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# How Economic Theory Shapes Infrastructure Investment

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# Assertion



Sir Crispin Tickell:

**“Out of date economics should be recognised as a dangerous mental condition.”**

Just how out of date does a theory have to be to be useless?  
Or more importantly how out of date does a theory have to be, to be downright dangerous?

Epic of Gilgamesh 2700bc

Wealth of Nations 1776

An ‘invisible hand’ (the gods or market) will effectively allocate resources to maximise profit; increase growth and all will be well as long as the State does not intervene

**GDP**



# GDP / Growth / APT



GDP is a measure of consumption, and is treated as an overriding success factor. GDP:

Measures air pollution for trade NOT clean oxygen production for life

Measures consumptive advertising NOT low impact lifestyles

Obesity treatment is good for GDP; a healthy lifestyle is good for me

**Concepts such as natural wealth and the circular, green economy have moved from the margins to become the substance of economic strategies and policies for businesses and nations**

**... there is little doubt that the challenge, although considerable, is essentially one of transition” (UNEP, 2015).**

**ARBITRAGE PRICING THEORY**



# Infrastructure and Investment



- \$4 trillion per year in 2012 to more than \$9 trillion per year by 2025.
- Overall, close to \$78 trillion is expected to be spent globally between 2014 and 2025.

**Established infrastructure assets' ability to generate stable long-term cash flows**

## Sources of finance:

**Capital grants; Loans; Revenue financing; Bonds; Crowd source funding; Land value capture; Regulation – planning; Lottery**

“Go for infrastructure stocks when they are cheap and hold them for 2-4 years and exit when valuations become excessive.” Investment Adviser.

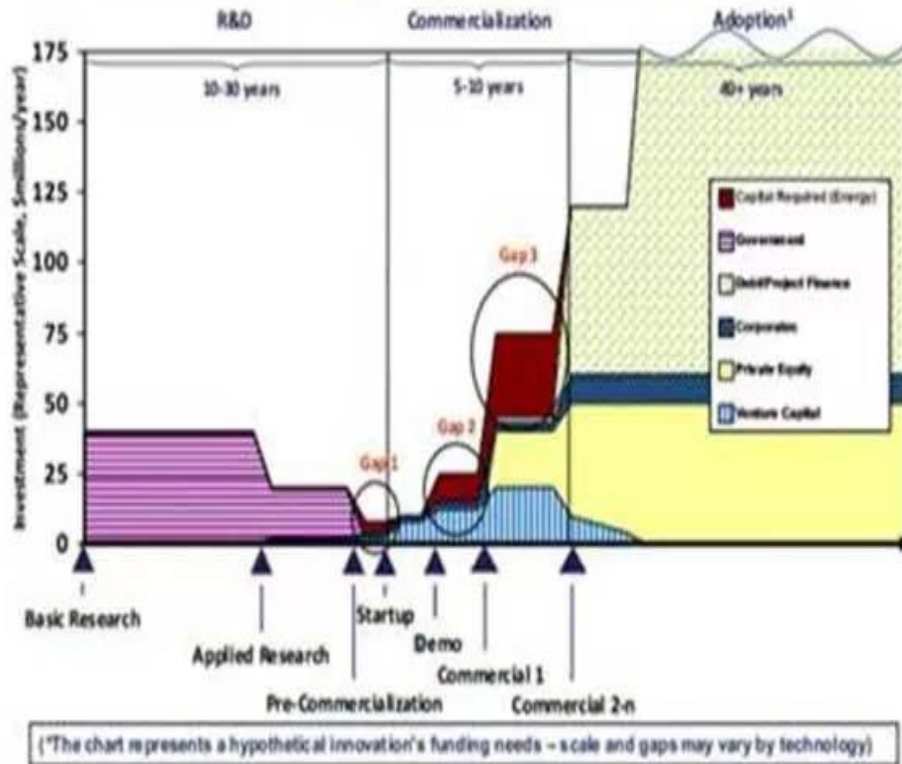
“We are pleased to announce Macquarie Group achieved a net profit of \$A2,063 million for the year ended 31 March 2016, up **29%** on the prior year.”



# Valley(s) of Death



Capital Investment Profile of a Cleantech Innovation



Variables in the infrastructure development and deployment graph are:

- Macro-economic policy
- Finance – availability; conditions; return on investment; value capture/realisation
- Funding – business models; value capture/realisation
- Risk perception
- Political direction
- Community acceptance
- Technical capability
- Facilities to pilot/demo
- Legislation

To accelerate deployment across the VoD; or to smooth the valley of risk – macro-economic policy embodied in the Entrepreneurial State



# Entrepreneurial State



**“The important thing for Government is not to do the things which individuals are doing already, and to do them a little better or a little worse; but to do those things which at present are not done at all”**

Keynes

**“chopping away at the very brains of the State” (p.4.)**

Mazzucato believes that the fundamental shifts required are as follows:

1. Empower governments to envision a direction for a technological change and invest in that direction.
2. Abandon the short-sighted way in which public spending is usually evaluated.
3. Allow public organisations to experiment, learn and even fail.
4. Establish ways in which government and taxpayers reap some of the rewards from success.

**This is the ‘Entrepreneurial State’ – ‘the Adventurer’ (Say, 1803)**



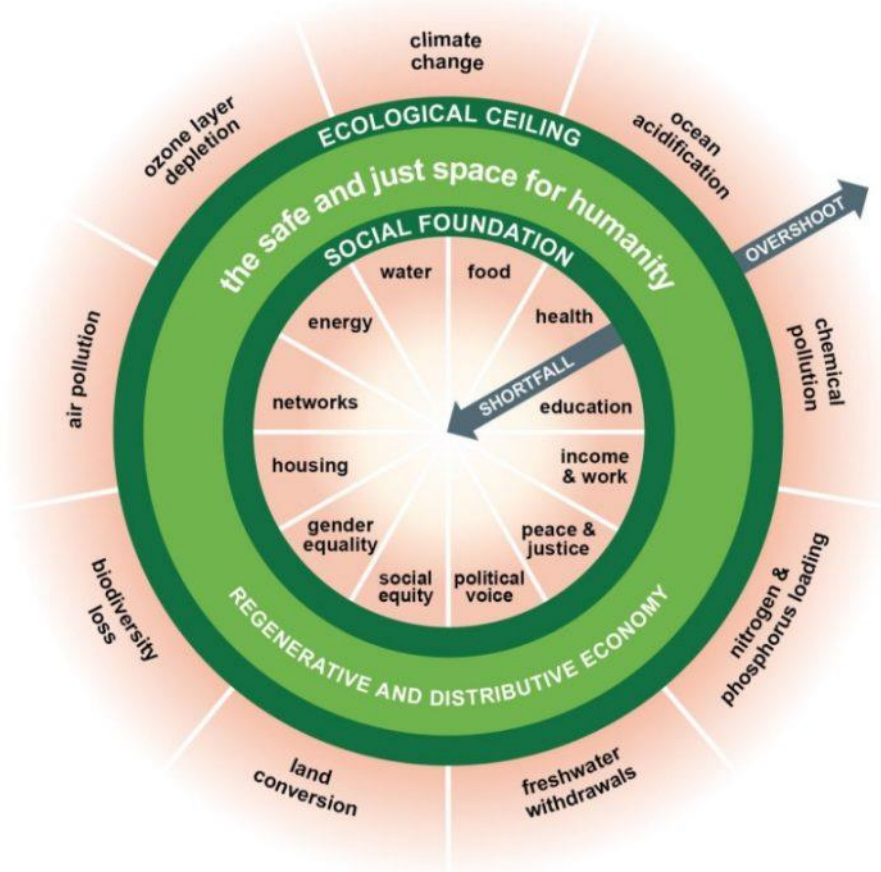
# RESTORATIVE ECONOMICS



**Earth Overshoot Day: August 8<sup>th</sup> in 2016**

**August 20<sup>th</sup> in 2009**

**September 30<sup>th</sup> 1999**



Economic theory should develop infrastructure that maintains society in that green ring

Kate Raworth (2017)



# COST OF FINANCE



## Appraisal Criteria:

### *Monetary*

Cost of capital  
 Contingent liabilities  
 Cost of project delay  
 Credit rating impact  
 Taxes forgone  
 Administration and transaction cost

### *Intangible*

Effectiveness  
 Efficiency  
 Fairness (equity or equality)  
 Flexibility  
 Accountability and transparency  
 Stakeholder support  
 Degree of public control/ownership

<i>Criteria</i>	<i>Weight</i>	<i>Weighted results (percentage)</i>		
		<i>Reserves</i>	<i>General purpose bonds</i>	<i>External equity</i>
Effective cost of financing (ECF)	80%	7.68	4.80	12.68
Discounted intangible benefits	20%	0.50	0.74	0.41
Net multi-faceted cost of financing (NMCF)		7.18	4.06	12.27





# RESEARCH



## *Application and revision of the model:*

Distributed energy storage

Worcestershire Local Enterprise Partnership  
Infrastructure Portfolio

**Intervention points in the Valley(s) of Death**

**Entrepreneurial State**