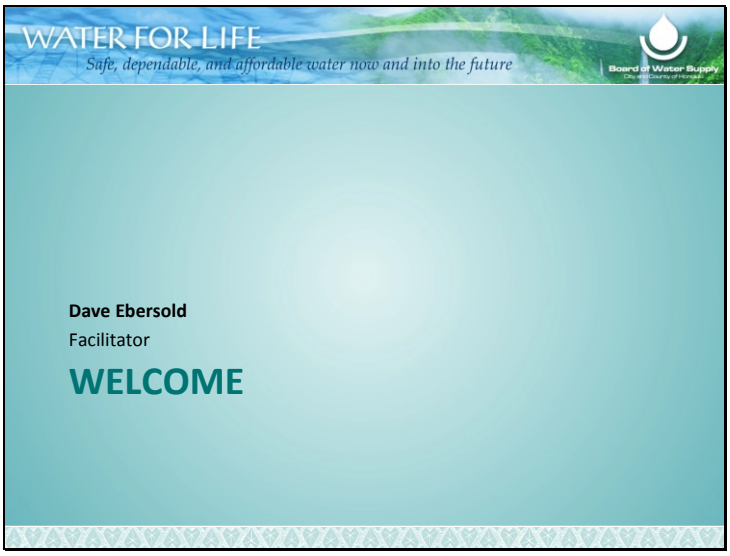
Slide 1


WATER FOR LIFE
Safe, dependable, and affordable water now and into the future
Board of Water Supply
Stakeholder Advisory Group
Board of Water Supply
City & County of Honolulu
Tuesday, November 15, 2016

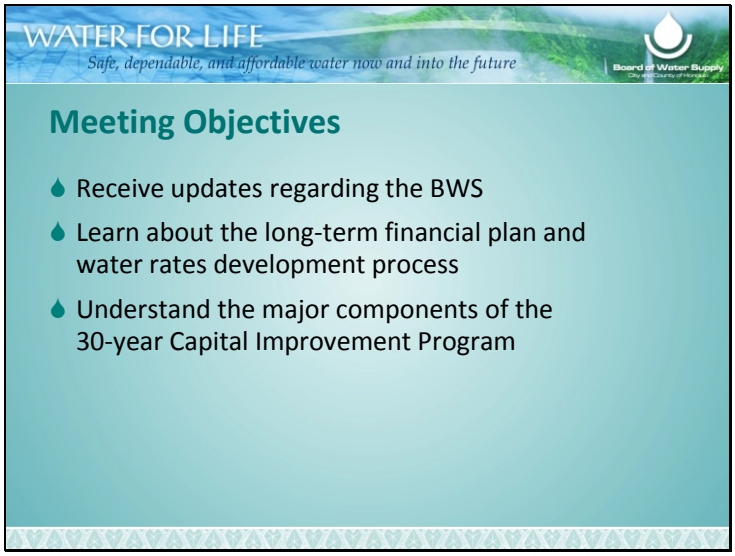
Slide 2


WATER FOR LIFE
Safe, dependable, and affordable water now and into the future
Board of Water Supply
Dave Ebersold
Facilitator
WELCOME

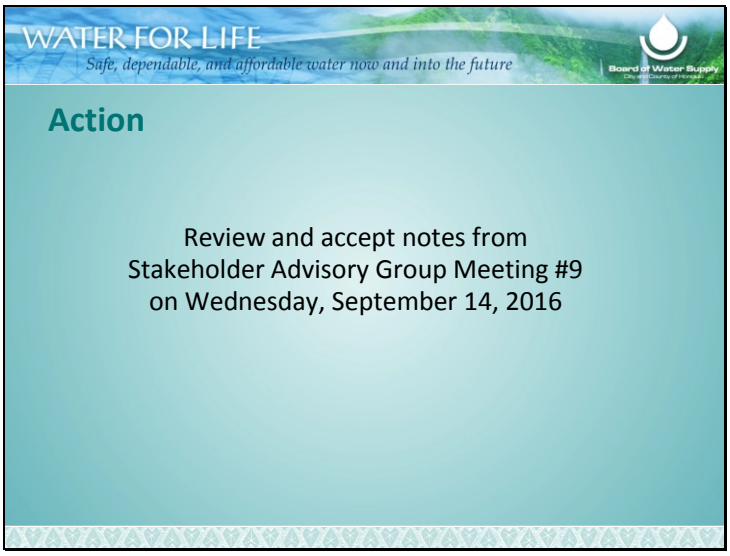
Slide 3


WATER FOR LIFE
Safe, dependable, and affordable water now and into the future
Board of Water Supply
Public Comments on Agenda Items

Slide 4


WATER FOR LIFE
Safe, dependable, and affordable water now and into the future
Board of Water Supply
Meeting Objectives
Receive updates regarding the BWS
Learn about the long-term financial plan and water rates development process
Understand the major components of the 30-year Capital Improvement Program

Slide 5


WATER FOR LIFE
Safe, dependable, and affordable water now and into the future
Board of Water Supply
Action
Review and accept notes from
Stakeholder Advisory Group Meeting #9
on Wednesday, September 14, 2016

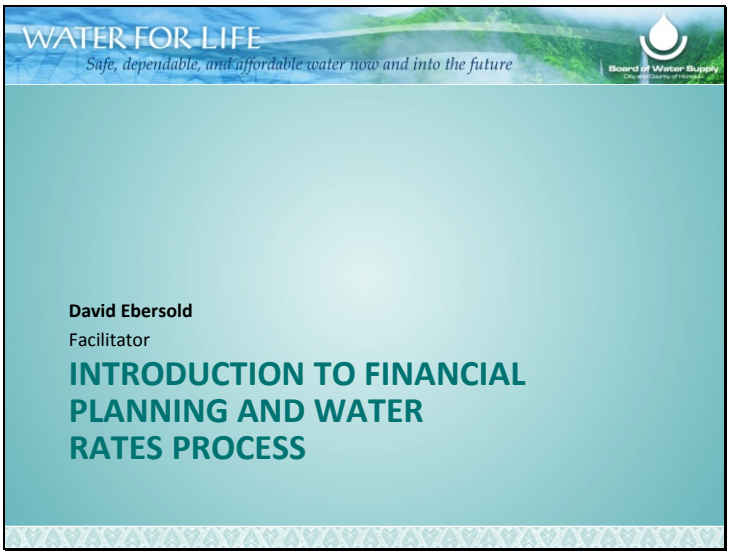
Slide 6


WATER FOR LIFE
Safe, dependable, and affordable water now and into the future
Board of Water Supply
Ernest Lau, P.E.
BWS Manager and Chief Engineer
BWS UPDATES

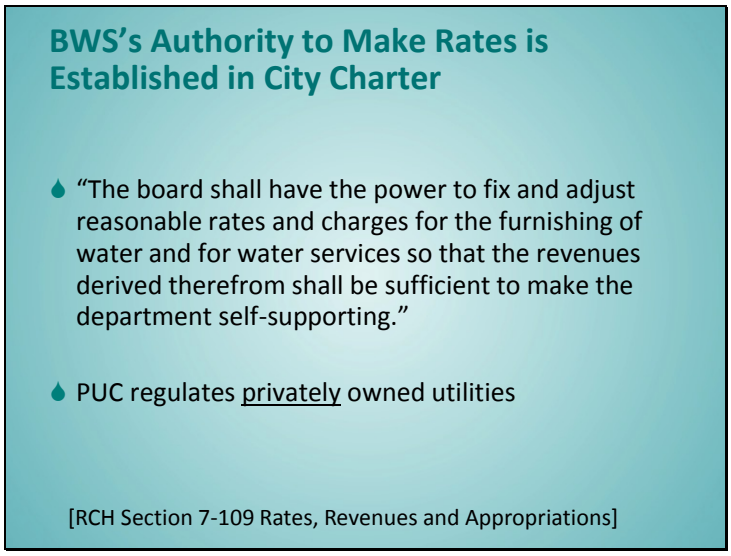
Slide 7


WATER FOR LIFE
Safe, dependable, and affordable water now and into the future
Board of Water Supply
Mahalo!
Questions & Answers
ENTRUSTED TO US TO
PRESERVE
FOR FUTURE GENERATIONS

Slide 8


WATER FOR LIFE
Safe, dependable, and affordable water now and into the future
Board of Water Supply
David Ebersold
Facilitator
INTRODUCTION TO FINANCIAL PLANNING AND WATER RATES PROCESS

Slide 9



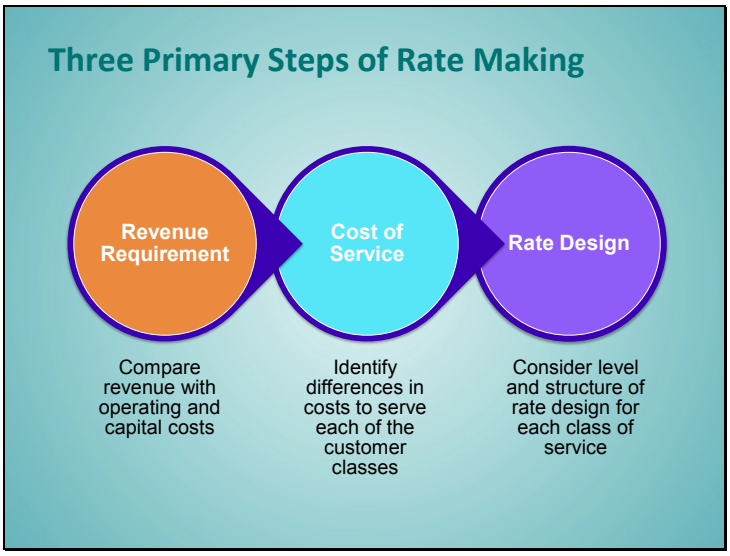
Examples of privately owned utilities include Hawaiian Electric, Hawaiian Telcom, Hawaii Gas, 38 private water and sewer companies in Hawaii.

Cost-Based Ratemaking is Intended to Support 3 Key Objectives for Utilities

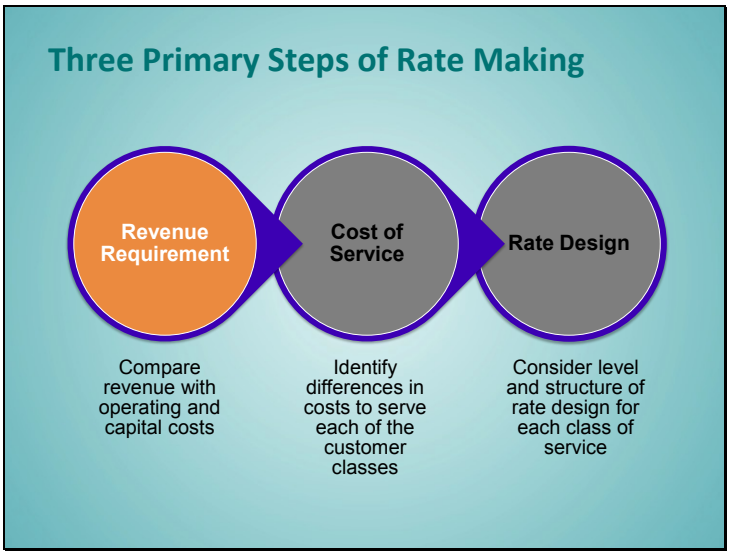
- Provide sufficient funding to build, operate, maintain and reinvest
- Provide safe and reliable drinking water and fire protection
- Allow for economic development and community sustainability

[American Water Works Association Manual M1, Principles of Water Rates, Fees and Charges, 6th Edition, 2012]

Slide 11


Three Primary Steps of Rate Making
Revenue Requirement
Cost of Service
Rate Design
Compare revenue with operating and capital costs
Identify differences in costs to serve each of the customer classes
Consider level and structure of rate design for each class of service

Slide 12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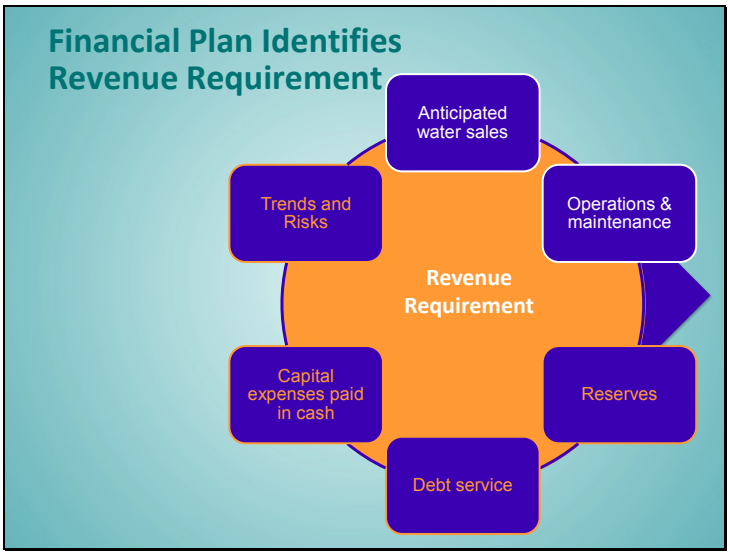
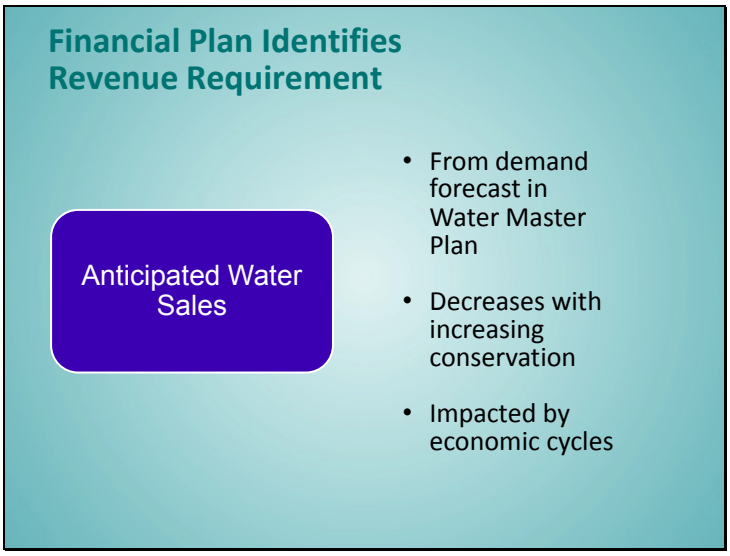
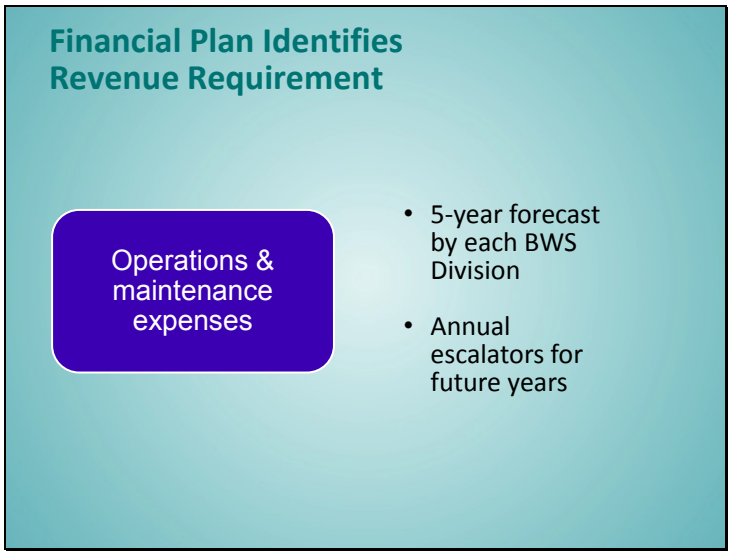
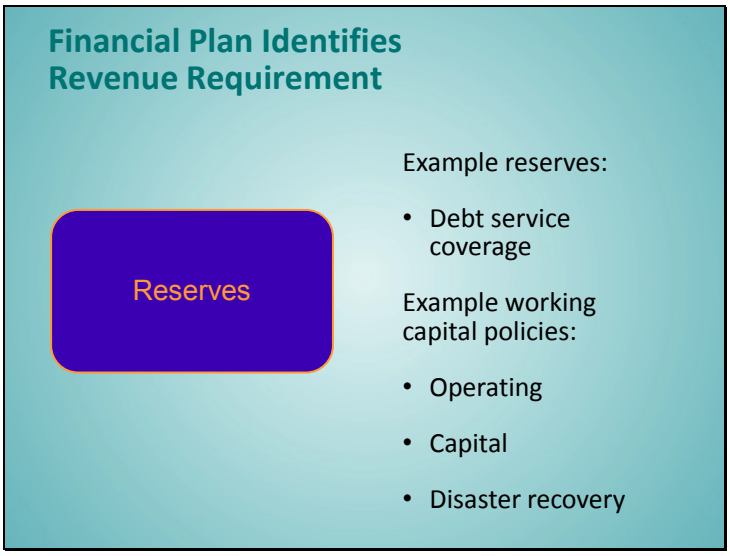
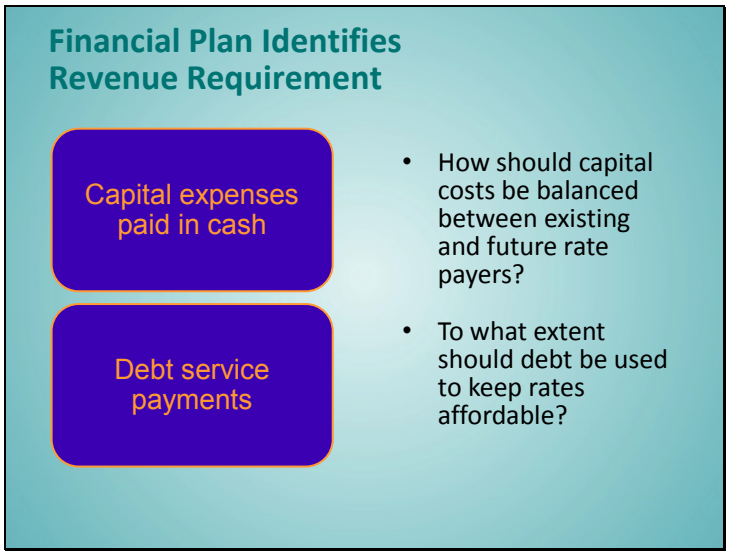
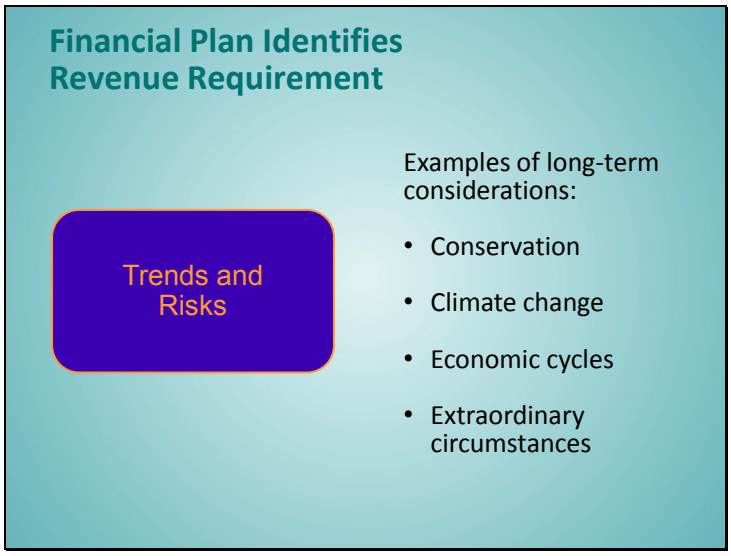

Financial Plan Identifies Revenue Requirement
Anticipated water sales
Operations & maintenance
Reserves
Debt service
Capital expenses paid in cash
Trends and Risks
Revenue Requirement


Financial Plan Identifies Revenue Requirement
Anticipated Water Sales
• From demand forecast in Water Master Plan
• Decreases with increasing conservation
• Impacted by economic cycles

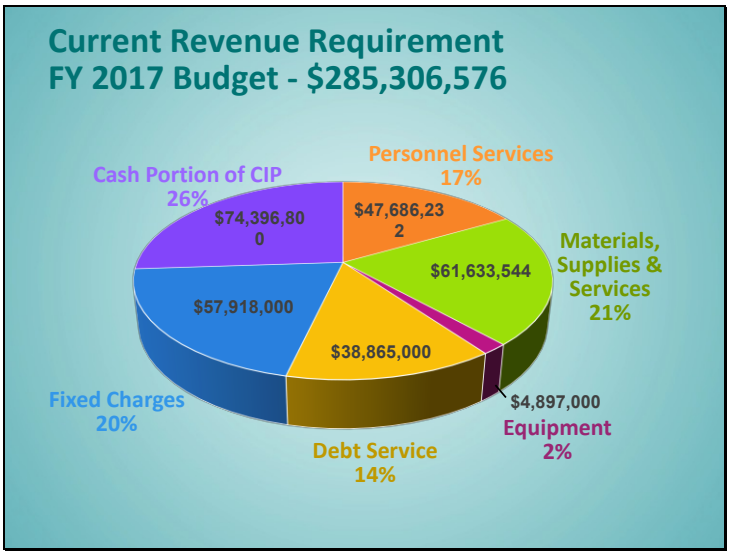

Financial Plan Identifies Revenue Requirement
Operations & maintenance expenses
• 5-year forecast by each BWS Division
• Annual escalators for future years


Financial Plan Identifies Revenue Requirement
Reserves
Example reserves:
• Debt service coverage
Example working capital policies:
• Operating
• Capital
• Disaster recovery

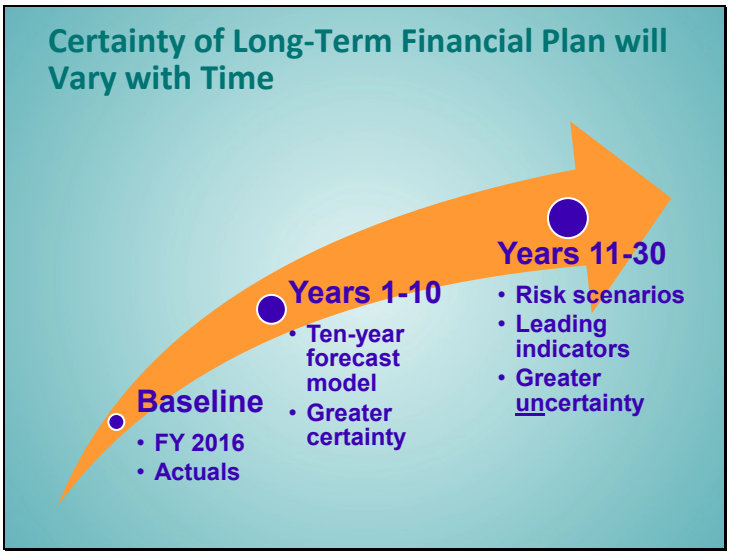

Financial Plan Identifies Revenue Requirement
Capital expenses paid in cash
Debt service payments
How should capital costs be balanced between existing and future rate payers?
To what extent should debt be used to keep rates affordable?


Financial Plan Identifies Revenue Requirement
Trends and Risks
Examples of long-term considerations:
• Conservation
• Climate change
• Economic cycles
• Extraordinary circumstances

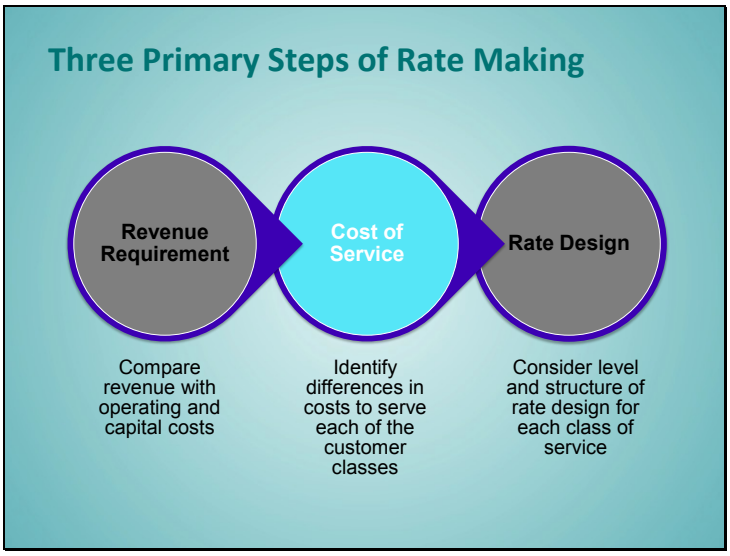
Slide 19


Current Revenue Requirement
FY 2017 Budget - $285,306,576
Personnel Services
17%
$47,686,232
Materials,
Supplies &
Services
21%
$61,633,544
$4,897,000
Equipment
2%
Debt Service
14%
$38,865,000
Fixed Charges
20%
$57,918,000
Cash Portion of CIP
26%
$74,396,800

Slide 20


Certainty of Long-Term Financial Plan will Vary with Time
Baseline
• FY 2016
• Actuals
Years 1-10
• Ten-year forecast model
• Greater certainty
Years 11-30
• Risk scenarios
• Leading indicators
• Greater uncertainty

Slide 21


Three Primary Steps of Rate Making
Revenue Requirement
Cost of Service
Rate Design
Compare revenue with operating and capital costs
Identify differences in costs to serve each of the customer classes
Consider level and structure of rate design for each class of service

Slide 22

Cost of Service Considers Differences Among BWS's Customer Classes

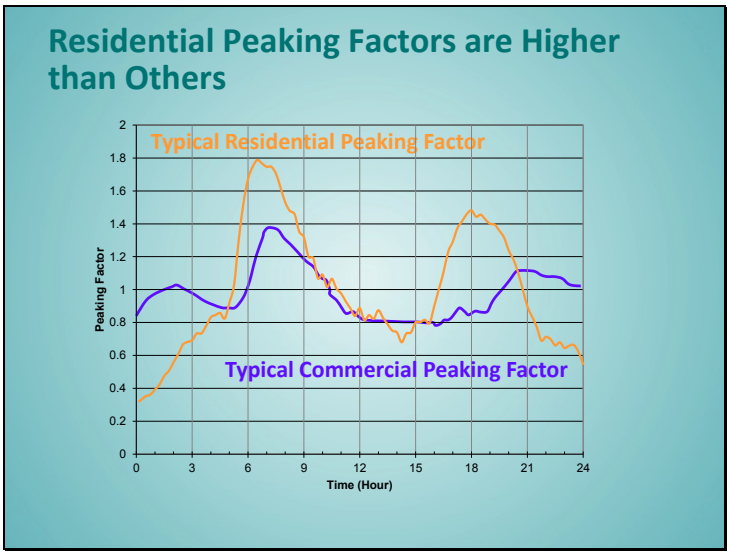
Single-Family

Multi-Family

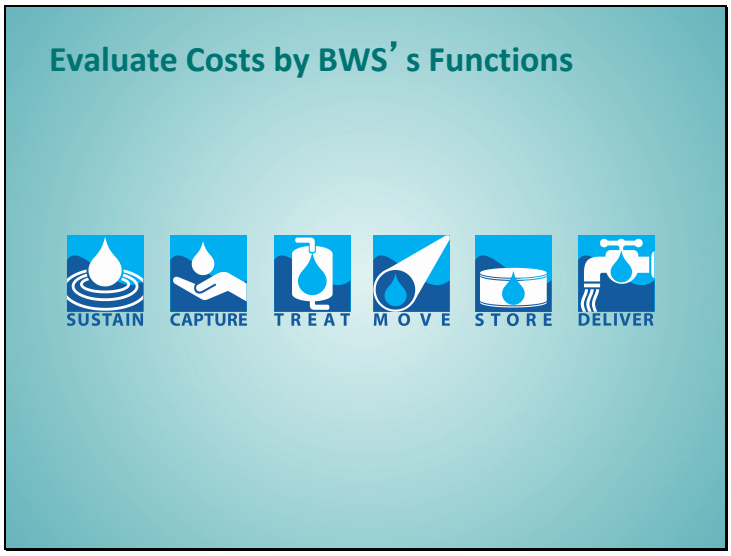
Commercial/Industrial

Agricultural

Slide 23


Residential Peaking Factors are Higher than Others
Typical Residential Peaking Factor
Typical Commercial Peaking Factor
Peaking Factor
Time (Hour)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
0
3
6
9
12
15
18
21
24

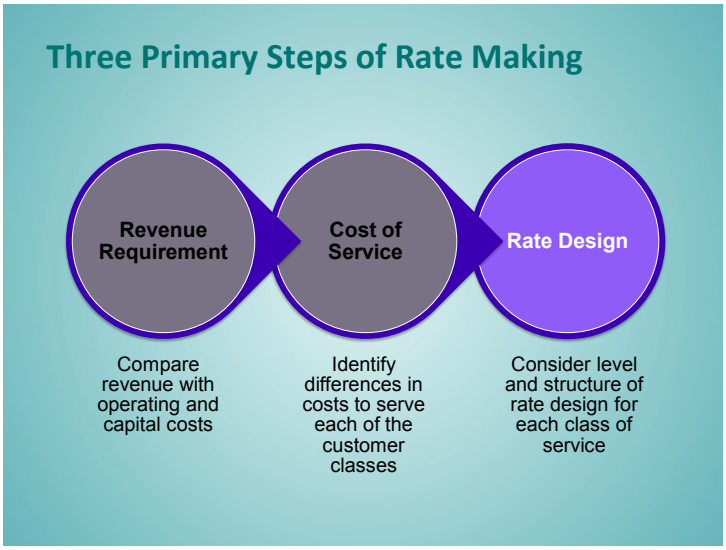
Slide 24


Evaluate Costs by BWS's Functions
SUSTAIN
CAPTURE
TREAT
MOVE
STORE
DELIVER

Allocate Functional Costs to Appropriate Cost Components

- Total usage
- Peak usage
- Customer meters and bills
- Direct fire protection
- Conservation and sustainability

Slide 26


Three Primary Steps of Rate Making
Revenue Requirement
Cost of Service
Rate Design
Compare revenue with operating and capital costs
Identify differences in costs to serve each of the customer classes
Consider level and structure of rate design for each class of service

Rate Design Process

- Define goals and objectives of the rate structure
- Evaluate alternatives to meet these goals and objectives
- Understand and communicate the potential effects to customers

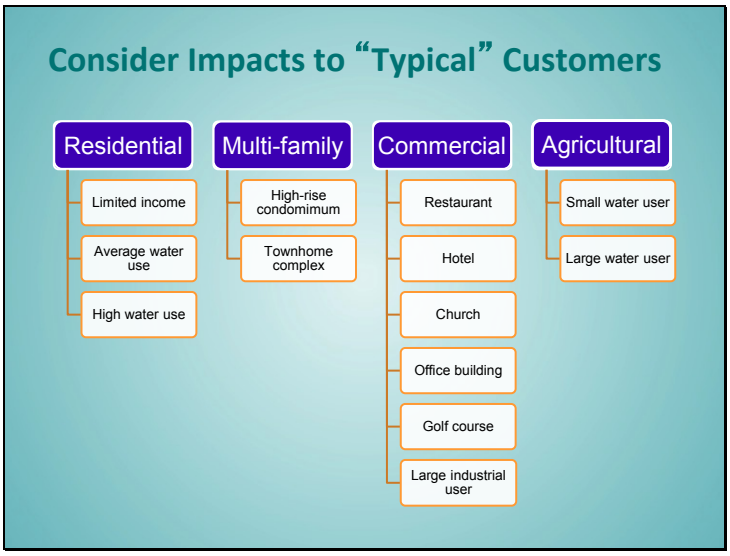
Examples of Rate Objectives

- Reliably provide required revenue
- Encourage efficient water use and conservation
- Promote fairness and equity
- Ensure affordability for economically disadvantaged
- Be easy to understand and administer
- Comply with all applicable laws

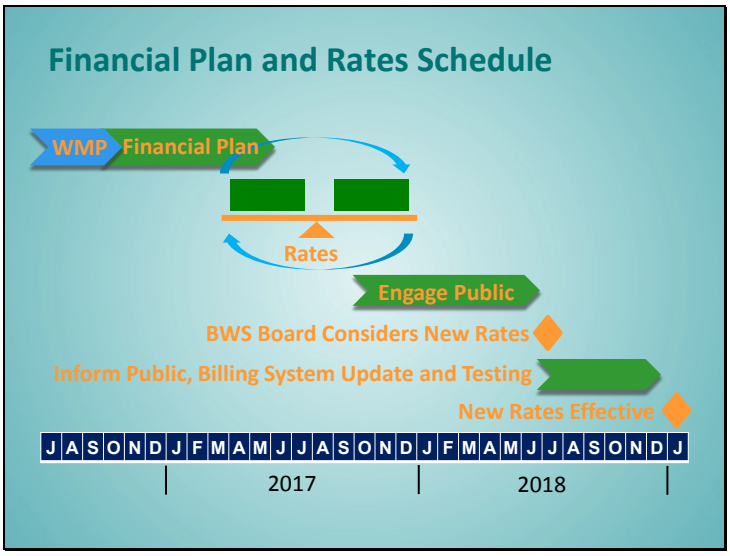
Evaluation will Utilize a 5-Year Water Rate Model

- Evaluate current structure
- Comprehensively look at all charges
- Consider how it could be improved to better achieve objectives

Slide 30


Consider Impacts to "Typical" Customers
Residential
Limited income
Average water use
High water use
Multi-family
High-rise condomimum
Townhome complex
Commercial
Restaurant
Hotel
Church
Office building
Golf course
Large industrial user
Agricultural
Small water user
Large water user

Slide 31


Financial Plan and Rates Schedule
WMP
Financial Plan
Rates
Engage Public
BWS Board Considers New Rates
Inform Public, Billing System Update and Testing
New Rates Effective
J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J
2017
2018

Slide 32

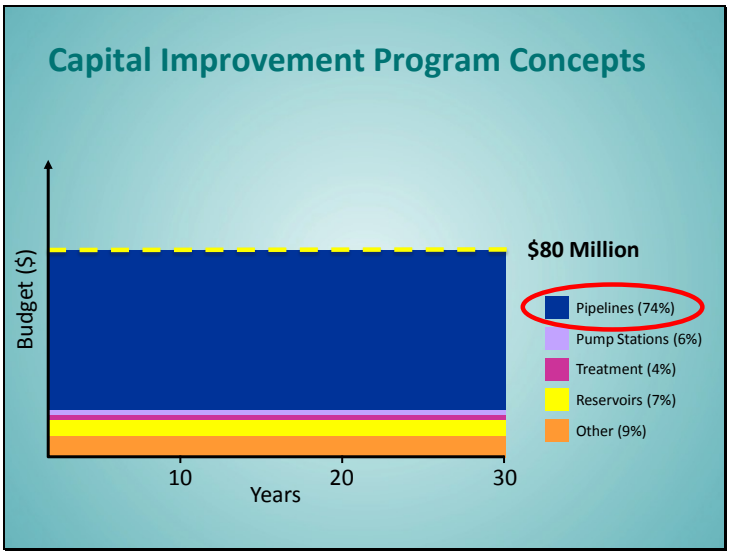

WATER FOR LIFE
Safe, dependable, and affordable water now and into the future
Board of Water Supply
Carl Lundin
Water Master Plan Team
30-YEAR CAPITAL IMPROVEMENT PROGRAM

Slide 33

"It is recommended that for the **near-term** the CIP continue at the **$80 million per year level**. This investment level is **adequate to address high priority** renewal and replacement projects in all asset classes over a 10-year window, **with the exception of pipelines**. Only a portion of high priority pipelines can be addressed at this funding level. Pipelines are the largest component of the BWS assets and pipeline health indicators (number of main breaks per year) are currently favorable. It should be recognized, however, that the **current pipeline replacement rate** will result in the average age of the pipelines increasing, meaning **pipeline breaks will eventually begin to rise**."

[BWS Water Master Plan, Oct. 2016]

Slide 34



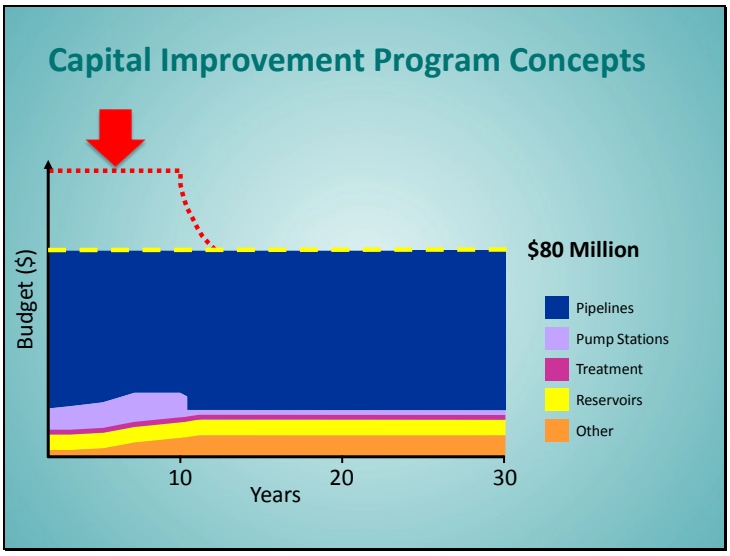
One approach to developing the 30-year CIP is to fit within a given constraint, in this case $80M/year, and still address all the types of water system assets (pipelines, pump stations, etc.).

Issues with this approach include:

- High priority improvements are pump stations, reservoirs and treatment facilities. The width of the budget allocations ("swim lanes") is adequate for reservoirs and treatment facilities. However, a larger (wider swim lane) is needed to accommodate pump stations (shown here in light purple).

- $73 million of pump stations over 10 years is about $7M/year.

Slide 35



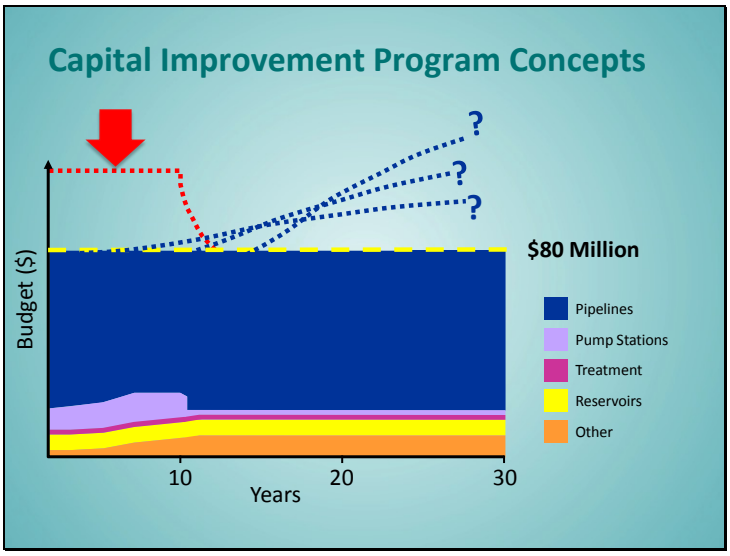
If we "widen" the swim lane (budget allocation) for pump stations to accommodate high and medium priority projects, the result is shown here.

Pump stations are critical to the operation of the water system. Whereas a pipeline failure can be repaired in a matter of hours, replacement of a failed pump or motor can take months. That is why BWS has "standby" equipment, but keeping the BWS's 400 pumps ready to go requires significant investment.

Issues with this approach:

- All of the high priority pipelines cannot be addressed in a 10-year timeframe. In essence, these projects get "pushed out" further in time as shown here.

Slide 36



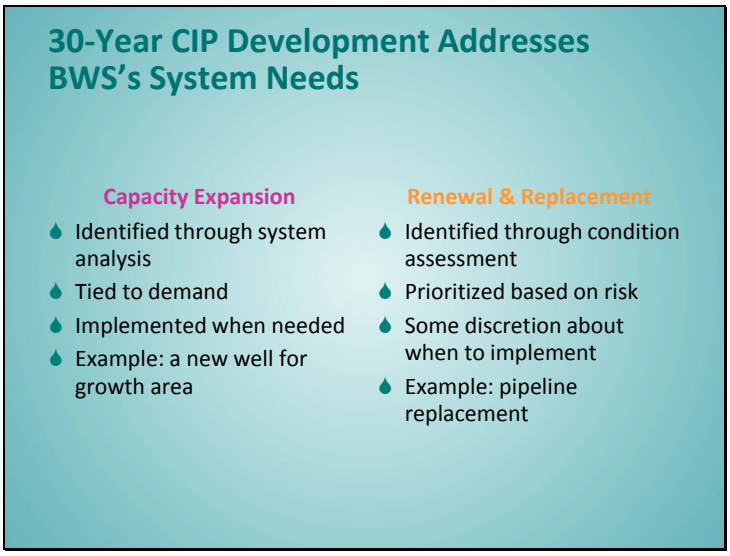
Questions that this approach creates include:

Is deferring the replacement of high risk pipes to more than 10 years acceptable?

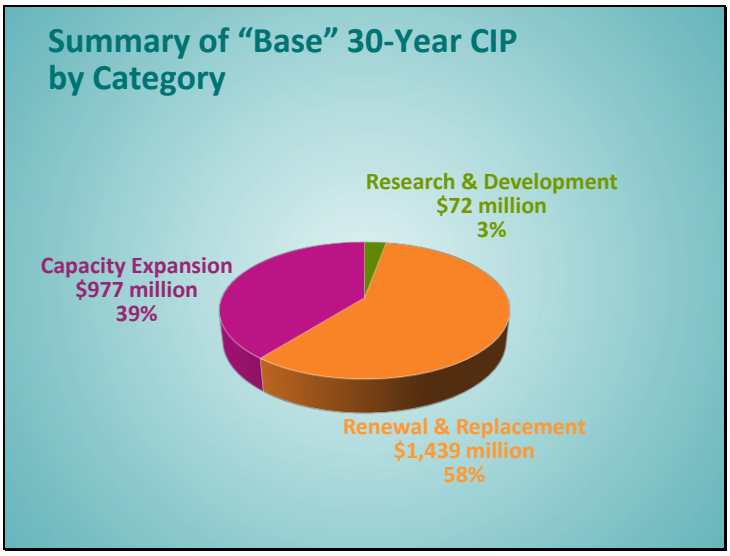
Or,

Should the BWS consider an increase of its CIP expenditures over time to allow more pipes to be replaced sooner?

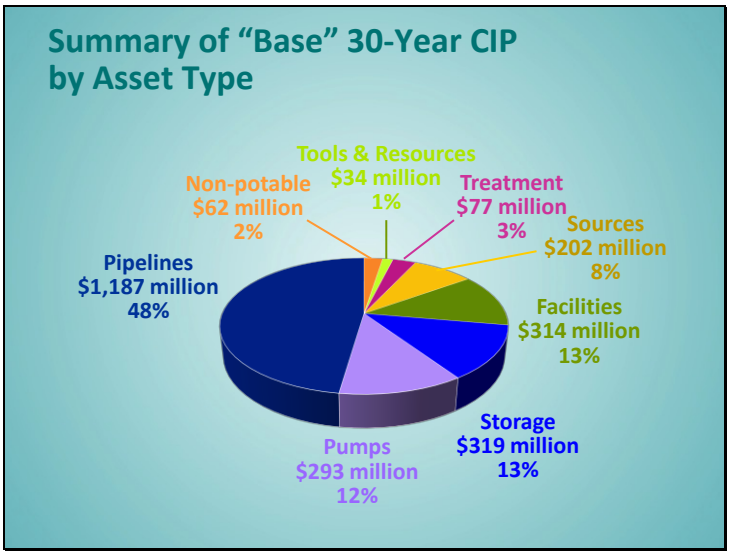
- If so when do you start?
- In general, the later you start increasing rates, the faster they have to increase and often, a higher level of investment is required to achieve the same long-term objectives.


30-Year CIP Development Addresses BWS's System Needs
Capacity Expansion
Identified through system analysis
Tied to demand
Implemented when needed
Example: a new well for growth area
Renewal & Replacement
Identified through condition assessment
Prioritized based on risk
Some discretion about when to implement
Example: pipeline replacement

Slide 38


Summary of "Base" 30-Year CIP by Category
Research & Development
$72 million
3%
Capacity Expansion
$977 million
39%
Renewal & Replacement
$1,439 million
58%

Slide 39



Pipelines make up 74% of the replacement value of the system. Constraining the "Base" 30-year CIP to $80 million per year results in a long-term underinvestment in pipeline renewal and replacement (R&R).

Principles of Infrastructure Renewal & Replacement

- Nothing lasts forever
- Without renewal/replacement, asset is guaranteed to fail at some time
- On shorter-term, can focus funding on greatest needs
- Can accommodate year-to-year fluctuations as needed (resource availability, permitting, etc.)
- Over the lifespan of the system, must replace the entire value

Over the Lifespan of the System, Must Renew/Replace it Entirely

Item	*Capital Cost (millions)*	*Lifespan (years)*
Sources	$1,300	150
Pumps	$400	40
Treatment	$300	40
Storage	$1,250	100
Pipelines	$12,300	100
Facilities	$330	60
TOTAL	**$15,880**	

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Water System Annual Replacement

Item	*Capital Cost (millions)*	*Lifespan (years)*	*Annual R&R (millions)*	*% of Total*
Sources	$1,300	150	$8.7	5%
Pumps	$400	40	$10.0	6%
Treatment	$300	40	$7.5	4%
Storage	$1,250	100	$12.5	7%
Pipelines	$12,300	100	$123.0	74%
Facilities	$330	60	$5.5	3%
TOTAL	**$15,880**		**$167**	**100%**

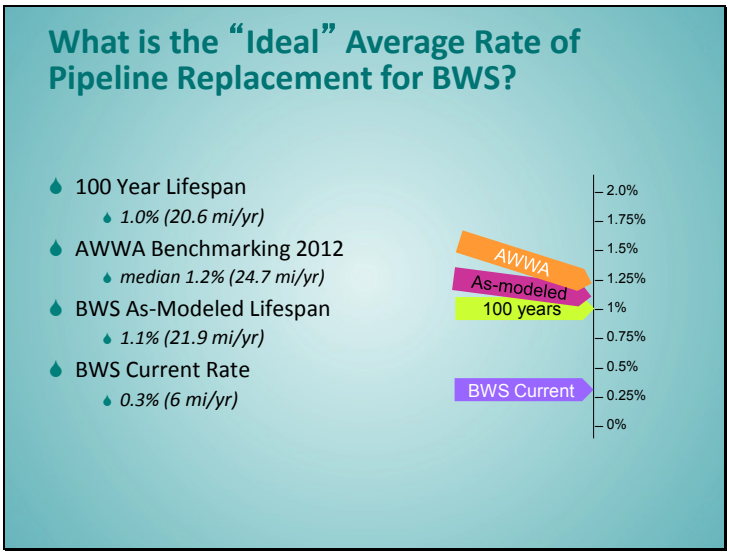
Over the full lifespan of the system, R&R must average at least $167 million.

Note that extending lifespan of all types of assets provides the benefit of reducing annual pipeline renewal and replacement (R&R) costs.

Water System Annual Replacement

Item	Annual R&R (millions)	% of Total	"Base" 30-Year CIP	% of Total
Sources	$8.7	5%	$6.8	8%
Pumps	$10.0	6%	$9.8	12%
Treatment	$7.5	4%	$2.6	3%
Storage	$12.5	7%	$10.6	13%
Pipelines	$123.0	74%	$39.6	48%
Facilities	$5.5	3%	$13.7	16%
TOTAL	**$167**	**100%**	**$82.9**	**100%**

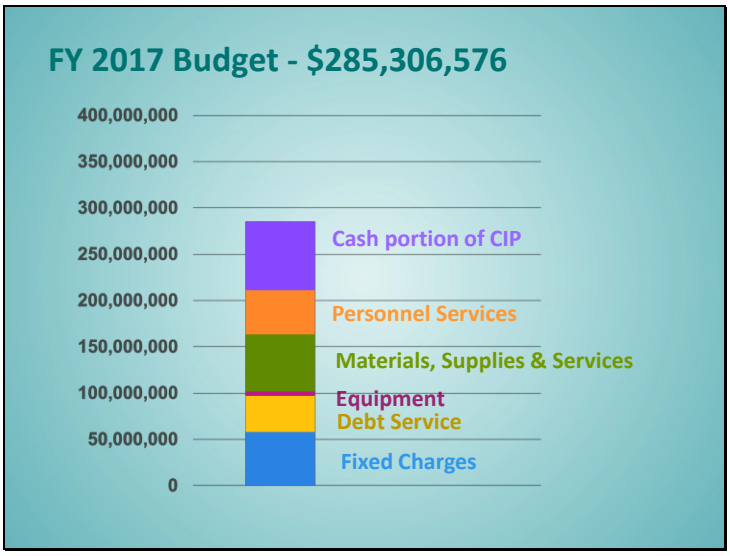
Slide 44



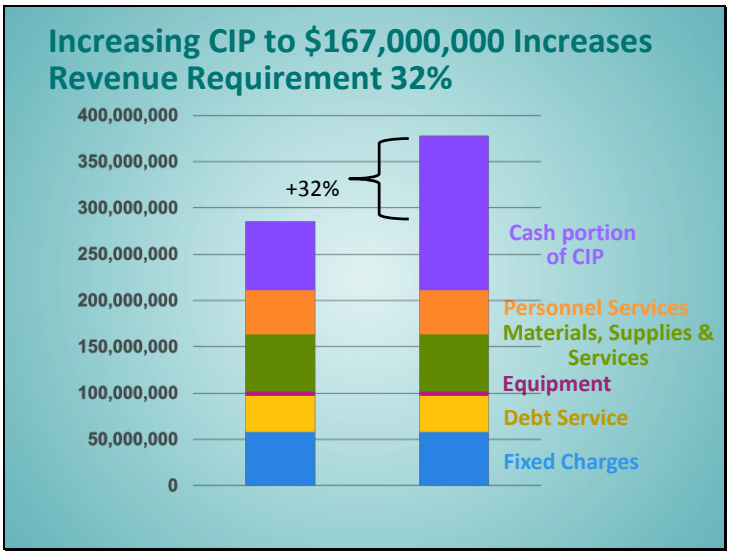
The rate of pipeline replacement is expressed above as a % of the overall system and assumes the system will continue to grow at the same rate it has in the last decade.

The current BWS rate of replacement reflects the fact that pipes are relatively young. The average pipeline age is 40 years.

Slide 45


FY 2017 Budget - $285,306,576
400,000,000
350,000,000
300,000,000
250,000,000
200,000,000
150,000,000
100,000,000
50,000,000
0
Cash portion of CIP
Personnel Services
Materials, Supplies & Services
Equipment
Debt Service
Fixed Charges

Slide 46



The CIP budget would have to be essentially doubled from $80 million/year to reflect the $167 million needed to match the life span level of investment. (See previous slide: Water System Annual Replacement.)

If all of that were funded with cash and no debt financing, the revenue requirement would need to increase about 32%. The use of debt financing would reduce this amount.

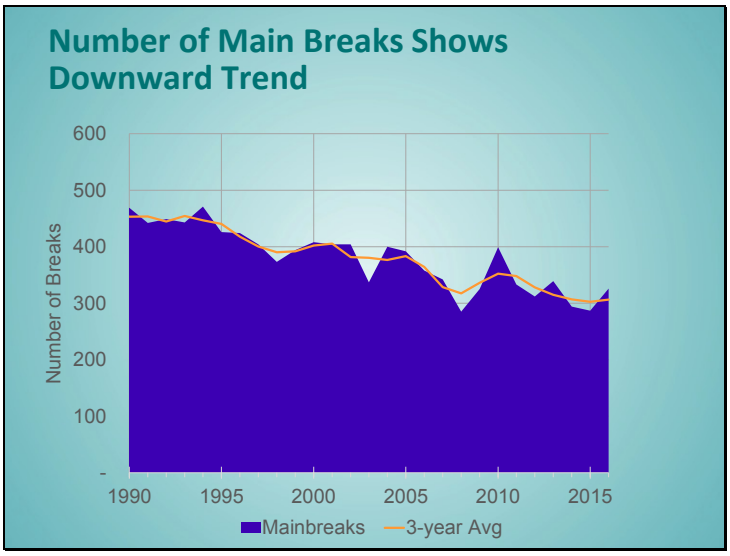
The decisions about pipeline replacement are the largest driver of future rate changes. This is why we are emphasizing pipelines in today's discussion.

Slide 47

BWS Pipelines are about Average

- Nearly 2,100 miles of pipe
- Average age 40 years (as of 2015)
- Currently 300 main breaks per year
- Breaks are about the national average
- Allows us to keep rates lower
- Currently replacing at about 6 miles per year

Slide 48


Number of Main Breaks Shows Downward Trend
600
500
400
300
200
100
-
Number of Breaks
1990
1995
2000
2005
2010
2015
Mainbreaks
3-year Avg

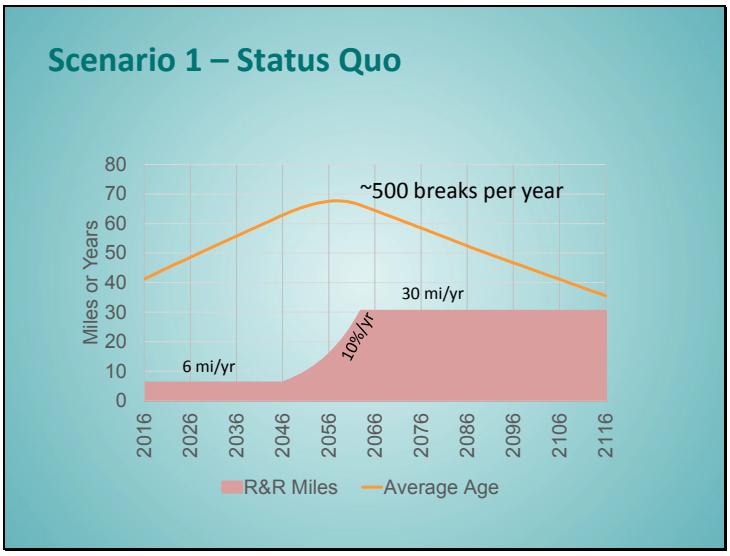
How Soon does BWS Need to Ramp Up Pipeline Replacement?

- Is 300 breaks per year too many?
- Is more than 300 acceptable?
- Do we need to invest in reducing them below 300?
- What if that cost an additional $100 million per year?

Initial Consideration of Financial Plan Alternatives

- Develop scenarios that "bracket" the desired level of service and spending
- Replace all 2,100 miles of pipe over 100 years, but
  - Different rates,
  - Different pipe ages,
  - Different main breaks rates, and
  - Different customer impacts
- Financial results and main break projections for the preferred scenarios will be developed and presented to the Group
  - Scenario 1 – "Base" 30-year CIP, status quo
  - Scenario 2 – Moderate ramp-up to 1% annual replacement rate
  - Scenario 3 – Reduce main breaks by replacing highest risk pipes as soon as possible

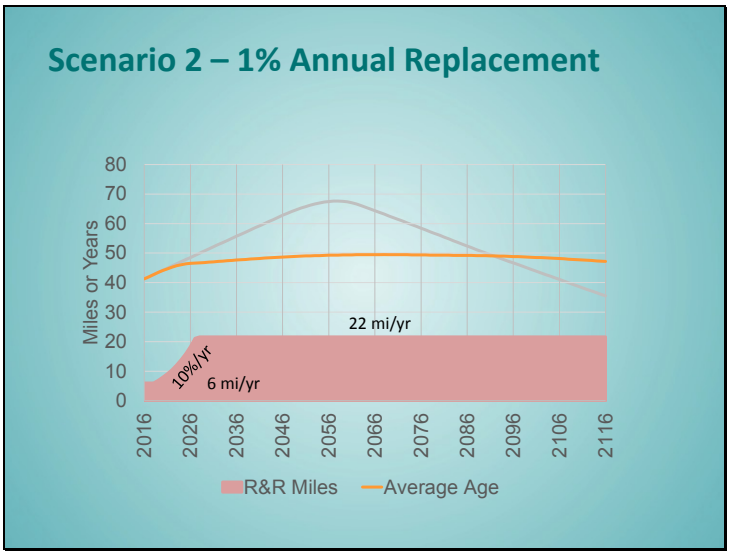
Slide 51



Scenario 1 maintains the current $80M/yr. (or 6 mi/yr.) CIP over the 30-year horizon, then ramps up to 30mi/yr. to replace all 2,100 miles of pipe in the century.

This scenario results in rapidly increasing age of pipes until the 2050s, peaking at nearly 70 years. Based on trend analysis of historical BWS data, we would expect about 500 main breaks per year at this age.

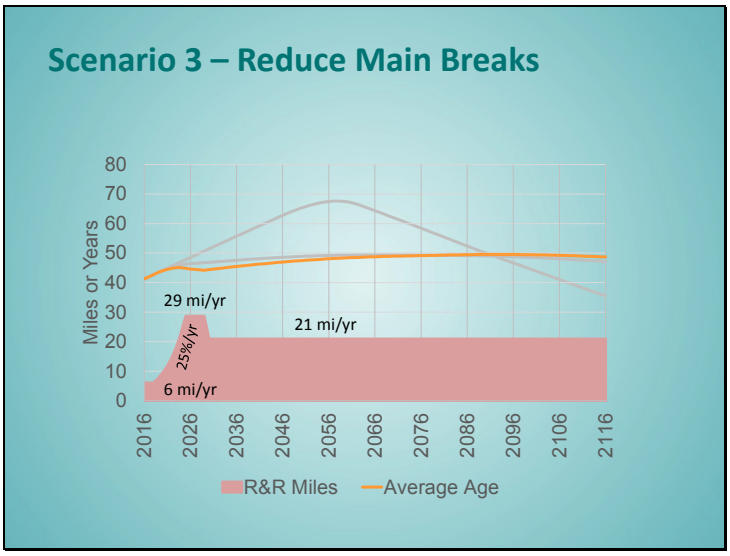
Slide 52



Scenario 2 ramps up at 10% per year to about 22mi./yr. to replace all 2,100 miles of pipe in the century.

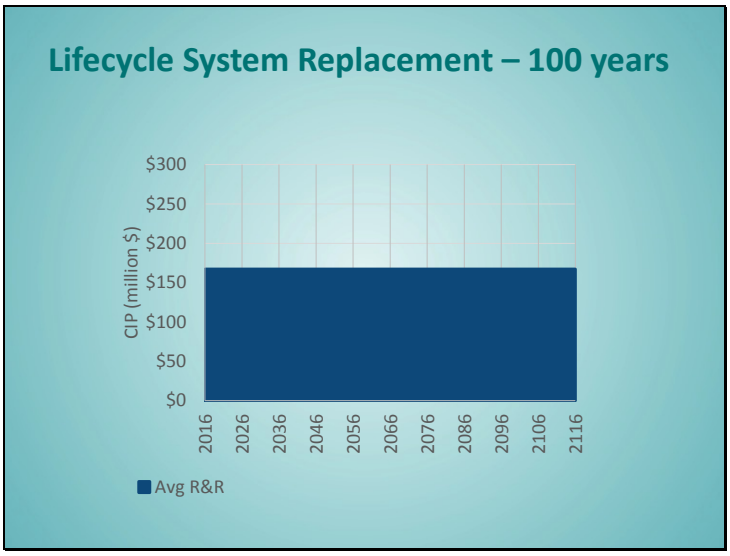
This scenario results in a flattening of the age of pipes until around 50, as expected at a 1% rate of replacement.

Slide 53

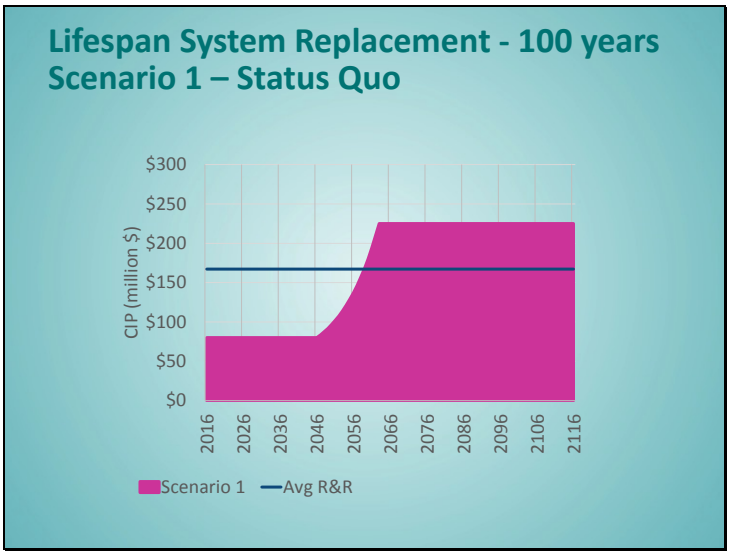


Scenario 3 ramps up very quickly in the first few years in order to more quickly replace "high risk" pipelines. A finding of the Water Master Plan was that if enough of the "high risk" pipelines could be replaced quickly, main breaks would be expected to decrease.

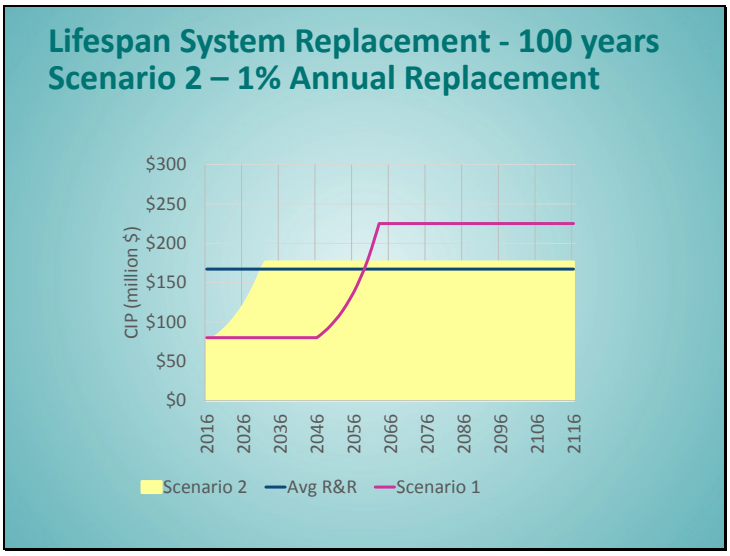
Slide 54


Lifecycle System Replacement – 100 years
$300
$250
$200
$150
$100
$50
$0
CIP (million $)
2016
2026
2036
2046
2056
2066
2076
2086
2096
2106
2116
Avg R&R

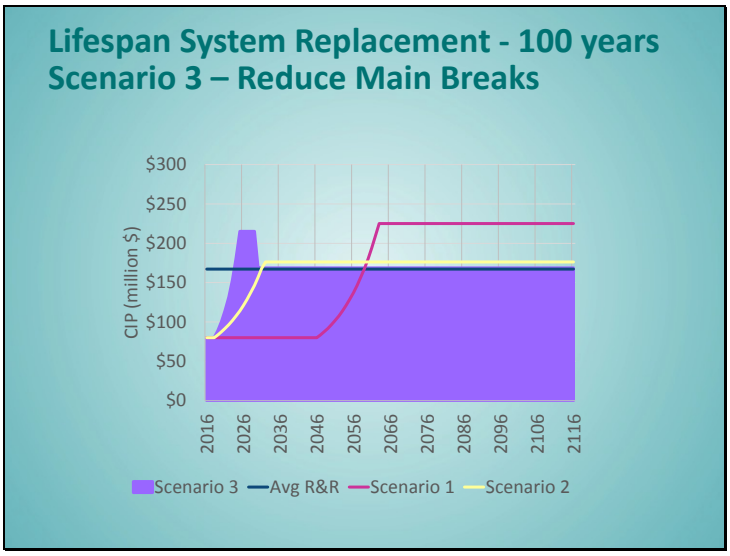
Slide 55


Lifespan System Replacement - 100 years
Scenario 1 – Status Quo
$300
$250
$200
$150
$100
$50
$0
CIP (million $)
2016
2026
2036
2046
2056
2066
2076
2086
2096
2106
2116
Scenario 1
Avg R&R

Slide 56


Lifespan System Replacement - 100 years
Scenario 2 – 1% Annual Replacement
$300
$250
$200
$150
$100
$50
$0
CIP (million $)
2016
2026
2036
2046
2056
2066
2076
2086
2096
2106
2116
Scenario 2
Avg R&R
Scenario 1

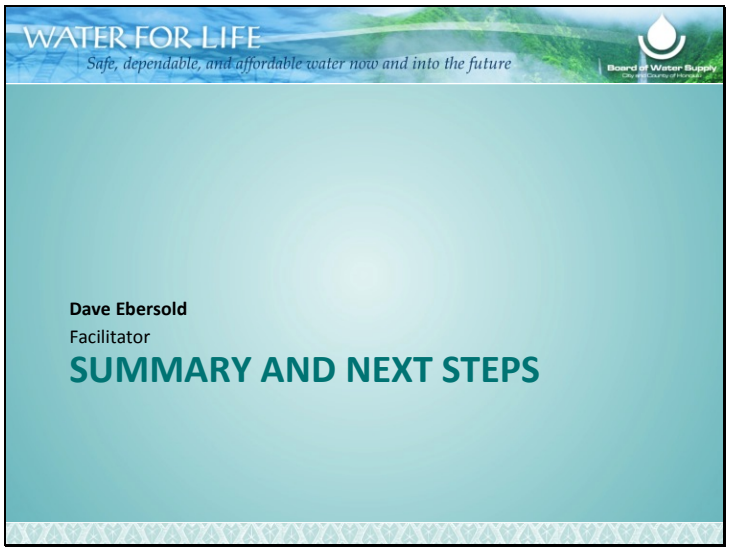
Slide 57


Lifespan System Replacement - 100 years
Scenario 3 – Reduce Main Breaks
$300
$250
$200
$150
$100
$50
$0
CIP (million $)
2016
2026
2036
2046
2056
2066
2076
2086
2096
2106
2116
Scenario 3
Avg R&R
Scenario 1
Scenario 2

Slide 58


WATER FOR LIFE
Safe, dependable, and affordable water now and into the future
Board of Water Supply
Mahalo!
Questions & Answers
ENTRUSTED TO US TO
PRESERVE
FOR FUTURE GENERATIONS

Slide 59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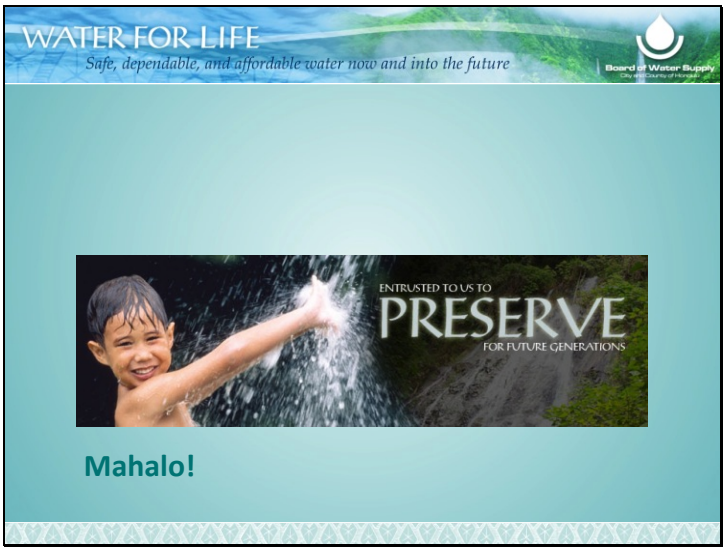
Board of Water Supply
Dave Ebersold
Facilitator
SUMMARY AND NEXT STEPS

Slide 60

Other Items

- Next Meeting
  Tuesday, January 10
  4:00 – 6:30 pm
  Blaisdell Center
- 2017 meeting schedule

Slide 61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