Power For the 21st Century

Capstone Event

October 29, 2012

Tonight's objectives

- Review P21 and SROI processes
- Review community education
- SROI analysis
- Community engagement
- Staff comments on power supply planning
- Review Recommendations
- Interactive activity; panel response system

The P21 Process

- Power for the 21st Century (P21) was created as a means of a broad-based community engagement effort
- The purpose of this engagement is to
  - inform the community about critical decisions and issues the community faces in its future
  - solicit the input of critical stakeholder groups in reaching answers.
- Community engagement had largely been from narrowly focused interest groups, which was not necessarily representative of the broader community's thinking

EXTENSIVE COMMUNITY EDUCATION AND OUTREACH

Community Education Efforts

- Education series ran from October 6 – December 13
  - Fuels Options
  - Generation Types
  - Regulations
  - District Heating
  - Transmission considerations
  - Energy Optimization & Conservation
  - World view of energy (John Doggett)

Communication & Education Efforts

Began the week of September 11, 2011

- P21Decision.com website launched
- P21 press release
- P21 Facebook page set up; videos & content
- P21 Twitter account established
- YouTube account established

Communication & Education Efforts

(Continued)

- P21 website
  - Videos; community perspectives, SROI process, meetings
  - updates
  - Timeline
  - Public comments, Q&A results
- Newspaper
  - Ads (online and print), Op-Eds, stories, press releases,
  - Mailings
  - Direct mail pieces, bill stuffers, business customer letters, Early Bird Breakfast take-away

Communication & Education Efforts

(Continued)

- Meetings
  - Key Accounts meetings
  - One on one customer meetings
  - Chamber of Commerce Early Bird Breakfast (John Doggett)
  - Community group meetings (Riverview Group, Chamber of Commerce, DDA)
- Radio ads/spots/e-blasts on WHTC, The Van, JQ99
- Billboards
- MacMedia aired educational series

ROBUST SROI ANALYSIS

The SROI Process

- SROI Public Hearings; Sept. 4 & 5, 2012
  - Hearing held Tuesday and Wednesday from 5-7pm.
  - Comments read into the record by customers and members of the greater community
  - Meetings were recorded and posted on P21 website
- SROI Q&A; Sept. 24, 2012
  - Dozens of questions were asked and answered at a 2 ½ hour meeting. Staff stayed longer than the scheduled two hour meeting to ensure that all questions were answered.
  - The meeting was recorded and posted on P21 website.

The SROI Process

- Engaged HDR; August, 2011
- Formed Risk Analysis Process (RAP) panel
  - HBPW Board Member, City Council, and SME's representing various community sectors including:
    - Government: Sustainability Committee, MACC
    - Education: Hope College, Holland Public Schools
    - Businesses such as: large industrial customers, Chamber of Commerce, DDA, Lakeshore Advantage
    - Special interest groups such as: environmental (WMEAC), land use (Riverview Group), League of Women Voters, Historic District, Young Professionals
  - Met in September and November, 2011
  - Mutually agreed to parameters for analysis such as:
    - Items of value to the community
    - Issues that can/cannot be controlled by HBPW (pollution from coal transportation, fracking, mountain top mining etc.)
    - Range of costs etc.

What is SROI?

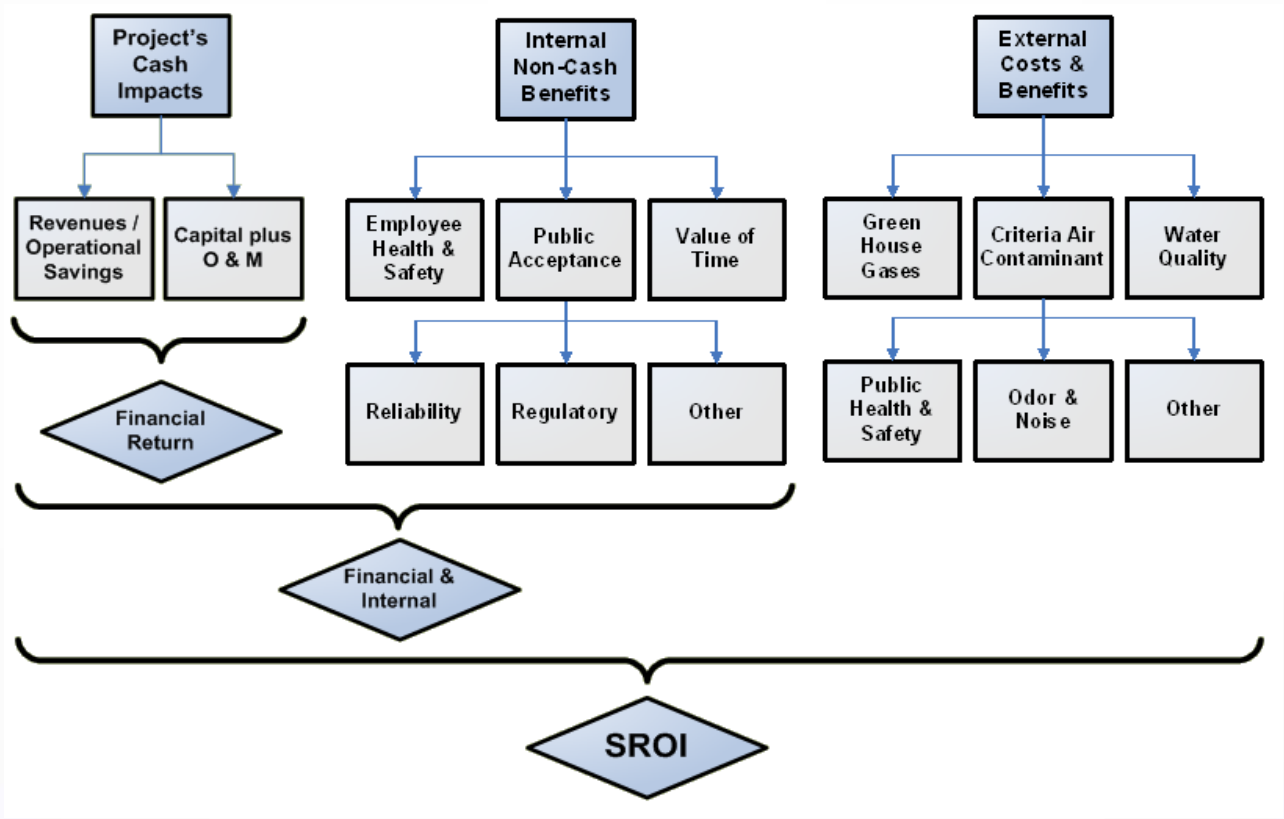
Triple Bottom Line Decision Making Framework

It's best practice in Cost-Benefit Analysis and Financial Analysis over a project's entire life-cycle, augmented by:

- Accounting for uncertainty using state-of-the-art risk analysis techniques
- Engaging stakeholders directly to generate consensus and transparency

The Triple-Bottom Line Framework

SROI adds to traditional financial analysis the monetized value of non-cash benefits and externalities



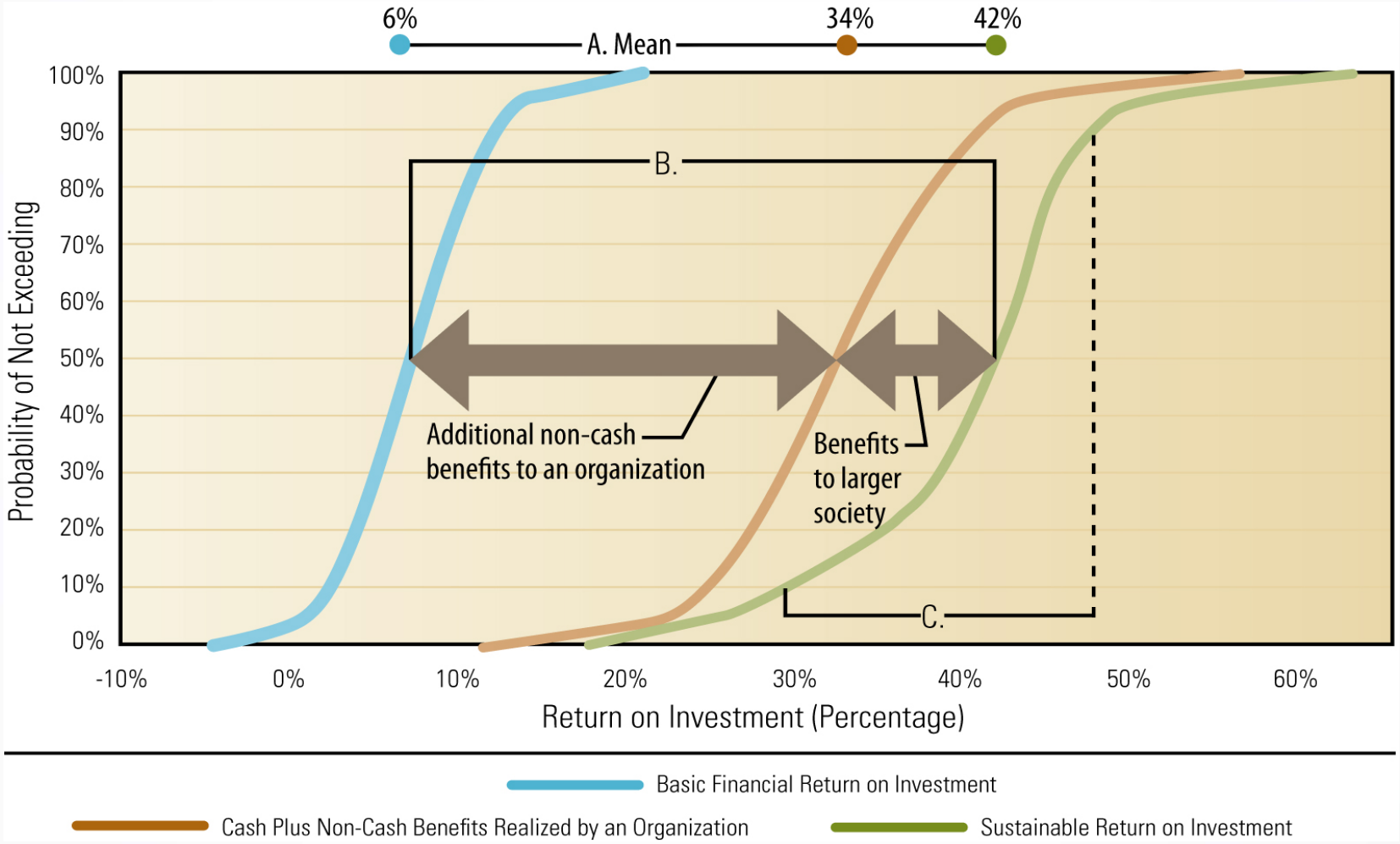
SROI Methodology

A Four-Step Process

"SROI reveals the **hidden value** in projects."

David Lewis, PhD
Former Principal Economist at the US Congressional Budget Office
Author *"Policy and Planning as a Public Choice: Mass Transit in the United States"*

S-Curve Diagram



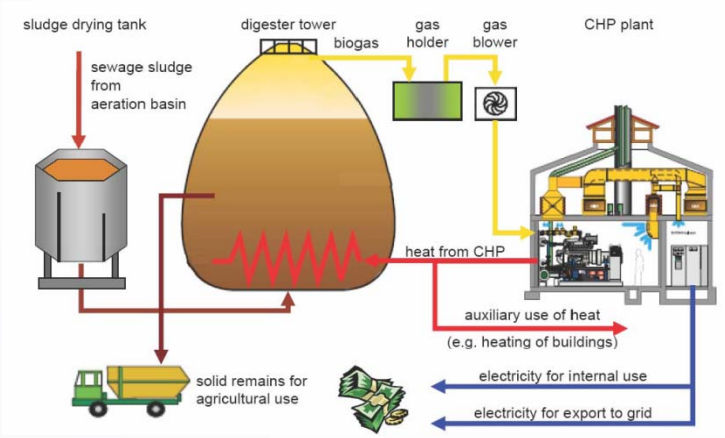
James De Young Station

- Unit 3 Retired in all cases
- Snowmelt system currently fed by U3/U4
- 46 MW Combined Capacity U4+U5
- No Capital Investment – Retire U4 &U5 by 2016 per the CEP
- Invest $28M Air Pollution Control Equipment , U4 Retires 2027, U5 Retires 2033 (Base Case)

Renewable Generation Options

20MW Wind Farm

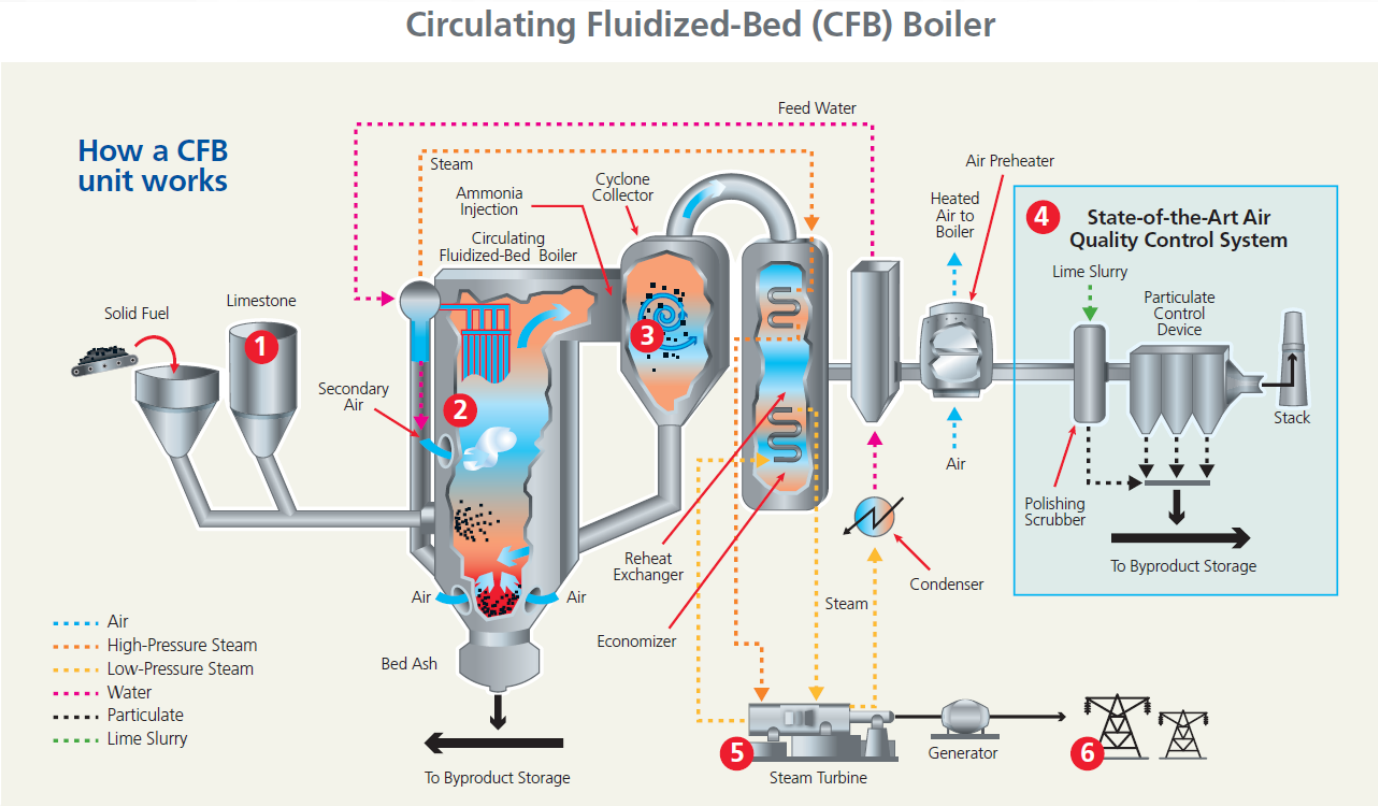
8MW Solar Photovoltaic



4MW Digester Gas CHP

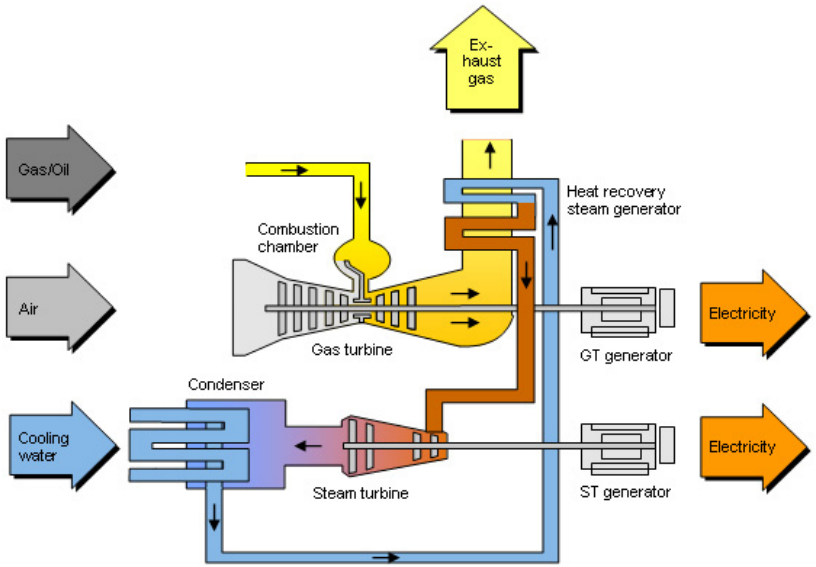
22MW Biomass Conversion JDY - U5

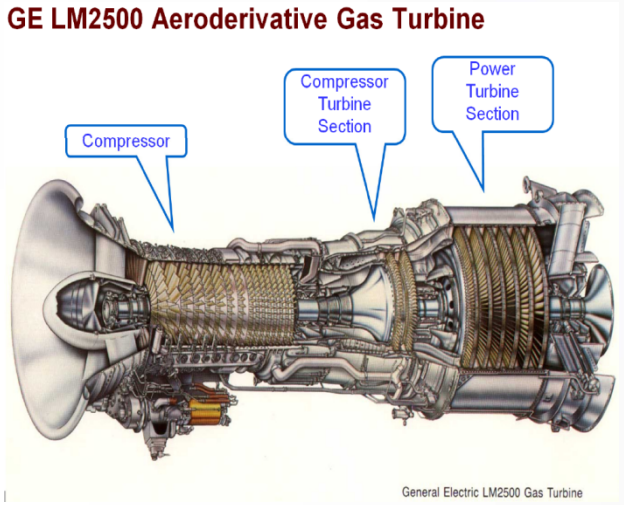
New Solid Fueled Unit 10 at JDY



70 MW Capacity
•50% Petroleum Coke
•30% Biomass
•20% PRB Coal

Natural Gas Fired Combined Cycle





2x1 LM2500 - 78MW
2x1 LM6000 – 114MW

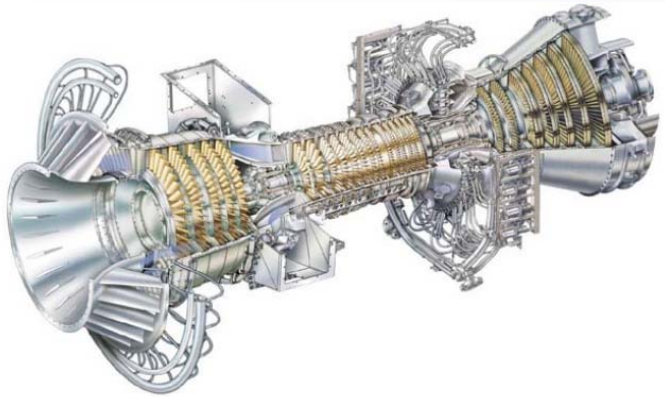
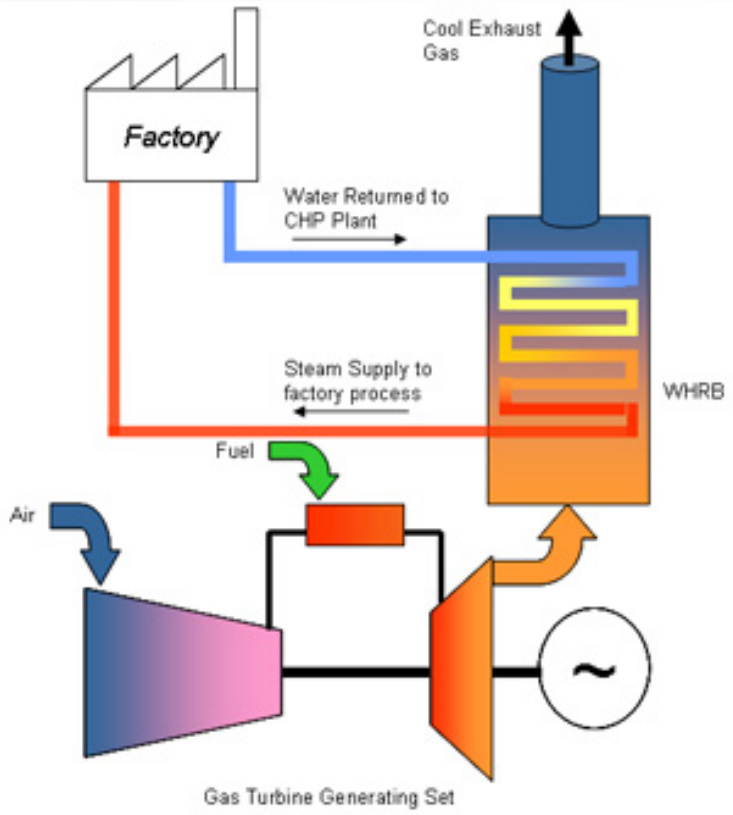


Fig. 13. The GE LM6000 (aeroderivative of the CF6-80C2). (Source: GE Power Systems)

Natural Gas Fired Combined Heat and Power (CHP)



The Gas Turbine based Combined Heat & Power Cycle

Combined Heat & Power is the simultaneous production of Power and Heat from a single fuel source.

The Gas Turbine generates electricity to power the plant.

The hot exhaust gases are passed through a Waste Heat Recovery Boiler*

The hot gases heat water which is supplied either as hot water or steam to the factory/facility processes.

* Waste Heat Recovery Boilers are also known as Heat Recovery Steam Generators (HRSG)

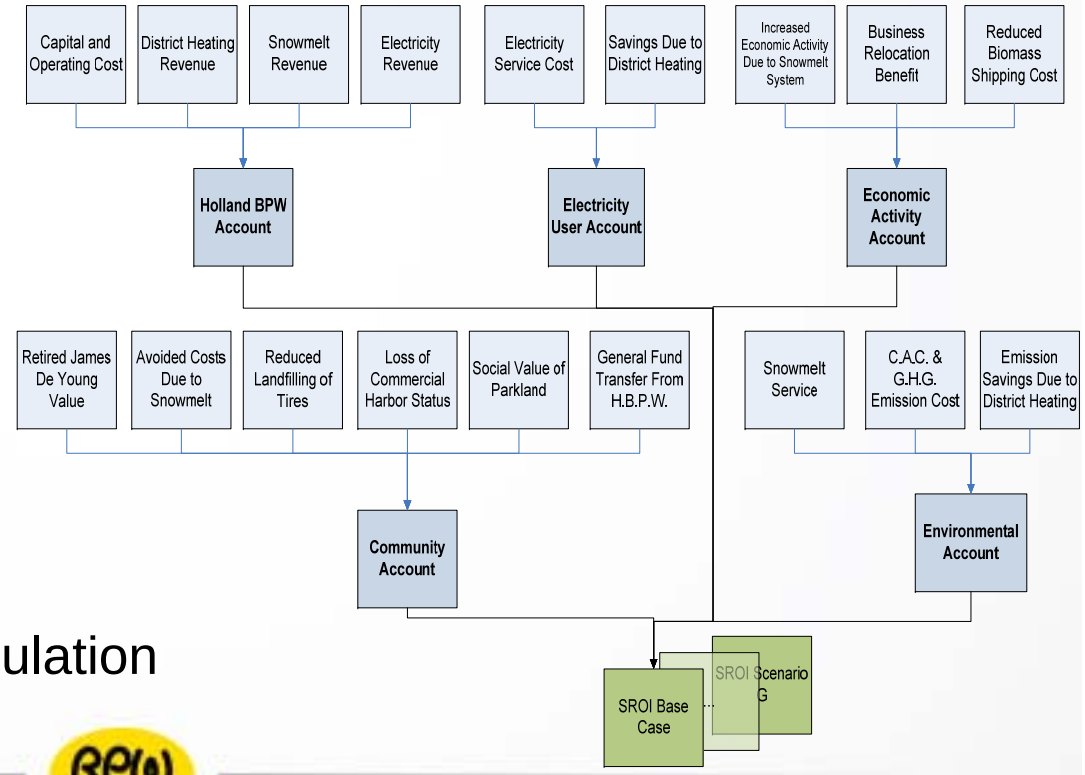
LM2500 CHP – 30.5MW

Benefit and Cost Impacts

- A range of impacts were identified by stakeholder group or "account"

- Key stakeholder accounts:
  - Holland BPW
  - Electricity User
  - Environmental
  - Economy
  - Community

- Some impacts are transfers
  - Quantified by account
  - But cancel out in NPV calculation

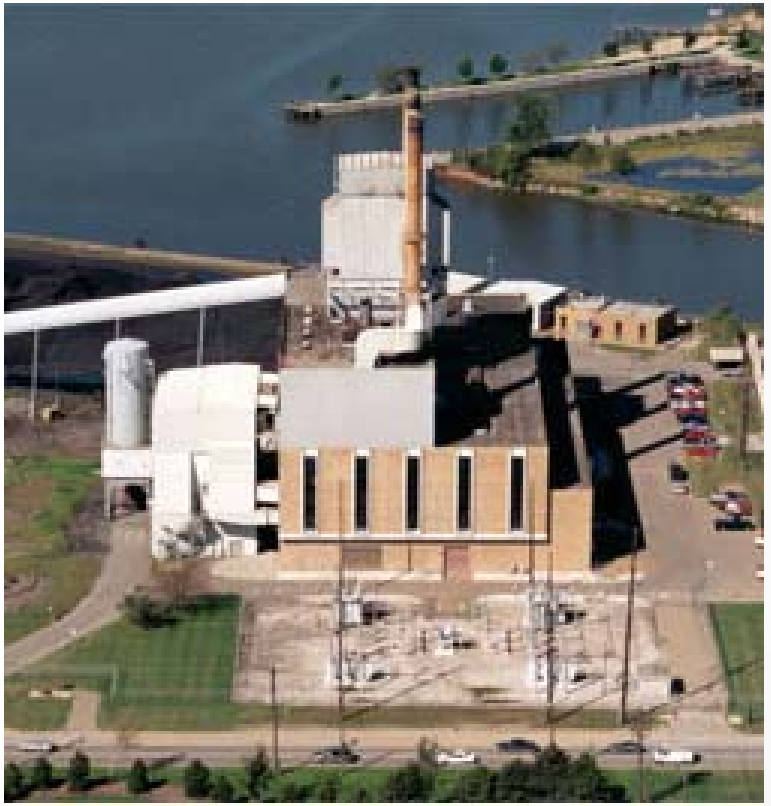


Holland BPW Account

- Capital, EPC, O&M, Fuel, and Fixed Costs
- Retail Electricity Sales
- Interchange Purchases & Sales
- District Heating Costs & Recovery
- Snowmelt Costs & Recovery
- Retired JDY Value
- Reduced Biosolids Treatment Cost
- Capacity Purchases & Sales
- Renewable Energy Credit Purchases & Sales
- Site Remediation Cost

Electricity User Account

- Savings due to District Heating
- Electricity Service Cost



Environmental Account

- Criteria Air Contaminant Emissions
- Greenhouse Gas Emissions
- Additional Emission Savings due to District Heating

Economic Activity Account

- Business Relocation Benefit
- Reduced Biomass Shipping Costs

Community Account

- General Fund Transfer from HBPW
- Loss of Commercial Harbor Status
- Social Value of Parkland
- Landfilling of Tires
- Retired James De Young Land Value
- Snowmelt Service Cost

High-Level Outcomes:

- The 3 scenarios with natural gas (e.g., A, B, G) provide the highest SROI
  - The largest benefit is reduced emissions
  - Electricity cost reductions significant too (>$100M)
- Two individual impacts dominate the overall results:
  - Value of electricity service cost reduction
  - Value of emissions reductions

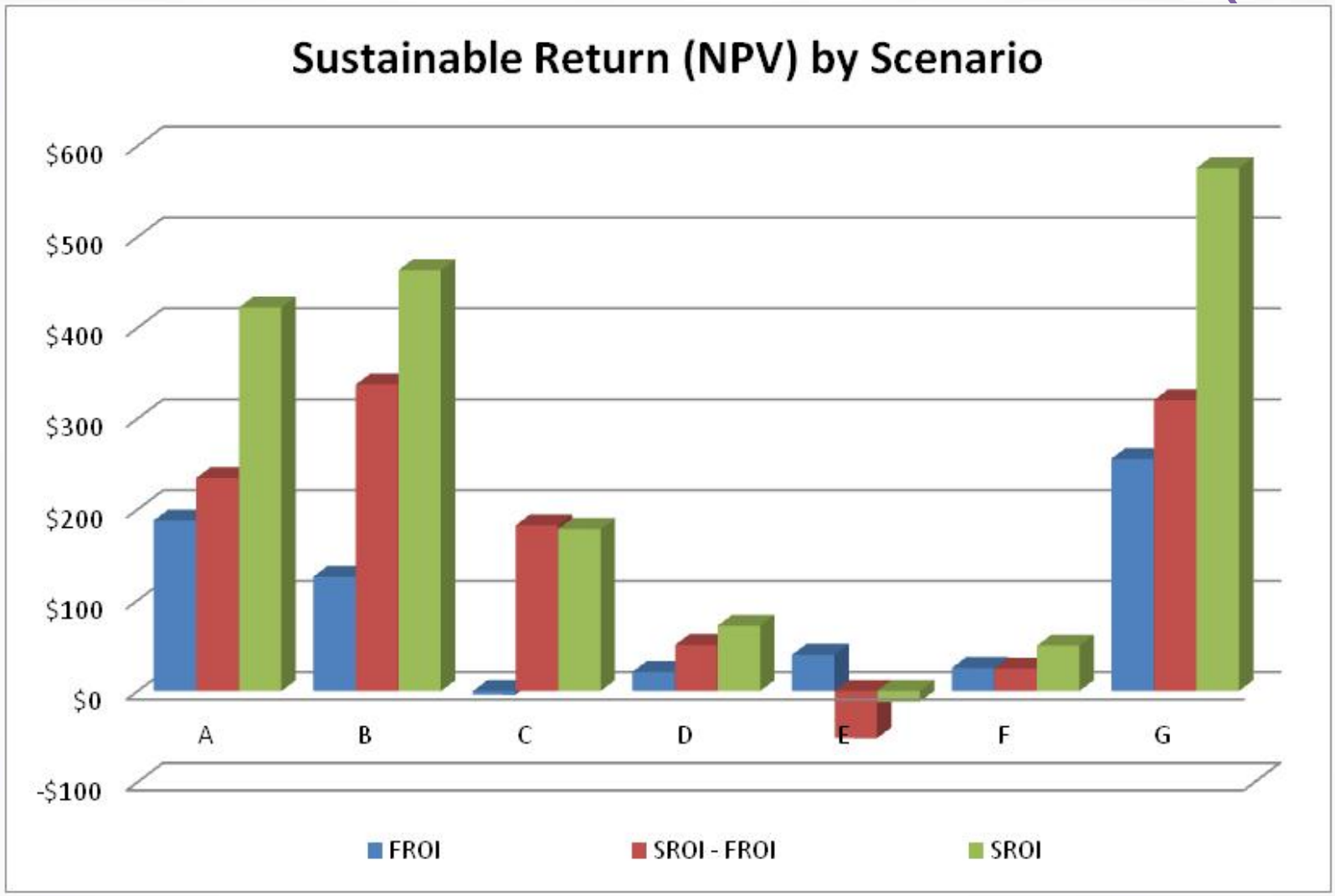
High-Level Outcomes (cont'd):

- The scenario providing the greatest incremental value (at the mean) from both an FROI and SROI perspective relative to the base case is Scenario G
  - FROI ~$250M
  - SROI ~$575M
    - Range from about $300M to $800M
    - Range includes low, medium and high gas price
- Scenario G:
  - reduces both electricity costs and emissions
  - Increases Holland's competiveness
  - Provides district heating and snowmelt benefits

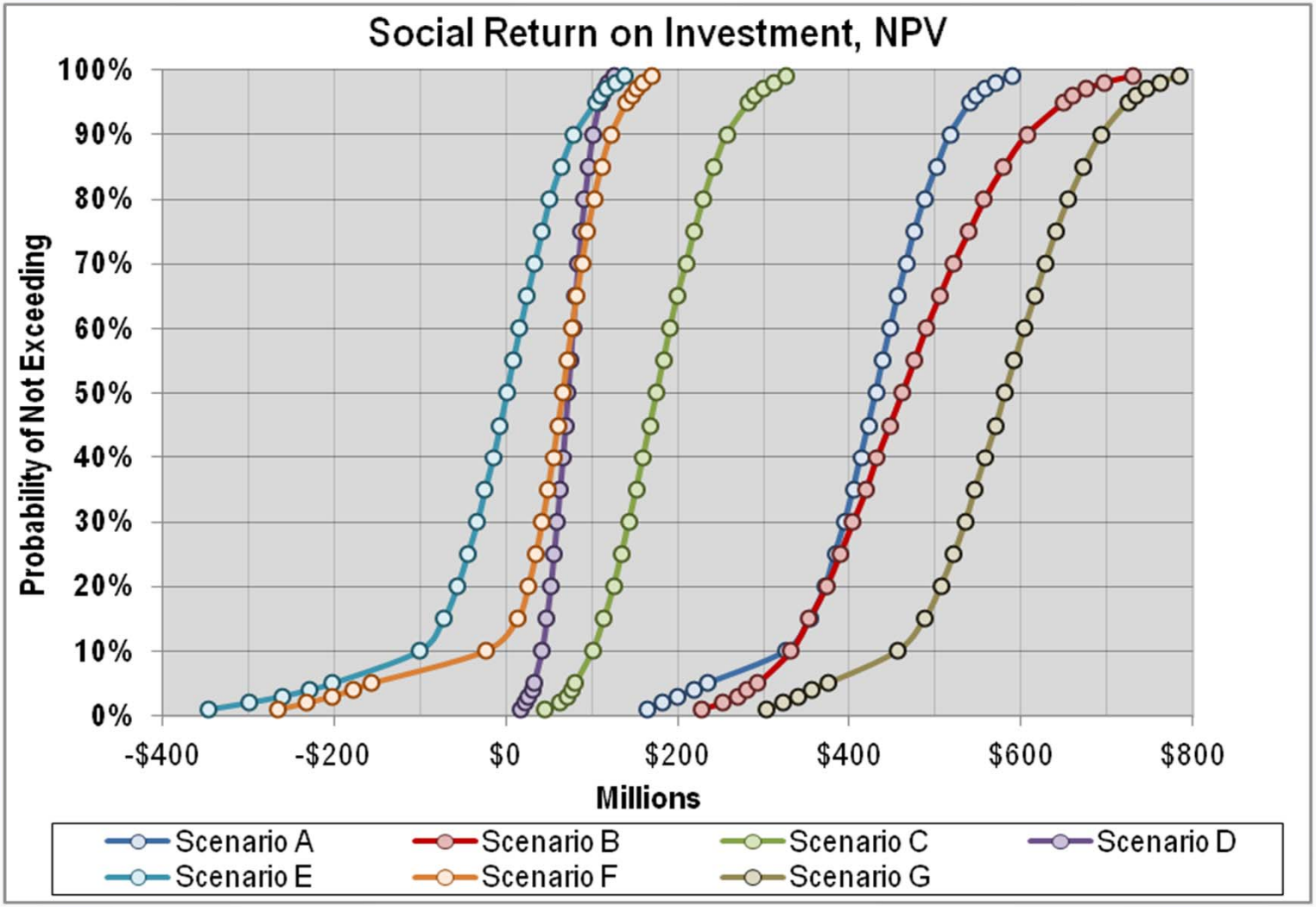
High-Level Outcomes (cont'd):

- On a macro-level, district heating shows potential for significant cost savings
- Owning and operating electric generation is in the best interest of the City
- Investing in controls for the James De Young coal units may not be economic
- Location of new generation not necessary to be located on the waterfront

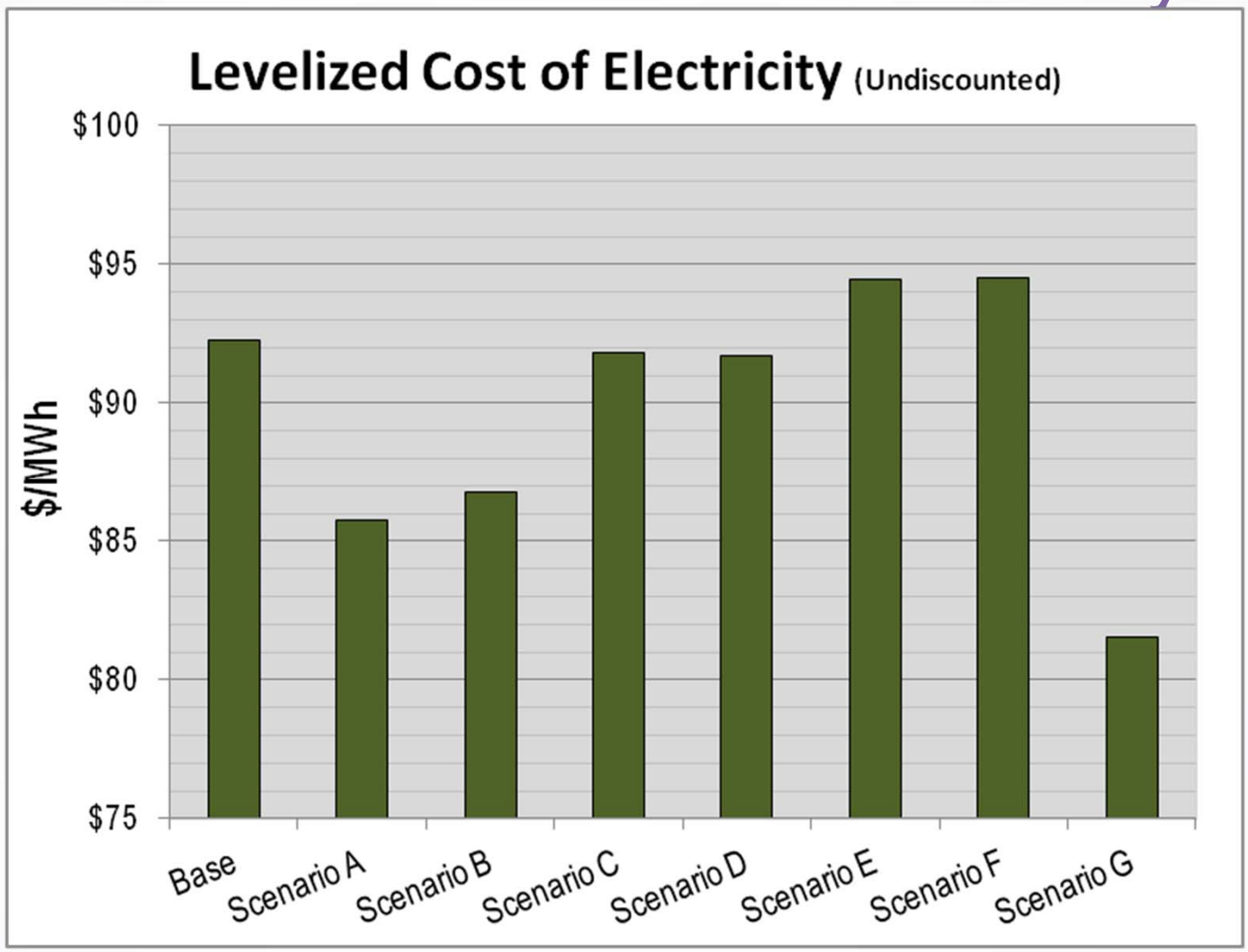
Sustainable Return on Investment ($M)



Sustainable Return on Investment (SROI)



Levelized Cost of Electricity



SIGNIFICANT COMMUNITY ENGAGEMENT

Post SROI Analysis Events

- Presented to various community groups
  - Riverview Group
  - MACC Policy Board
  - Downtown Development Authority
  - West Coast Chamber of Commerce Policy Committee
  - Haworth
  - HBPW Key Accounts Meeting (24 Companies)
- Public Comments received through P21 website
- Public Hearings on September 4 & 5
- Question and Answer Session on September 24

WHAT WE'VE HEARD FROM THE COMMUNITY

What Our Customers Said

- Embrace renewable energy, energy efficiency, and conservation (multiple comments)
- Conservation is far more cost effective and you should invest in that and efficiency before you invest in a new plant
- Move away from coal
- Move to natural gas if you must move away from coal
- Gas still has pollutants and contributes to global warming
- No fracking
- Include community members on all energy task forces; all meetings should be open to the public
- Consider potential for green job creation with renewables

What Our Customers Said (cont.)

- You are rushing this decision
- This process is taking too long
- You and the city are sneaking these proposals through the system; public hearings occurred during vacation season
- You are over-building the gas plant
- You should diversify generation options
- You are not publicizing your efforts enough
- Variance to projected demand and electric market pricing won't be picked up by gas price contingencies risk-tests
- Appreciate the open approach
- Good job

Key Accounts Meeting Review

- 24 Companies Represented
- Reviewed the SROI process and high level findings
- Used a response system to identify agreement with statements about the process and the staff recommendations
- 89% agree or strongly agree that the “combined recommendations regarding base load generation, location for the new resource, renewable energy agreements and the existing units at James De Young provide a comprehensive plan that will meet our community’s future energy needs.”

Other Public Comments

- Extensive input from the Sierra Club and other outside organizations / individuals
  - Comments and answers to questions were summarized and published on the P21 website.

Concern about amount of Natural Gas

	Scenarios A&B	Scenario G
Combined Cycle Size	78 MW	114 MW
Combined Heat & Power Size	30 MW	0 MW
Total Gas Capacity	108 MW	114 MW
Combined Cycle Cost	$147 Million	$182 Million
Combined Heat & Power Cost	$ 60 Million	$ 0 Million
Total Gas Generation Cost	$207 Million	$182 Million

The amount of gas generation in all three scenarios is essentially the same. However, Scenario G costs $25 Million less to build and has a higher energy efficiency for electric generation.

Concern about Scenario G Generation Overbuild

	Scenario A	Scenario B	Scenario G
Combined Cycle	78 MW	78 MW	114 MW
Combined Heat & Power	30 MW	30 MW	0 MW
Biomass Conversion	0 MW	22 MW	0 MW
Wind	0 MW	20 MW	0 MW
Bio-digester	0 MW	4 MW	0 MW
Solar	0 MW	8 MW	0 MW
Total New	**108 MW**	**162 MW**	**114 MW**
- Loss of James De Young	- 60 MW	- 60 MW	- 60 MW
Net of Retirements	**48 MW**	**102 MW**	**54 MW**

In Scenario A and G, the HBPW experiences a capacity deficiency by 2029.
In Scenario B, there is no deficiency through 2036.

HBPW Commitment to Energy Efficiency

	EO Revenue	EO Investments	KWh Goal	kWh Savings
2009	$ 383,179	$ 412,865	3,089,387	3,252,003
2010	$ 542,435	$ 682,760	4,849,100	5,480,600
2011	$ 705,136	$ 917,544	6,476,661	7,762,398
2012 Budget	$ 943,248	$ 1,448,815	9,356,393	TBD
Total to Date	$ 2,573,998	$ 3,461,984	23,771,541	

Using an average home consumption of 10,000 kWh per year, HBPW's EO program in 2012 will save the equivalent energy use of over 900 homes

Through 2011, the HBPW invested $382,000 (23.4%) more than revenue received in EO program investments and saved 2,079,853 (14.4%) more kWh than required. Equivalent to 200 homes annual usage.

HBPW Commitment to Renewable Energy

- 20-year contracts with numerous landfill gas generation sources throughout lower Michigan
- Long-term biomass generation contract
- Current arrangements meet or exceed PA295 requirements through 2018
- Spent hundreds of thousands of dollars on two wind developments
- Finalizing two purchased power agreements with wind developers
  - One 10-year and one 20-year
  - Potential of up to 15 MW in each contract
  - Would exceed requirements well beyond 2030

WHAT WE NEED TO CONSIDER

Power Supply Planning Considerations

- Sustainability
- Diversity of fuel
- Diversity of location
- Land use
- Resource size
- Availability of market power supply
- Ability to bond project
- Rate impact
- Access to high voltage, fuel supply and water

Staff Recommendations

Staff Recommendation – Base Load

- Pursue combined-cycle technology in a 2x1 configuration approximately 114 MW in size
  - Economy of scale
  - Operational efficiency
  - Additional heat available for district heating and snowmelt
  - Opportunities for collaboration with other municipals

Staff Recommendation – Location

- Preferred site would be other than the James De Young location
  - Constructability of site
  - Once-through cooling is not an option
  - Alternatives are closer to both the natural gas pipeline route and proposed district heating networks
  - Need to preserve access to high-voltage distribution and roads

Staff Recommendation – Renewables

- Finalize 10-year Power Purchase Agreement with E-ON Wildcat I for 15 MW of wind generation near Elwood, Indiana
  - Complements current portfolio of landfill gas and biomass resources
  - Excellent pricing without operational or development risk
  - Pay as power is received preserves capital for other investments

Staff Recommendation – Renewables

- Complete 20 year agreement with Exelon, Beebe Wind LLC, for approximately 17 MW of wind generation near Ithaca, Michigan
  - Pricing competitive with Wildcat I project
  - Dependent upon the extension of Production Tax Credits in their current form
  - Working to build a group of Michigan municipal entities to fully subscribe the development

Staff Recommendation – JDY

- No immediate capital investments in control technology to meet upcoming regulations
  - Unit 5 (28MW) will need to stop burning coal in next 3-4 years
  - Unit 3 (11 MW) and Unit 4 (22 MW)- Pending regulatory changes are being reconsidered by the EPA
  - Monitor regulations and technology improvements
  - Preserve $4.5MM of value by utilizing natural gas capability for all units

Staff Recommendation – Next Steps

- Engage services of Owner's Engineer
  - Begin preliminary engineering
  - Submit air quality permit
  - Begin major equipment procurement process
  - Develop project execution plan and RFP for design-build services
- Initiate site selection process for new unit
- Hire HT Engineering for gas pipeline design
- Procure fuel management services and begin hedge plan development for natural gas