

# Value and valuation- why public infrastructure requires a business model approach for sustainability appraisal

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# Climate change adaptation requires new ways of thinking about infrastructure



# Integrated Urban Water Management creates opportunities for multiple sustainability benefits

- Urban cooling benefits
- Flood mitigation and resilience
- Improvements to water quality
- Health (heat stress, mobility)
- Redress biodiversity losses



# Just a pipedream? West may get 27-kilometre park along old sewer pipeline

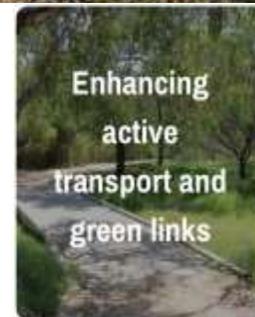
By Clay Lucas

31 May 2016 – 7:18pm



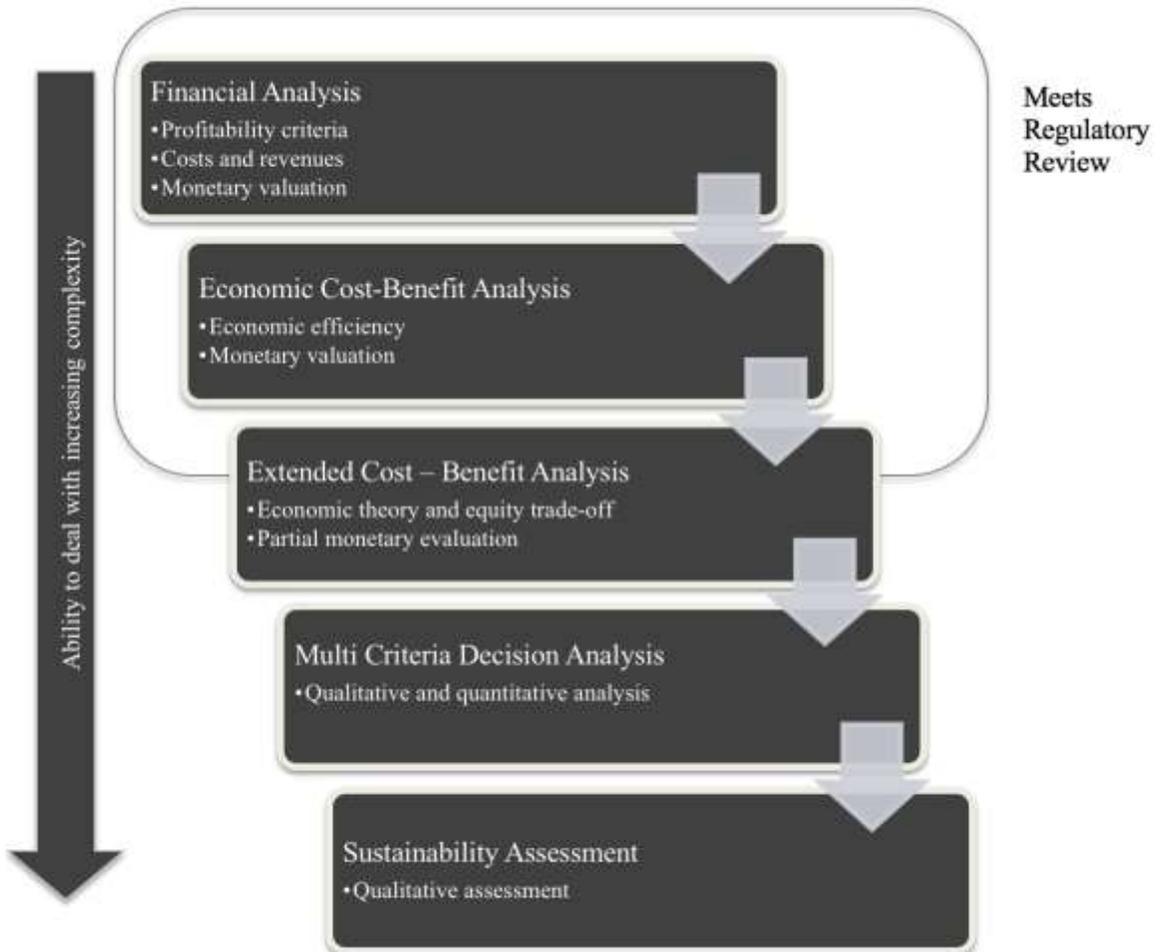
New York has its High Line – a park built along an old elevated railway line. Melbourne's west could soon have its own 27-kilometre linear park – along the route of an abandoned sewage canal.

Running from the old pumping station in Spotswood to the banks of Werribee River, Greening the Pipeline is a proposal launched on Wednesday by a western suburbs council, Melbourne Water and City West Water, the state government and VicRoads.



# Infrastructure appraisal is often subject to regulatory review

For decades, CBA has been a widely accepted form of appraisal for infrastructure projects. CBA structured approaches are applied throughout other elements of the Queensland Government, for example in assessing rural transportation and primary industry investment analyses.



**CBA is not new and it is not perfect.** It does not capture all impacts of an investment. However, we think improving and extending the use of CBA will help government make more informed investment decisions and spend more wisely.



Proponents should:

- provide the cost-benefit excel model
- attach an appendix showing the time stream for each benefit and cost component (\$m, real, undiscounted).



**Infrastructure Australia**

# CBA and value



## Aristotle:

The economy exists within a social and ethical frame

'value co-creation'



## Bentham (1890):

laws with net positive utility should pass, based on the price each individual would be willing to pay for 'imagined' benefits



**Political economy**

**Market economy**

## Adam Smith (1776):

Value in exchange and value in use and the 'invisible hand'

## US (1930s):

CBA formally adopted to support decision making in water planning- US Army Corp of Engineers

# Criticisms of CBA are based on theoretical and practical implications.



Raphael: *The School of Athens*

## Feds lose the way on Cross River Rail

### 'Flawed' report slamming project all over the map

JESSICA MARSZALEK

A FEDERAL report slamming Queensland's biggest infrastructure project could not even produce an accurate map of Brisbane.

The State Government has ridiculed Infrastructure Australia's report into Cross River Rail, pointing to 23 errors in the document – including a bizarre map of Brisbane that has the CBD on the wrong side of the river and a new suburb of "Hill Gate" where West End should be.

IA's report rubbished the state's Cross River Rail business case, suggesting it contains drastically overstated passenger figures, as it refused to list the project on its Infrastructure Priority List.

Deputy Premier Jackie Trad (pictured) yesterday fired back at the "flawed" analysis and argued IA wanted the state to wait until crowding was so bad on trains that one in three

passengers were standing before building the project. The Palaszczuk Government will now fund the \$5.4 billion project alone.

IA found the business case predicted patronage growth of 6.9 per cent, which is seven times faster than growth over the past decade and 2.5 times faster than what's occurring in other capital cities.

reached 150 per cent – when one in three passengers will be standing – between 2026 and 2036.

It also complains other rail infrastructure options were ruled out without proper evidence, including the 2011 Cross River Rail configuration, Bus and Trains (BaT) tunnel, duplication of the Merivale Bridge and conversion of the Cleveland and Ferny Grove lines to light rail.

"Infrastructure Australia considers that the benefits of the proposed project, as set out in the business case, are significantly overstated, and that the costs of the project as currently presented are likely to exceed its benefits," it concluded.

Ms Trad said that the assessment didn't take into account any recent information provided to IA and argued the underground line would cost an extra \$2 billion to build in 2036.

"Their analysis is based on mistakes and assumptions that are clearly false," she said.

Urban Infrastructure Minister Paul Fletcher said greater detail as to the basis on which IA had reached its conclusions would be provided in coming days.

“**THEIR ANALYSIS IS BASED ON MISTAKES AND ASSUMPTIONS THAT ARE CLEARLY FALSE**”

Jackie Trad



# CBA- theoretical limitations

- The social and political dimensions of value are not fully represented
- Consumption is equated with well-being
- Whole of system considerations- is value greater than the sum of parts?
- Mathematical abstractions of value do not account for ethical considerations or integrity (where happiness is the ultimate ideal)

(Miller, 2017)

# Practical limitations

- The ability to fully represent collective value (preference based surveys)
- The ability to represent and capture externalities
- The basis for assumptions (eg the cost of a life, use of the discount rate)
- The representation of cultural value (aesthetic, spiritual, historic, symbolic values)
- The ability for trade-offs to be made where valuations represent multiple value dimensions

# And ex-post reviews shows different outcomes to ex-ante analysis

Flyvbjerg (2009) discussed:

- Optimism bias
- Higher costs
- Reduced benefits
- Higher risk

**THE CONVERSATION**  
Academics, opinion, perspectives, debate

## Spectacular cost blowouts show need to keep governments honest on transport

October 24, 2014 4:11pm AEST | [Comment & Feedback](#) | [Print](#) | [RSS](#)

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Executive Program Director at WestConnex



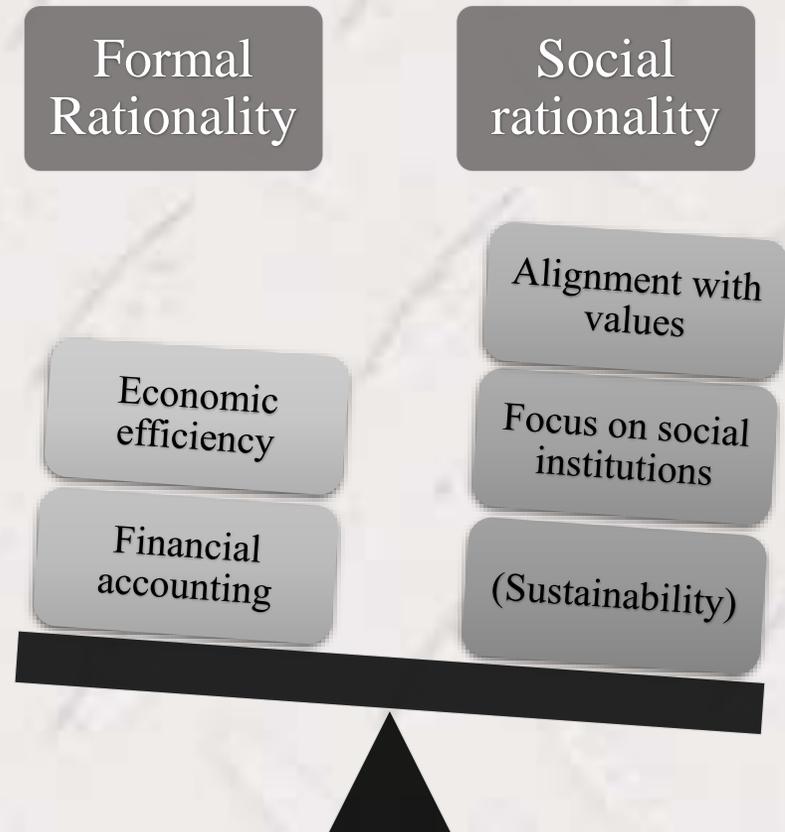
Ryde's WestConnex road project has a surprisingly low 'worst case' cost estimate, David Munn/AP

Last week Fairfax Media reported that the Parramatta Light Rail is set to cost the NSW government not \$1.1 billion (together with part of the proceeds of a levy on new residential developments), as budgeted, but a whopping A\$3.5 billion.

<https://theconversation.com/spectacular-cost-blowouts-show-need-to-keep-governments-honest-on-transport/10014>

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# In the public sector, notions of rationality prevail



*“**Global rationality**, the rationality of neoclassical theory, assumes that the decision maker has a comprehensive, consistent utility function, knows all the alternatives that are available for choice, can compute the expected value of utility associated with each alternative, and chooses the alternative that maximizes expected utility.*

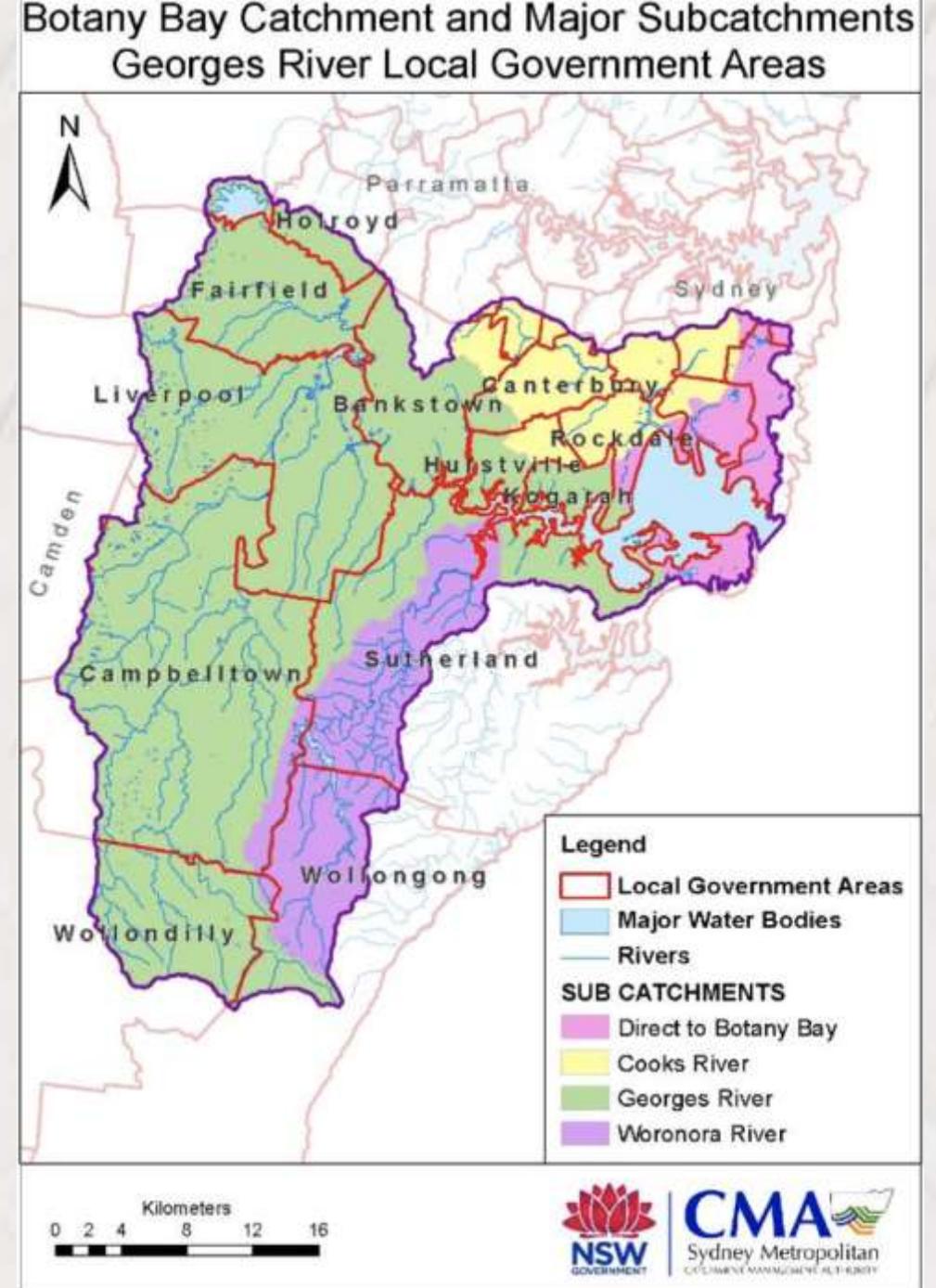
***Bounded rationality**, a rationality that is consistent with our knowledge of actual human choice behavior, assumes that the decision maker must search for alternatives, has egregiously incomplete and inaccurate knowledge about the consequences of actions, and chooses actions that are expected to be satisfactory (attain targets while satisfying constraints)” Simon (1993)*

# Summary of overall research findings

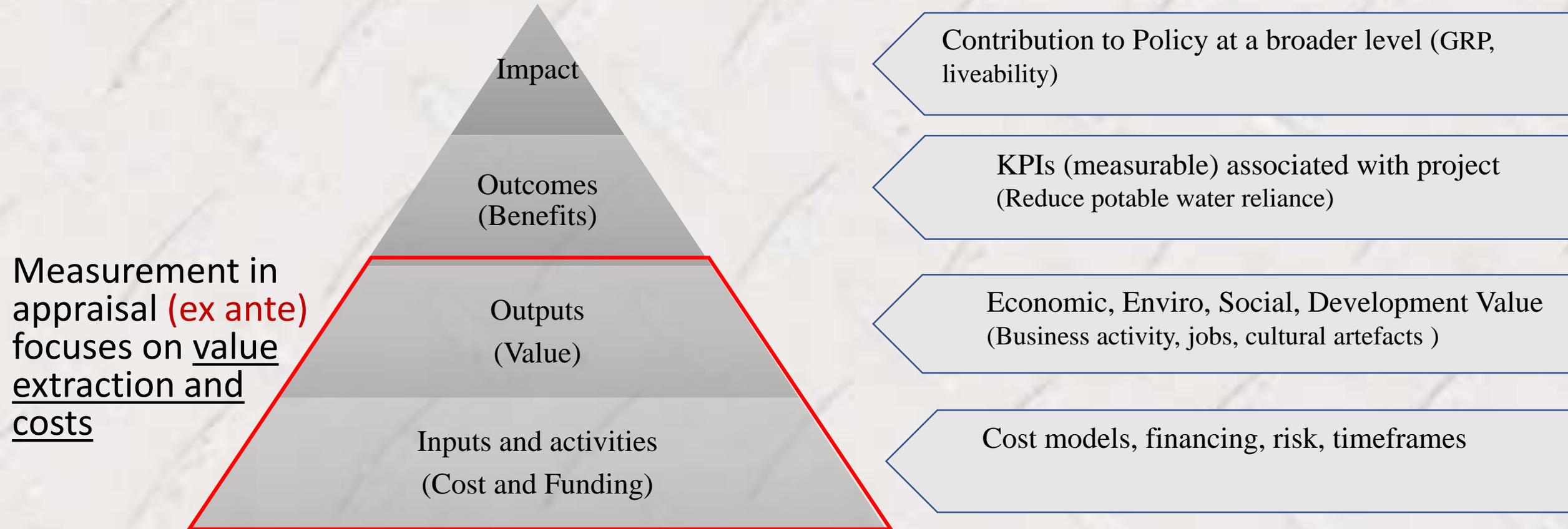
- Despite sustainability commitments, there is **no uniform approach** to sustainability appraisal
- **Participation of end users** is critical to sustainability appraisal
- In some settings, economic/ financial models are often constructed to support a **pre-determined project outcome**
- Alternatively, in highly regulated settings, **economic models cannot support projects with sustainable outcomes**
- A clearer framing of **benefits and value created** is required for sustainability
- Sustainability requires a strong **institutional framework** involving governance and policy, leadership and capability

A key issue for advancing projects with sustainability outcomes

Who benefits and who pays?



# The public good of infrastructure may be viewed within a business model hierarchy



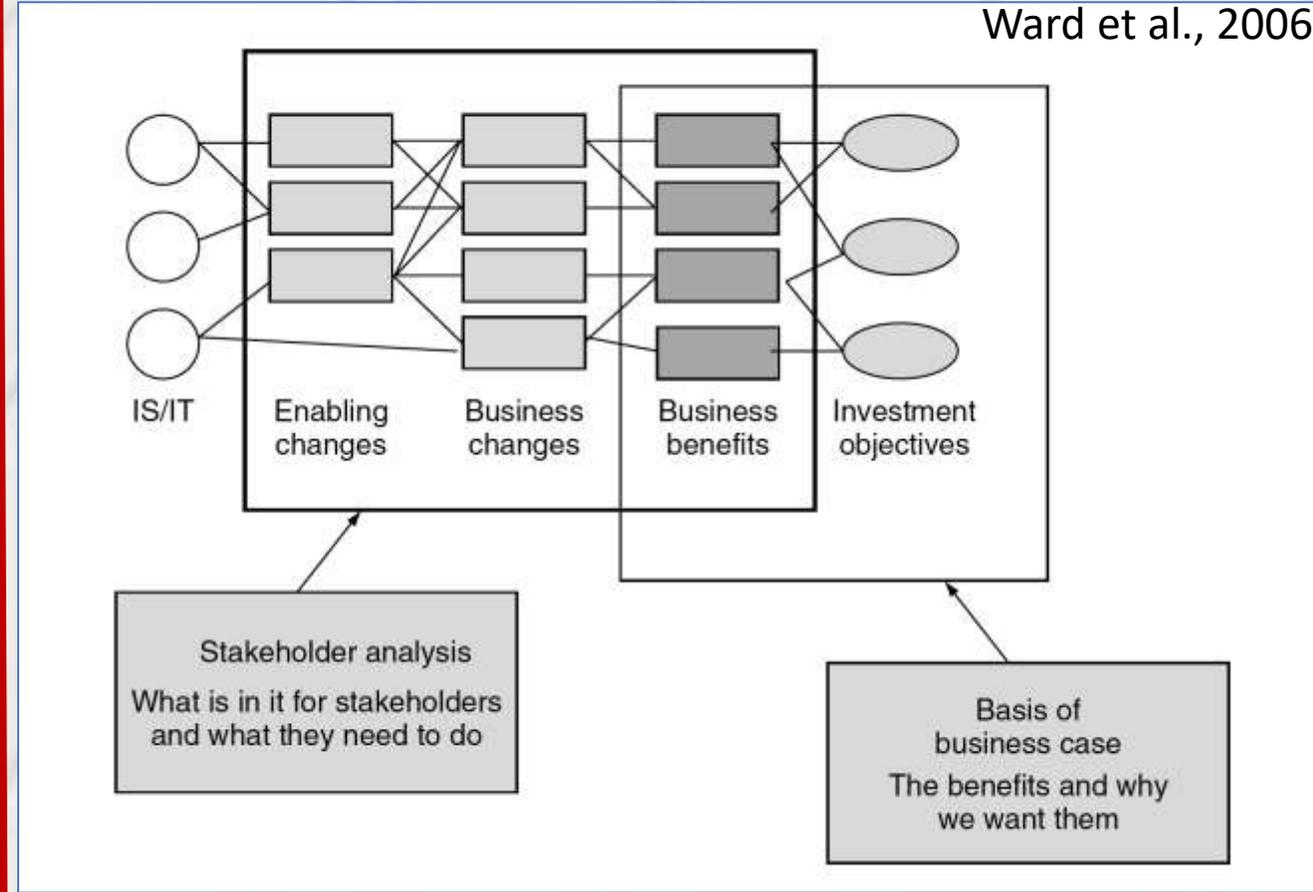
*Adapted from Bryson et al (2014)*



# A different frame to BCA

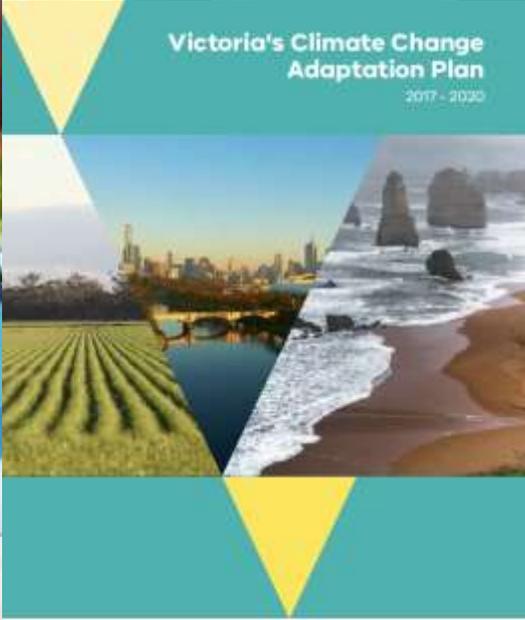
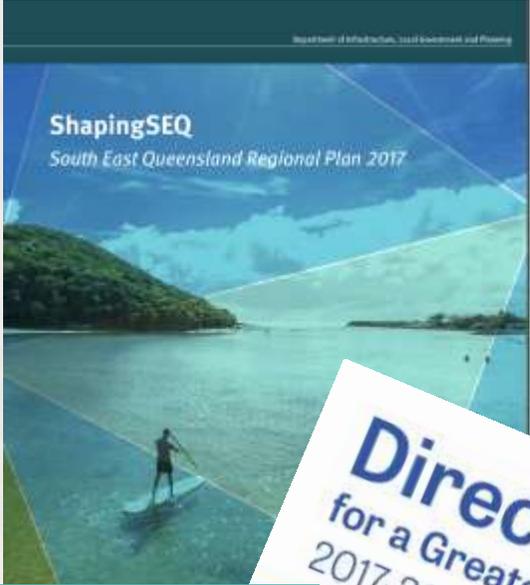
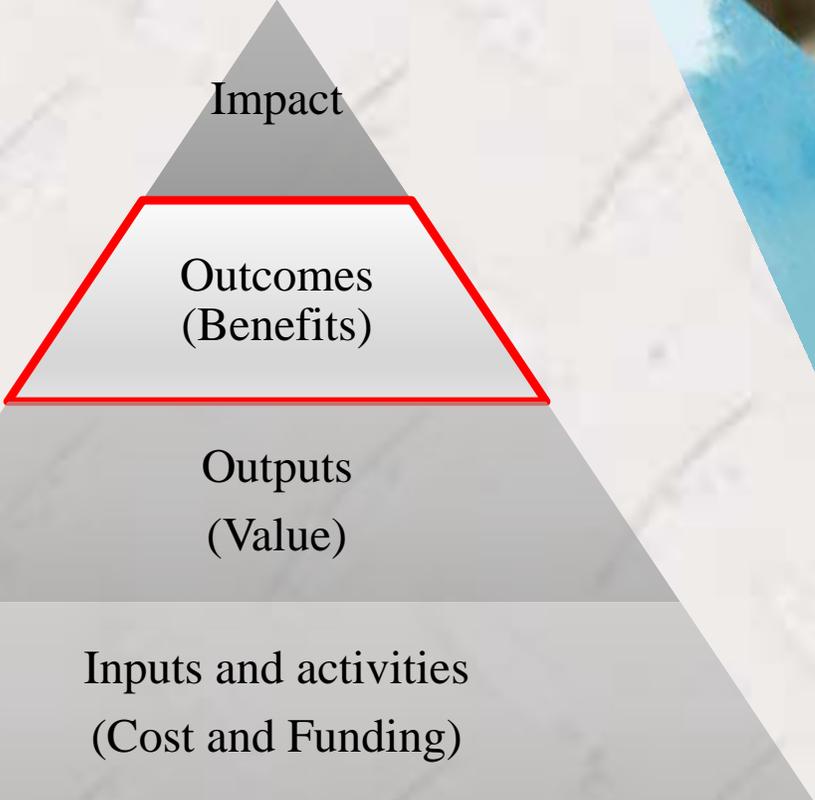
Benefits are a point value

$$BCR = \frac{\sum PV \text{ benefits}}{\sum PV \text{ costs}}$$

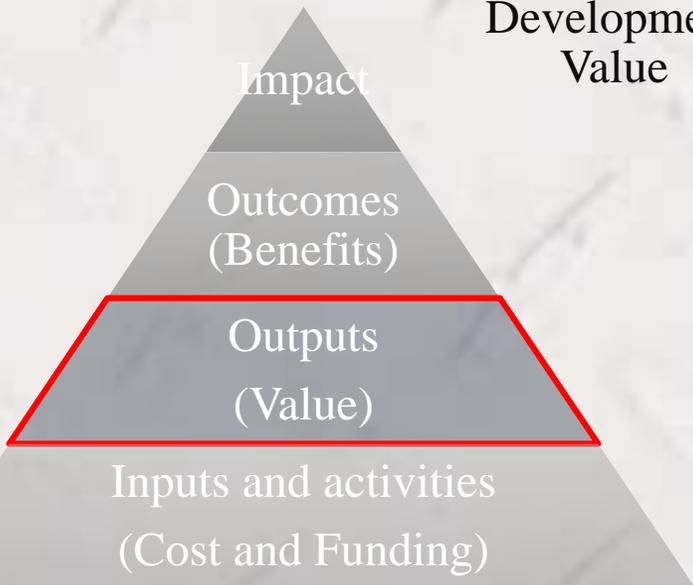
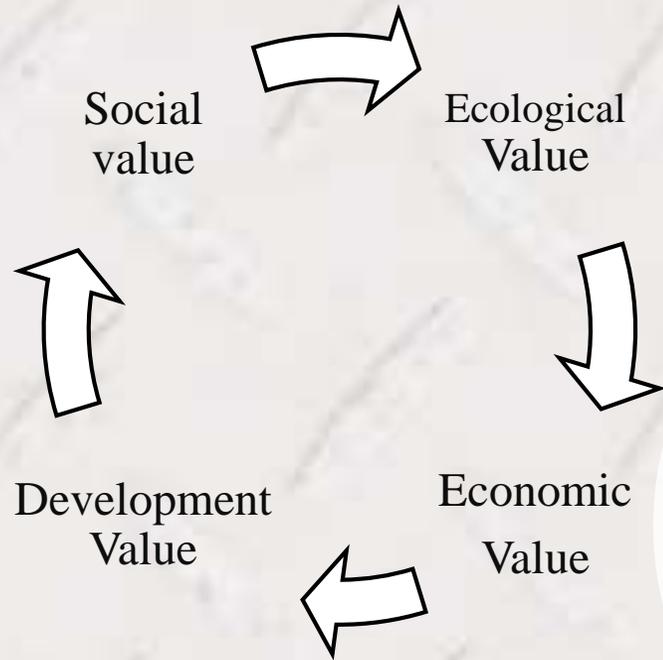


# Benefits = Outcomes

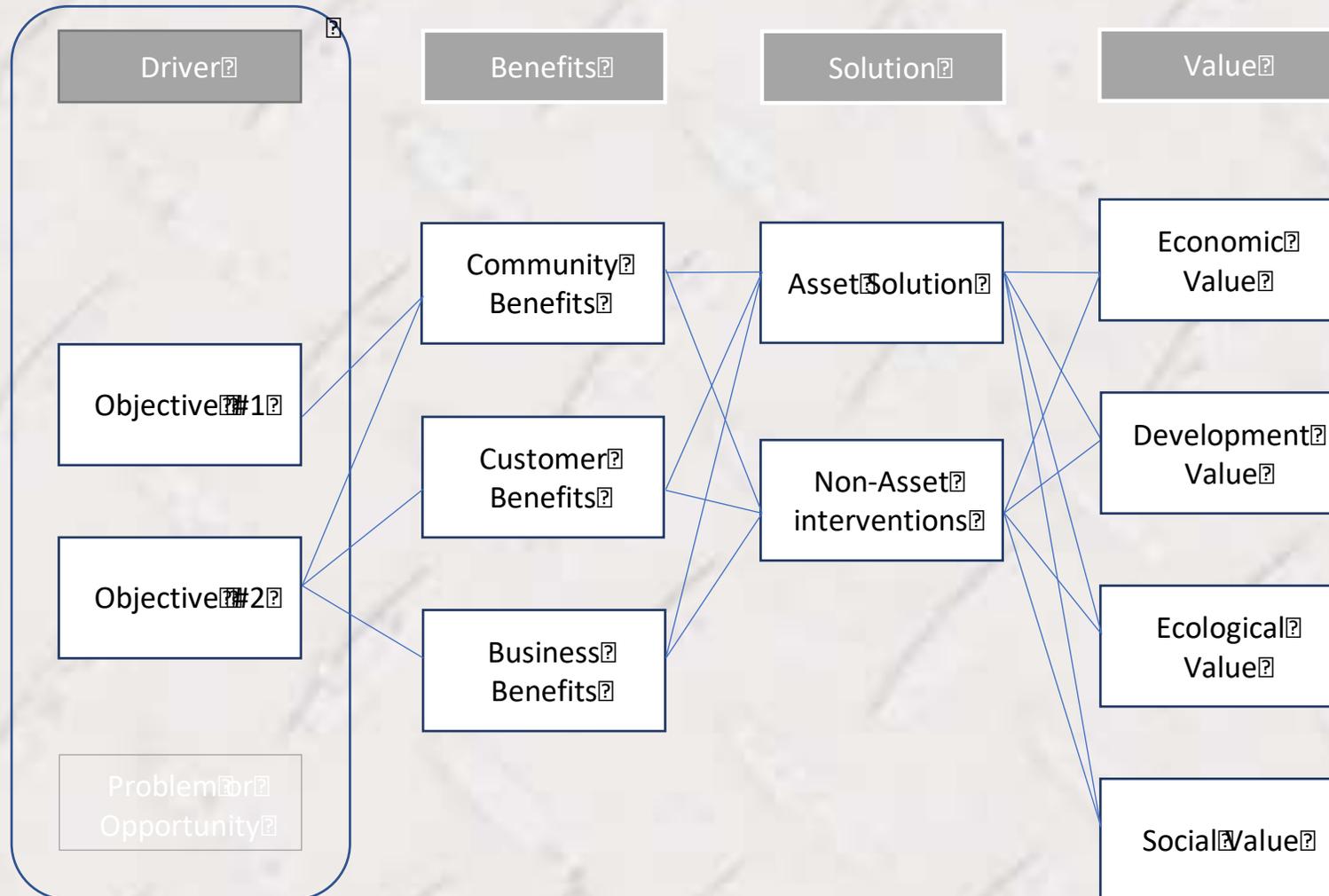
## These link to policy directions



# Dimensions of value may be interlinking and change over time

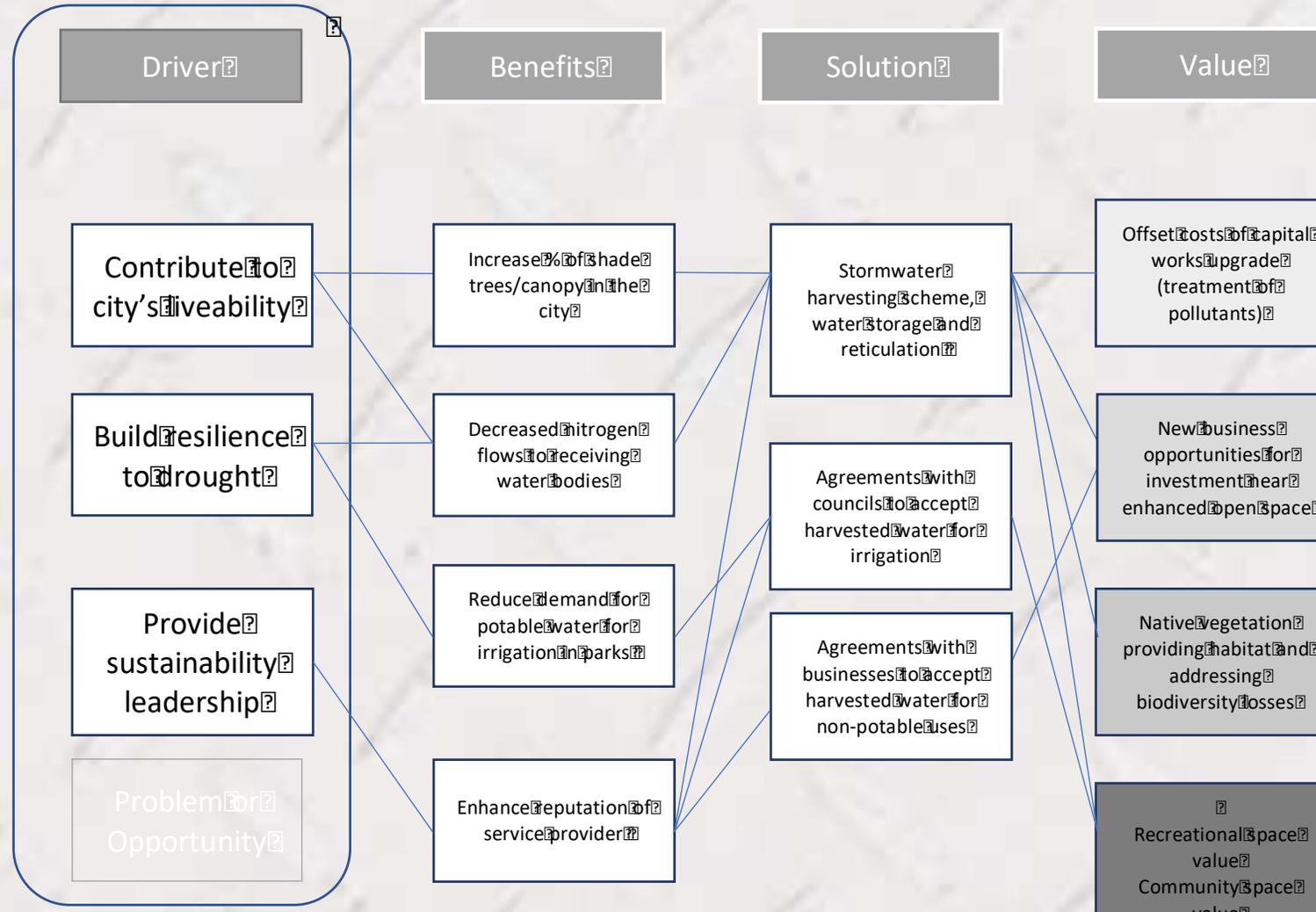


# A sustainability investment logic:



*A sustainability investment logic provides a clear line of sight between drivers, and solutions, and an understanding of benefits and value that may be created*

# For integrated water management scenario:



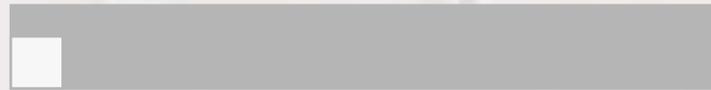
# A sustainability investment logic would inform a cost and revenue model

## Cost Inputs



- Materials
- Labour
- Risk adjustments

## Revenue streams



- Direct
- Indirect

## Funding sources



- The project initiator?
- Government?
- Other public entities?
- Private sector?

# Watch this space:

## National accounts- from GDP to welfare indicators

### The Four Capitals

Intergenerational wellbeing relies on the growth, distribution, and sustainability of the Four Capitals. The Capitals are interdependent and work together to support wellbeing. The Crown-Māori relationship is integral to all four capitals. The LSF is being continually developed and the next iteration of the framework will consider the role of culture, including Māori culture, as part of the capitals approach in more detail.



This refers to all aspects of the natural environment needed to support life and human activity. It includes land, soil, water, plants and animals, as well as minerals and energy resources.



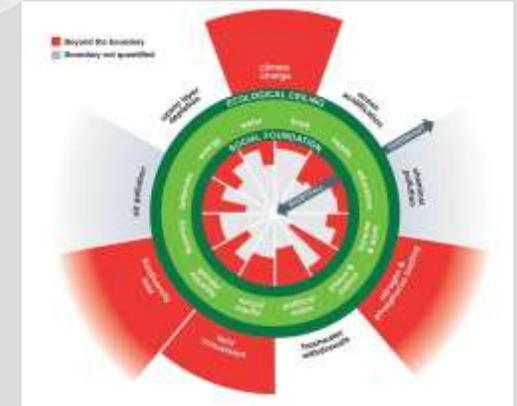
This describes the norms and values that underpin society. It includes things like trust, the rule of law, the Crown-Māori relationship, cultural identity, and the connections between people and communities.



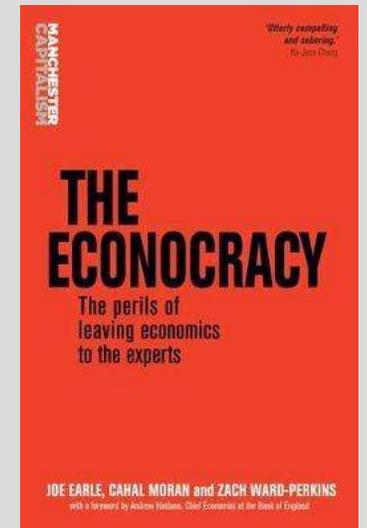
This encompasses people's skills, knowledge and physical and mental health. These are the things which enable people to participate fully in work, study, recreation and in society more broadly.



This includes things like houses, roads, buildings, hospitals, factories, equipment and vehicles. These are the things which make up the country's physical and financial assets which have a direct role in supporting incomes and material living conditions.

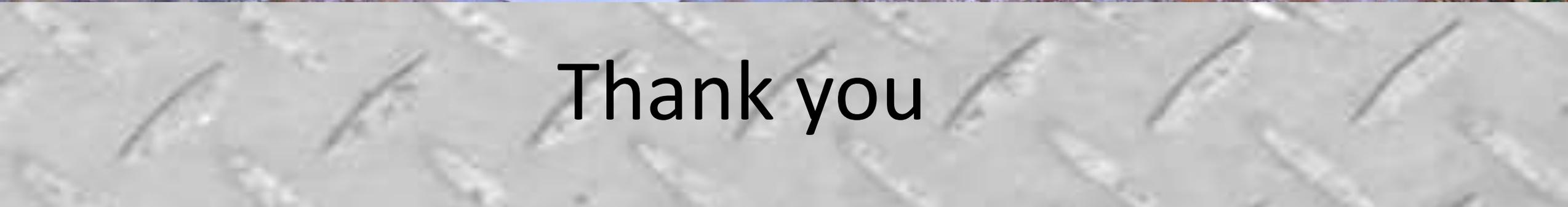


## The role of economics/ new economic thinking





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Thank you

