Final Report Under Senate Bill 400: Options for Re-Regulation and New Generation

Maryland Public Service Commission

December 16, 2008

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Senate Bill 400

- "The Public Service Commission shall conduct hearings, including the use of any necessary outside experts and consultants, to study and evaluate the status of electric restructuring in the State as it pertains to the current and future availability of competitive generation to residential and small commercial customers and the structure, procurement, terms and conditions of standard offer service for residential and small commercial customers."
  - "In its evaluation, the Commission shall consider changes that are necessary to provide residential and small commercial customers the benefit of a reliable electric system at the best possible price, including options for re-regulation, if advisable…."
  - "Among other considerations, the Commission shall consider the implications of… (1) requiring or allowing investor-owned electric companies to purchase electricity by competitive or negotiated contracts of various durations… [and] (2) requiring or allowing investor-owned utilities to construct, acquire or lease peak-load or other generating plants and associated transmission lines…."

Interim Report – December 1, 2007

- Defined and analyzed “re-regulation” options and discussed “re-regulation” experiences of other states
- Articulated Commission’s commitment not to rely entirely on market forces to serve Maryland’s electricity needs
- Modeled economic benefits of various “re-regulation” options, including long-term contracts, under then-present market conditions

Final Report – December 10, 2008

- Updates legal and economic analyses of “re-regulation” options and other States’ experiences
- Updates Interim Report’s analyses – but assumptions and data were locked in before recent credit crisis and unprecedented decline in oil and natural gas prices
- Updates analysis of wind options to reflect the BlueWater contract and updated operational data, and performed a separate analysis of solar
- Given increased interest in returning to rate base, models a hypothetical return to rate base regulation and economic impacts in Pepco service territory

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"Re-regulation"

- "Re-regulation," as used in the Report, encompasses the full range of possible Commission or legislative responses to the markets' failure to ensure reliable, cost-effective electricity supply
- In that sense, Maryland re-regulated in Senate Bill 1 (2006 Special Session) and the Commission has re-regulated incrementally since 2007
  - Demand response and energy efficiency programs
  - Gap RFP case
  - Wholesale markets advocacy at PJM and FERC which controls 80% of typical electric customer's bill
  - Future generation
  - Authority to order or allow IOUs to build or acquire generation

"Re-regulation"

- Three reasons (not mutually exclusive) to "re-regulate" to some degree
  - Reliability – if markets do not deliver the generation, transmission or demand response Maryland needs to ensure a reliable supply
  - Economics – if markets do not deliver resources that would reduce prices and rates and bring benefits to ratepayers
  - Policy – to incent resources (*e.g.*, new generation or renewables) the markets won't deliver *or* to change policy direction

Final Report – Main Conclusions

- The Commission cannot recommend that the legislature seek to return the existing generation fleet to full cost-of-service regulation
  - Costs, risks and likely disruption are too great and too serious
- Instead, we recommend incremental, forward-looking re-regulation when appropriate to ensure a reliable supply of electricity or to obtain economic benefits to ratepayers
  - In light of existing authority to require Maryland IOUs to build, own, and operate plants under cost-of service regulation, we will consider whether future generation additions should be subject to cost-of-service regulation
- The General Assembly should not limit the Commission's options for obtaining new generation
  - Any legislative initiatives should enhance flexibility, particularly in these volatile times, not proscribe options

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Final Report – Main Conclusions

- Maryland still faces **real reliability challenges** in 2011-12, but that picture has improved
  - In early 2008, Commission approved several demand response programs proposed by the utilities, such as BGE's Peak Rewards program, which resulted in 495 MW of demand response offered into PJM's capacity market for 2011/2012
  - Gap RFP case under way, incremental demand response and distributed generation ordered, more to come
  - TrAIL line has progressed, may arrive in time to help, but is not a long-term panacea unto itself
  - EmPower Maryland programs, once approved, may reduce demand and consumption
  - Broader economic downturn may independently be motivating people to reduce usage

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Final Report – Main Conclusions

- Maryland ratepayers would reap economic benefits from additional capacity—new generation or demand side resources
  - Accordingly, we will investigate in 2009 whether and on what terms to build additional generation in Maryland
  - The economic benefits from utility construction of new generation are roughly equivalent to long-term purchase power agreements – the difference lies in the cost of capital, which favors slightly utility ownership
  - The "overbuild" scenario reveals some additional value, but not nearly enough incremental benefit to offset the much greater cost and risk associated with sustaining the extra capacity
  - Demand response and energy efficiency offer the best overall savings opportunities for participants and non-participants alike

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Final Report – Main Conclusions

- The economic benefits from renewables remain uncertain and challenging
  - Onshore wind yields net economic benefits, albeit on a small scale
  - Offshore wind as modeled does not yield economic benefits
  - The overall economics of solar remain negative, but could improve if technology progresses much faster than contemplated in the study and various financial incentives continue over the long term

Final Report – Main Conclusions

- Advocacy at PJM and FERC continues to be important and beneficial
  - Wholesale markets will continue to dictate a significant portion of electric customers' bills under any re-regulation approach
  - PSC initiatives to date have affected PJM's energy and capacity markets
    - PSC complaint eliminated bid cap exemptions in PJM's energy market
    - Pending complaint seeks $12 billion rollback in transition capacity charges for all of PJM through May 2012
    - Pending proceeding seeks to maintain restrictions on generators' ability to exercise market power in PJM's energy market

Final Report – Assumptions

- The Reference Case – same fundamental approach as Interim Report, including addition of market-driven peaking units, but updates data, including fuel costs, capacity prices and projections, and DSM programs
  - The Reference Case is the baseline for determining the relative benefits of other strategies
- Return to economic normalcy – recognition of historically volatile current conditions
- Offshore wind modeled based on BlueWater contract with Delmarva Power in Delaware and updated operational data

The Reference Case

- Assumes **compliance with PJM reliability rules** and addition of "just-in-time" generation whenever needed to maintain grid reliability
- Assumes **25% achievement of EmPower Maryland objectives through 2015**, based on utility filings approved by or pending before the Commission (and contrasts, in DSM case, benefits of 100% achievement)
- Assumes the **TrAIL line is in service by the second quarter of 2014**
- Assumes a **federal cap-and-trade program** governing the cost of CO2 emissions from fossil power plants commencing in 2014; between 2009 and 2013, assumes that the CO2 emissions are regulated only in the RGGI states in the study region.
- Assumes the addition of **renewable generation units** across PJM based on each state's RPS requirements, available wind resources, and transmission infrastructure – adds 100 MW of onshore wind projects, *i.e.*, Synergics Eastern Wind Energy and Synergics Roth Rock Wind, and satisfies the remainder of Maryland's RPS requirement from out-of-state purchases of renewable energy, RECs, or the Alternative Compliance Payment ("ACP")
- Assumes that Maryland's **solar RPS requirements are fulfilled** over the study period through installation of photovoltaic cells on customer sites, a substantial refinement over the treatment of solar energy resources and the economics of photovoltaic investments in the Interim Report

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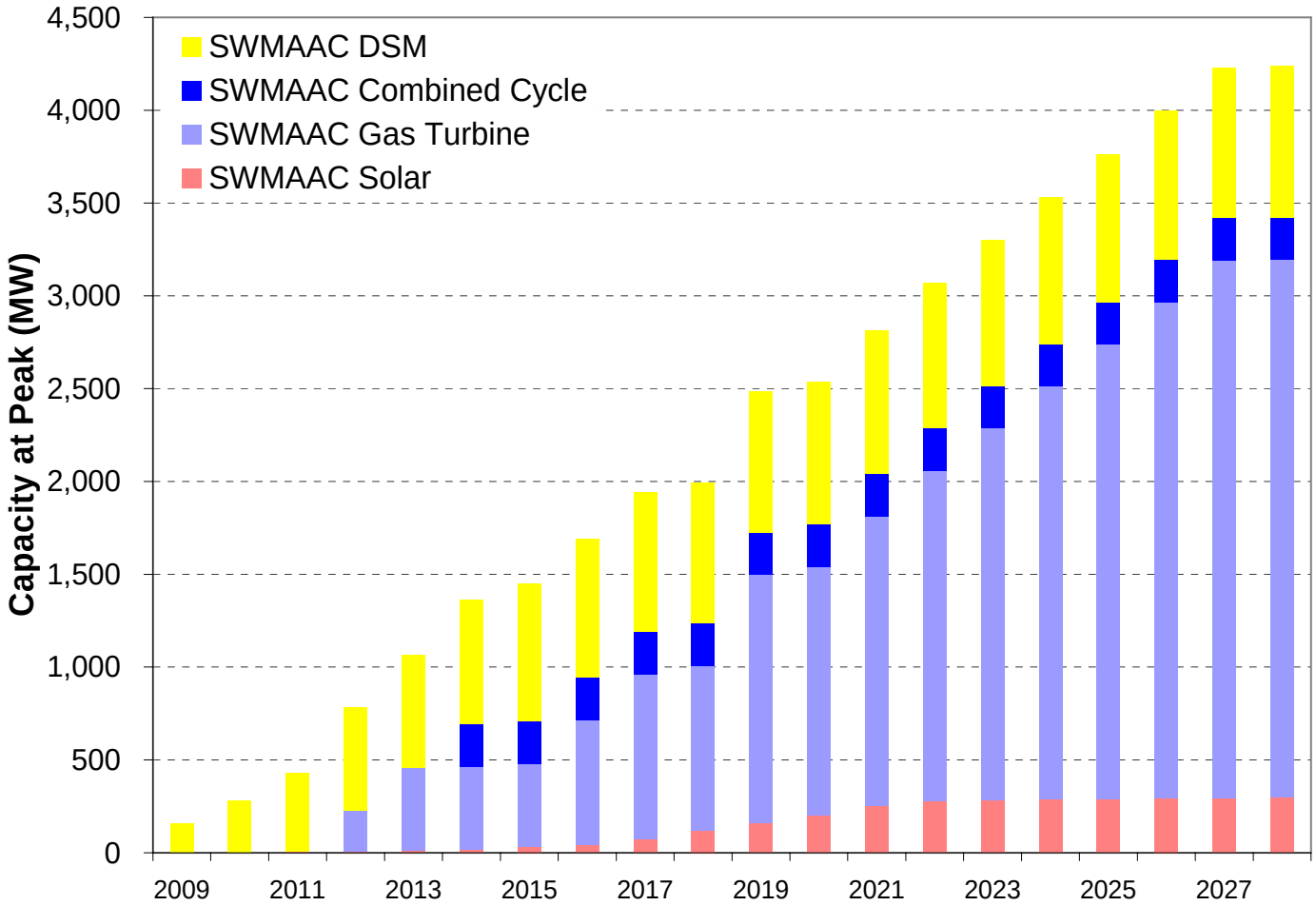
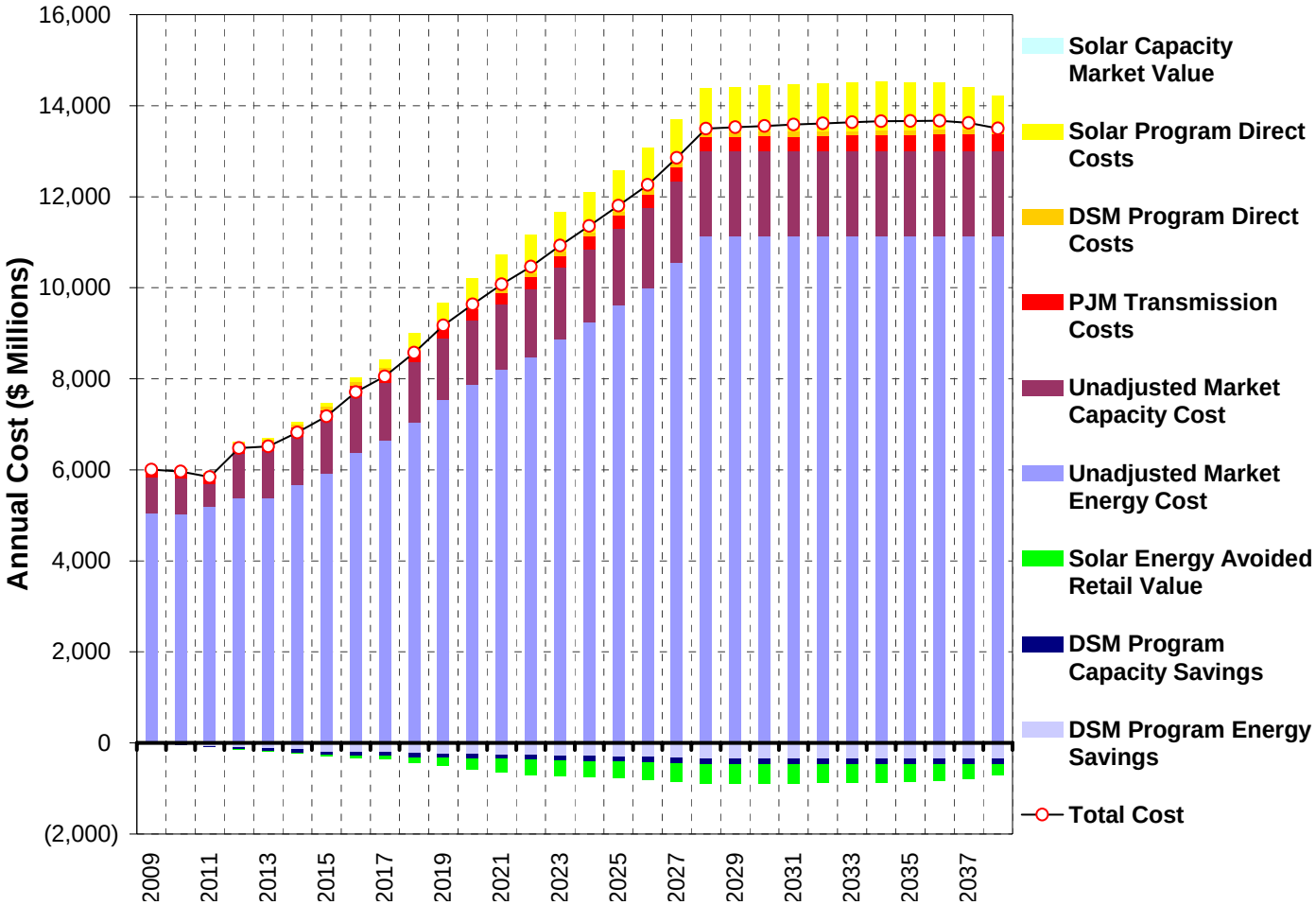
Capacity Additions Required in SWMAAC to Maintain Reliability through 2028



Annual Costs of Reference Case



Cases Studied

- The ***Contract CC Case*** assumes that the utility enters into a 20-year power purchase agreement to purchase 1,080 MW of efficient, state-of-the-art combined cycle technology, with a 10-year renewal option unilaterally exercisable by the utility, with in-service dates in 2012.
- The ***Utility CC Case*** assumes the same 1,080 MW of incremental capacity as the *Contract CC Case*, but assumes that the units are owned by the utility.
- The ***Overbuild Case*** assumes 1,080 MW of gas-fired combined cycle units in excess of the SWMAAC requirement are added to the resource mix under long-term contracts with the IOUs and that surplus is sustained by contracts with peaking units.
- The ***15x15 DSM Case*** assumes that the EmPower Maryland goals are realized in full by 2015.

Cases Studied

- The ***Onshore Wind Case*** assesses the merit of 200 MW (nameplate) of new onshore wind plants constructed in western Maryland. From 2011 to 2015, 40-MW projects are added each year in the APS zone.
- The ***Offshore Wind Case*** assumes that a 500 MW (nameplate) wind project is constructed offshore and in service in 2014, 300 MW of which would be purchased by Maryland's IOUs. The economic and operational benefits attributable to offshore wind reflect the provisions defined by BlueWater in its long-term PPA with Delmarva Power and Light, updated with more recent operational data.
- The ***Solar Case*** is an economic analysis of the benefits or disbenefits related to Maryland's mandatory solar RPS requirement. The *Reference Case* and all study cases postulate full compliance with the Maryland solar RPS through installation of 1-MW photovoltaic cells at commercial and industrial ("C&I") sites. The quantity assumed equates in 2015 to 45 MW of UCAP for reliability purposes.

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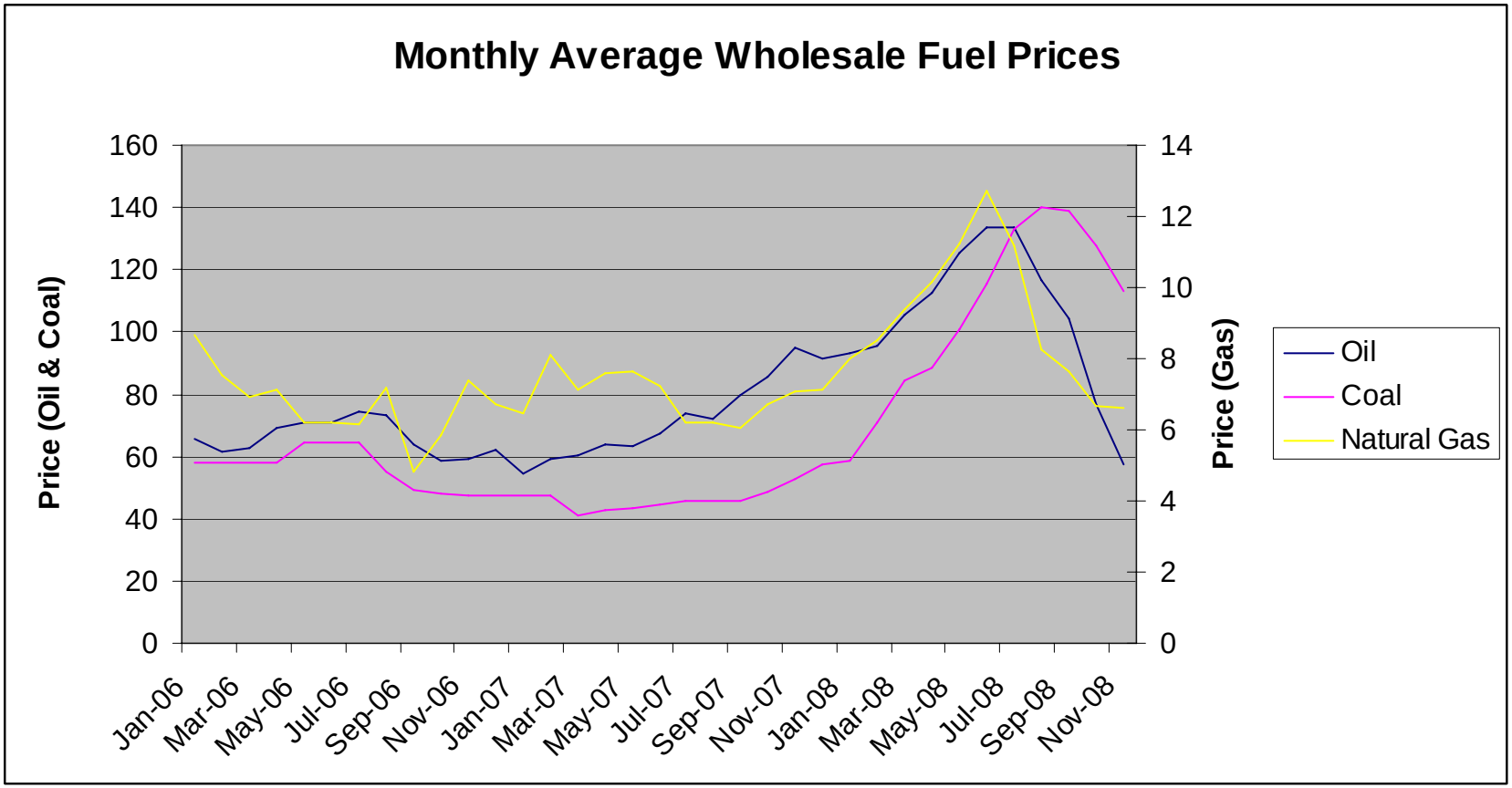
Cases Studied

- The ***Rate Base Regulation Case*** studies a hypothetical return to traditional cost of service regulation in Pepco's service territory
  - Computes the fair market value of Mirant's coal-, oil- and gas-fired generation assets, about 4,780 MW, then quantifies the resulting ratepayer benefits under traditional cost-of-service regulation
  - Assumes that the existing Mirant generation fleet in Maryland is acquired through condemnation or consensual negotiation
  - Evaluates two different ownership conditions:
    - Pepco ownership and operation, which involves taxable debt and equity at prices that are in general accord with the utility's weighted average cost of capital;
    - The formation of a not-for-profit state power Authority, which involves taxable debt for all or the majority of the Authority's capital requirements. Costs and benefits have been evaluated assuming cost of service regulation in Pepco's service territory over a 20-year horizon

Scenarios Applied to The Cases Studied

- The *Base Scenario* represents the external variable assumptions under which all policies and actions (cases) are evaluated. This assumes the *Conventional Wisdom* fuel price forecast, which was prepared in the summer of 2008, a time when oil prices briefly exceeded $145 per barrel and the global credit implosion had not yet occurred. Also included in the *Base Scenario* is the assumption that the Trans-Allegheny Interstate Line ("TrAIL") transmission project will be in-service by 2014, about three years after TrAIL's sponsors and PJM have indicated planned commercial operation
- Alternative scenarios:
  - The *Federal Outlook Scenario* assumes low fuel prices
  - The *Peak Oil Scenario* assumes high fuel prices
  - The *No TrAIL Scenario* assumes no new backbone transmission in PJM over the study horizon
  - The *TrAIL+PATH Scenario* assumes that TrAIL is commercialized in 2014 and the Potomac Appalachian Transmission Highline ("PATH") is commercialized one year later

Monthly Average Wholesale Fuel Prices



Oil: $/ Barrel; WTI Cushing, Oklahoma. Source: Velocity Suite.
Natural Gas: $/ MMBtu; Henry Hub. Source: Velocity Suite.
Coal: $/ Short Ton; Central Appalachia. Source: EIA.

Comparison – Economic Value Added

- Economic Value Added ("EVA") is the difference in cost of a particular re-regulation option relative to the Reference Case
  - The greater the EVA, the higher the net economic benefit to ratepayers in relation to the Reference Case
  - A negative EVA represents an increase in costs relative to the Reference Case, and therefore an additional cost to ratepayers

Return to Rate Base Regulation Case

- We cannot recommend legislation to return existing plants to cost-of-service regulation. The magnitude and uncertainty of the benefits, relative to the high cost of achieving the outcome, do not clearly warrant return to rate base regulation
  - We studied a return to rate base regulation for generation plants located in the Maryland portion of the Pepco service territory
  - The study valued only the impact of the cost of purchasing the assets under fair market value relative to ratepayer benefits (does not attempt to quantify complexities, substantial risks and potential additional costs related to accomplishing the transaction)
  - Because of the lower cost of capital assumed in the Authority ownership structure, that structure has a higher value than the IOU ownership structure
  - Absent other arrangements, benefits accrue only to the ratepayers in whose territory the generation plants that are returned to rate base regulation are located

Rate Base Regulation—What it Means

- Under rate base regulation, ratepayers bear all prudently incurred costs to own and operate a generation plant, plus a rate of return
- This equates to ratepayers being responsible for the rate base, which can be thought of as the cost to build or purchase a generation asset, multiplied by a rate of return on that rate base
  - The return on rate base fluctuates over time, much like cost of capital – ratepayers are responsible to make up any difference
- In addition, ratepayers are responsible for the actual costs of operating the generation asset, including fuel costs, personnel costs, etc., so long as those costs are prudently incurred by the IOU
- Responsibility for prudently incurred costs means:
  - Prudent, but wrong investment decision (*e.g.*, for a generation asset that becomes technologically obsolete prior to the end of its useful life) results in stranded costs to ratepayers
  - Cost to procure replacement power in the event of unplanned plant outages is borne by ratepayers (recall $500 million Calvert Cliffs outage—ratepayers ultimately bore $400 million of that cost)

Final Report – Main Conclusions

- Risk Factors regarding return to rate base regulation
  - May further deter merchant build-out in Maryland
  - May require end to customer choice program
  - Exposes ratepayers to risk that value (if any) realized differs significantly from that modeled by Levitan (exposure to upside and downside risk)
  - Generation fleet located in Pepco service territory consists of an aging coal-based fleet in need of costly maintenance that may become technologically or economically obsolete
  - Infrastructure required to manage and operate the generation assets will require significant time and resources to develop
  - The fair market value of the assets may be significantly higher or lower than that modeled by Levitan, depending on market conditions at the time FMV is determined
  - Significant transaction costs associated with rate-base regulation
  - Effects of large debt issuance on State's bond rating

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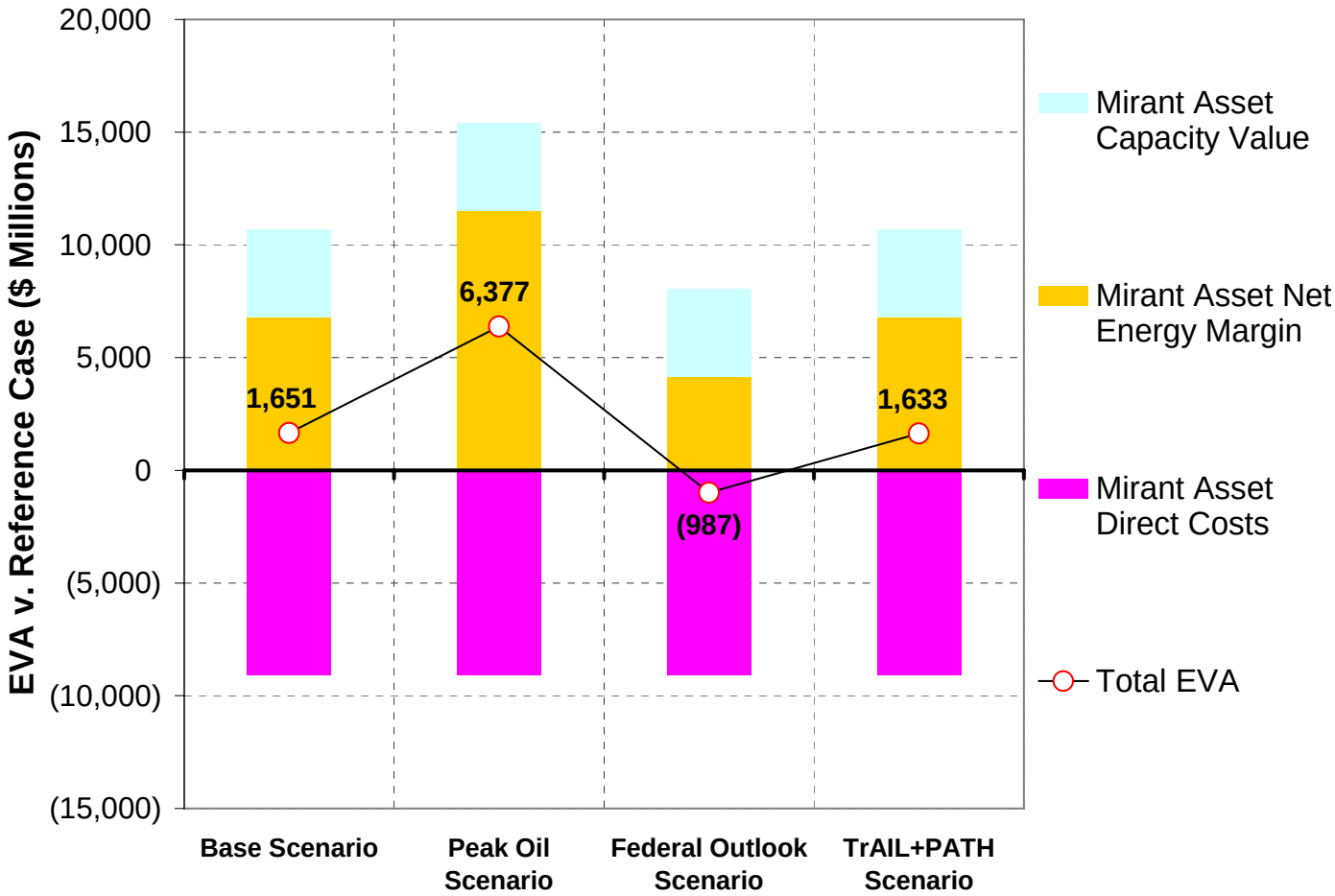
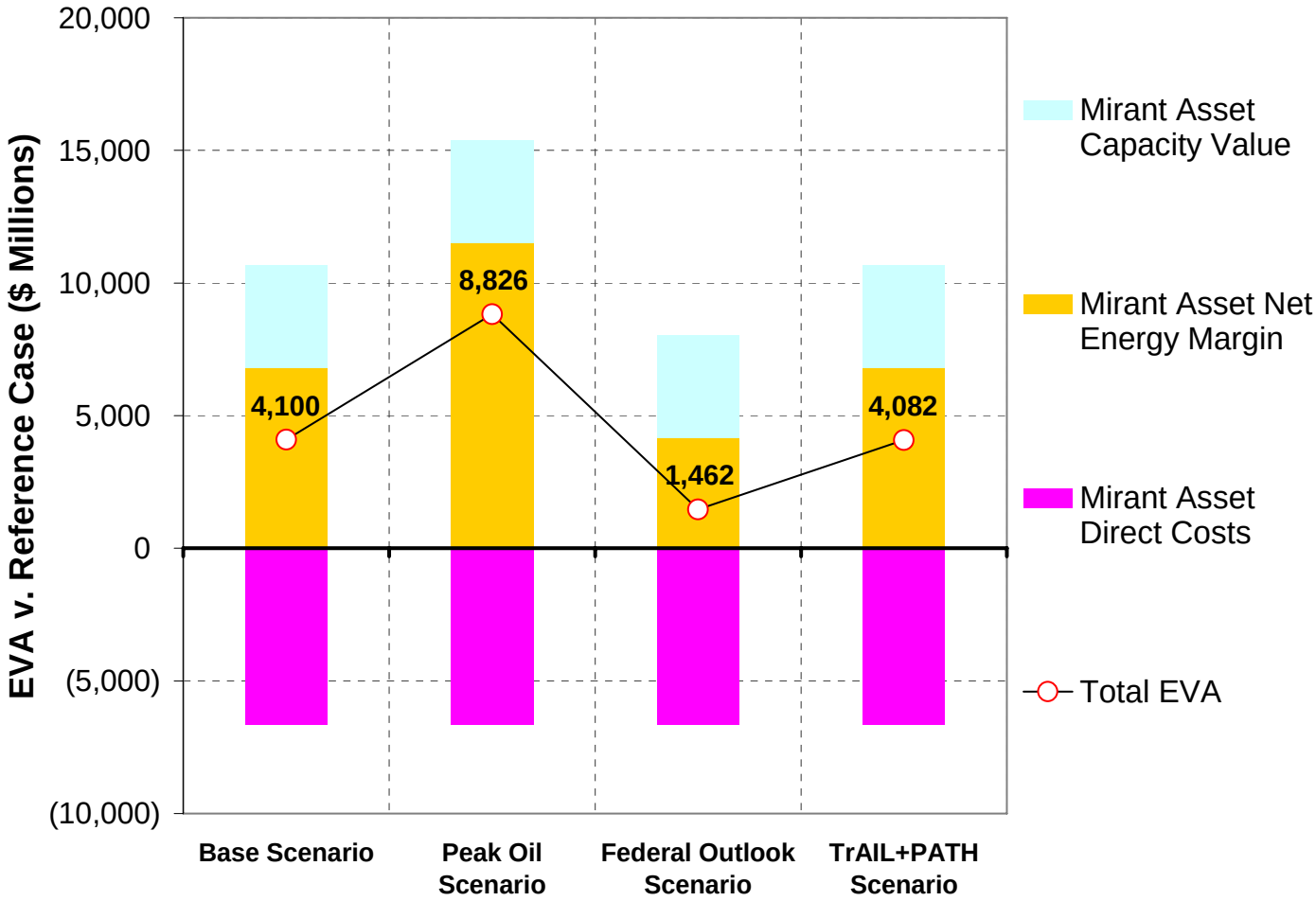
State Power Authority

- Could reduce capital costs given its tax-advantaged status
- Will expose ratepayers to risk of adverse outcomes, such as fuel volatility, credit market abnormalities, and technological or economic obsolescence
- Will require significant time and resources to create infrastructure needed to manage and operate generation assets
- May not operate over the long run as efficiently as a private owner
- Mixed results in other states

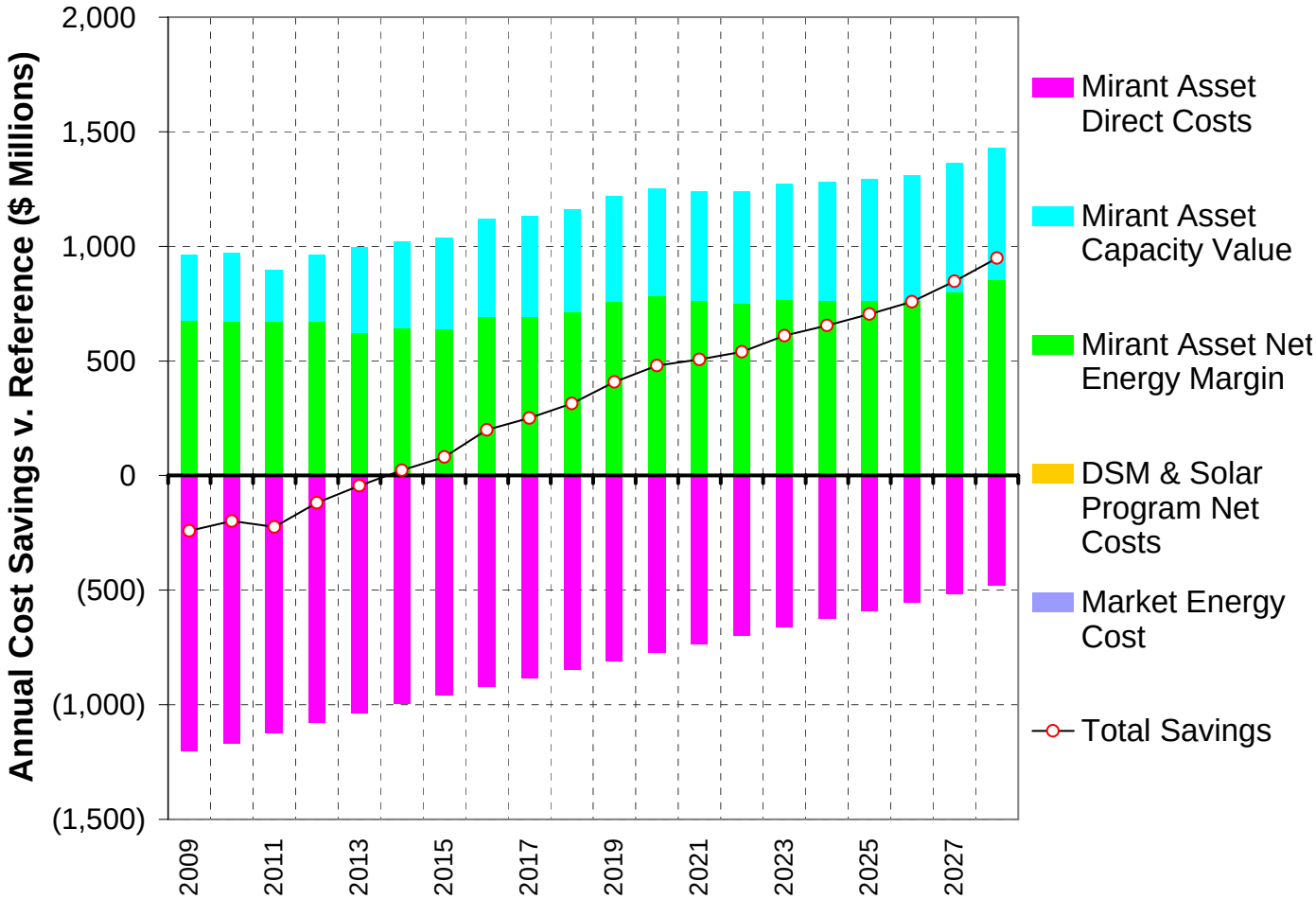
Rate Base Regulation—IOU Ownership (EVA)



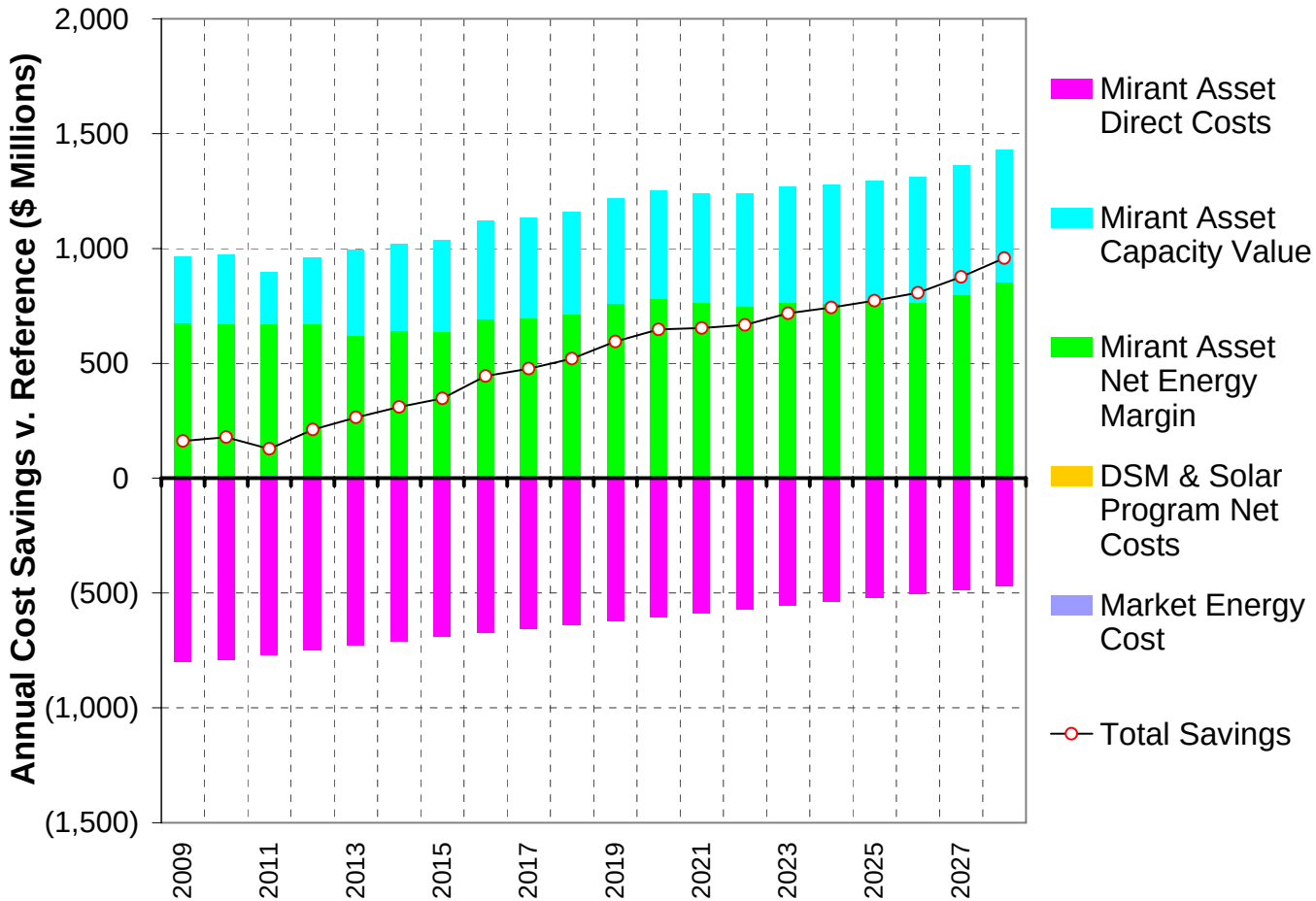
Rate Base Regulation—Authority Ownership (EVA)



Rate Base Regulation—IOU Ownership
Annual Costs/Savings



Rate Base Regulation—Authority Ownership Annual Savings



Reliability

- Commission's has continued to review reliability since the Interim Report
- The Mid-Atlantic region faces a shortfall of capacity in 2011/2012 unless TrAIL is in service by June 2011
  - Maryland's share of the shortfall is 600-690 MW (approximately one power plant)
  - TrAIL is not a total panacea – without PATH, shortfalls may recur by 2013
- But: TrAIL made important regulatory progress in 2008
  - Allegheny will update the Commission on both lines on Wednesday, December 17

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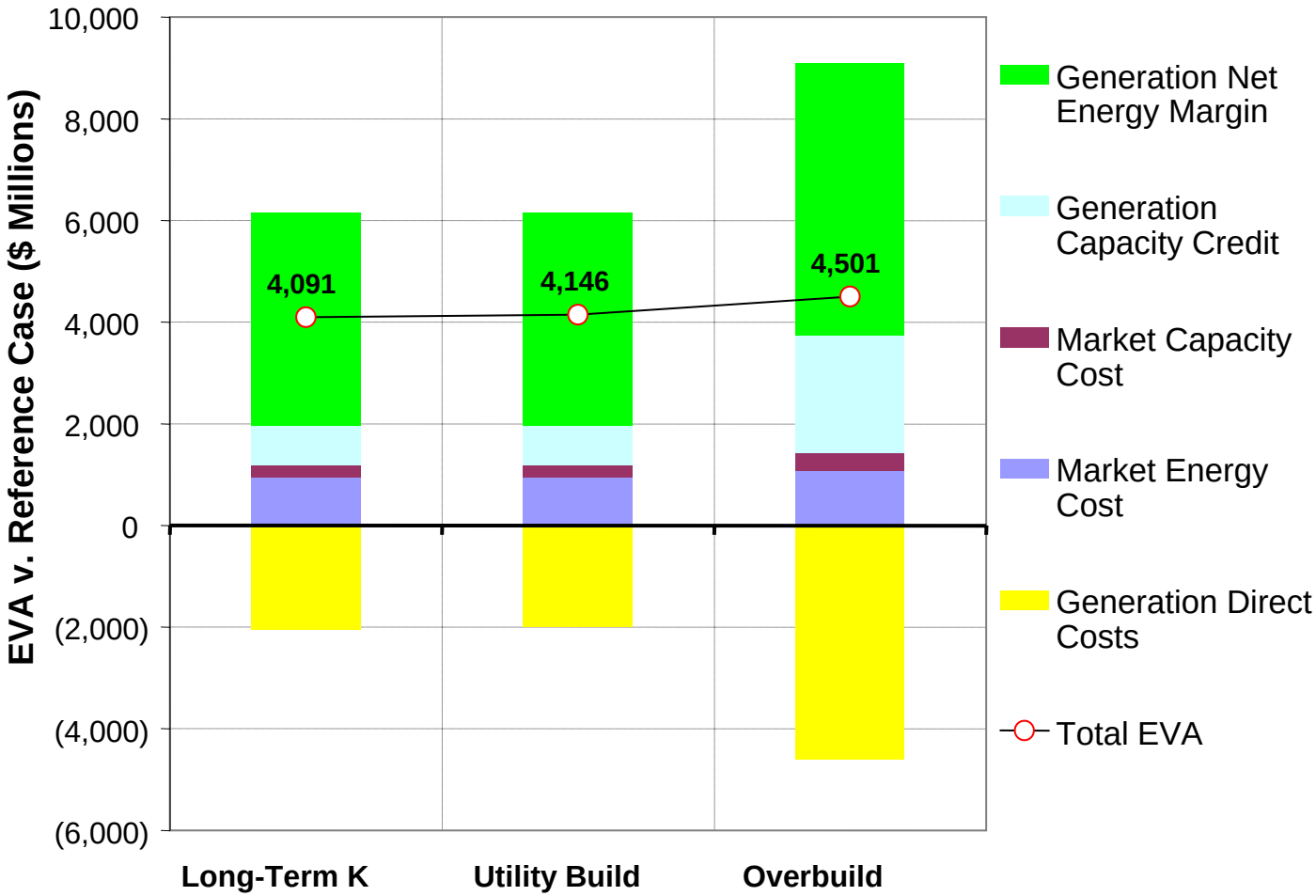
Reliability

- Pre-EmPower Maryland Act programs encouraged and achieved a power plant worth of demand response
- "Gap RFP" case
  - Initiated in July, hearings in October
  - Commission directed the IOUs in November to develop RFPs for demand response, Staff will recommend form of RFPs by December 31
  - Further proceedings will follow
- Regional Reliability Summit

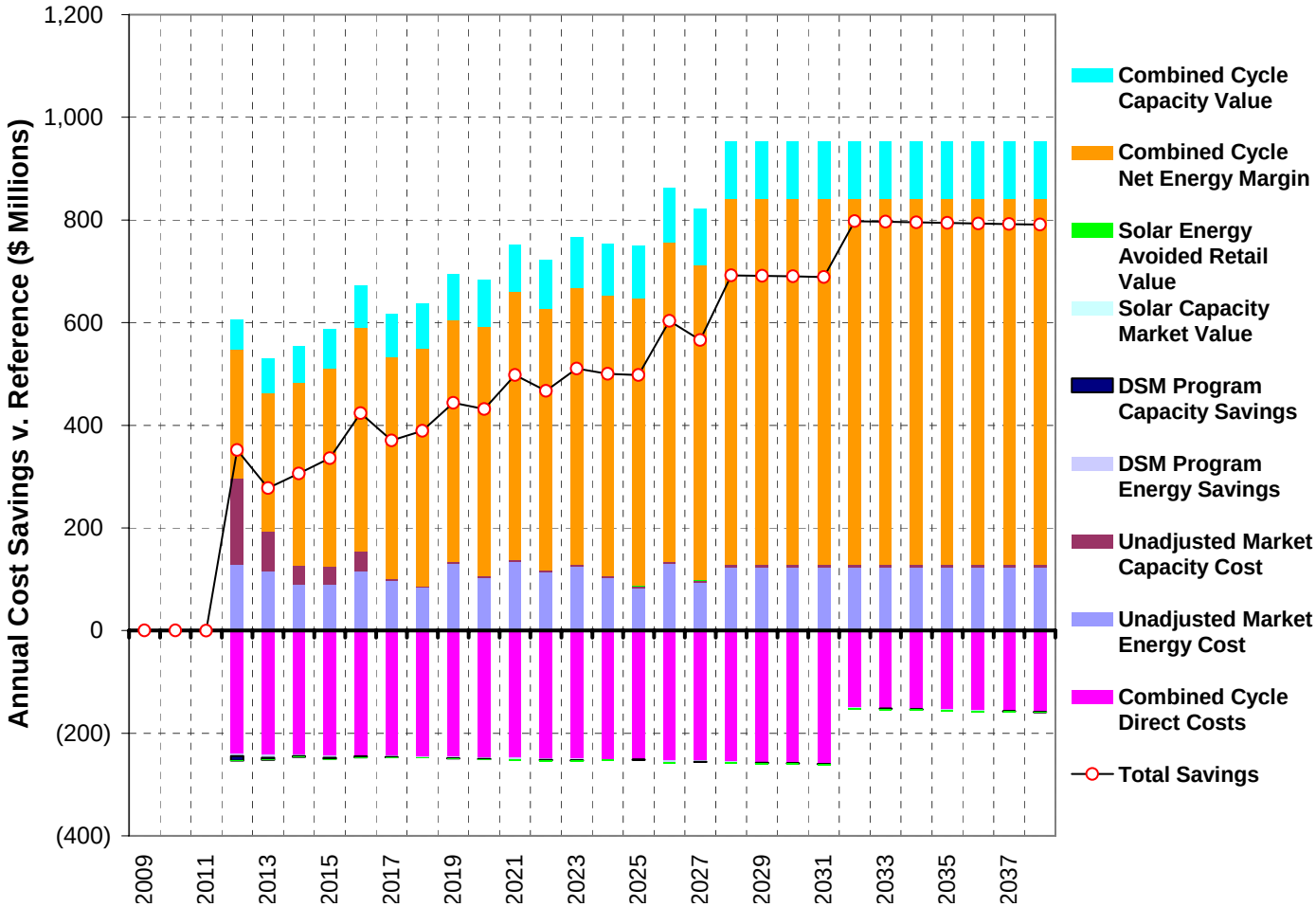
Economic Benefits – New Generation

- Maryland ratepayers will benefit from the addition of approximately 1,080 MW of conventional generation above and beyond reliability needs
  - This is true whether the generation is secured through a long-term power purchase agreement or a utility-owned and -built plant under cost-of-service regulation – benefits are roughly equal, slightly favoring utility-build under current conditions
  - The benefits of a further "overhang" do not outweigh the costs (a comparison not analyzed last year)
- Demand-side resources (demand response and energy efficiency) still yield the greatest benefit from the investment, under any scenario

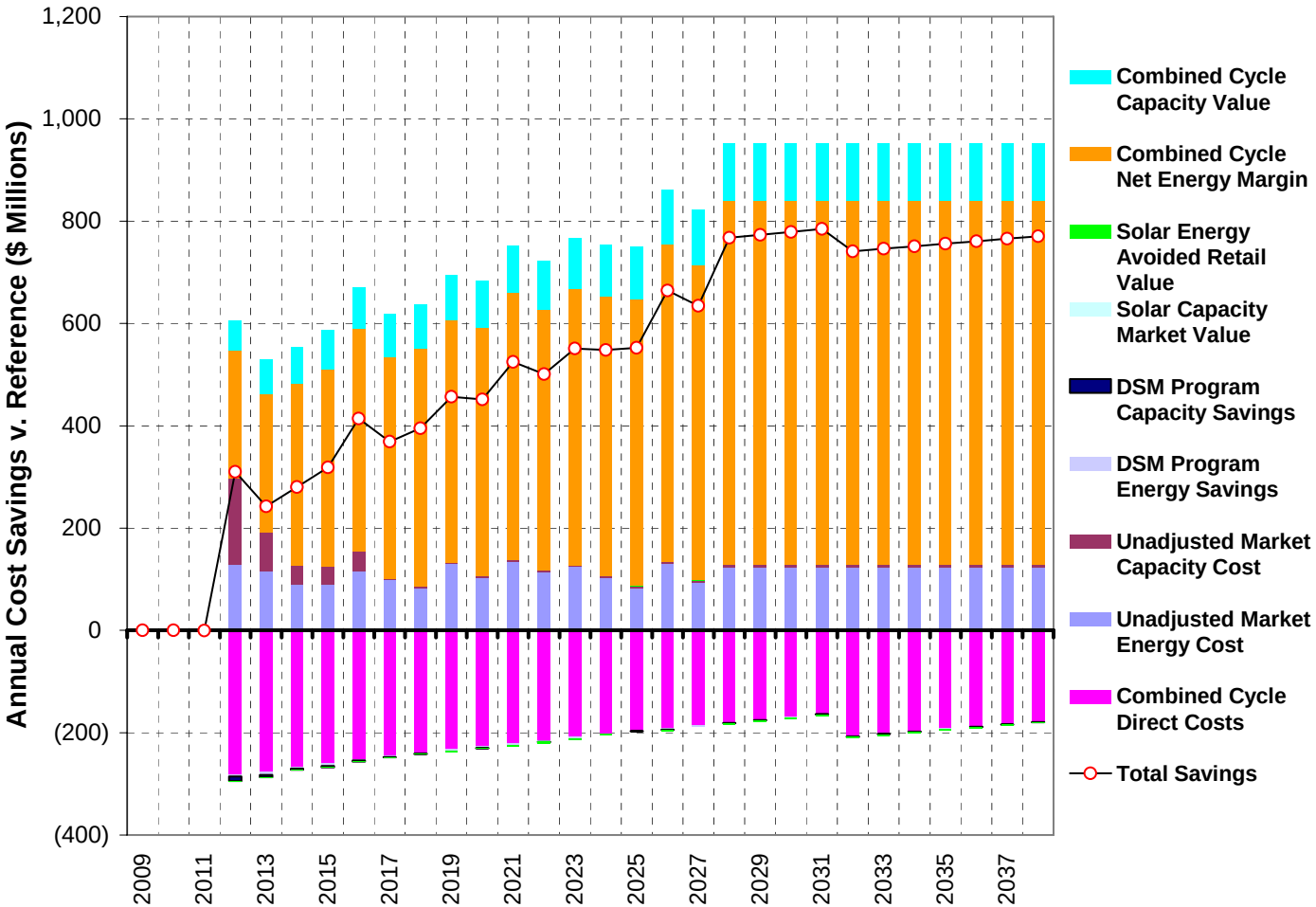
Conventional Generation (Base Scenario--EVA)



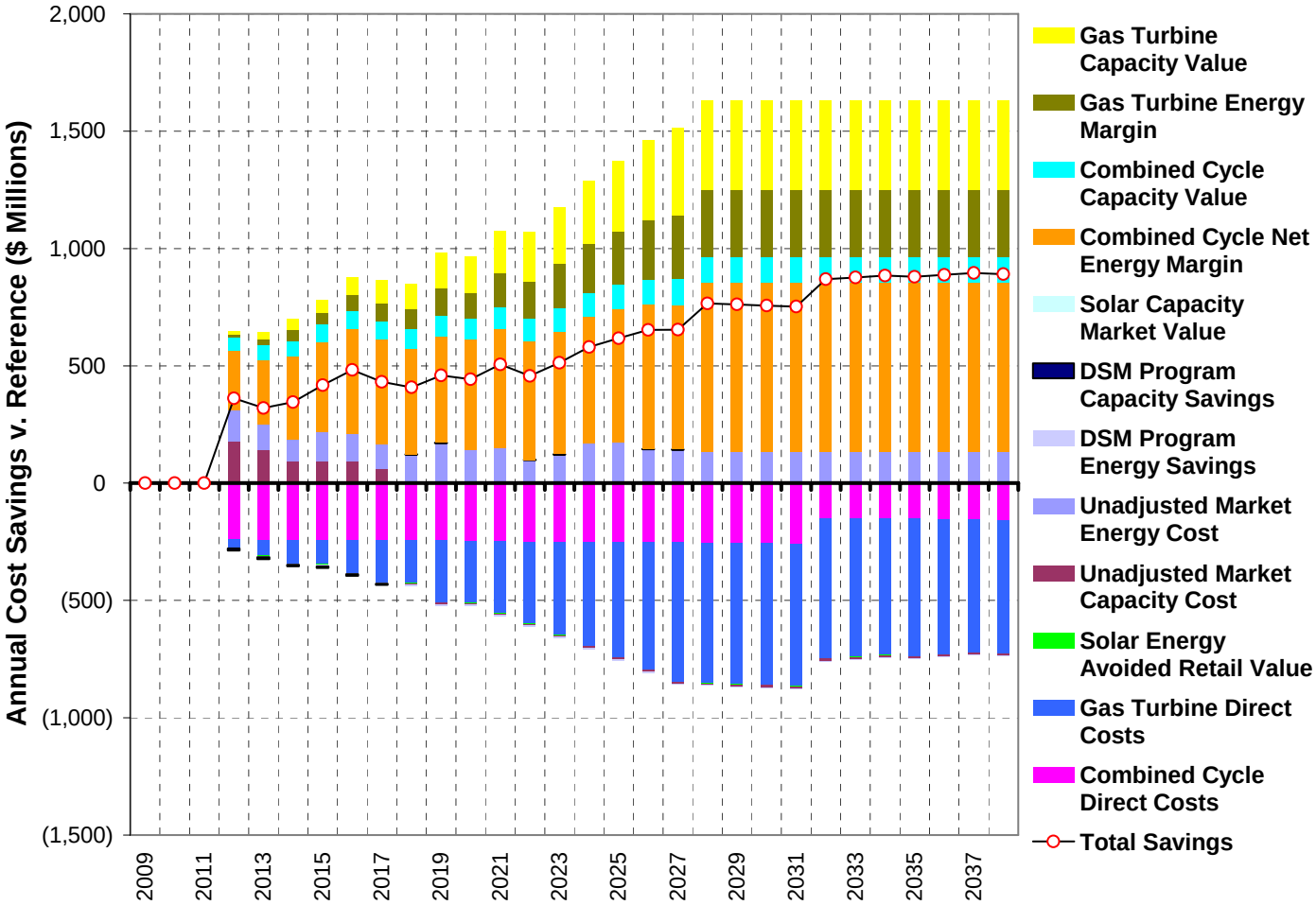
Conventional Generation—Long Term Contracts Annual Savings



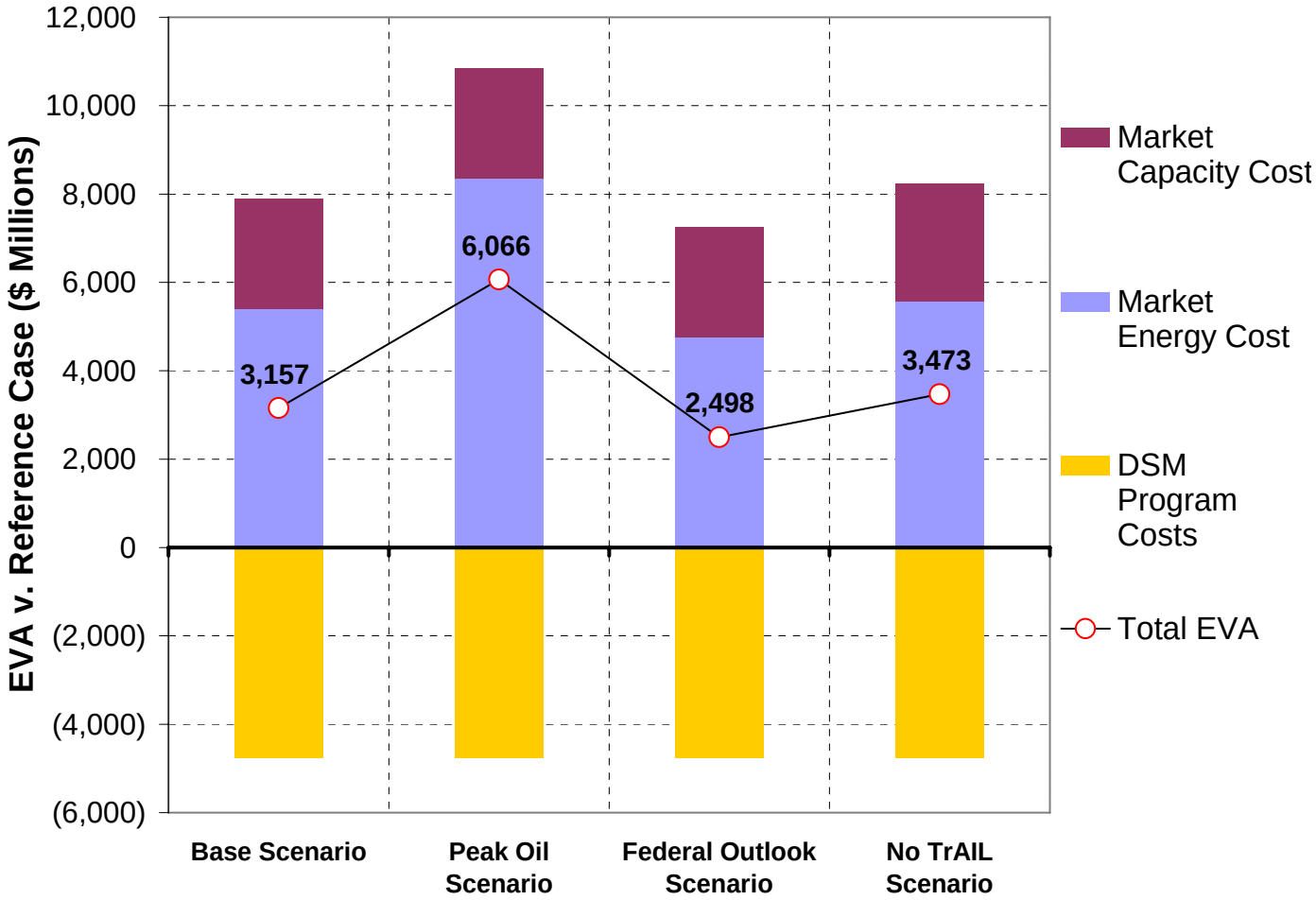
Conventional Generation—Utility Build Annual Savings



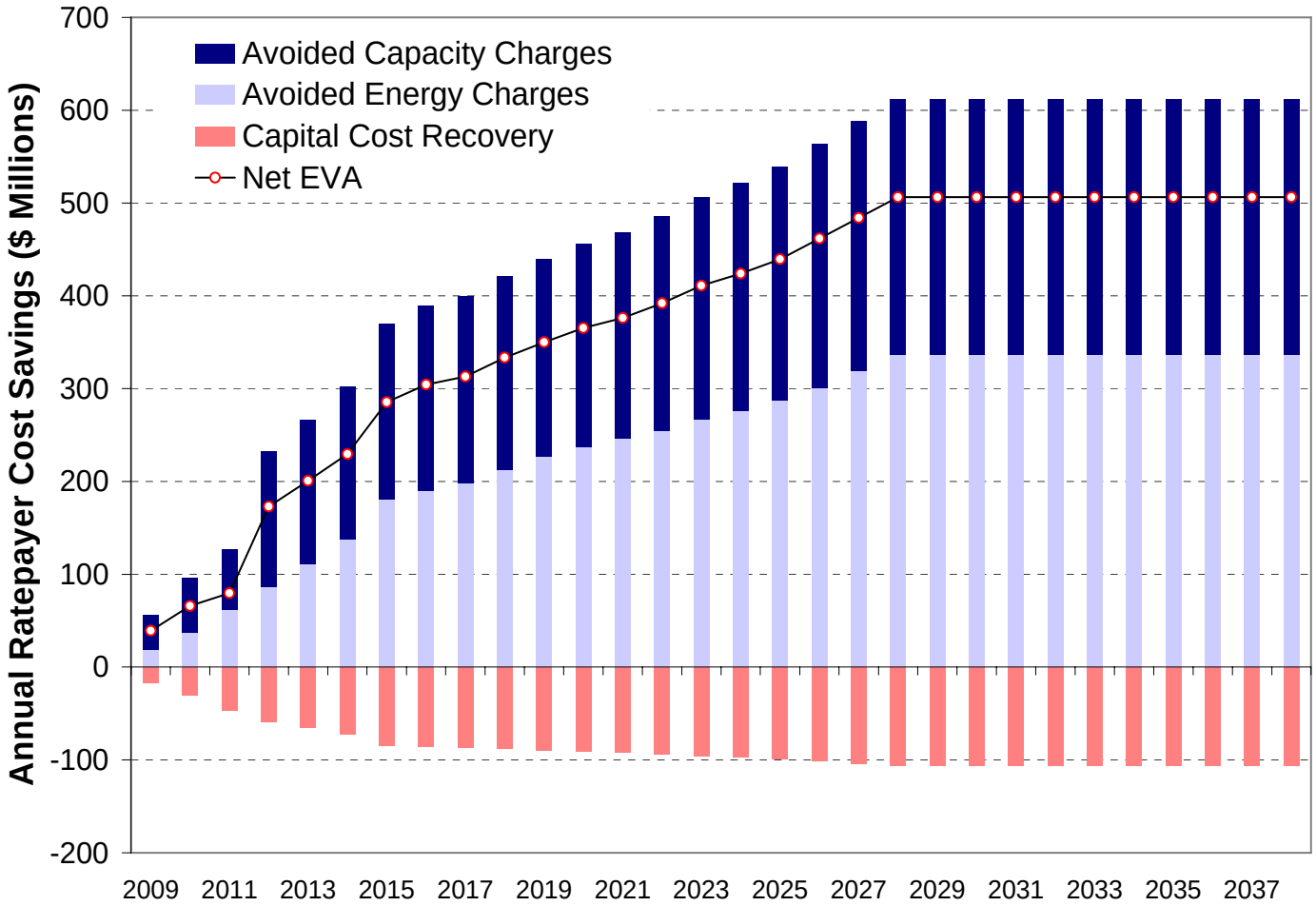
Conventional Generation—Overbuild Annual Savings



Demand Side Options (EVA)



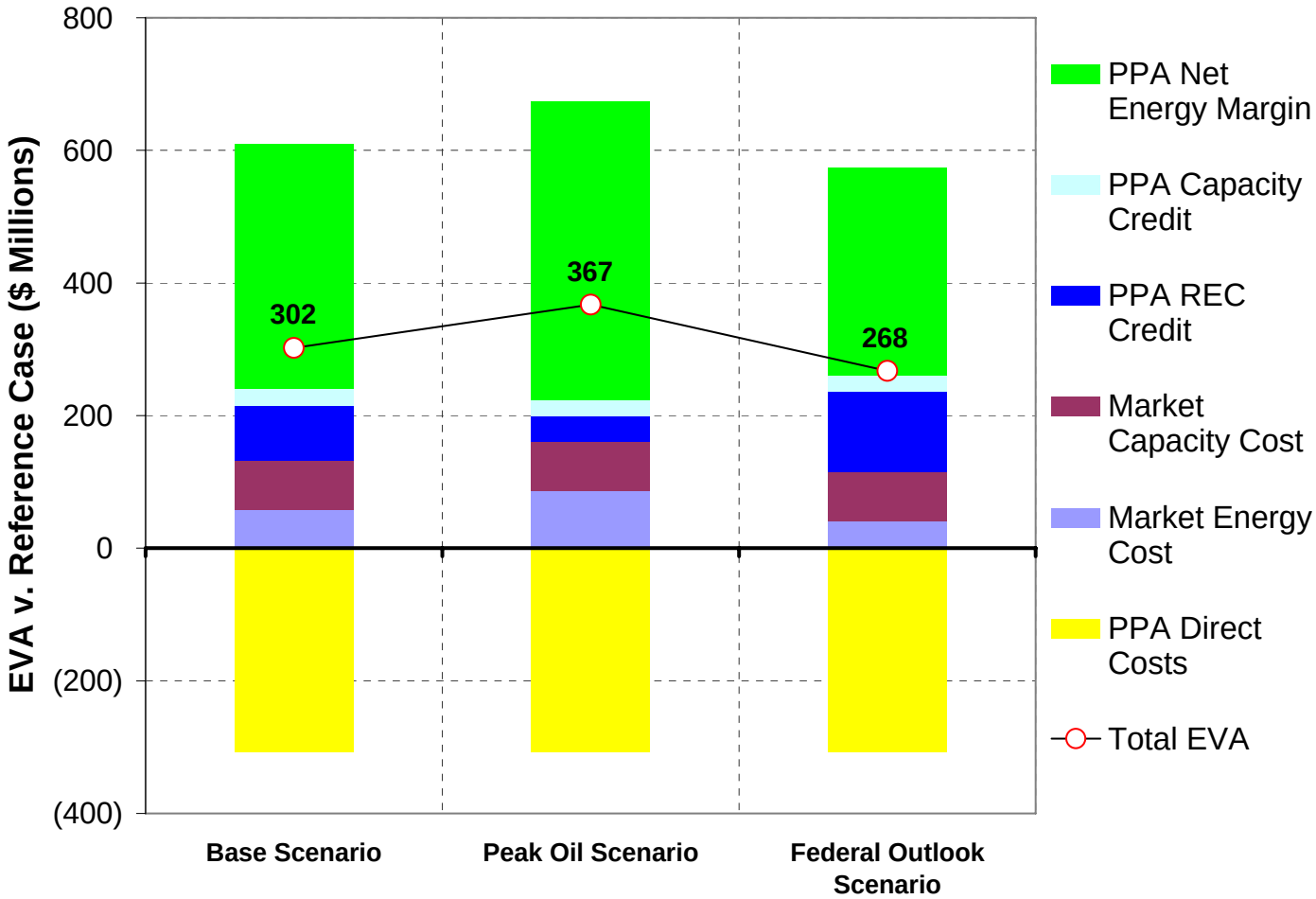
Demand Side Options
Annual Savings



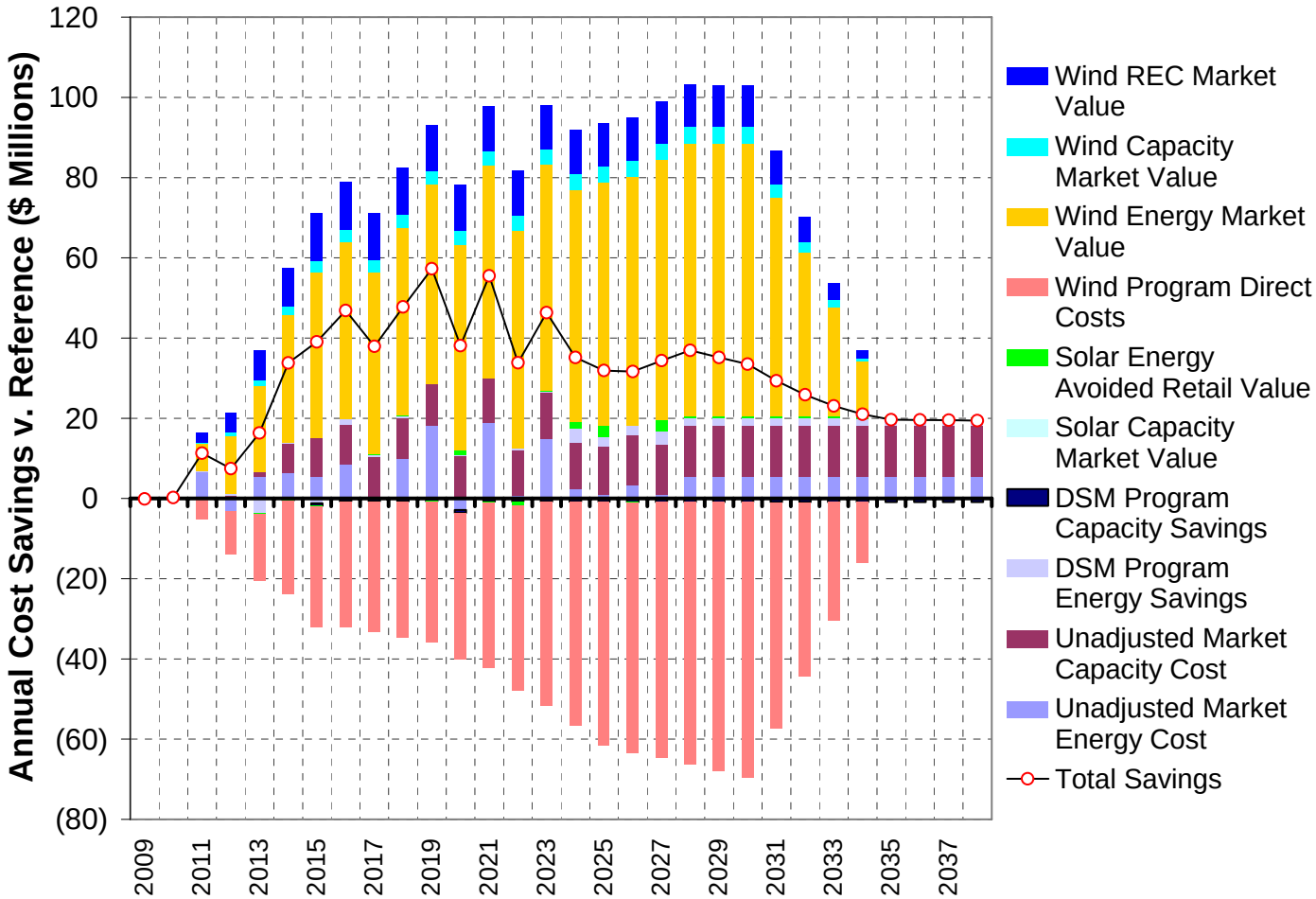
On-Shore Wind

- Assumes the addition of 200 MW of installed capacity, which equates to 33 MW of available capacity for PJM planning purposes
- Although on-shore wind yields environmental benefits, the small capacity benefits of on-shore wind development will not likely defer or replace conventional generation resources to satisfy reliability requirements
- On-shore wind development yields benefits through the combination of the market value of energy produced and the sale of RECs

On-Shore Wind (EVA)



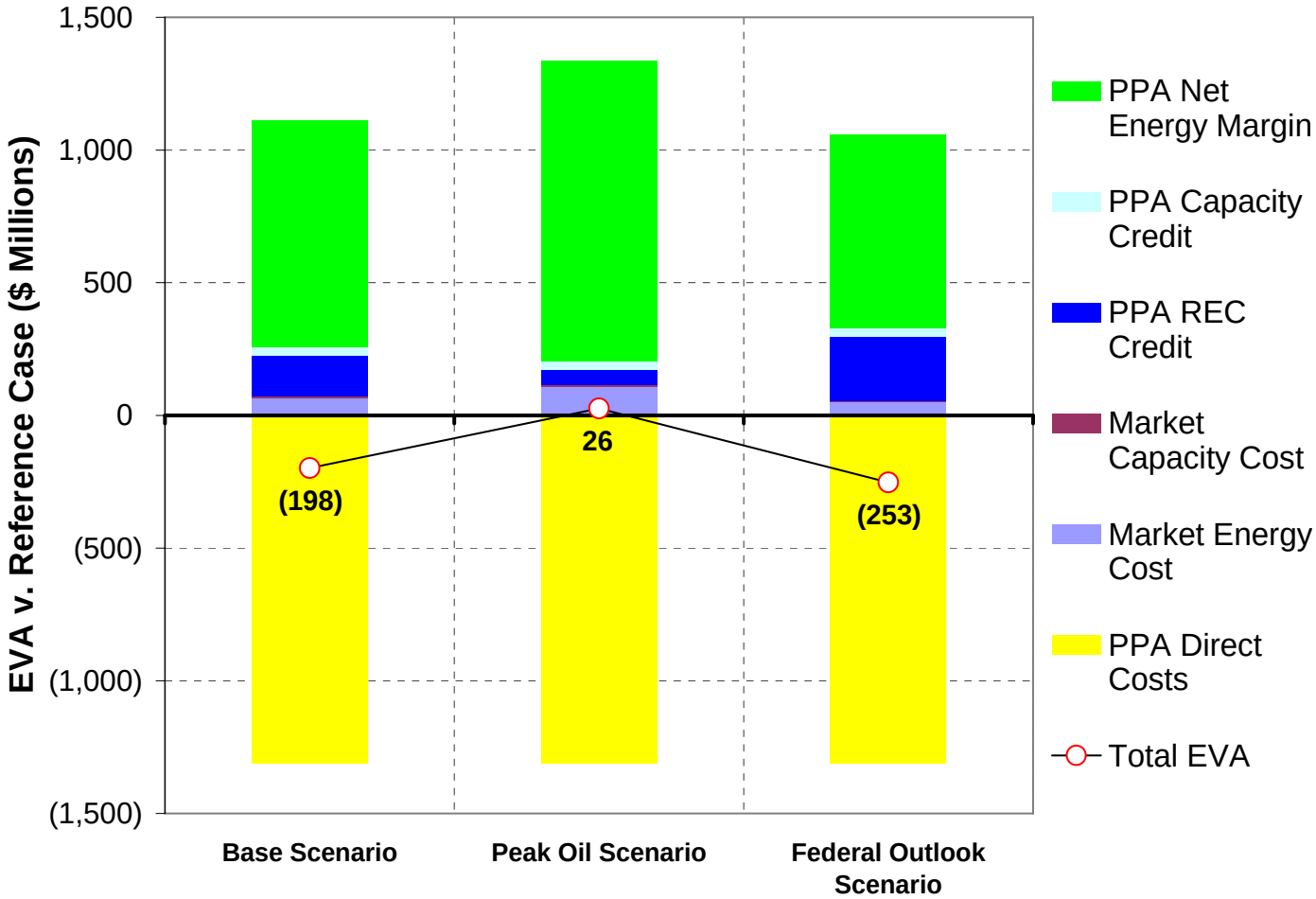
On-Shore Wind Savings



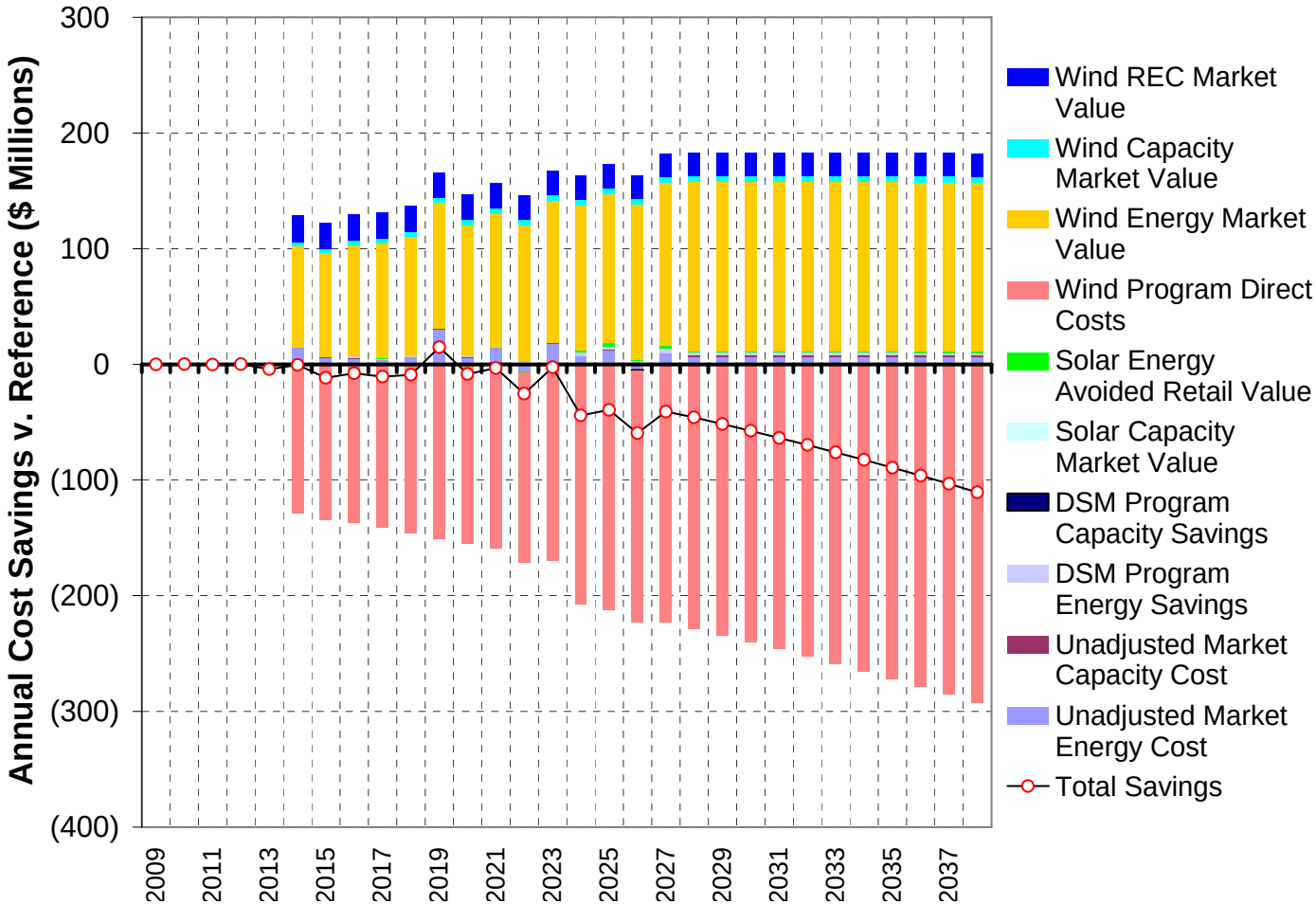
Off-Shore Wind

- Assumes the addition of 500 MW of installed capacity, which equates to 128 MW of available capacity for PJM planning purposes
- Economic analysis based upon BlueWater contract terms, with updated/improved operational data (which positively affects economics)
- High costs of building and operating off-shore wind results in unfavorable economics, especially as compared to on-shore wind

Off-Shore Wind (EVA)



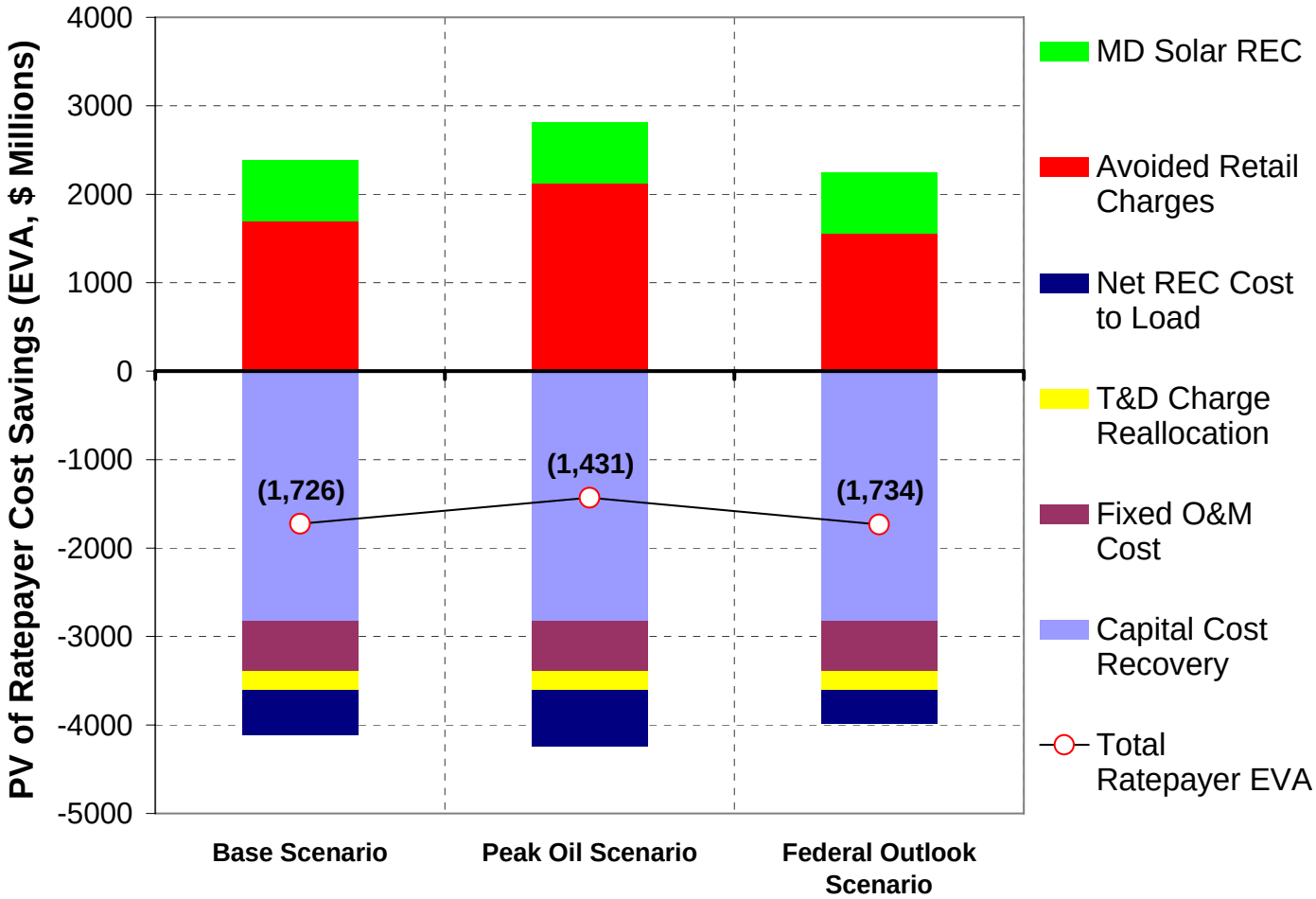
Off-Shore Wind Costs/Savings



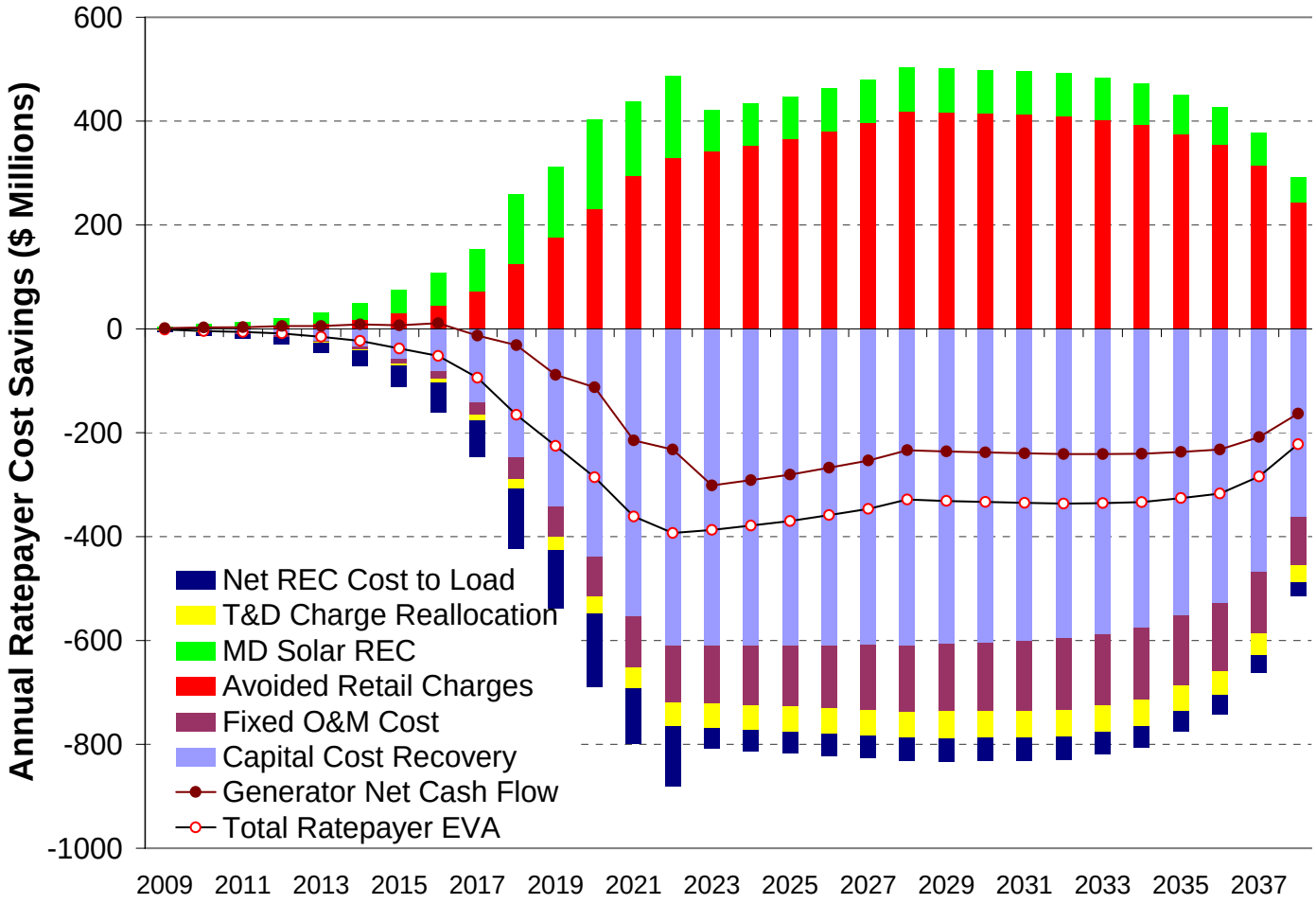
Solar

- Mixed results: a 1 MW rooftop installation yields a marginally acceptable return to an investor, so long as the value of the REC and the Federal Investment Tax Credit are included in the analysis
- However, the Maryland in-state solar RPS requirement (1,100 MW by 2022) yields negative value for ratepayers as whole

Solar
(negative value over study period)



Solar Annual Costs



For more information…

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