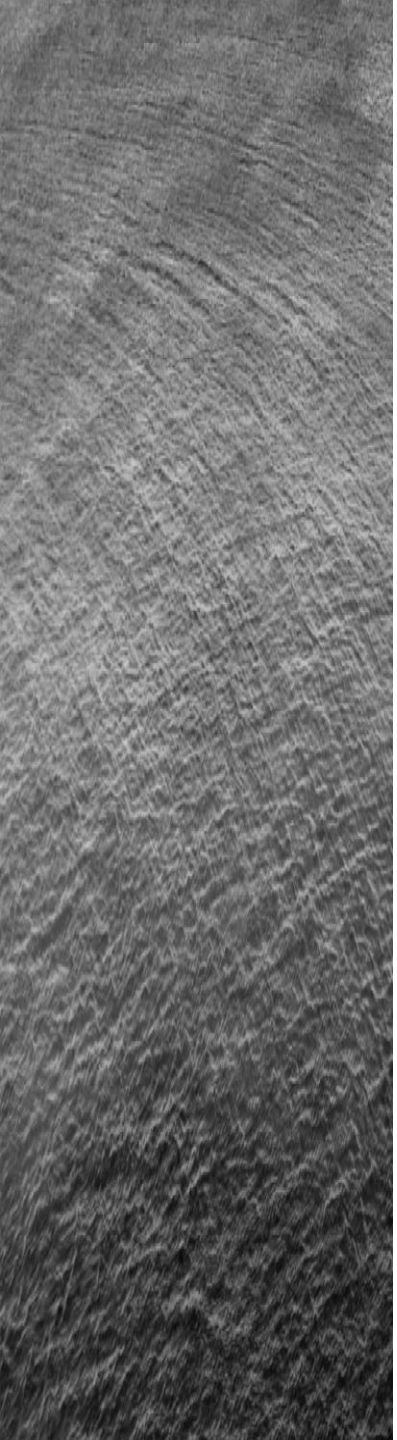


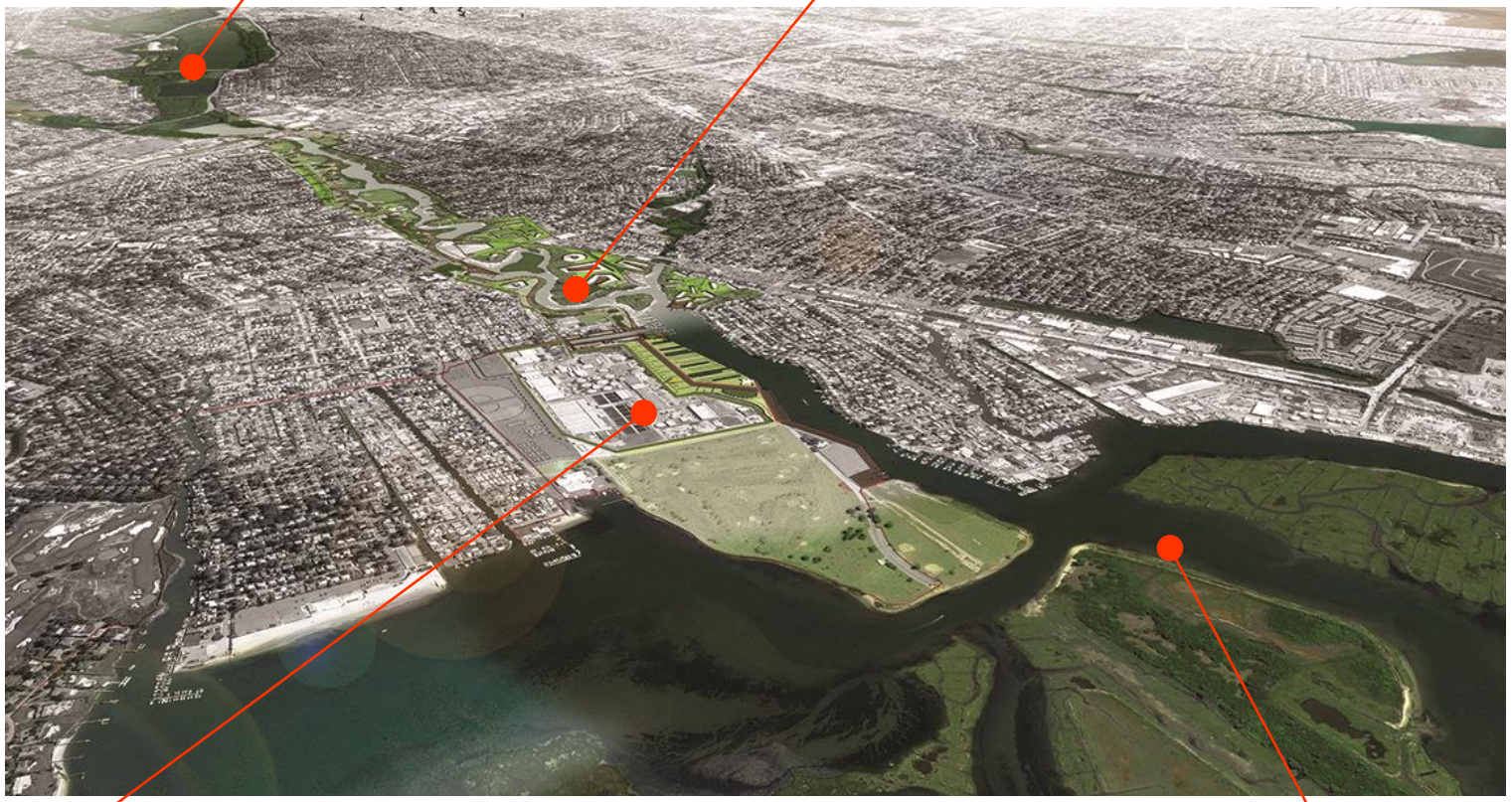
IUWM Financial + Economic Module

Simulation Game

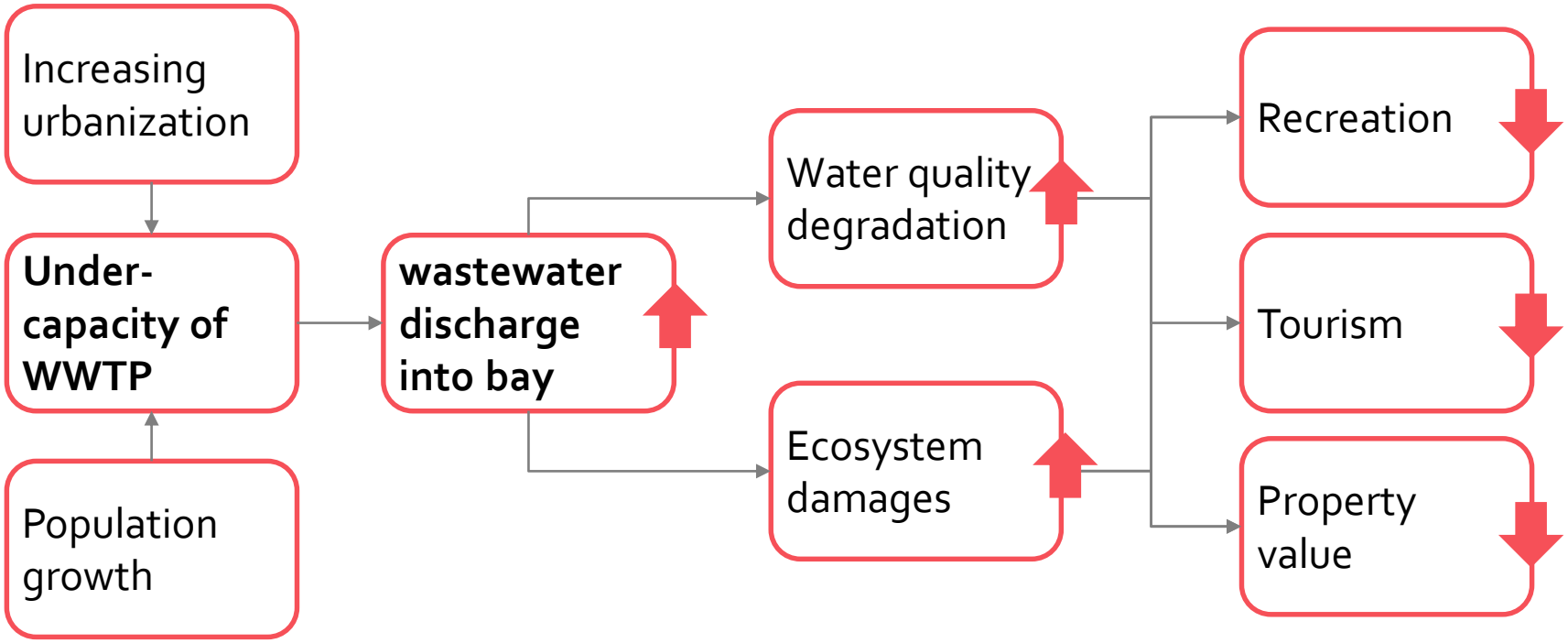
Introduction Round 1


Welcome!
…to the expert session of
Bay City's
Water Management Investment
Program

Bay City – a growing city in the delta



Bay City is facing problems with regard to urban development and wastewater



Your task and your budget

- Your responsibility:
  the water management investment program

- Your budget (based on results of a revenue study):
  - Annual revenue stream of $ 1 million over the coming 30 years (from levies/ taxes)
  - Available for investments in capacity expansion of the WWTP

- Your task:
  Determine the optimal solution for the wastewater problem

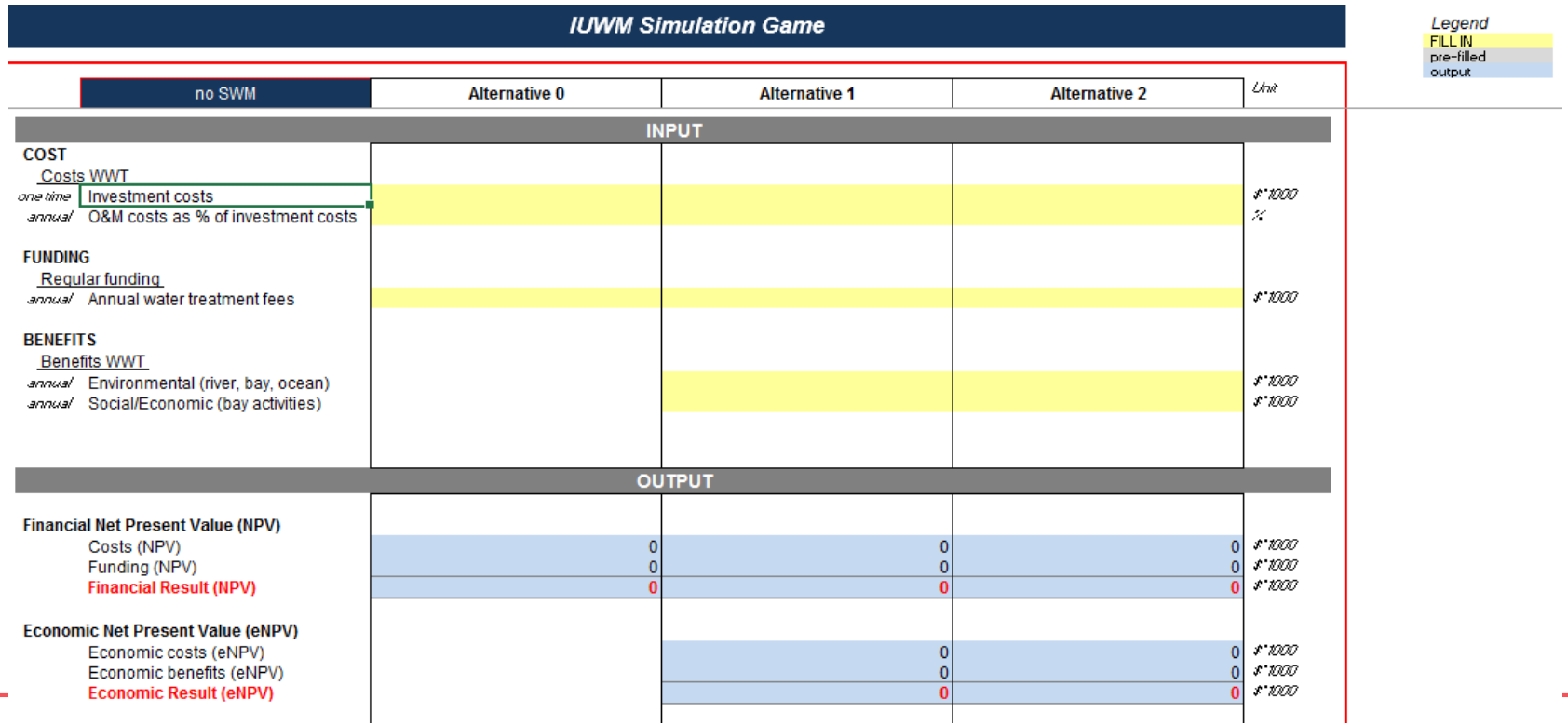
Alternatives and choices

- The working group responsible for developing alternative technical investment programs came up with *three technically feasible alternatives*

- We now need an assessment of these alternatives from an **economic and financial perspective**

Round 1: how to

- Description of case, alternatives & economic analysis
- XL tool: one per table
- Results on the scoring sheet: one per table



IUWM Simulation Game

Legend: FILL IN; pre-filled; output

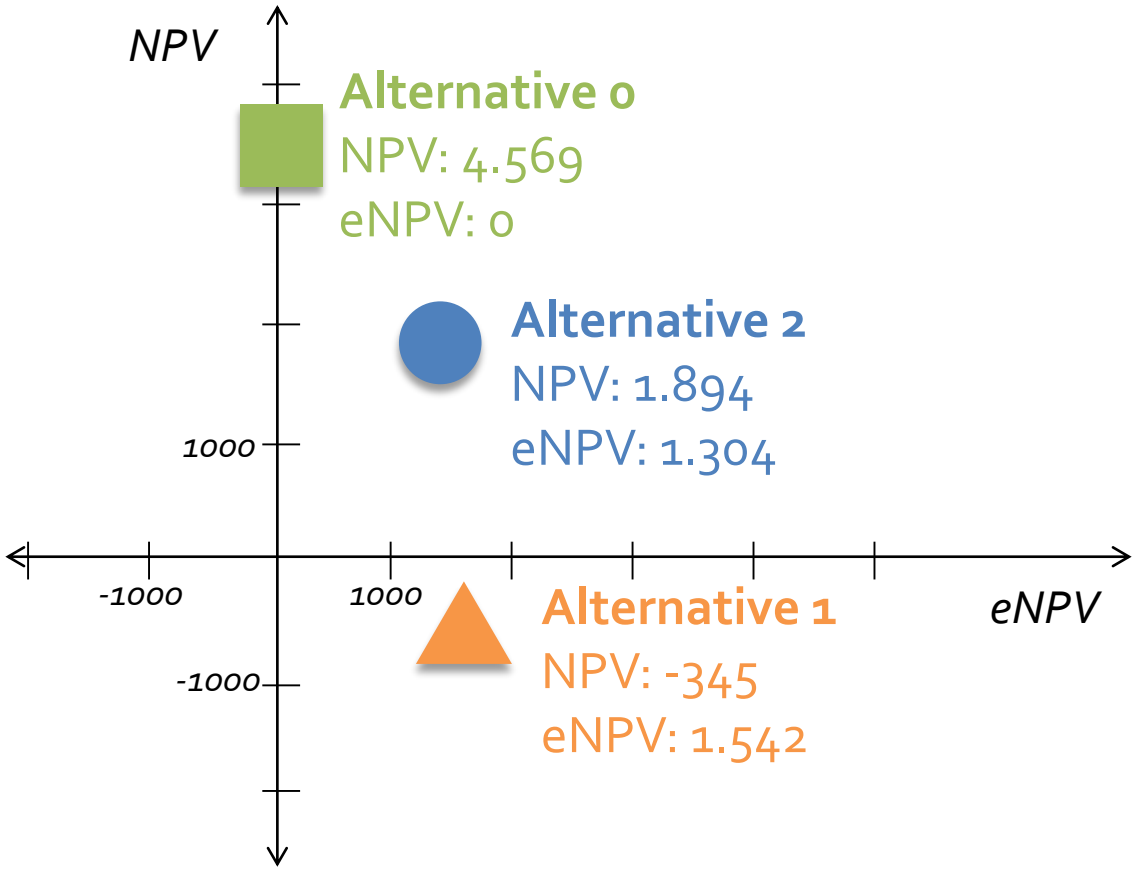
	no SWM	Alternative 0	Alternative 1	Alternative 2	Unit
INPUT					
COST					
Costs WWT					
one time	Investment costs				$*1000
annual	O&M costs as % of investment costs				%
FUNDING					
Regular funding					
annual	Annual water treatment fees				$*1000
BENEFITS					
Benefits WWT					
annual	Environmental (river, bay, ocean)				$*1000
annual	Social/Economic (bay activities)				$*1000
OUTPUT					
Financial Net Present Value (NPV)					
	Costs (NPV)	0	0	0	$*1000
	Funding (NPV)	0	0	0	$*1000
	Financial Result (NPV)	0	0	0	$*1000
Economic Net Present Value (eNPV)					
	Economic costs (eNPV)		0	0	$*1000
	Economic benefits (eNPV)		0	0	$*1000
	Economic Result (eNPV)		0	0	$*1000

IUWM Financial + Economic Module

Simulation Game

Round 1 – Results

Results

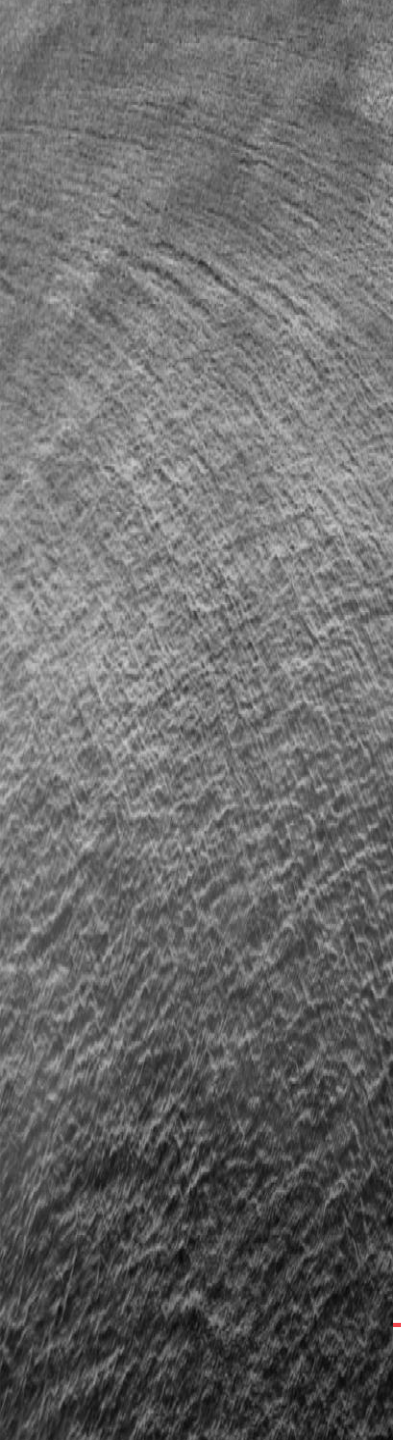

NPV
Alternative 0
NPV: 4.569
eNPV: 0
Alternative 2
NPV: 1.894
eNPV: 1.304
1000
-1000
1000
-1000
eNPV
Alternative 1
NPV: -345
eNPV: 1.542

Lessons learned

- ✓ Financial feasibility is not just about investment costs, but also about life cycle costs, as well as revenues.
- ✓ The "without project" alternative is not just "doing nothing", often some action is required in a situation with autonomous growth (population, economy)
- ✓ The economically optimal solution is not always the same as the financially optimal solution, but economic result can be a justification for government contribution, which then improves financial feasibility.

In real life…

- ✓ …there is uncertainty about pretty much all parameters in financial and economic feasibility analyses.
- ✓ …several factors – especially benefits – cannot be quantified or monetized, but are still relevant in decision making.
- ✓ …this typically leads to ranges of monetized outcomes and qualitative discussions of additional considerations.



IUWM Financial + Economic Module

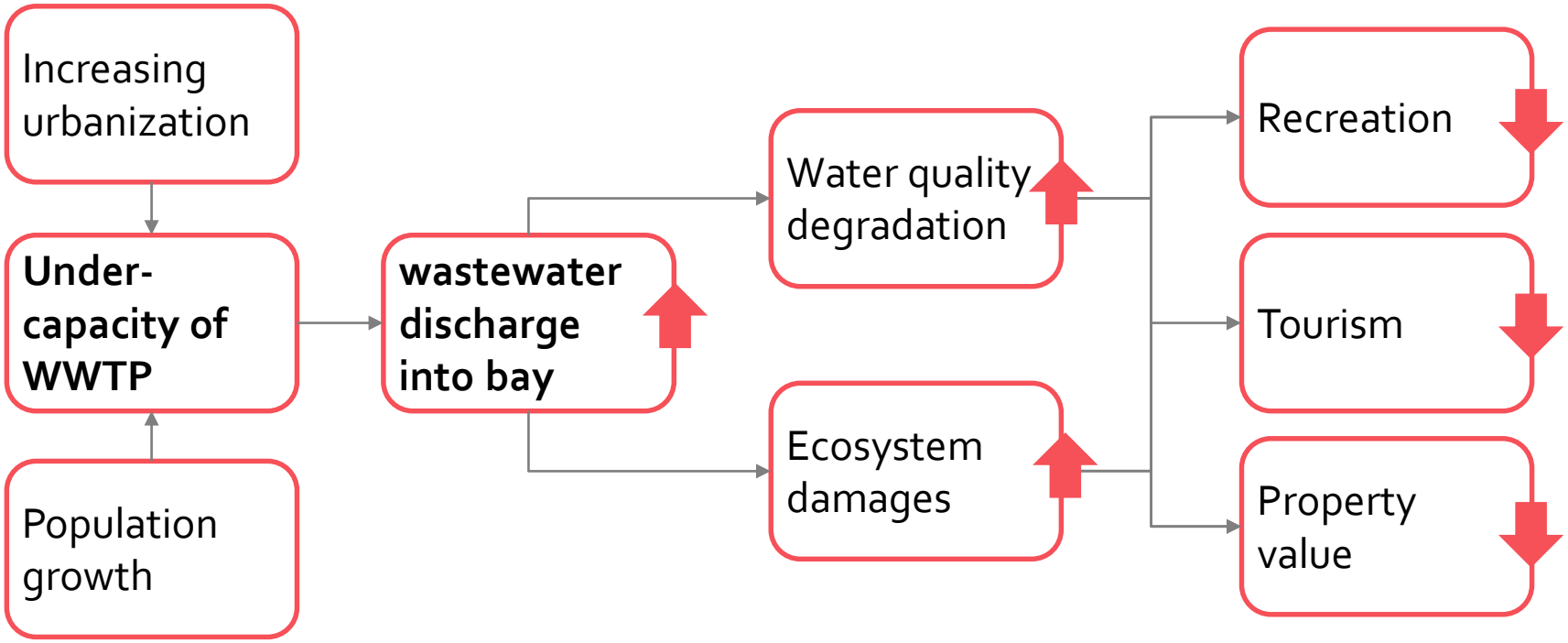
Simulation Game

Introduction Round 2

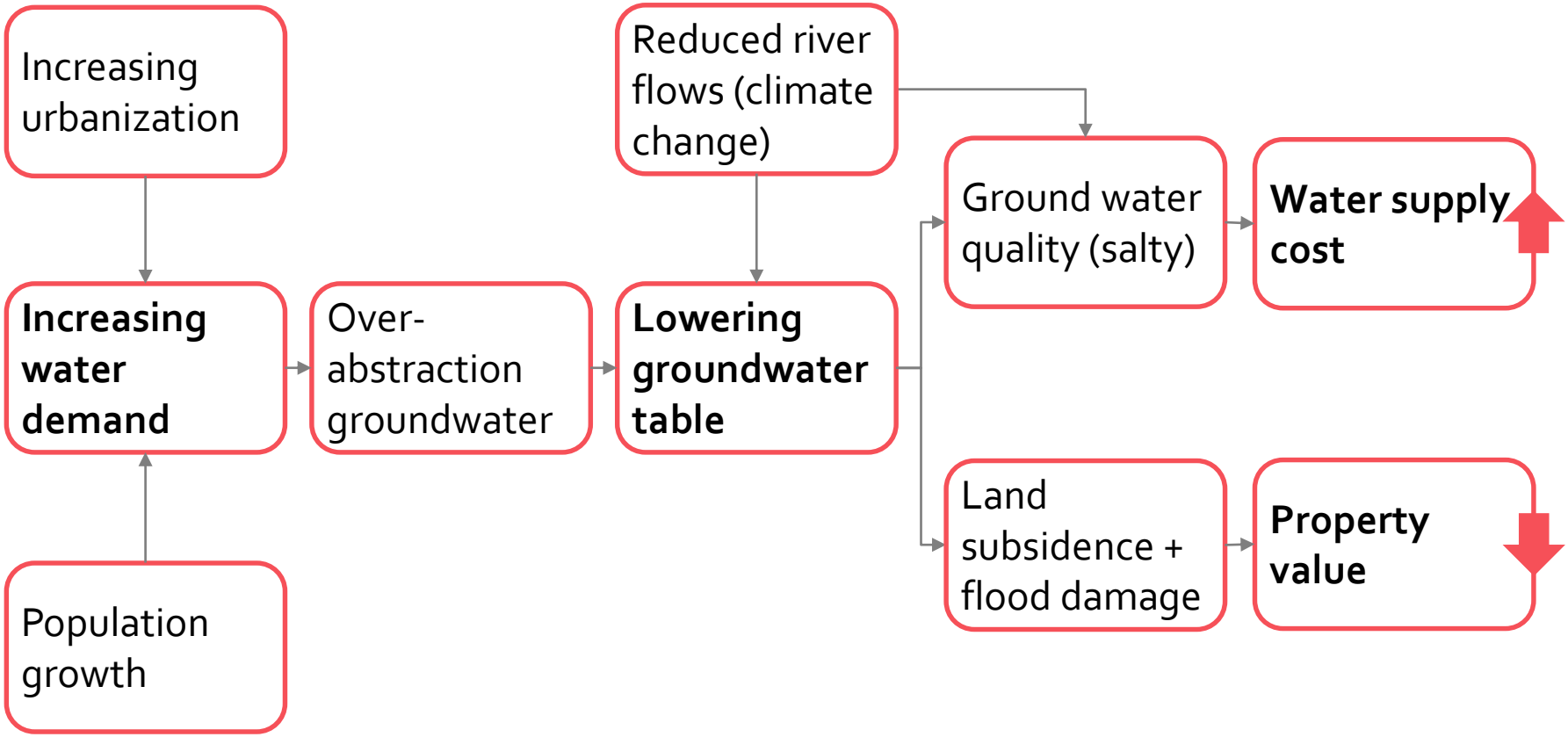
Welcome!

…to the 2nd expert session of Bay City's Water Management Investment Program

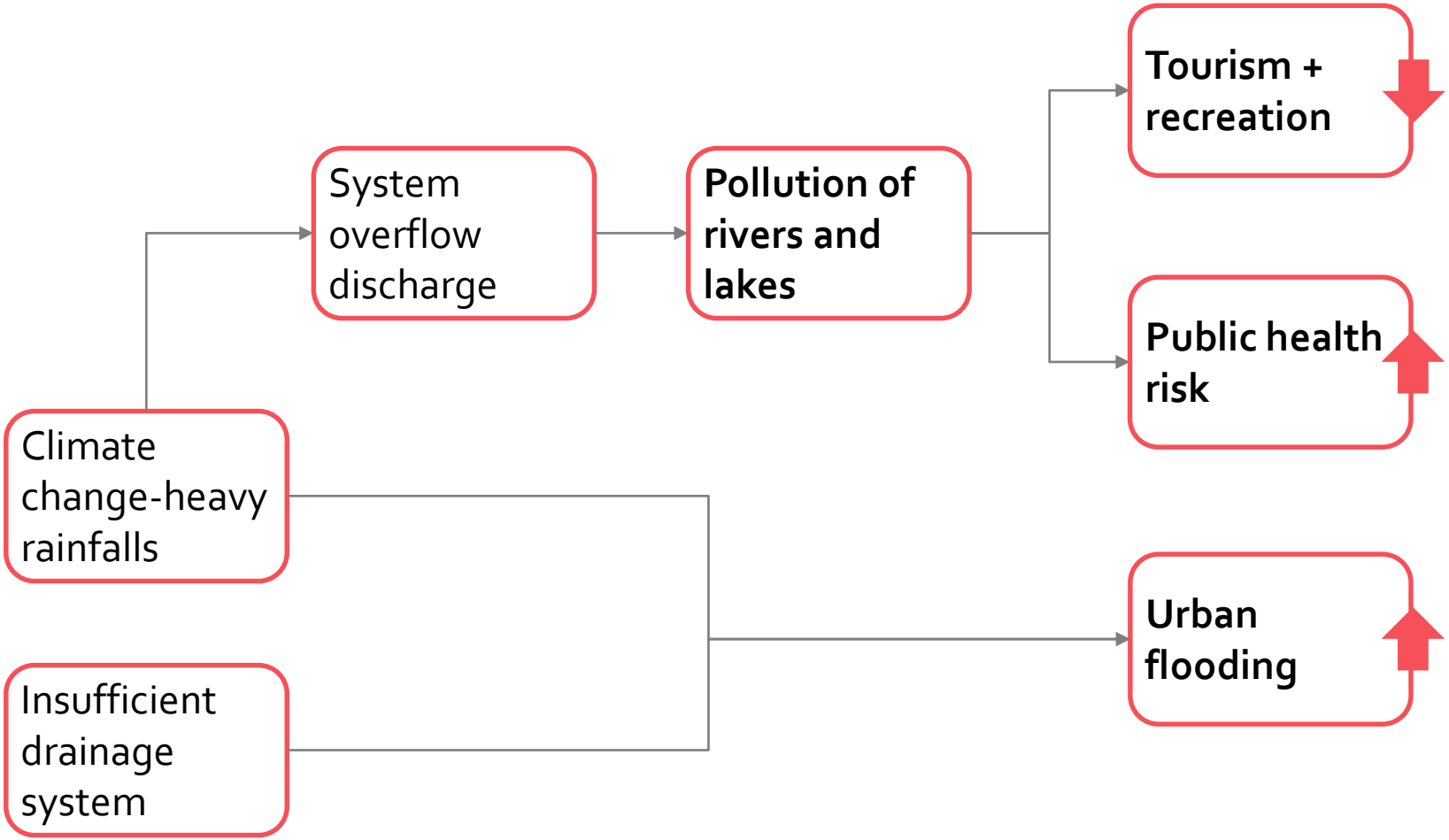
Bay City is facing problems with regard to urban development and wastewater



Bay City is also facing problems with regard to **groundwater**



Bay City is also facing problems with regard to **stormwater**



Your task and your budget

- Your **task**, again:
  Determine the optimal solution for the wastewater problem but now also integrating stormwater and groundwater issues

- Your **budget**, again:
  Annual revenue stream of $ 1 million over the coming 30 years (from levies/ taxes)

- **New approach**: pursue an **integrated approach** by:
  - Considering other urban water challenges
  - Seeking input from stakeholders!

Stakeholders

Three main **stakeholders** were identified:

1. the Bay City water utility,
2. the regional blue-green infrastructure program, and
3. ABCD, a major developer in the region.

Potential advantages of stakeholder engagement:

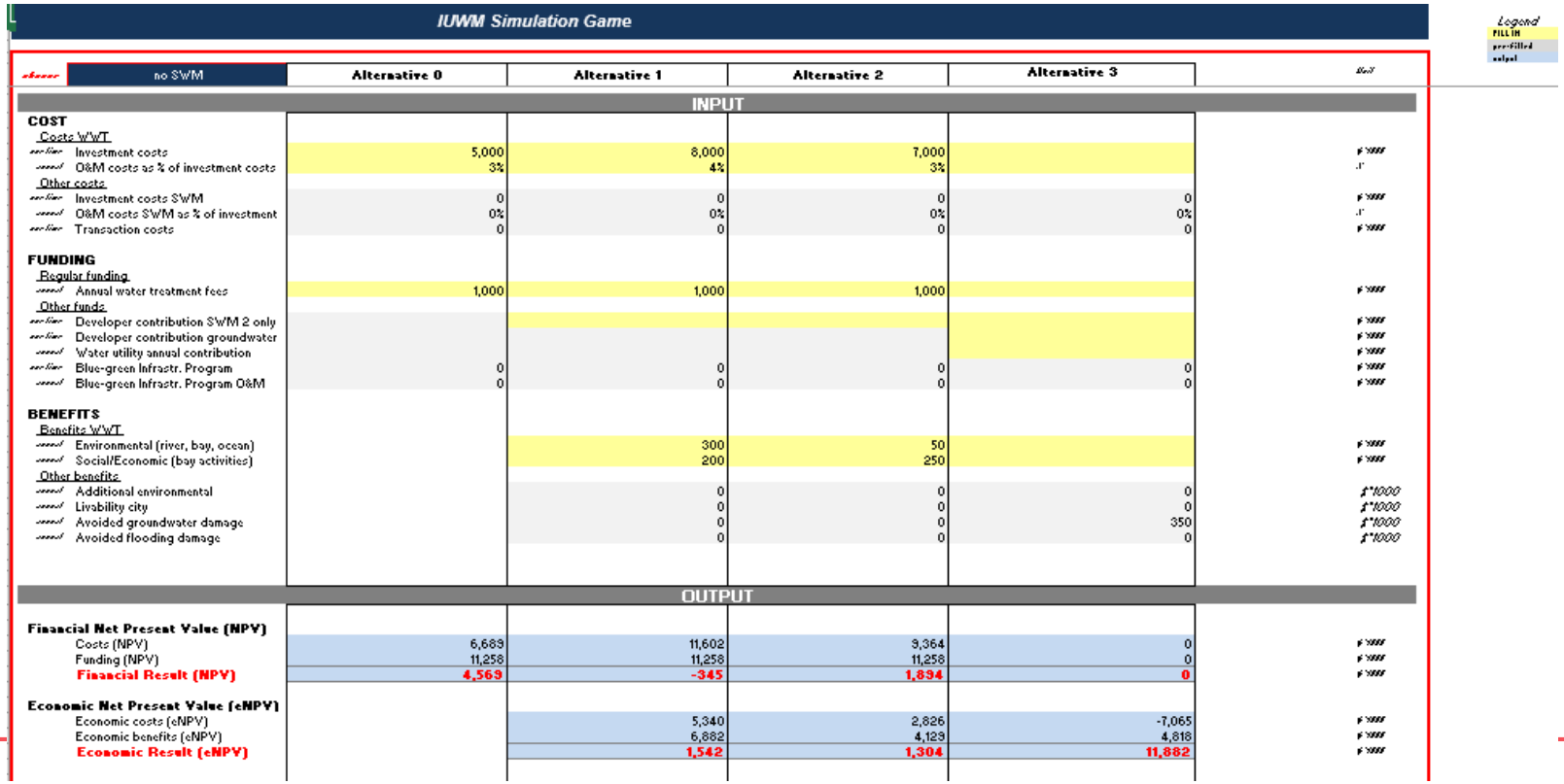
- New alternatives / solutions
- Better solutions due to integrated approach
- Additional funding

Potential disadvantage of stakeholder engagement:

- More effort/ time required: transaction costs

Round 2: how to

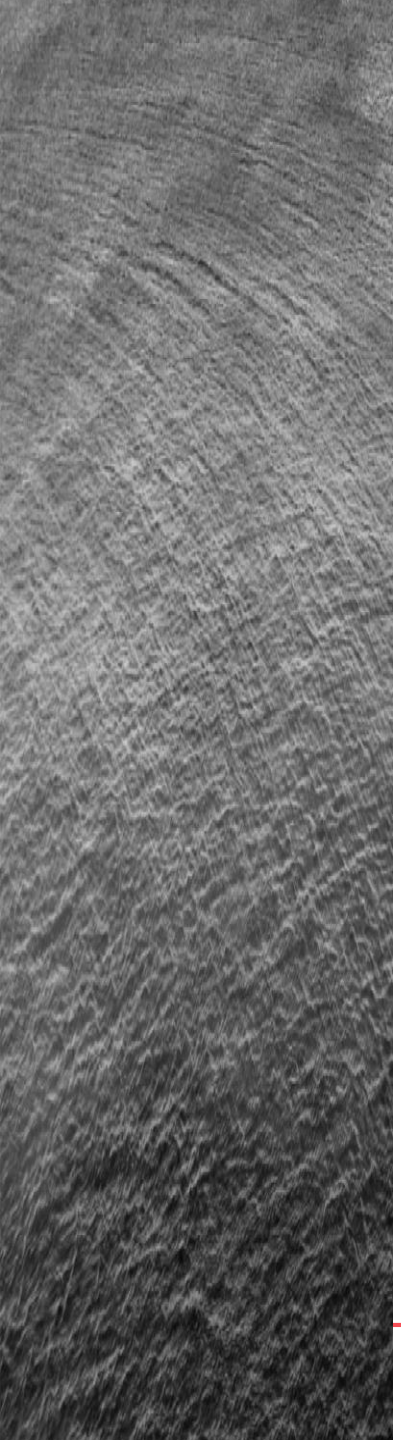
- Description of case, alternatives & economic analysis
- XL tool: one per table
- Results on the scoring sheet: one per table



IUWM Simulation Game

Legend
FILL IN
pre-filled
output

	no SWM	Alternative 0	Alternative 1	Alternative 2	Alternative 3	
INPUT						
COST						
Costs WWT						
Investment costs		5,000	8,000	7,000		k$
O&M costs as % of investment costs		3%	4%	3%		%
Other costs						
Investment costs SWM		0	0	0	0	k$
O&M costs SWM as % of investment		0%	0%	0%	0%	%
Transaction costs		0	0	0	0	k$
FUNDING						
Regular funding						
Annual water treatment fees		1,000	1,000	1,000		k$
Other funds						
Developer contribution SWM 2 only						k$
Developer contribution groundwater						k$
Water utility annual contribution						k$
Blue-green Infrastr. Program		0	0	0	0	k$
Blue-green Infrastr. Program O&M		0	0	0	0	k$
BENEFITS						
Benefits WWT						
Environmental (river, bay, ocean)			300	50		k$
Social/Economic (bay activities)			200	250		k$
Other benefits						
Additional environmental			0	0	0	$*1000
Livability city			0	0	0	$*1000
Avoided groundwater damage			0	0	350	$*1000
Avoided flooding damage			0	0	0	$*1000
OUTPUT						
Financial Net Present Value (NPV)						
Costs (NPV)		6,683	11,602	3,364	0	k$
Funding (NPV)		11,258	11,258	11,258	0	k$
Financial Result (NPV)		**4,569**	**-345**	**1,894**	**0**	k$
Economic Net Present Value (eNPV)						
Economic costs (eNPV)			5,340	2,826	-7,065	k$
Economic benefits (eNPV)			6,882	4,129	4,818	k$
Economic Result (eNPV)			**1,542**	**1,304**	**11,882**	k$

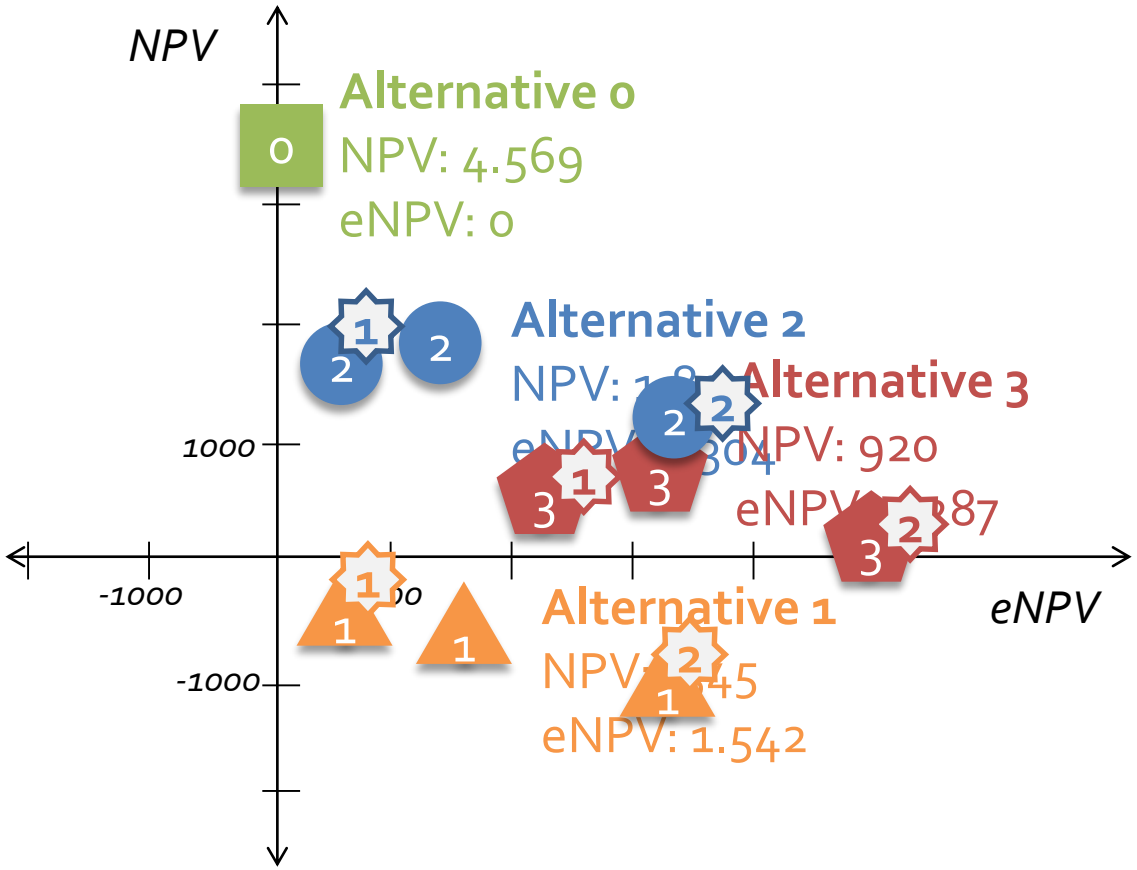


IUWM Financial + Economic Module

Simulation Game

Round 2 – Results

Results


NPV
Alternative 0
NPV: 4.569
eNPV: 0
1000
-1000
-1000
Alternative 2
Alternative 3
NPV: 920
Alternative 1
eNPV: 1.542
eNPV

Lessons learned

- ✓ Understanding the water system is crucial in understanding the true benefits and costs of urban water investments
  - ✓ Understanding the cause-effect relations of the problem
  - ✓ Understanding the effect of the intervention(s)
- ✓ Understanding and engaging stakeholders/beneficiaries can help in the identification of different funding sources
- ✓ Starting from one urban water challenge and widening the scope to others is an effective approach to IUWM

In depth discussion

- ✓ Why would real life be even more complicated?
- ✓ What is your experience with 'transaction costs'?
- ✓ What could have been other integrated solutions?
- ✓ What demand management solutions, behavioral interventions and other non-hard-infrastructure measures contribute to overcoming water management challenges?
- ✓ What other stakeholder groups would be relevant?
- ✓ How can economic benefits be turned in financial revenues?