44.97 | 0.05 | Operating | 2009 |
| Fixed Price PPA, 4-year, winter, ATC | Barclays Bank PLC | n/a | 25-275* | $XXX | $39.97 | 0.30 | ATC | 11/1/2011 to 3/31/2015 |

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## Continuing Investigation List

| Project | Owner /Developer | Location | MW | Levelized Cost $/MWh | Portfolio Benefit | Benefit Ratio | Status | Commercial Operation Date |
|---|---|---|---|---|---|---|---|---|
| XXXXXX XXXXX | XXXXX | XXXXX | XXX | $XXX | $111.36 | 0.32 | XXXXX | XXXXX |
| XXXXX XXXXX | XXXXX | XXXXX | XXX | $XXX | $21.90 | 0.03 | XXXXX | XXXXX |
| XXXXX XXXXX | XXXXX | XXXXX | XXX | $XXX | $145.48 | 0.10 | XXXXX | XXXXX |

*Does not include PSE development projects that did not come through the RFP projects.



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