



FUNDAMENTALS

Construction

Procurement, Finance and Management Practices in

AUSTRALIA

Presentation to CMAK, March 2018

**RMIT Construction Procurement and Major
Projects Group [The PPP CLUB]**



Speaker

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Construction Procurement and Major Projects Group

PUBLIC-PRIVATE PARTNERSHIPS [PPP + CLUB]

Dr Guillermo Aranda-Mena

Leader



GUILLERMO ARANDA-MENA



...beyond training, education and research we have a strong industry presence, we promote and enable shared learning across sectors and provide 'glocal' R&D and networking opportunities

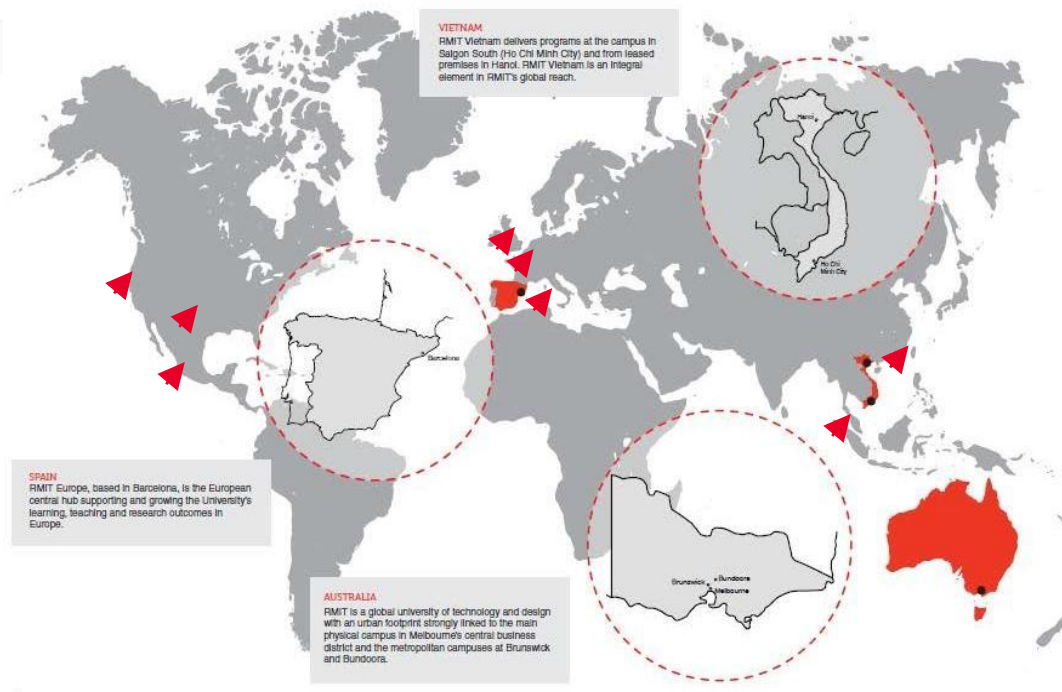


Guillermo Aranda-Mena (PhD) is an Associate Professor at RMIT Melbourne and is UNESCO Architecture Professor at the Politecnico di Milano, Italy. He has worked on research, consulting and education in the built environment disciplines of architecture, planning and building operations for over two decades. Guillermo provides expertise in architectural design at the early conceptual project stages, and advises on project value, risk and building innovation including the use of Building Information Modeling (BIM) for lifecycle operations. His clients include a wide range of government, educational and corporate organisations. Guillermo also sits on RMIT University's steering committee for BIM governance. RMIT University is the largest holder of property in Melbourne CBD with a total property portfolio asset value across all campuses currently worth AUD\$1.70 billion, and a total Gross Floor Area (GFA) of 474,342m². The University provides an excellent case to demonstrate the value of BIM for lifecycle assessment and use: from architectural design to building operations across its campuses in Australia, Europe and Southeast Asia. Guillermo also provides independent expert advice to private and corporate clients at during the project stages to develop governance strategies and architectural briefing utilising Value Management (VM) workshops.

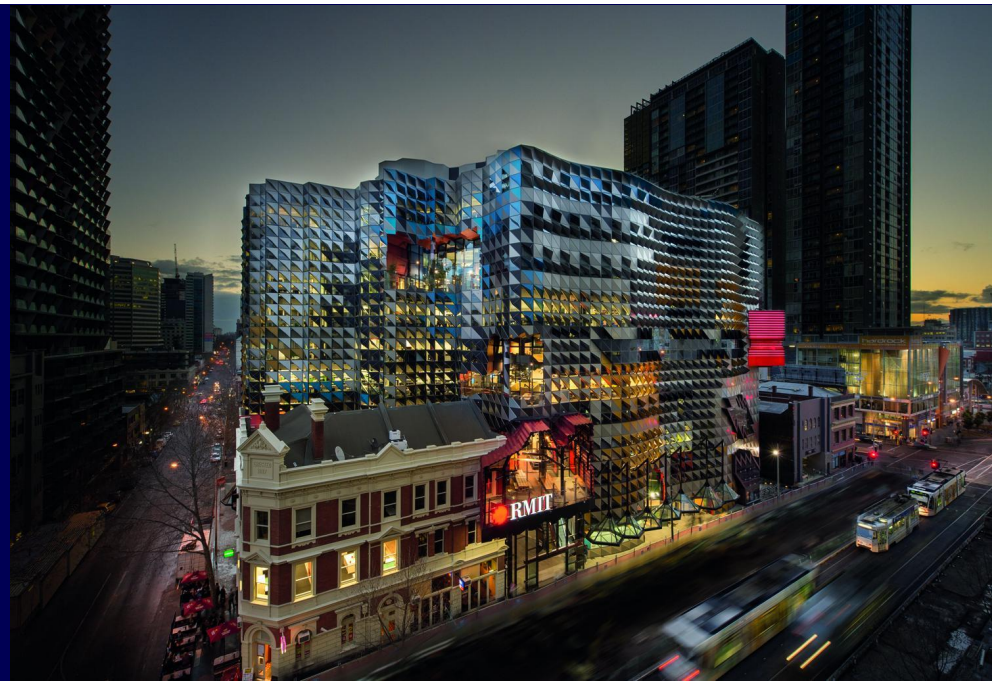


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Campus Locations



RMIT INNOVATION PRECINCT



School of Property, Construction and Project Management PCPM

RMIT University Melbourne

- 50 full-time and 4 part-time academic staff
- 12 professional staff
- 1300+ undergraduate and 250+ postgraduate students in Australia
- 350+ undergraduate students in offshore programs in Singapore and Hong Kong

Construction Procurement: The PPP+ CLUB

Group Director: A/Professor Guillermo Aranda-Mena

20+ Construction and Project Management professionals, industry partners
PhDs researchers and Industry Fellows with expertise in:

- Construction Management
- Public-Private Partnerships
- Alliancing / Integrated Project Delivery
- Risk Management
- Value Management
- Project Finance
- Stakeholder Management
- Project Lifecycle
- eProcurement and BIM
- Research Practice and Design Thinking

PCPM has created an international reputation of research excellence and academic leadership on the above areas.

For more information contact Guillermo.Aranda-Mena@rmit.edu.au

Industry Sponsor / Mentor (2008-2018)

Darrin Grimsey

Partner, Infrastructure Advisory at Ernst&Young

Email: darrin.grimsey@au.ey.com

Darrin Grimsey is Partner with EY's Infrastructure Advisory Group in Melbourne and a leading adviser on infrastructure projects in Australia.

He specialises in the delivery of infrastructure projects including commercial, strategic and financial advice, project structuring and contract negotiations.

He has extensive experience advising governments in Australia and elsewhere on infrastructure policy and guidelines well as delivering projects in health, education, corrections, justice and water. He recently completed the Victorian Government's Ravenhall full service PPP and the ACT Government's light rail project for Canberra.

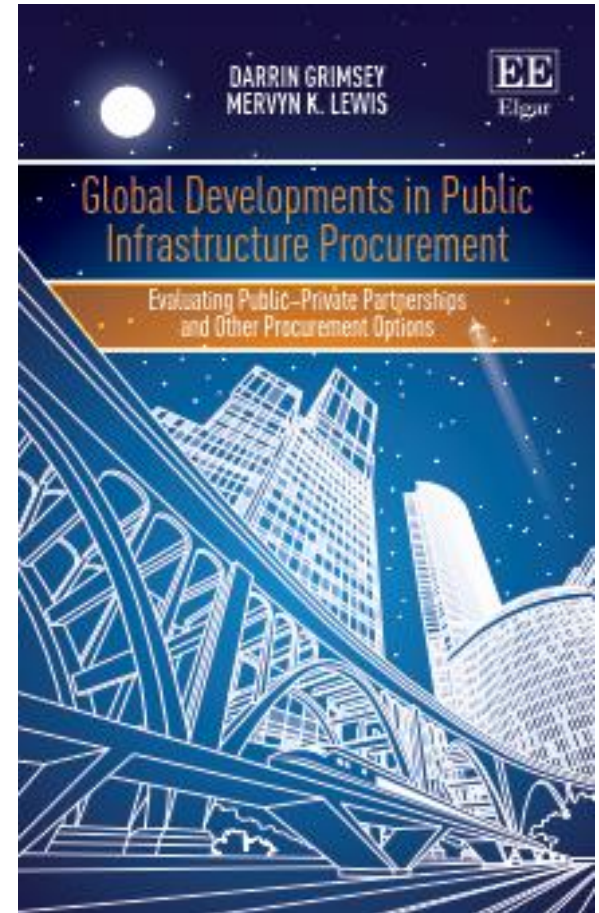
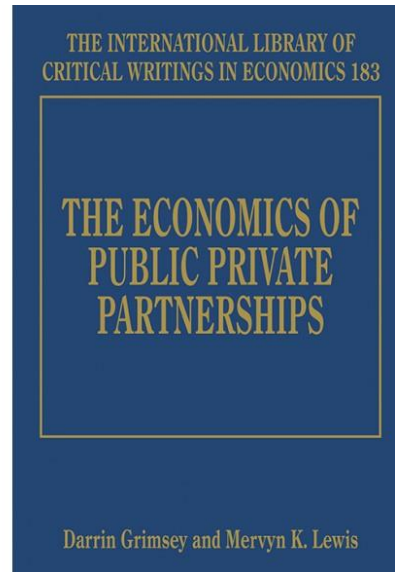
Darrin has published several papers in leading peer reviewed academic journals and books dealing with various issues

relating to infrastructure, including *Public Private Partnerships: the revolution in infrastructure provision and project*

***finance* which won the 2006 Blake Dawson Waldron award for business literature in Australia.**



Publications



<http://www.e-elgar.com/>

+ dozens of papers and articles

INFRASTRUCTURE IN AUSTRALIA: FUNDAMENTALS

[co-lecture material w/ Darrin Grimsey]

- 1. PROCUREMENT FUNDAMENTALS IN AUSTRALIA
- 2. FINANCE FUNDAMENTALS IN AUSTRALIA
- 3. MANAGEMENT FUNDAMENTALS IN AUSTRALIA
- OPPORTUNITIES FOR SOUTH KOREAN CONTRACTORS AND CONSULTANTS



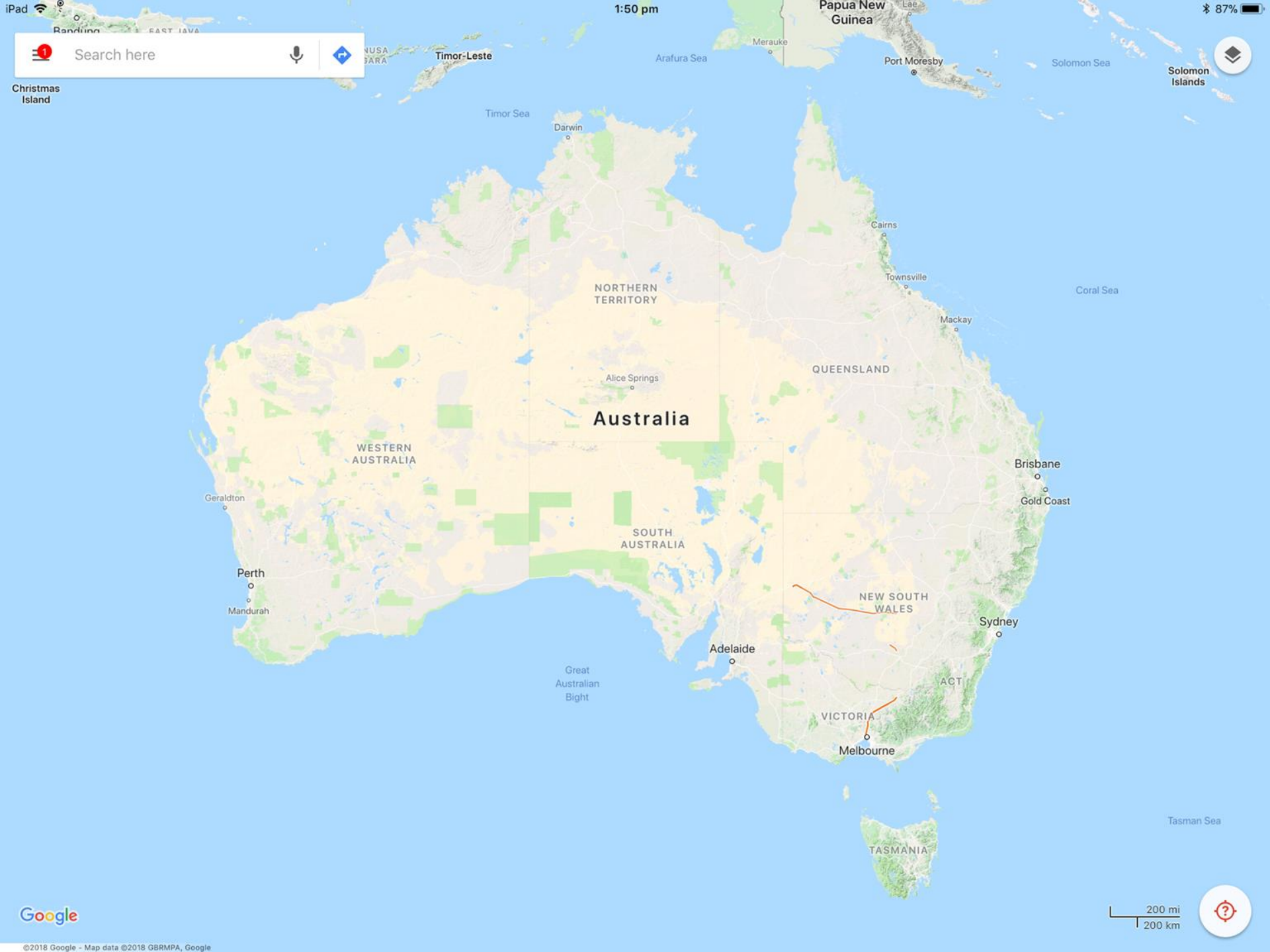
1. FUNDAMENTALS

CONSTRUCTION PROCUREMENT

AU +61 versus KR +82

- Six states and two territories inc ACT
 - Largest City: Sydney
 - Capital City: Canberra
 - Federation Constitution 1901
 - Area: 7,700,000 km²
 - Population: 25,000,000
 - Density 3.2/km²
 - Density city
 - GDP US\$1.24 trillion (19th World Bank ranks)
 - Drives on the left
 - Calling code +61
 - ISO 3166 AU
- 1 special city, 6 metropolitan cities, 8 provinces
 - Largest City: Seoul
 - Capital City: Seoul
 - First Kingdoms 18 BC
 - Area: 100,210 km²
 - Population: 51,446,201
 - Density 507/km²
 - Density Seoul
 - GDP US\$1.53 trillion (11th World Bank ranks)
 - Drives on the right
 - Calling code +82
 - ISO 3166 KR





 Search here

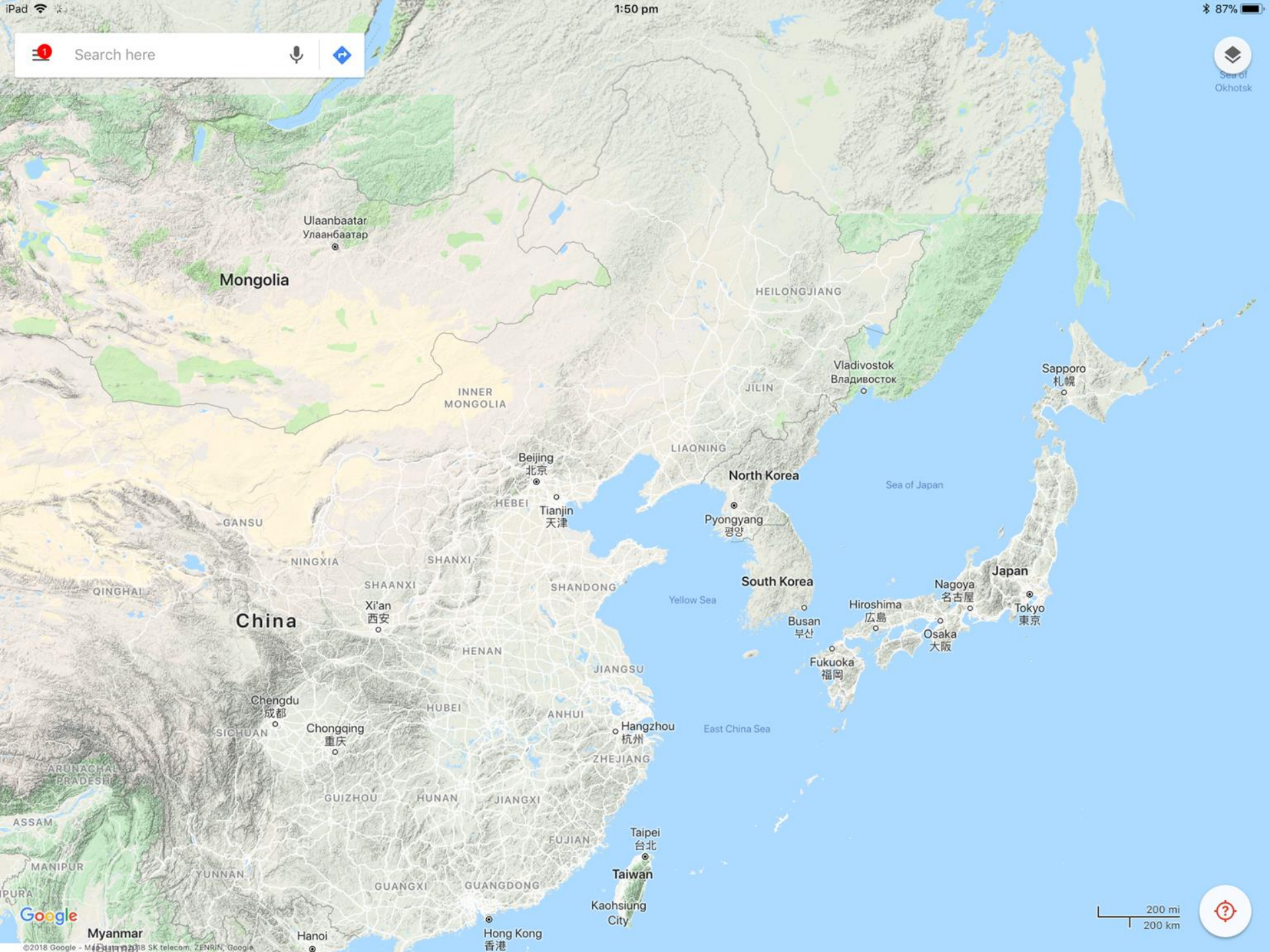




Christmas Island

Solomon Islands

Australia



1:50 pm

87%

Search here

Ulaanbaatar
Улаанбаатар

Mongolia

HEILONGJIANG

JILIN

Vladivostok
Владивосток

Sapporo
札幌

Inner Mongolia

Beijing
北京

Tianjin
天津

HEBEI

SHANXI

SHANDONG

North Korea

Pyongyang
평양

Sea of Japan

South Korea

Busan
부산

Hiroshima
広島

Nagoya
名古屋

Osaka
大阪

Japan

Tokyo
東京

China

GANSU

NINGXIA

QINGHAI

SHAANXI

Xi'an
西安

HENAN

JIANGSU

Hubei

Chengdu
成都

Chongqing
重庆

SICHUAN

GUANGXI

GUANGDONG

HONG KONG
香港

Taipei
台北

Taiwan

Kaohsiung City

Yellow Sea

East China Sea

200 mi
200 km

Google

Myanmar

Manipur

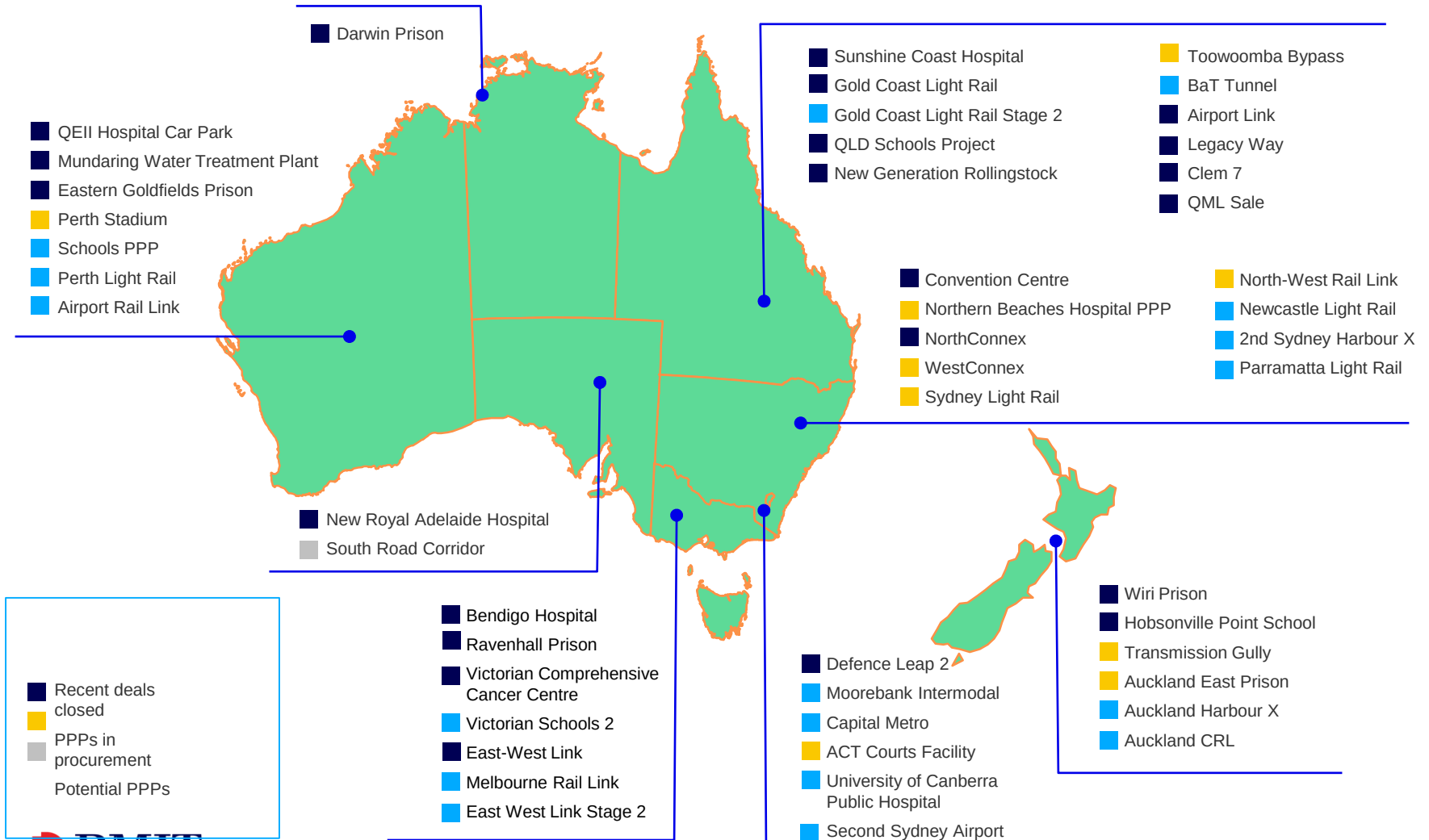
Assam

Yunnan

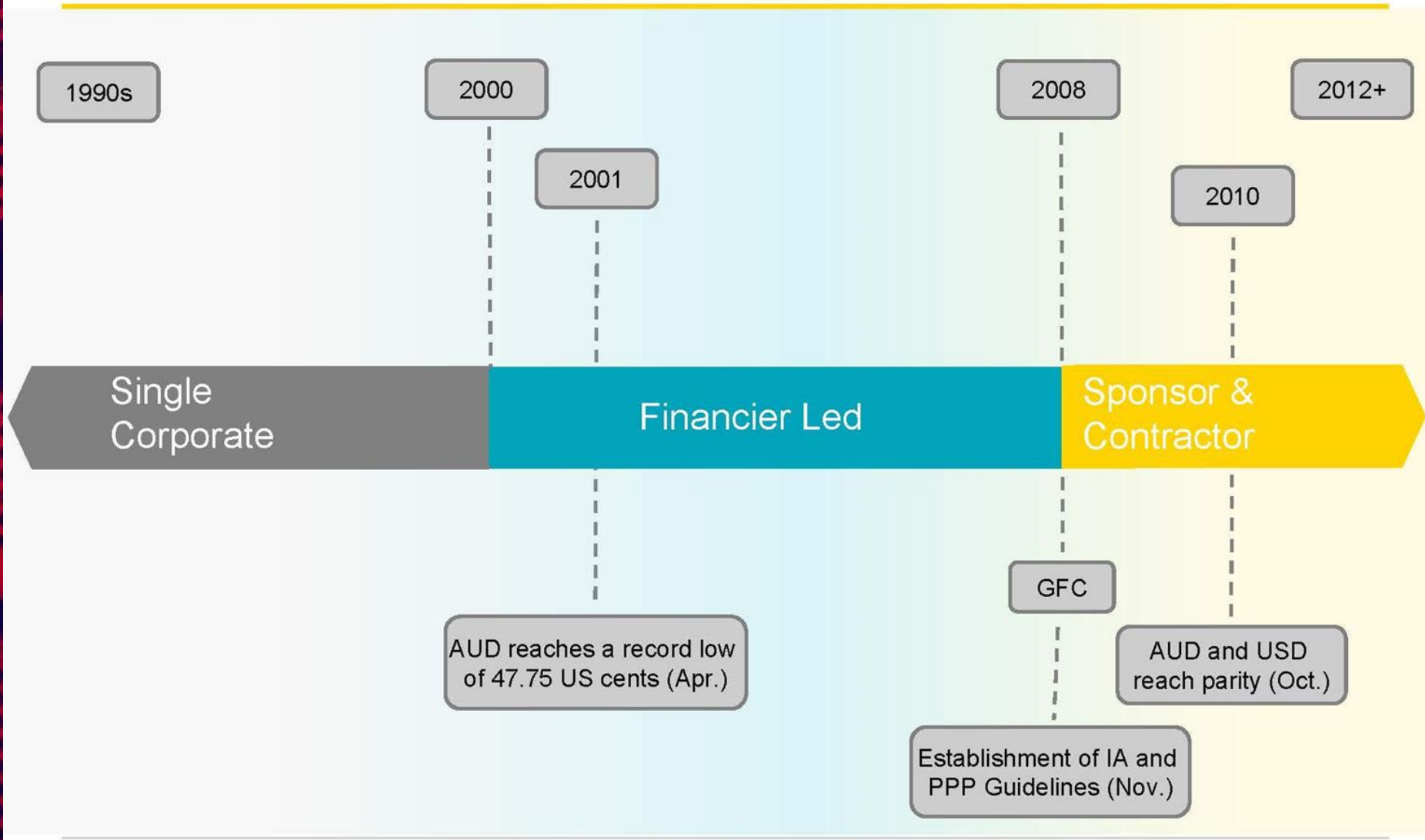
Hanoi

© 2018 Google - Map data © 2018 SK telecom, ZENRIN, Google

Transport & mega projects dominate the pipeline



Market model

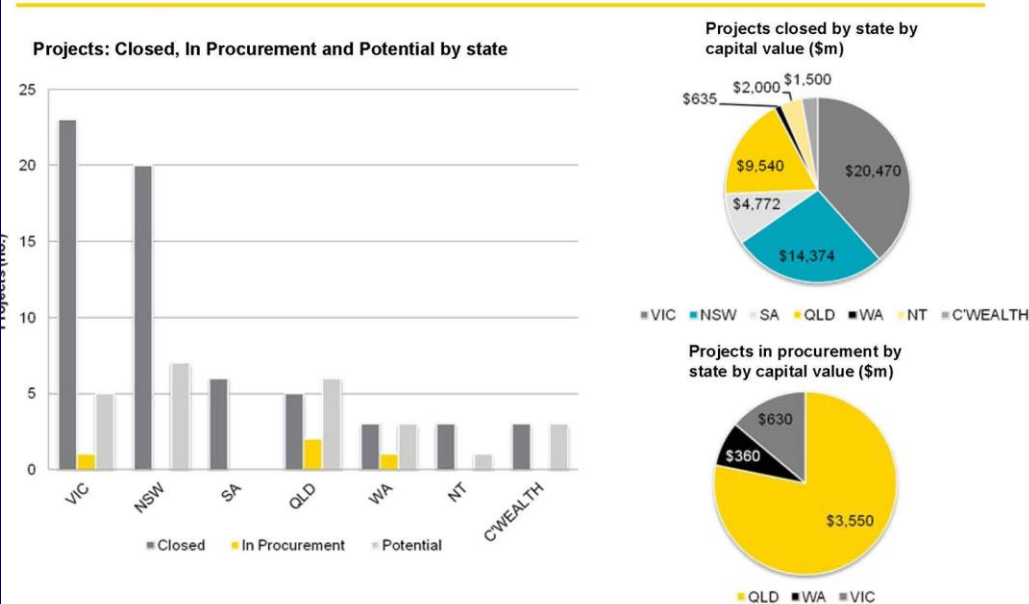


GEO SPREAD

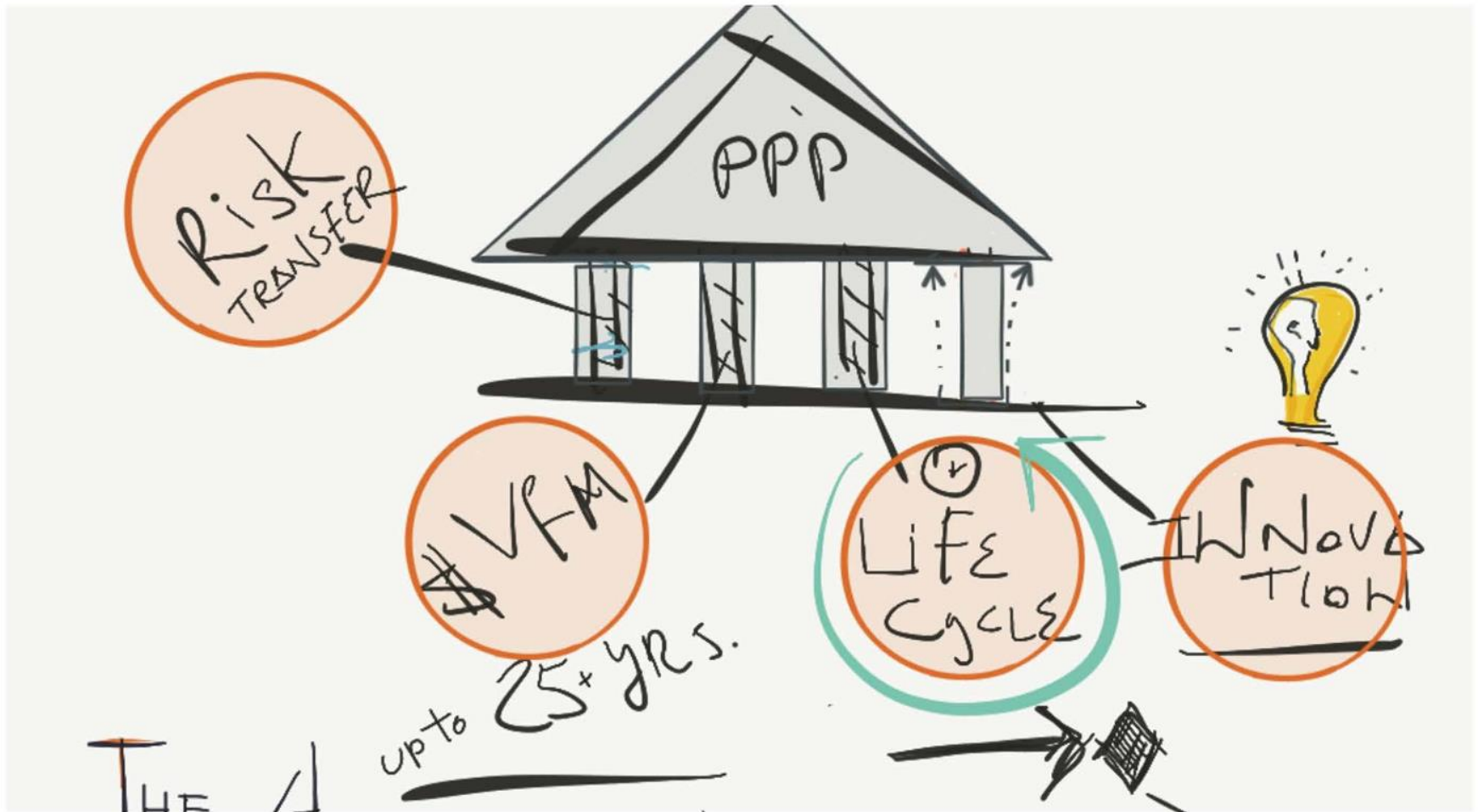
- VICTORIA
- NEW SOUTH WALES
- SOUTH AUSTRALIA
- QUEENSLAND
- WESTERN AUSTRALIA
- NORTHERN TERRITORIES

Geographic spread

Closed, procured and potential projects, 1988 - 2012

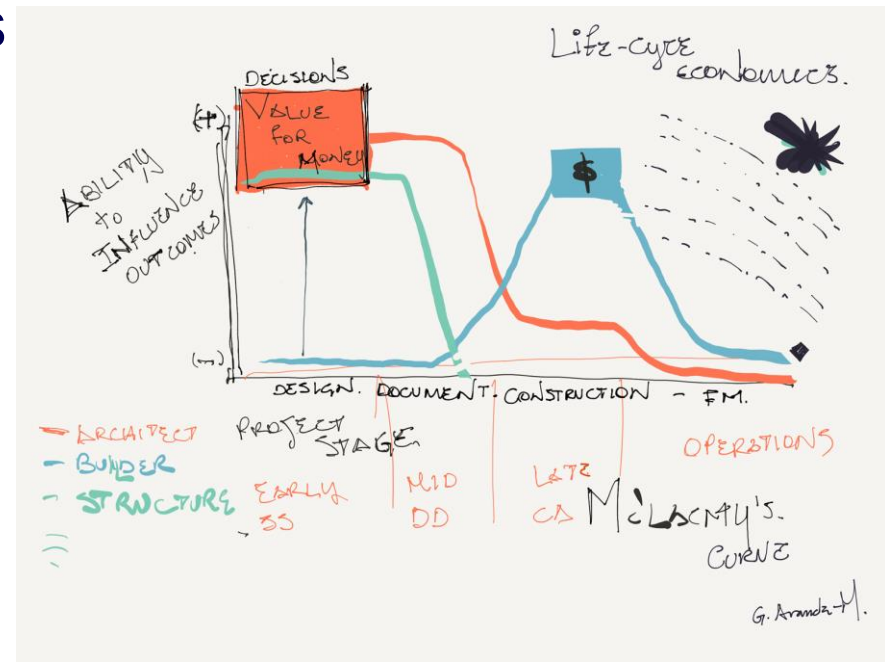


The PPP model for INFRASTRUCTURE PROCUREMENT



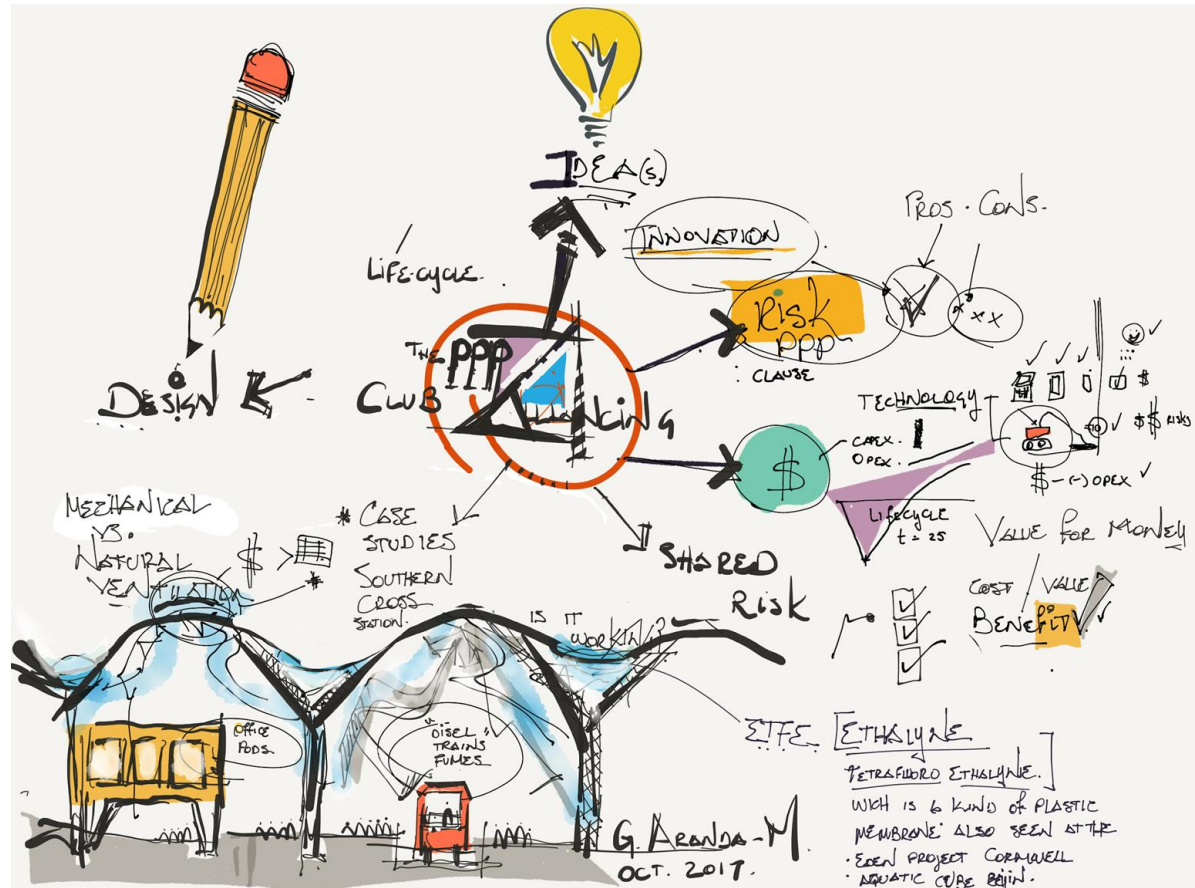
Role of the public sector

- Define detailed contract specification
- Determine appropriate roles and responsibilities i.e. risk transfer
- Construct payment mechanism
- Manage procurement process
- Select best solution
- Negotiate contract to close

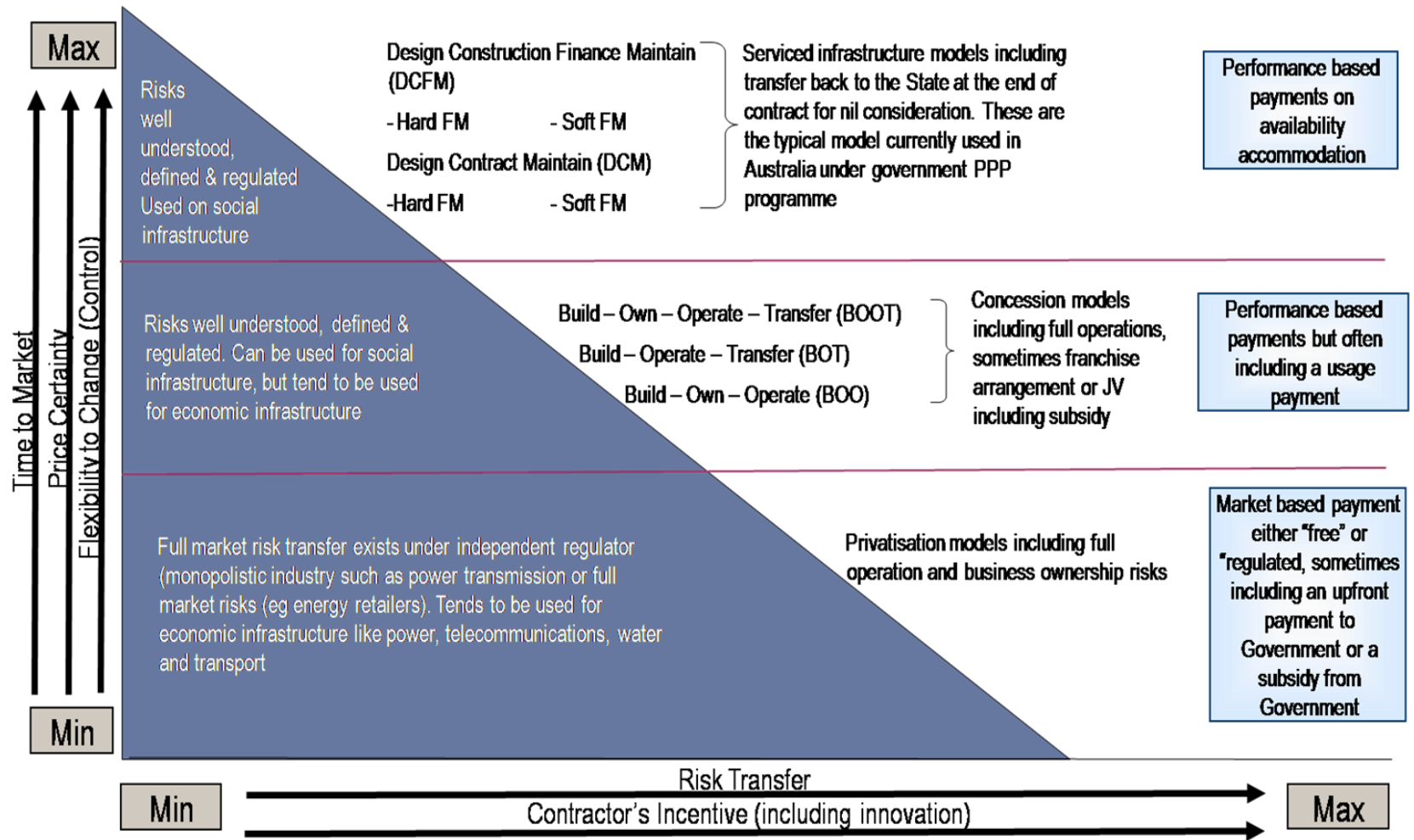


Role of the private sector

- Design of facilities to meet contractual requirements
- Build facilities
- Finance required investment
- Operate facilities and required services
- DBFO, but could be DCMF, BOOT, BOT...

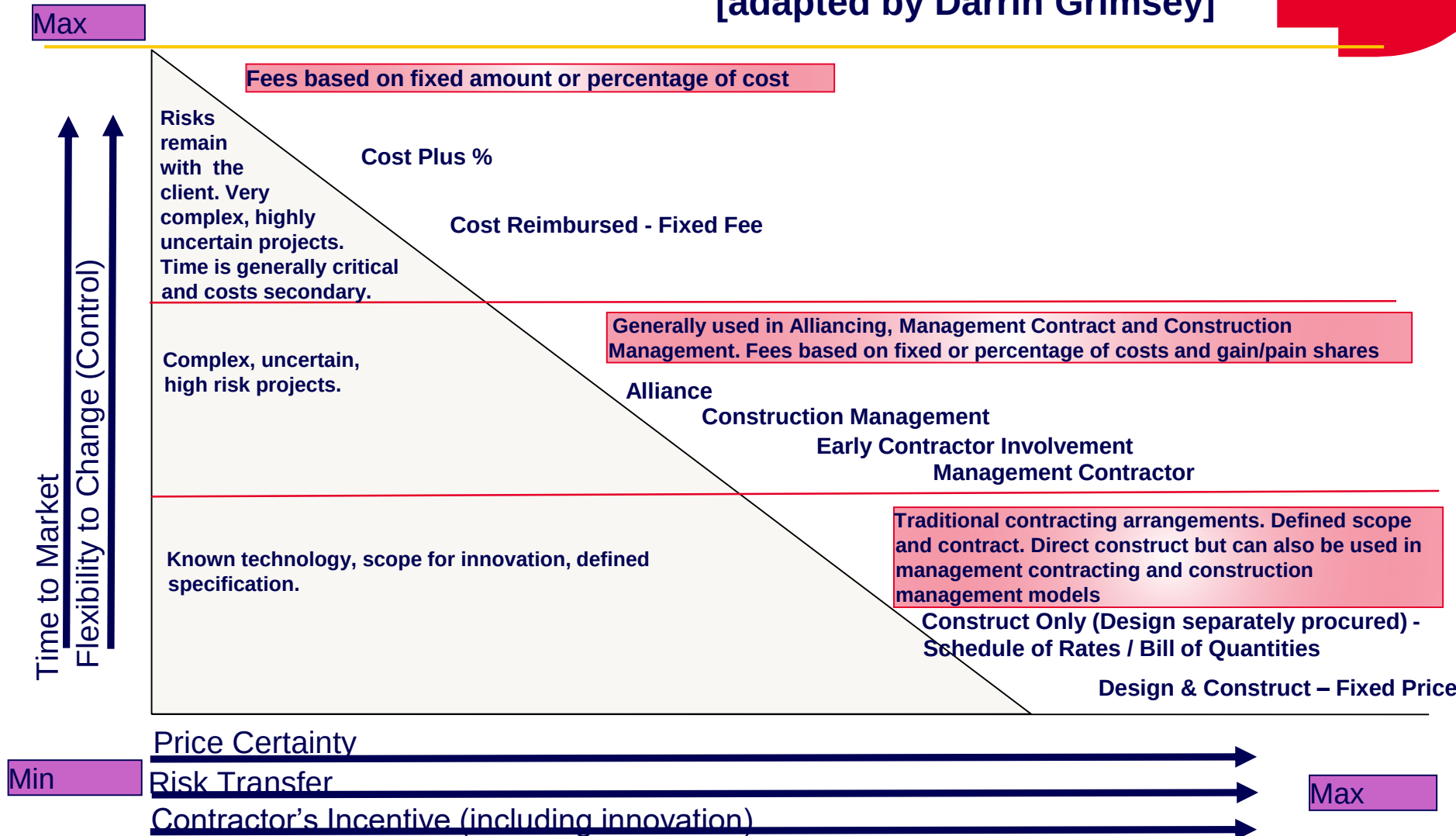


Role of the private sector (Grimsey's Triangle)

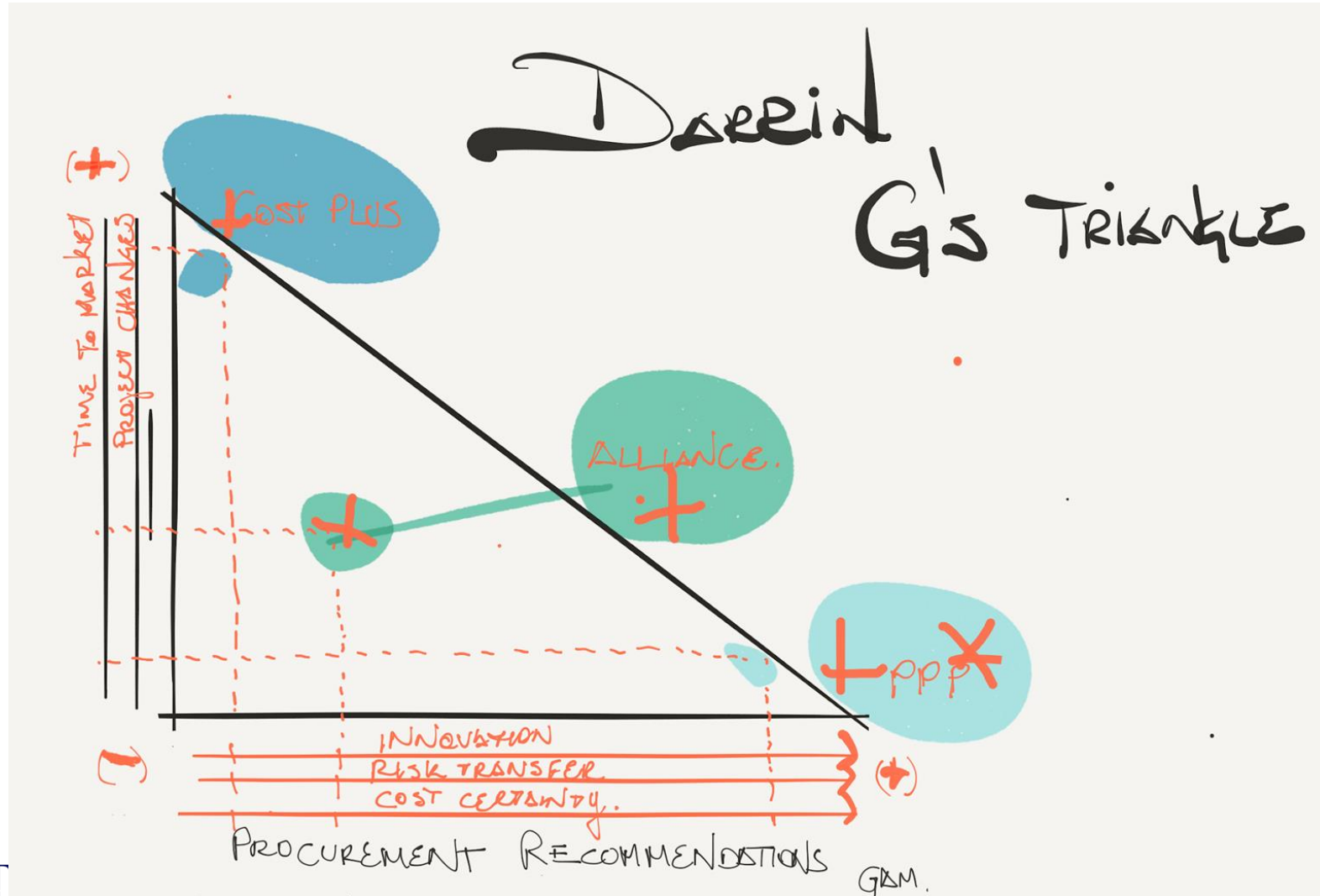


Procurement assessment framework

[adapted by Darrin Grimsey]



Value for Money



Risk management in PPP's – best practice

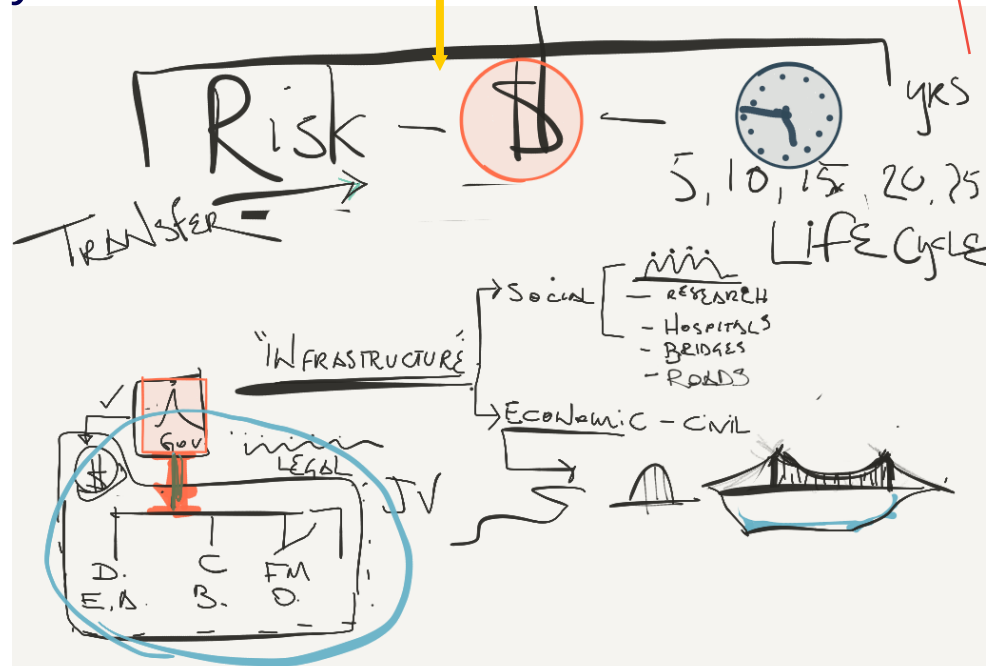
Aim is to achieve Optimal Risk Transfer
not Maximum Risk Transfer

Optimal risk allocation seeks to minimise both project costs and the risks to the project by allocating risk to the party in the best position to control them in the most cost effective way. That party has:

- the best ability to reduce the likelihood of the risk occurring
- the best ability to control the consequences if it does arise

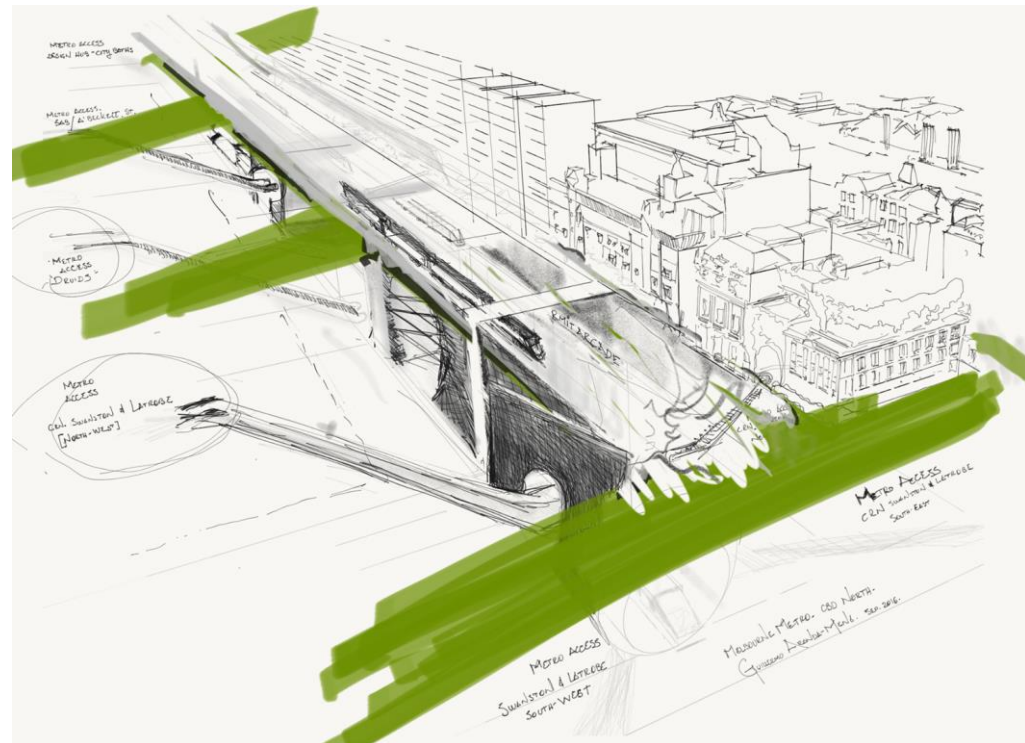
VFM

Risk



Critical success factors for PPP

- Properly resourced and committed Government team
- Effective procurement process
- Effective management and allocation of risk
- Clear specification of outputs
- Project affordability – no free goods!
- Understanding that private sector needs to make an appropriate level of return!
- Contract structure and payment mechanisms

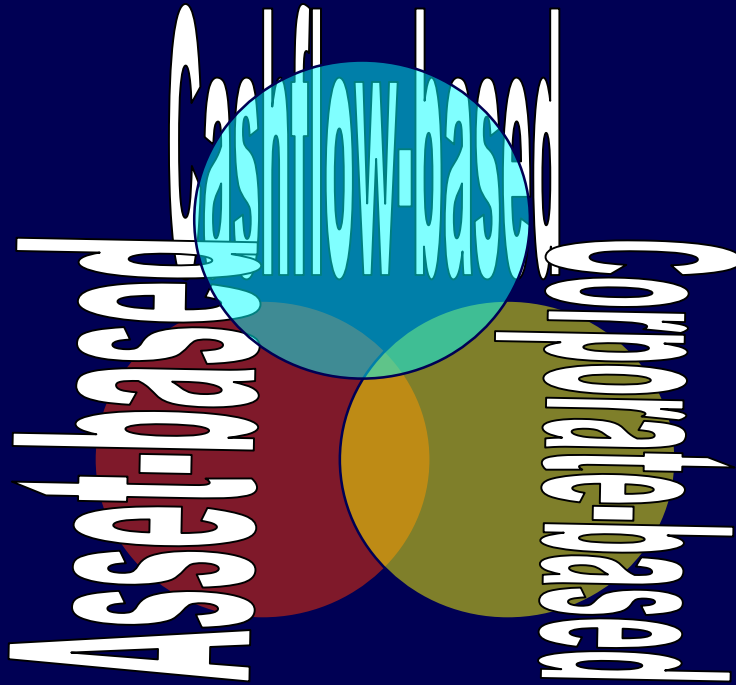




2. FUNDAMENTALS

FINANCE: CASH IS KING

The Three Fundamental Forms of Lending



Different
approaches, but
interlinked

All lending relies primarily on cashflows for repayment

Most lending involves taking security over physical assets

Lending always remains a corporate obligation

Cashflow is Central to All Lending

For loans to be maintained in good condition, the borrower must find sufficient cashflow on a regular basis to pay interest and principal

Most sound lending implicitly and informally assesses this cashflow, and the risks associated with it

Project finance therefore gives insights into all lending decisions by applying a rigorous, explicit, and formal process



What is Project Finance? Definition

Where lenders can look solely to the cashflow generated by the project for repayment

and The assumptions used to forecast the cashflow can be independently verified

so that Risk analysis can demonstrate that there is a very high probability of repayment



Why use Project Finance ?

Traditional Reasons

Where project = company

Where project is large relative to company

Cheap political risk insurance

To provide an additional discipline on investment appraisal

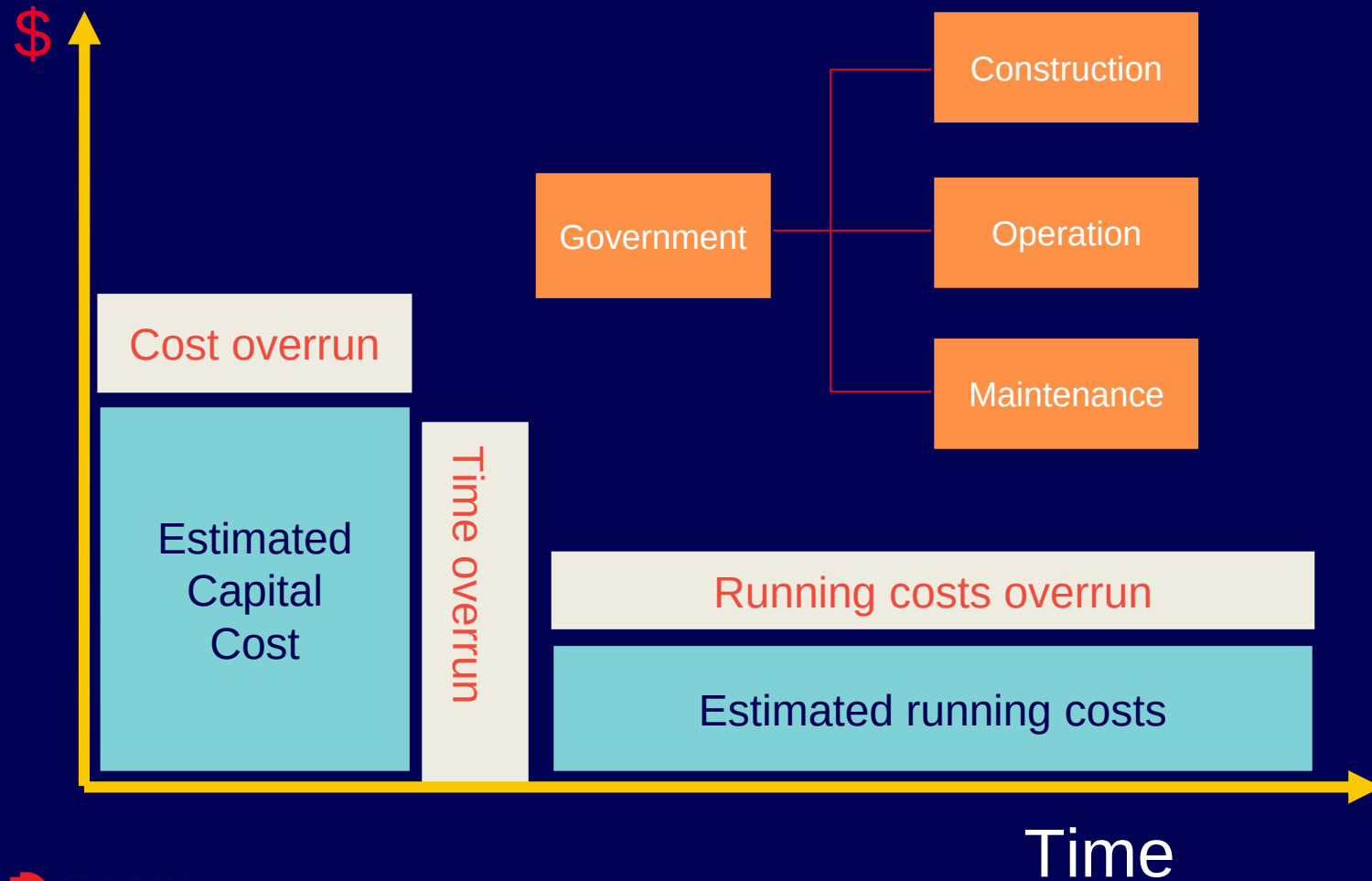
To regulate a weak JV partner

PPPs = the “glue” that fixes the risk allocation



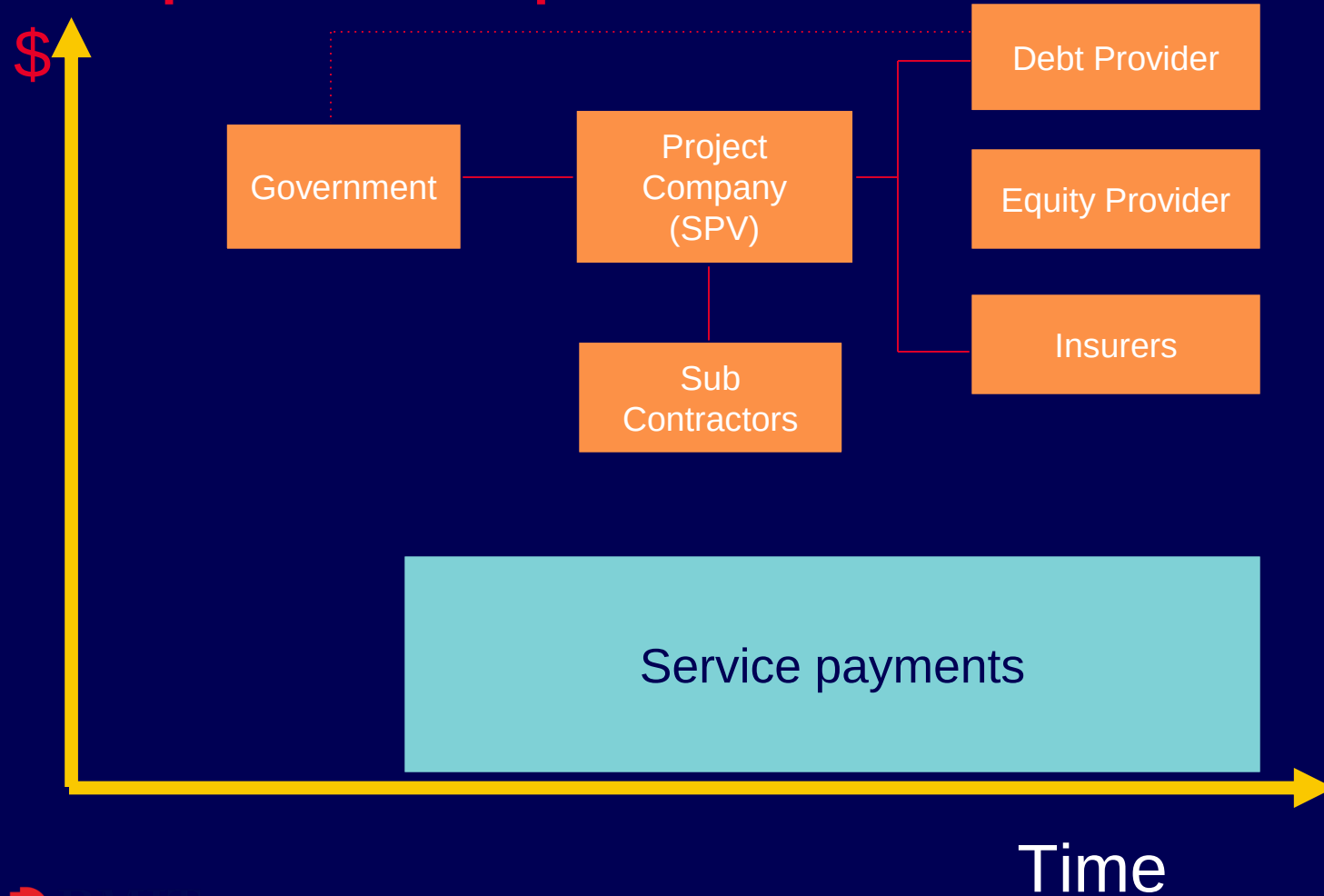
PPPs - What Do We Mean ?

Traditional public procurement picture



PPPs - What Do We Mean ?

PPP procurement picture



Social Infrastructure PPP – The Concept

Long term contract eg 20-25 years

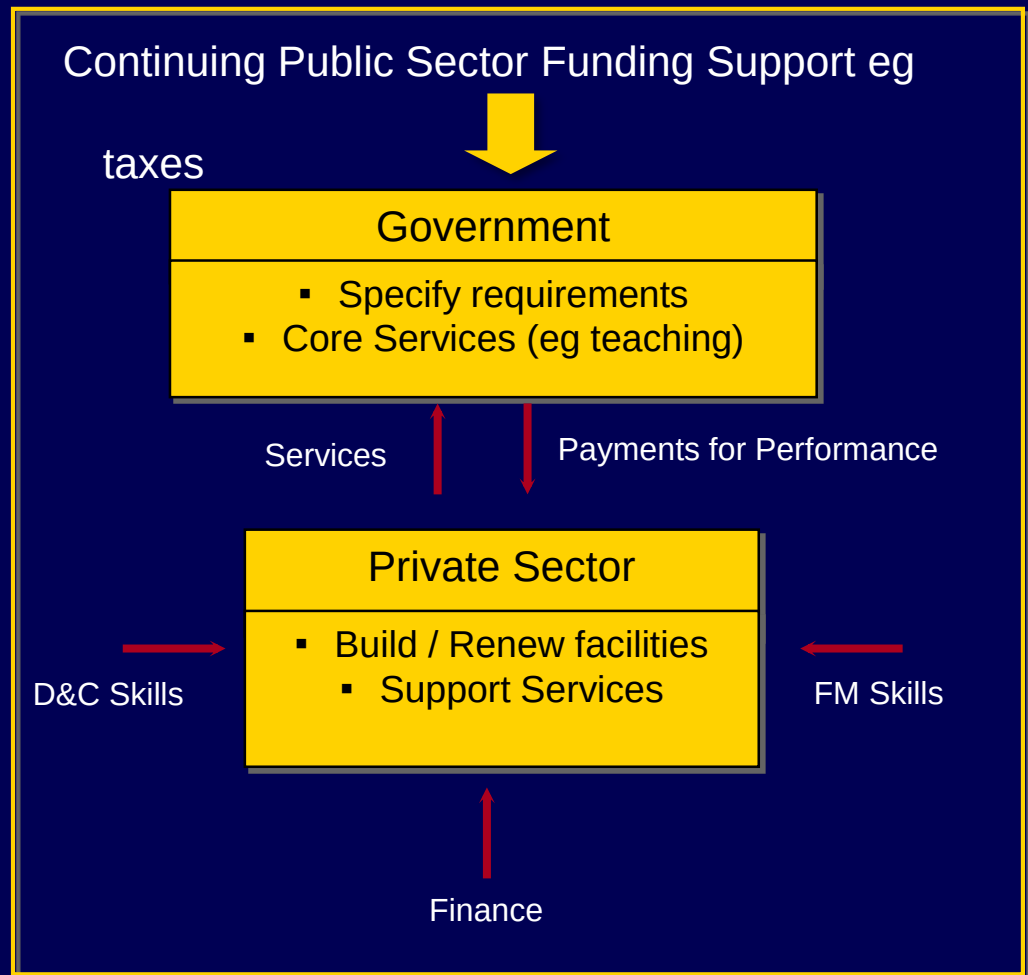
Government responsible for:

- Land acquisition
- Approvals
- Service payments

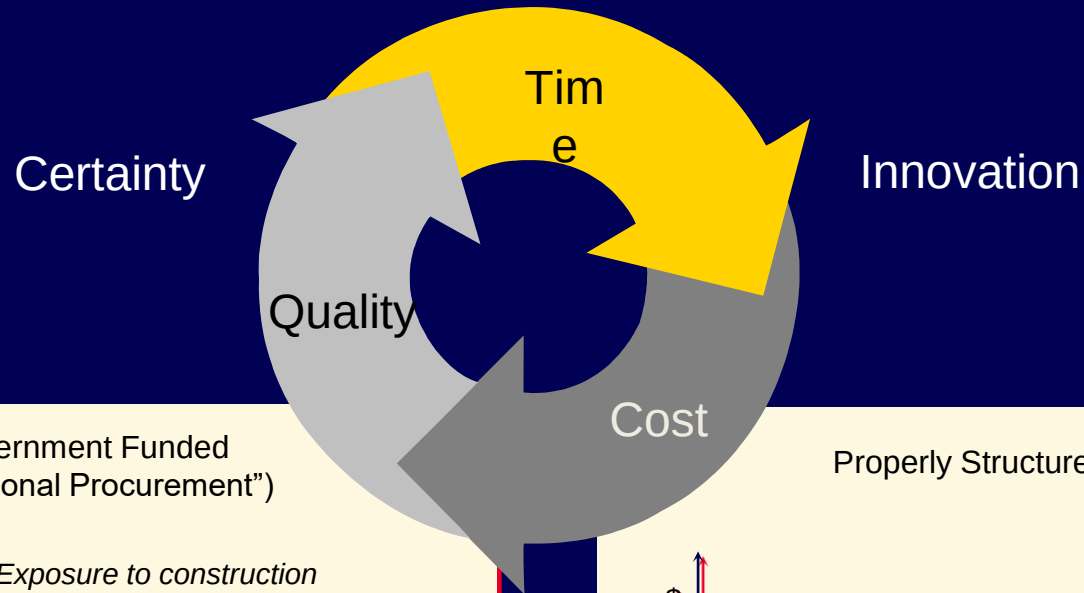
Private sector responsible for:

- Design and construction of infrastructure asset
- Some operating period services
eg facility maintenance (FM)
- Financing

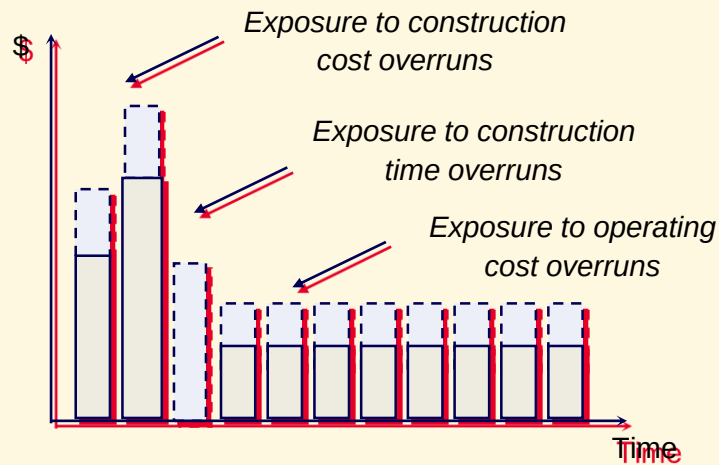
Payments to private sector only upon construction completion and subject to performance



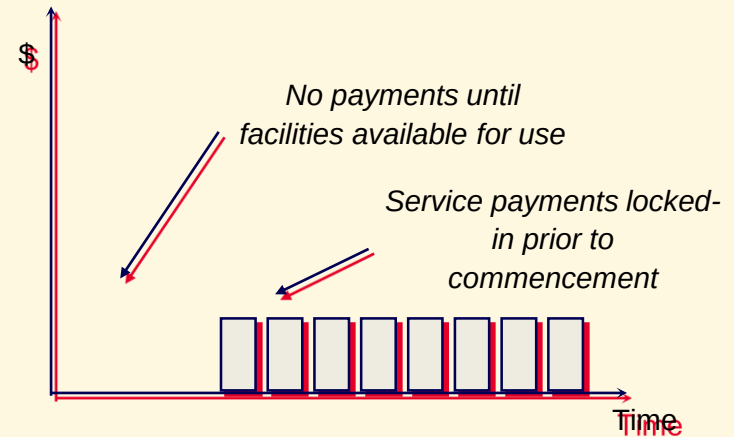
Why do Governments use PPPs?



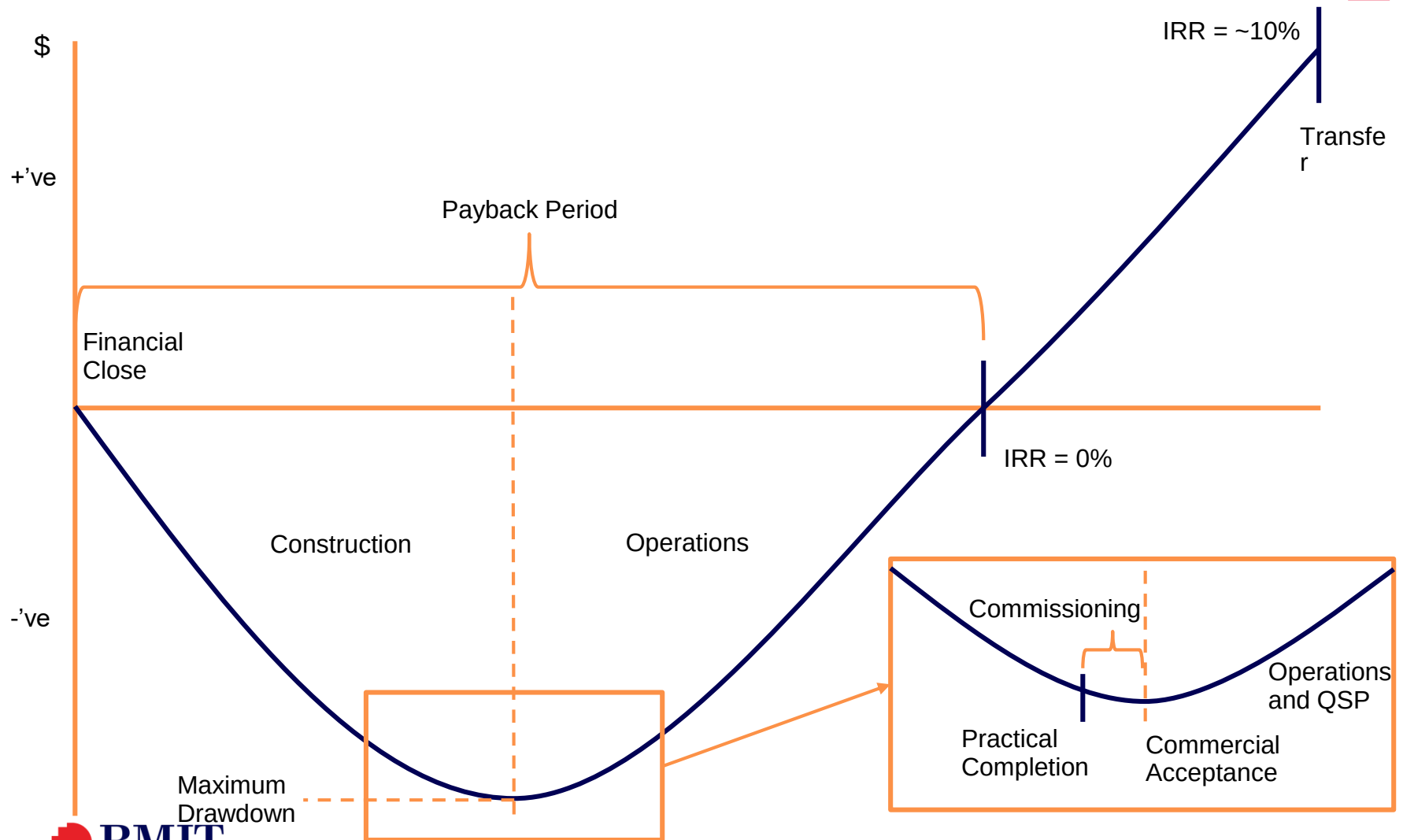
Government Funded
("Traditional Procurement")



Properly Structured PPP

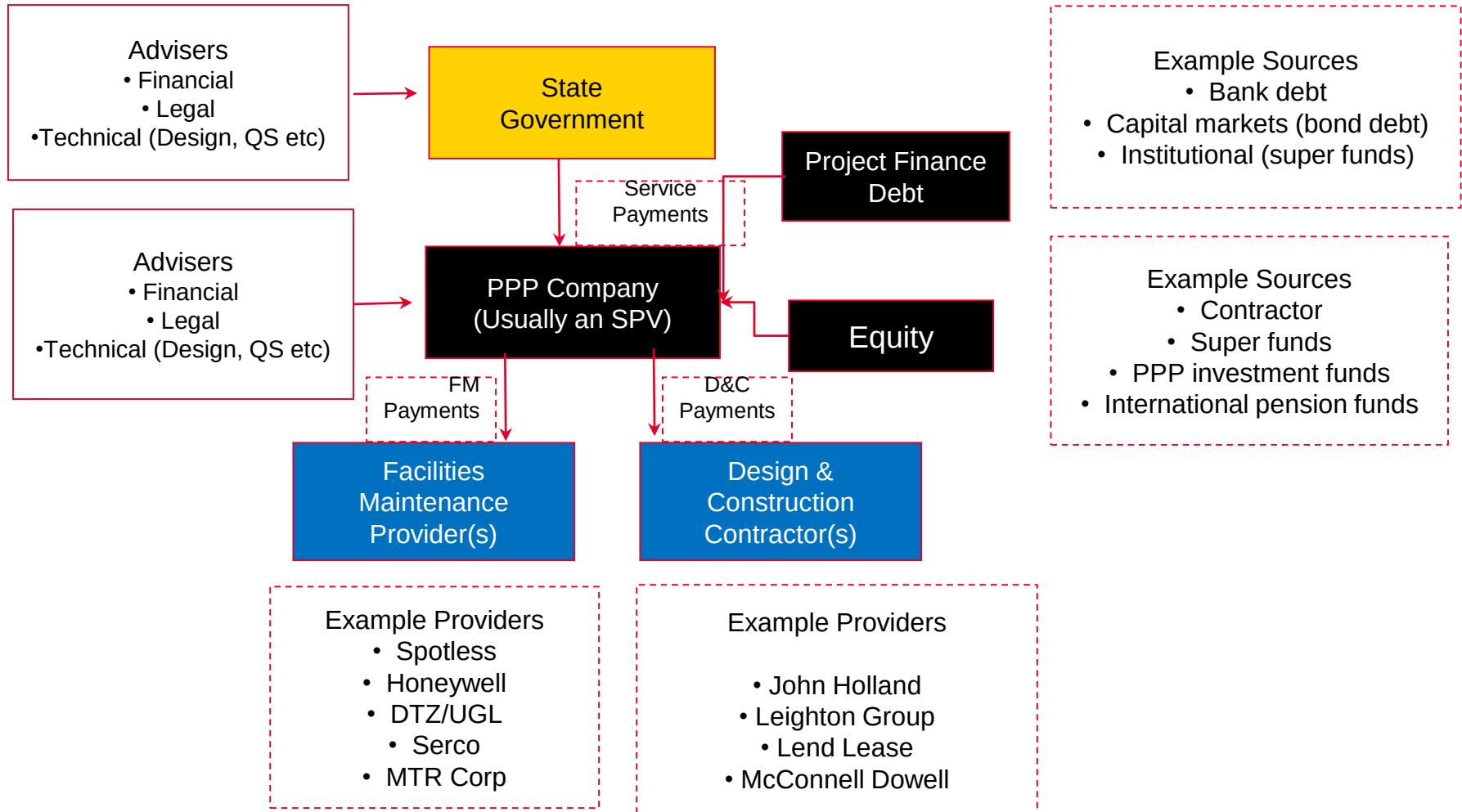


PPP Cumulative Cashflow

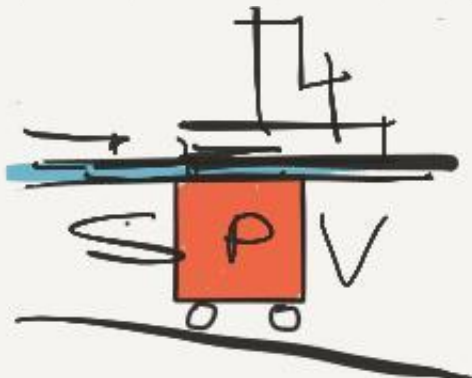
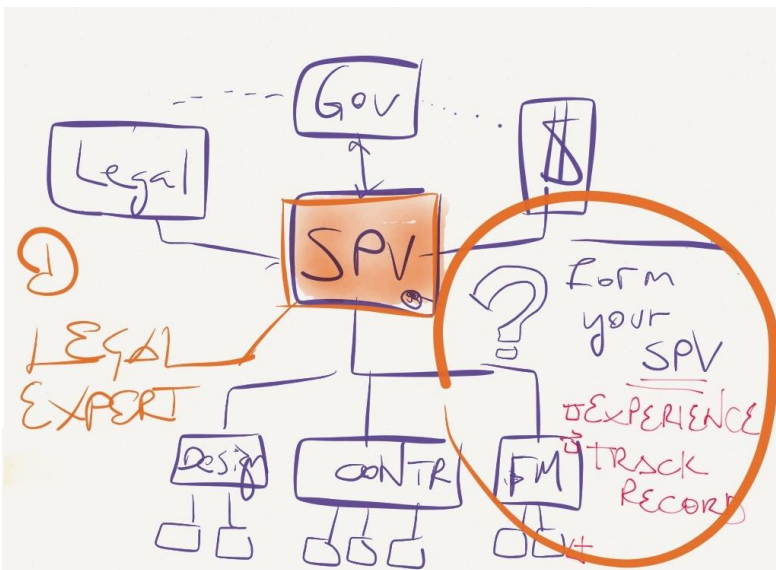


Typical Project Finance Structure

“Social Infrastructure” PPP Transaction

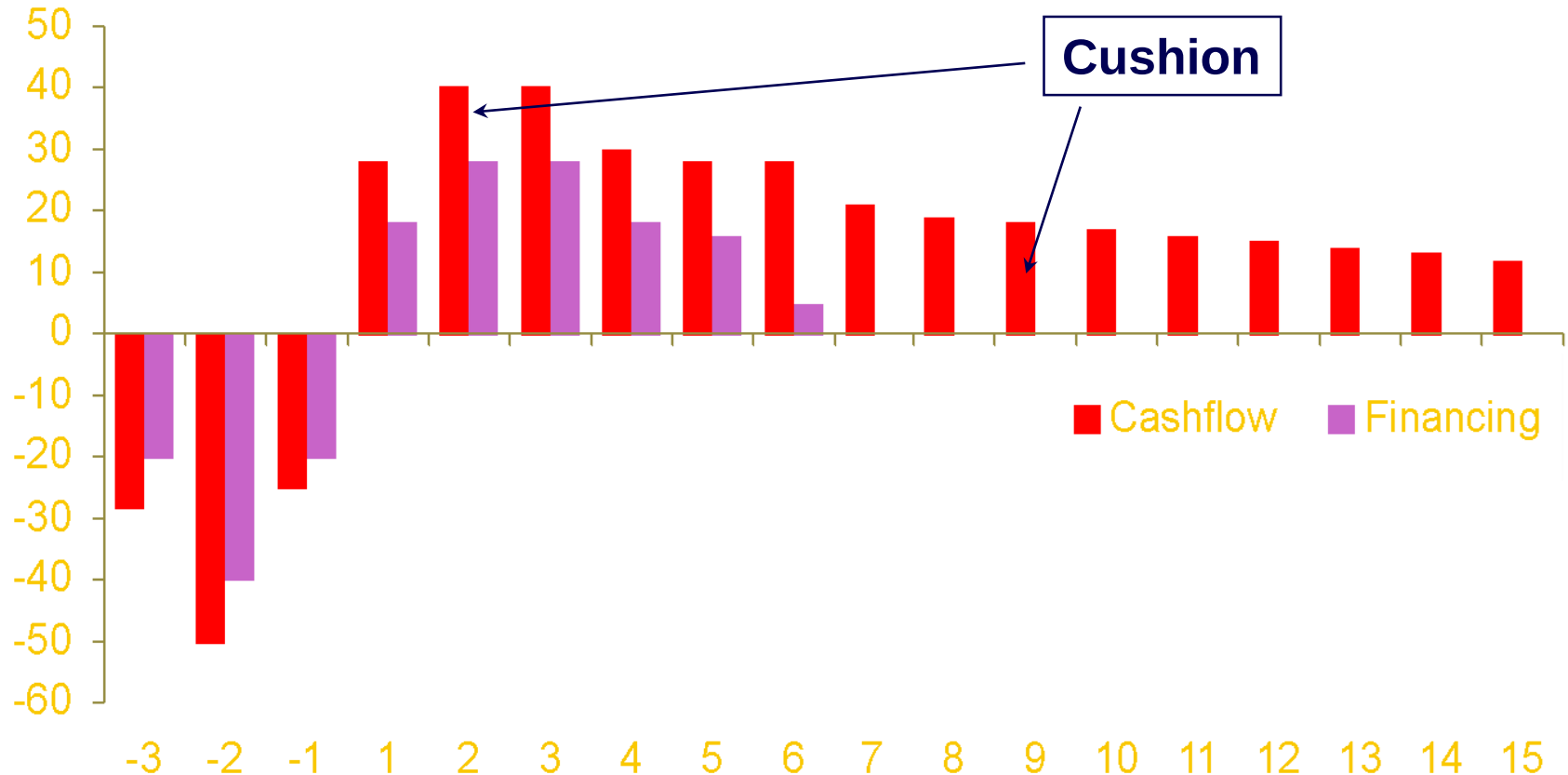


Special Purpose Vehicle [SPV, JV, Project Co.]



Cashflow Based

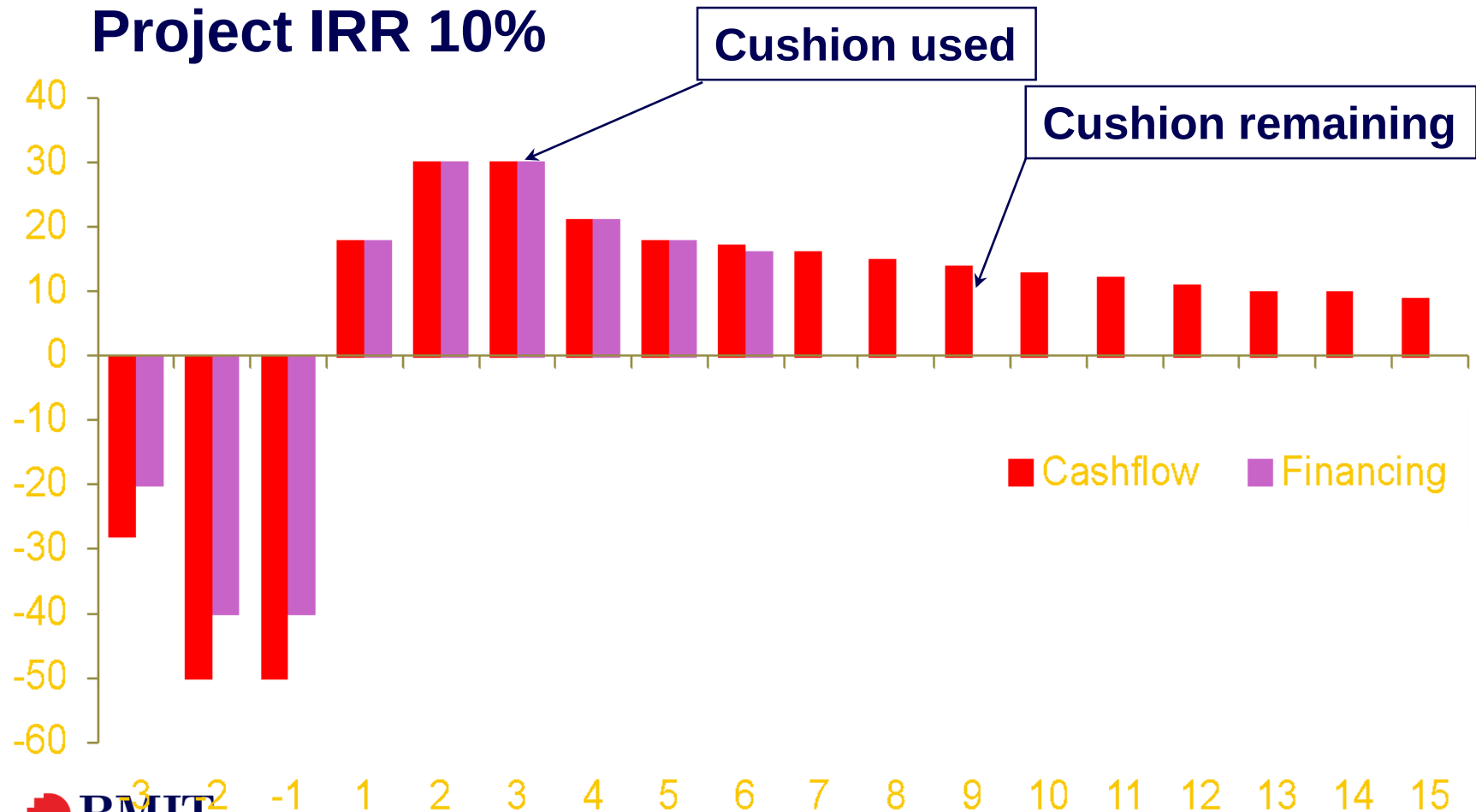
Base case: Project IRR 20%



Real debt interest rate = 6% pa

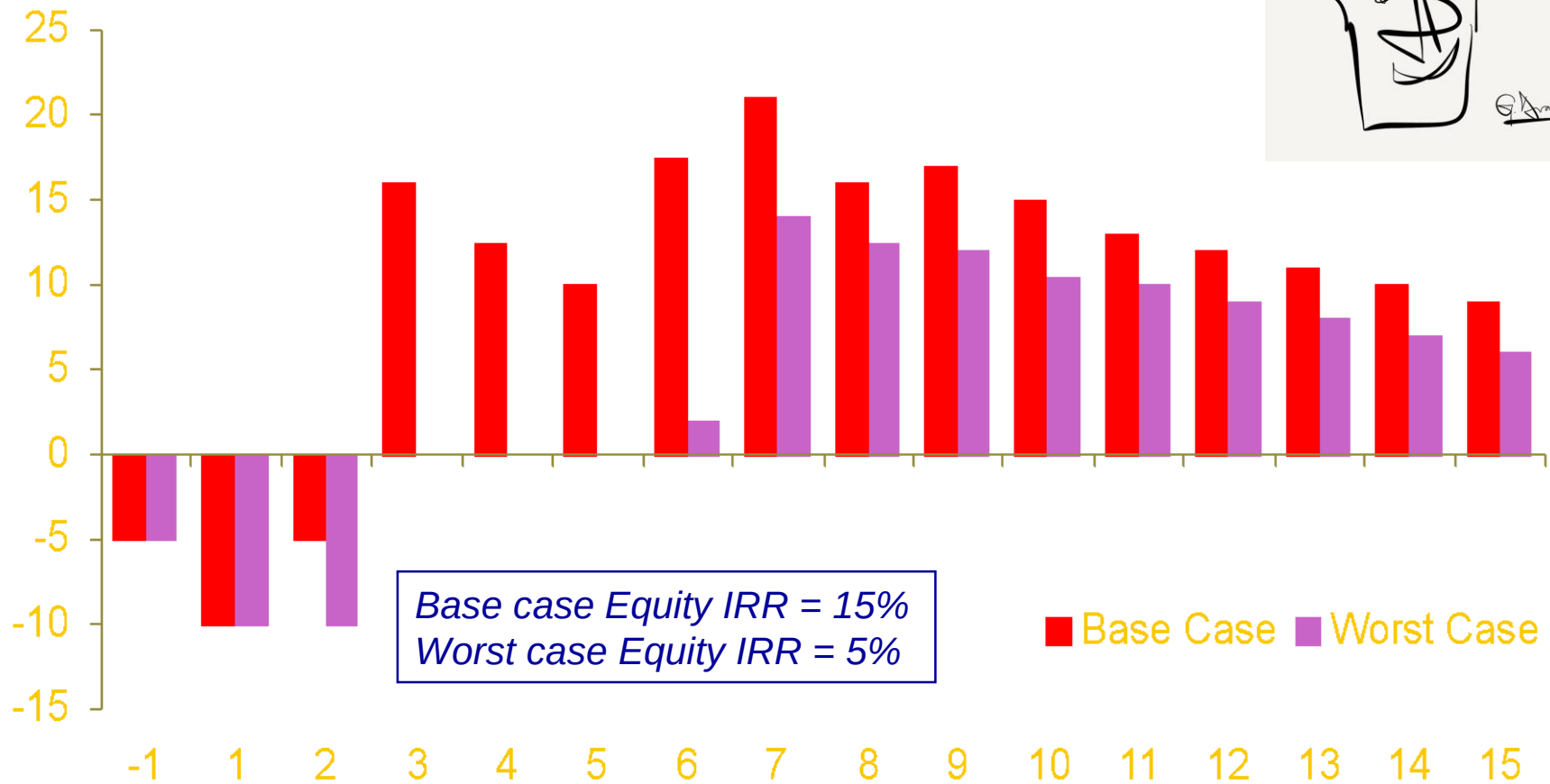
It Can Absorb Risk

**25% cost overrun; Oil Price falls from 20\$ to 15\$;
Project IRR 10%**

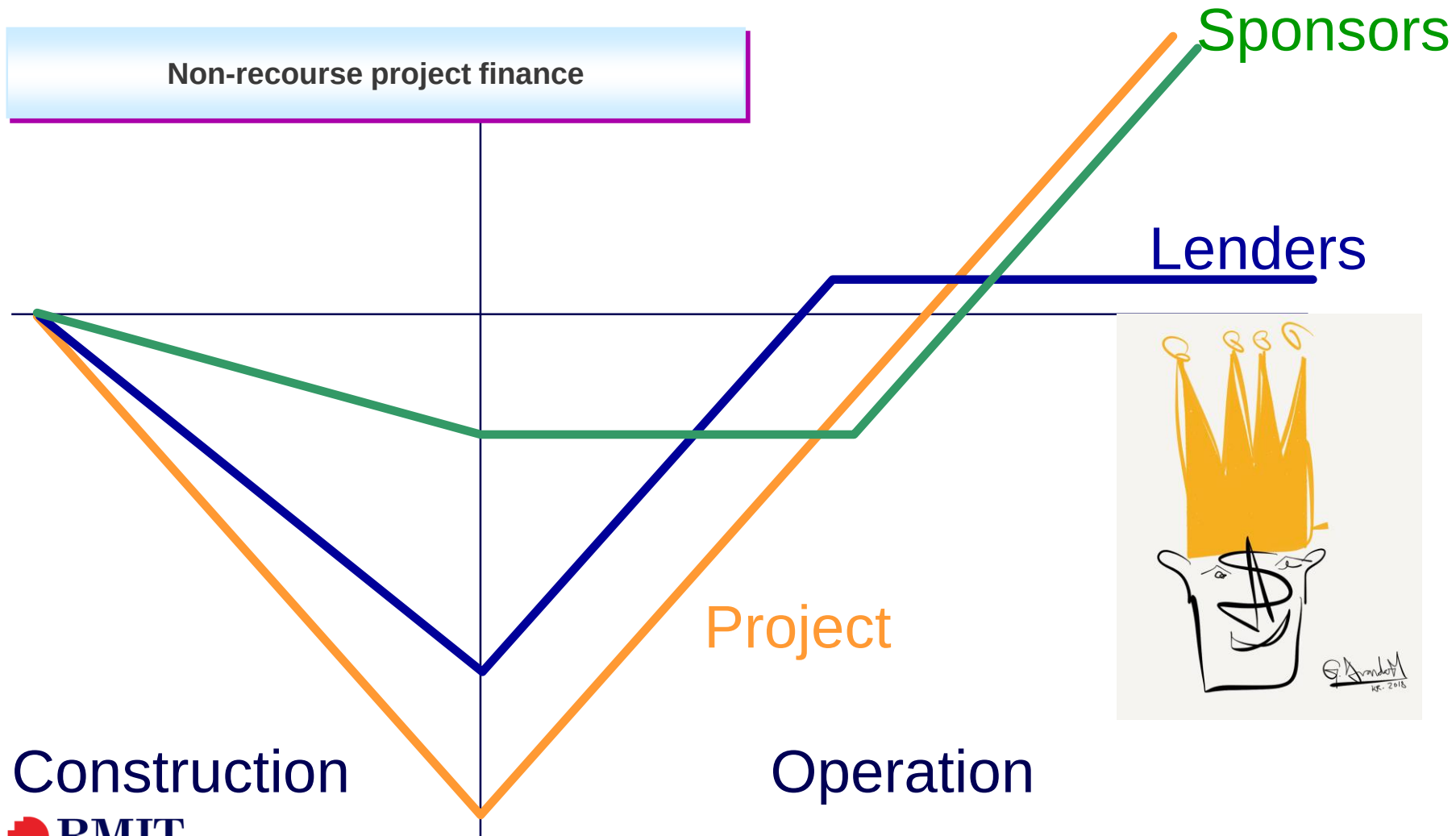


By Reducing Equity Return

Net cashflow after financing



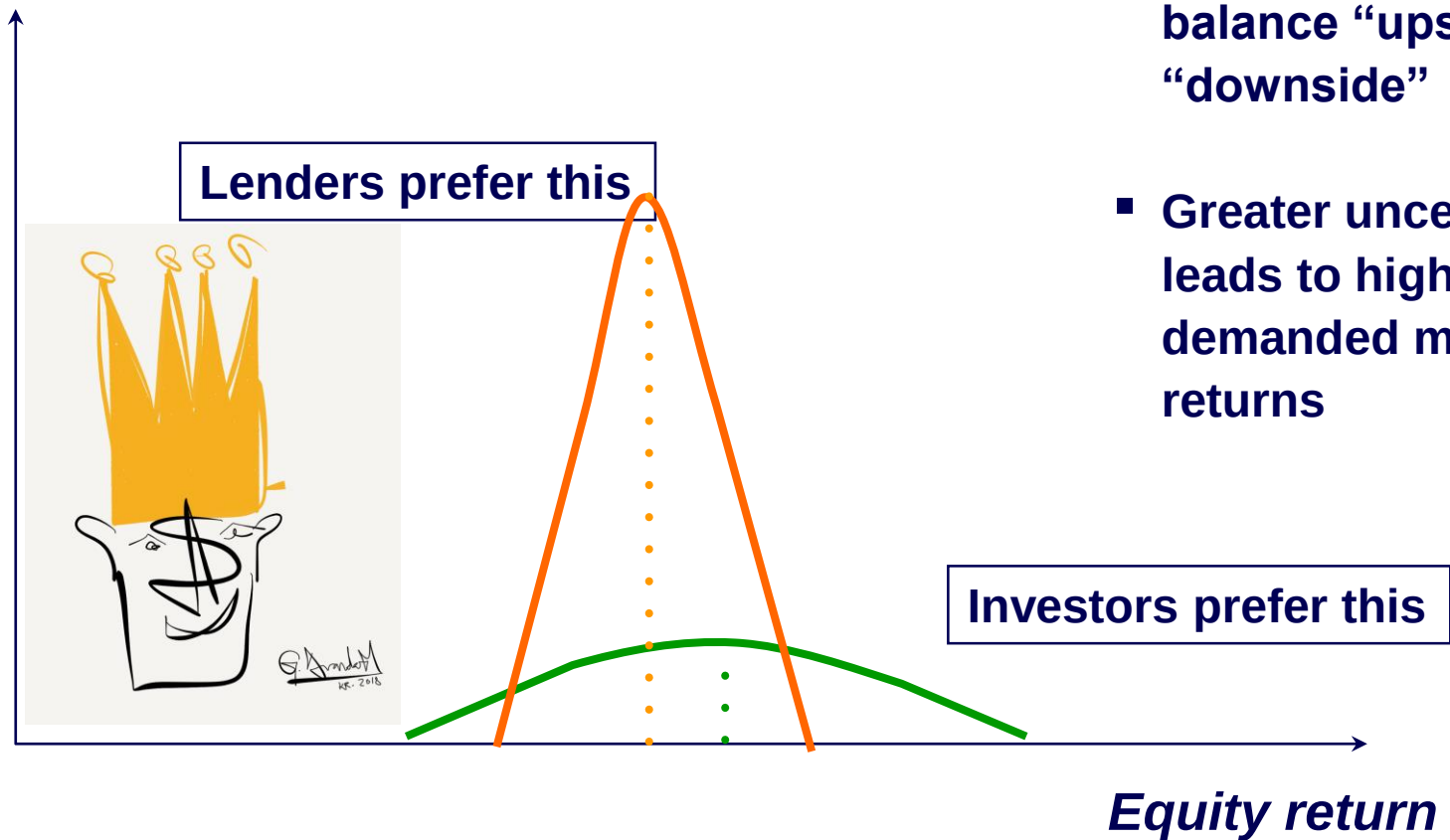
Project Finance - Lenders vs Sponsors



Construction

Operation

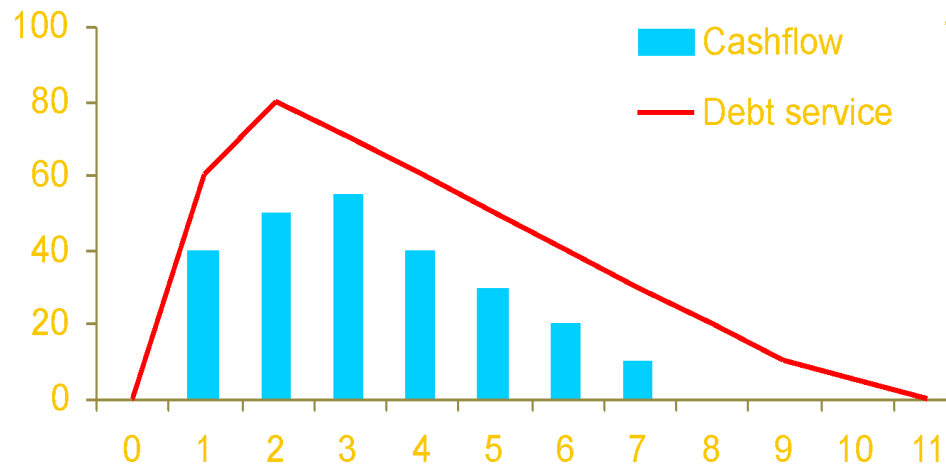
Analysing Risk - Investors' Perspectives



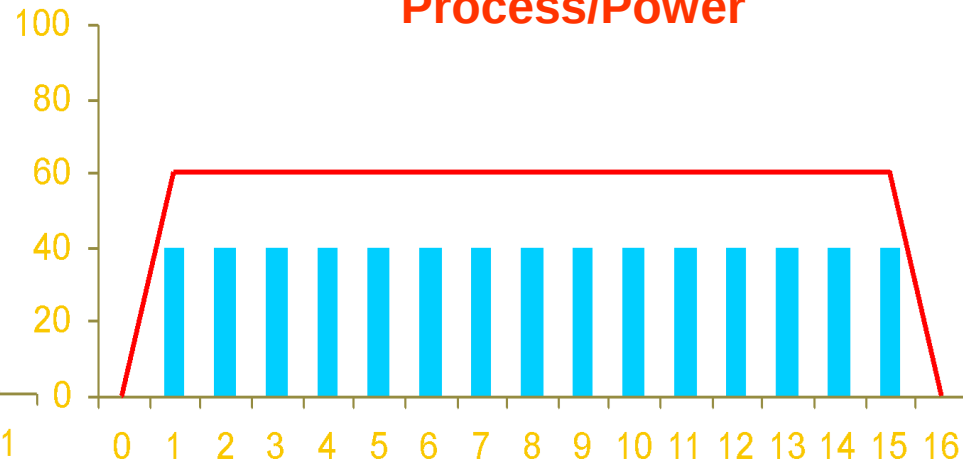
- Investor prepared to balance “upside” and “downside”
- Greater uncertainty leads to higher demanded mean returns

Profile Comparisons

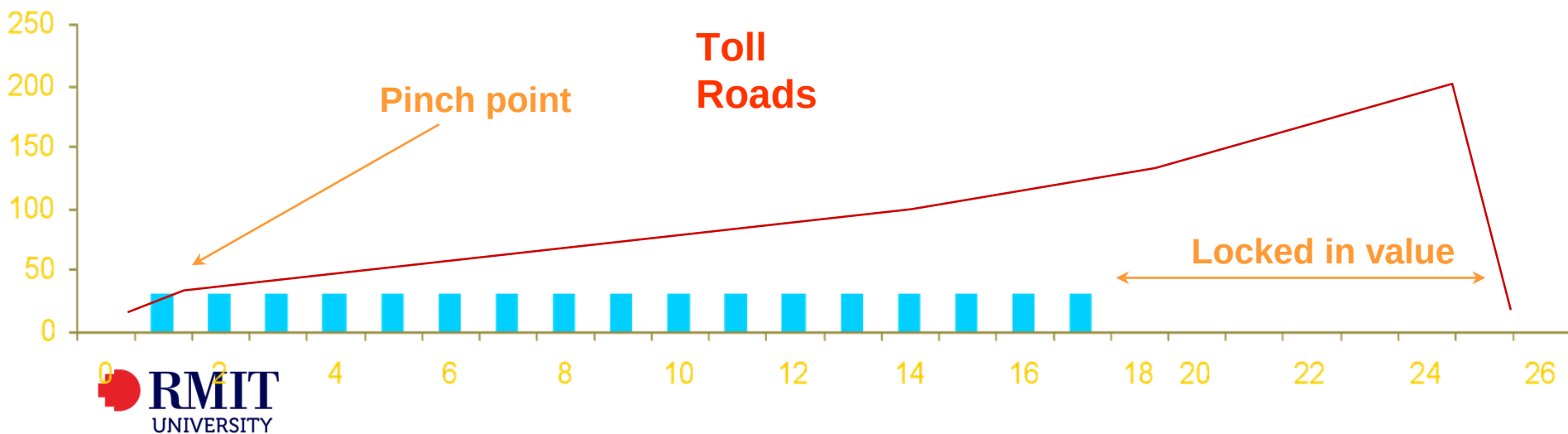
Natural Resources



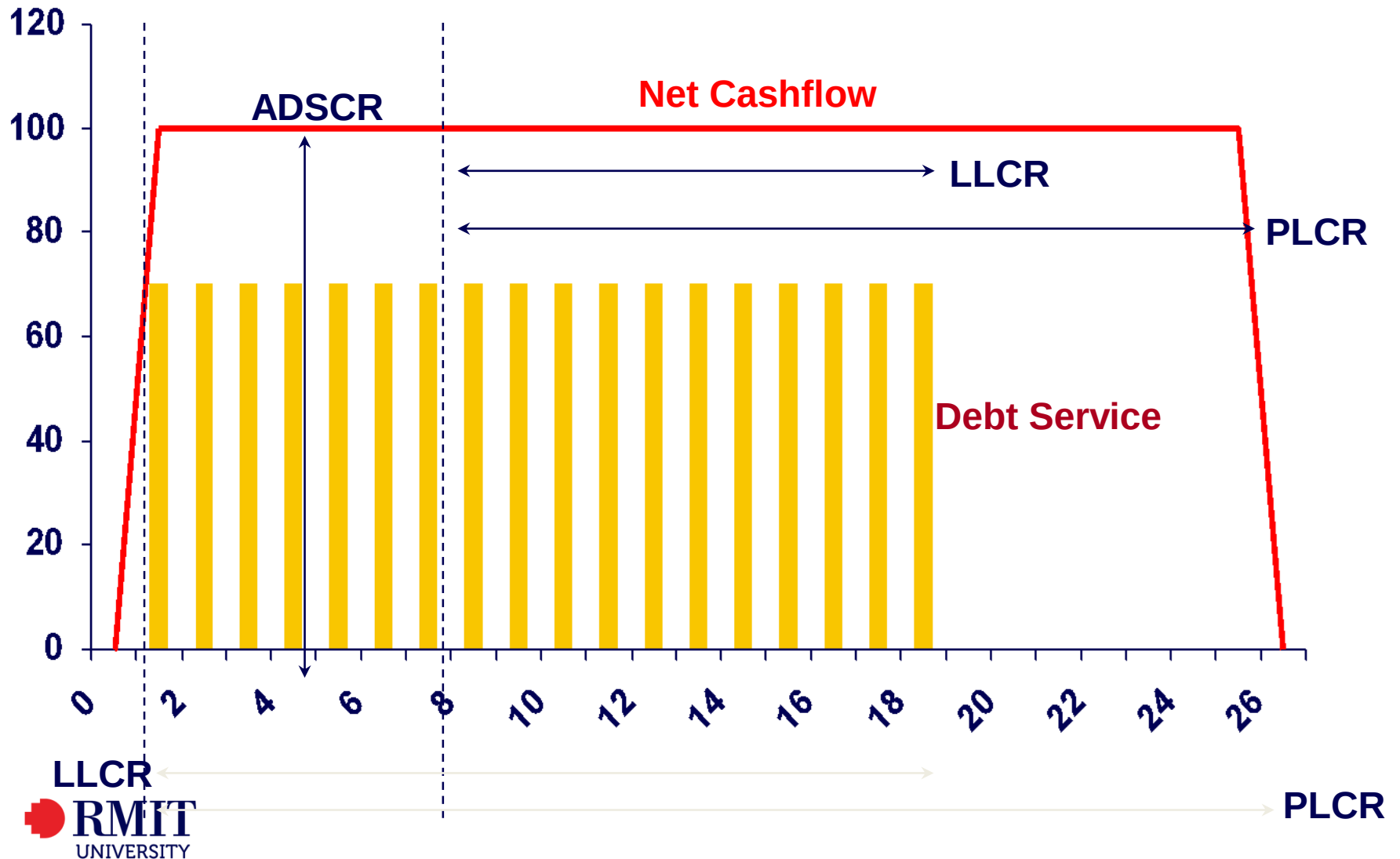
Availability PPP Process/Power



Toll Roads



Key Banking Ratios



Key Banking Ratios - Definitions

Annual Debt Service = Pre-Finance Post-tax Cashflow
Cover Ratio (ADSCR) Loan Interest, Repayments, Fees

Loan Life Cover Ratio = NPV of Pre-Finance Post-Tax
(LLCR) Cashflow over the Loan Life
Loan Outstanding

Project Life Cover Ratio = NPV of Pre-Finance Post-Tax
(PLCR) Cashflow over the Project Life
Loan Outstanding



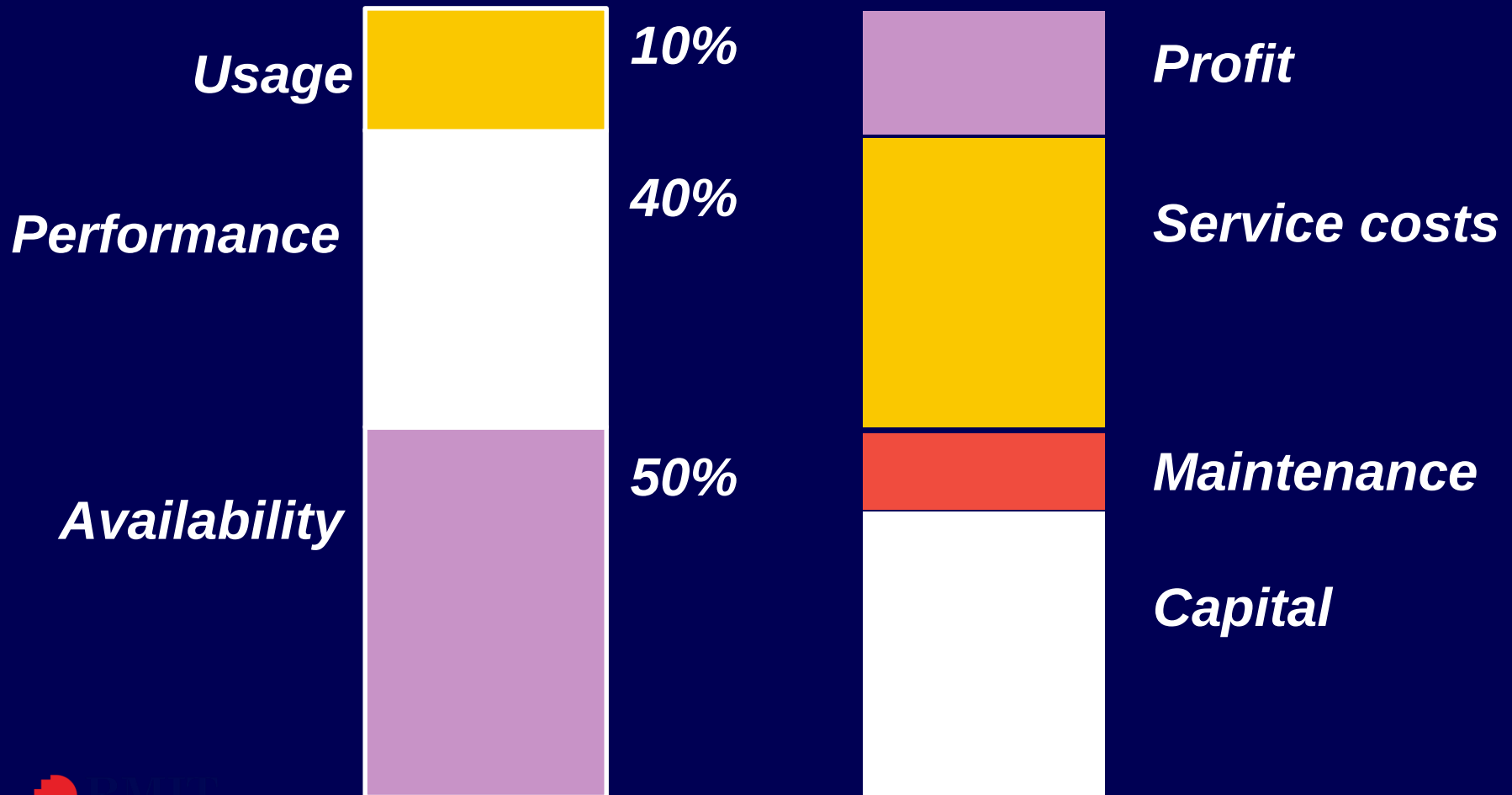
Key Banking Ratios

Decreasing price risk

	<i>Natural resources</i>	<i>Road Tolls</i>	<i>Power</i>	<i>PPP Availability</i>
<i>ADSCR Minimum</i>	1.35	1.25	1.25	1.15
<i>LLCR Minimum</i>	1.75	1.50	1.35	1.25
<i>PLCR Expected</i>	2.00	1.80	1.50	1.30

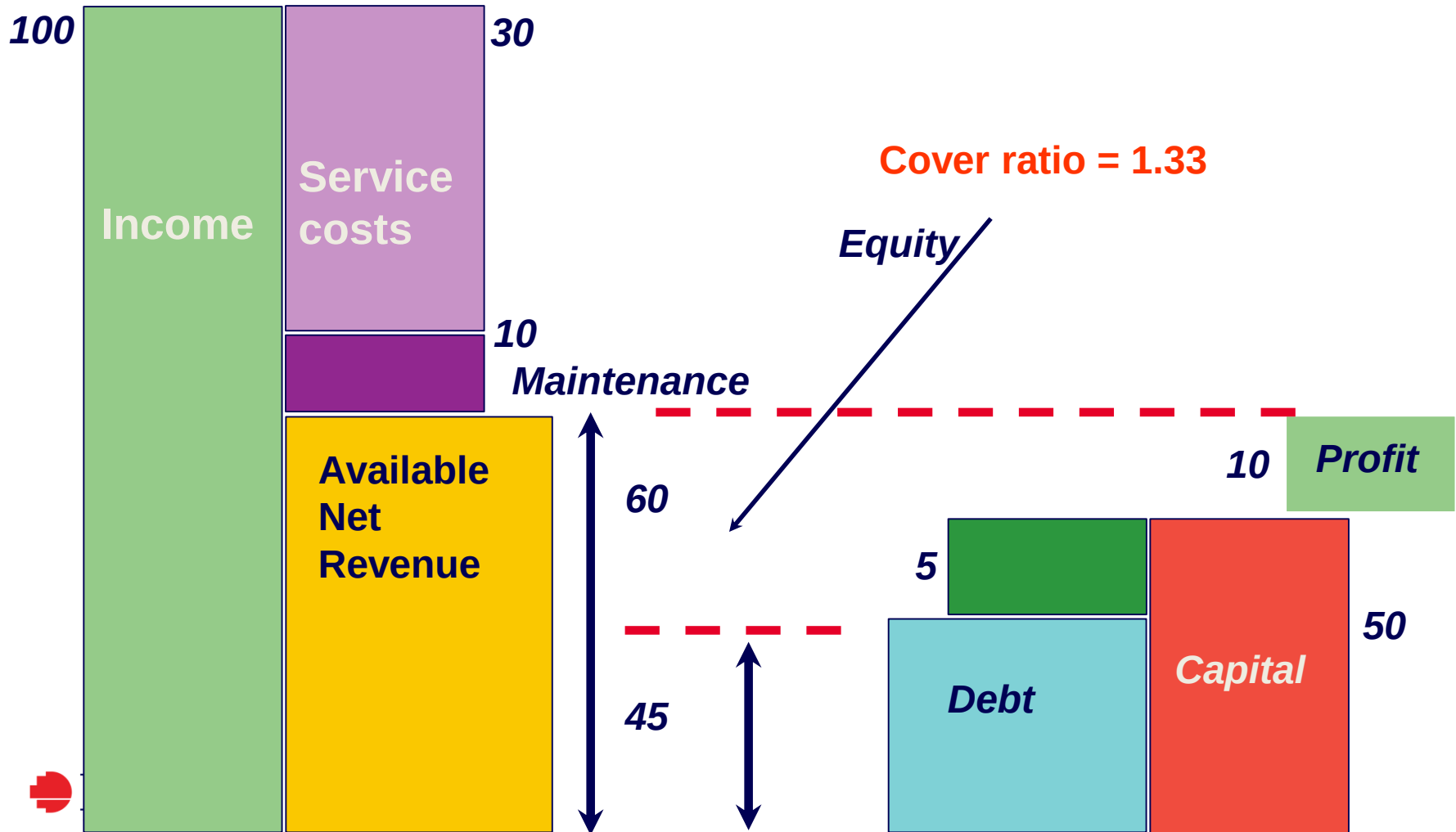
Repayment Mechanism

Relationship with Project Co Costs



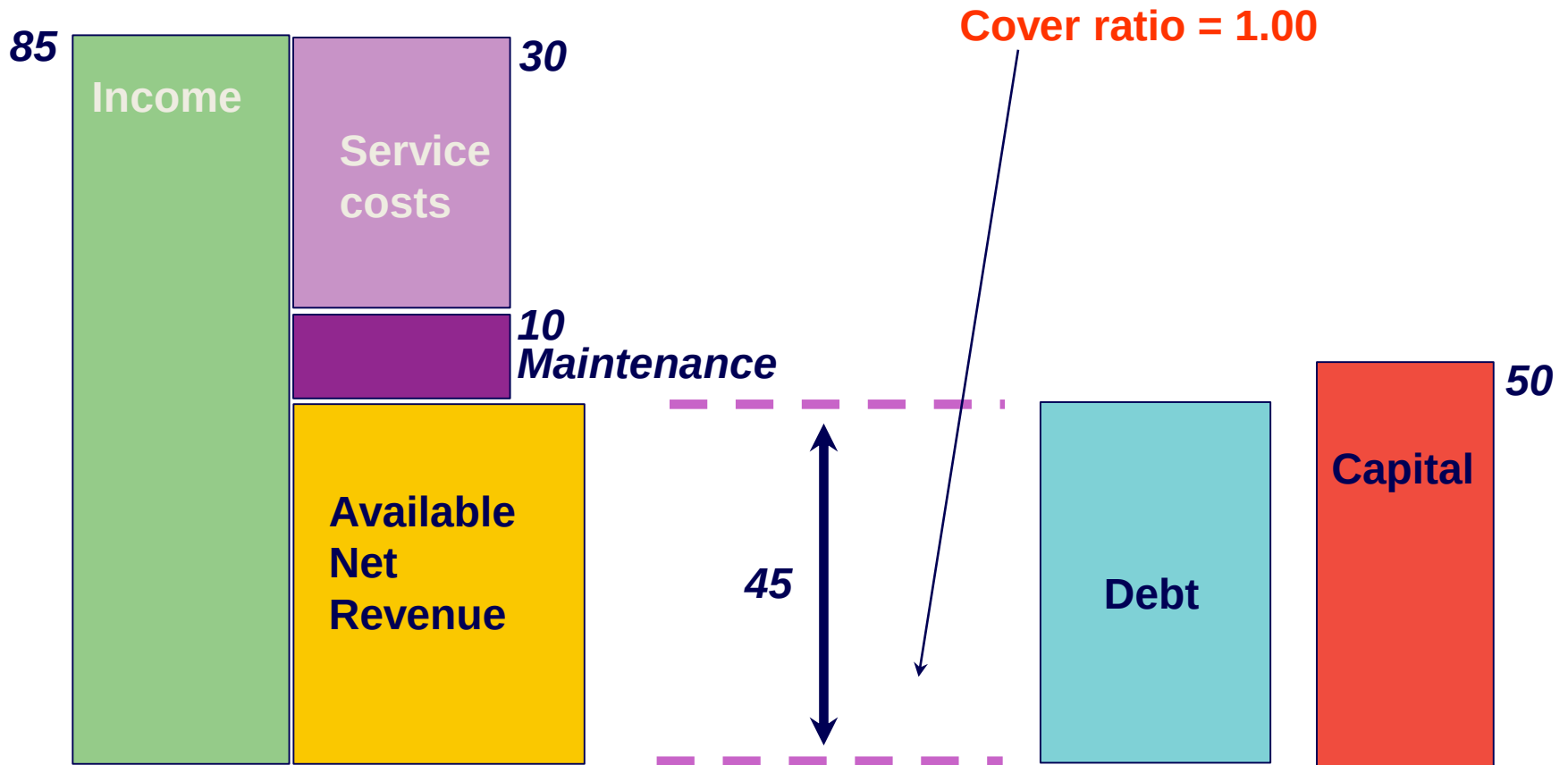
Repayment Mechanism

Relationship with Debt Service

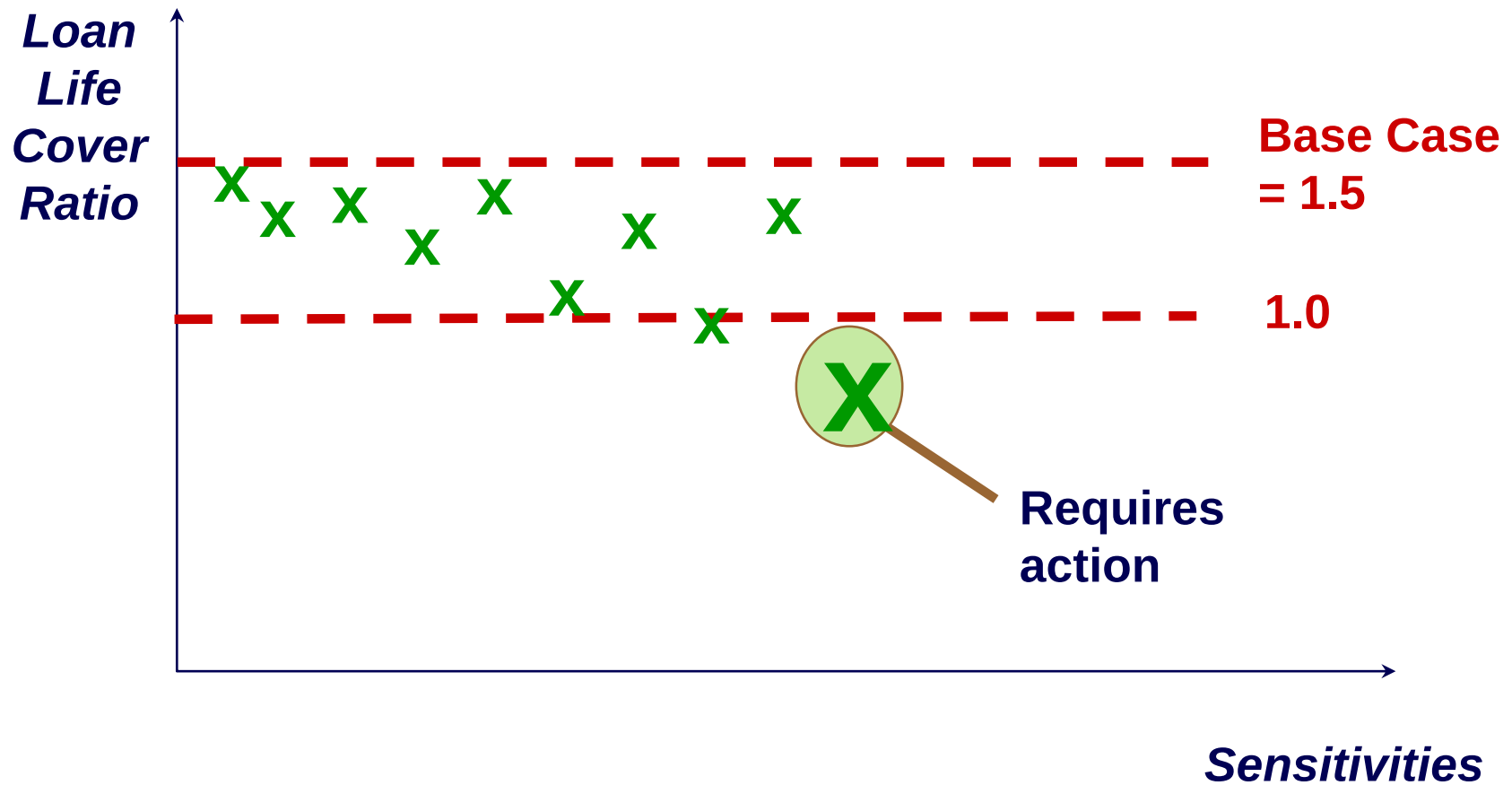


Repayment mechanism

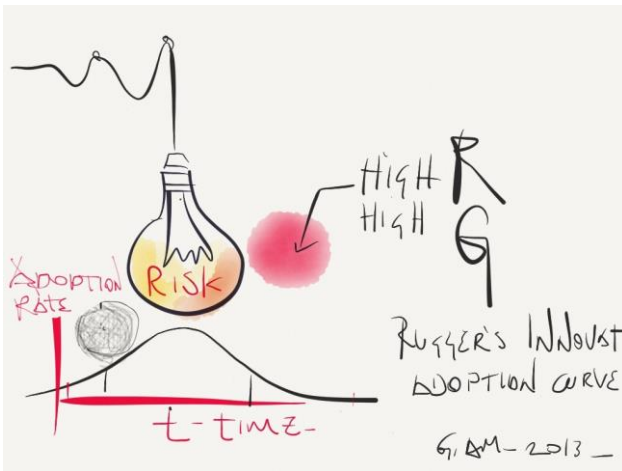
Effect of 70% availability



Analysing Risk - Lenders' Perspective



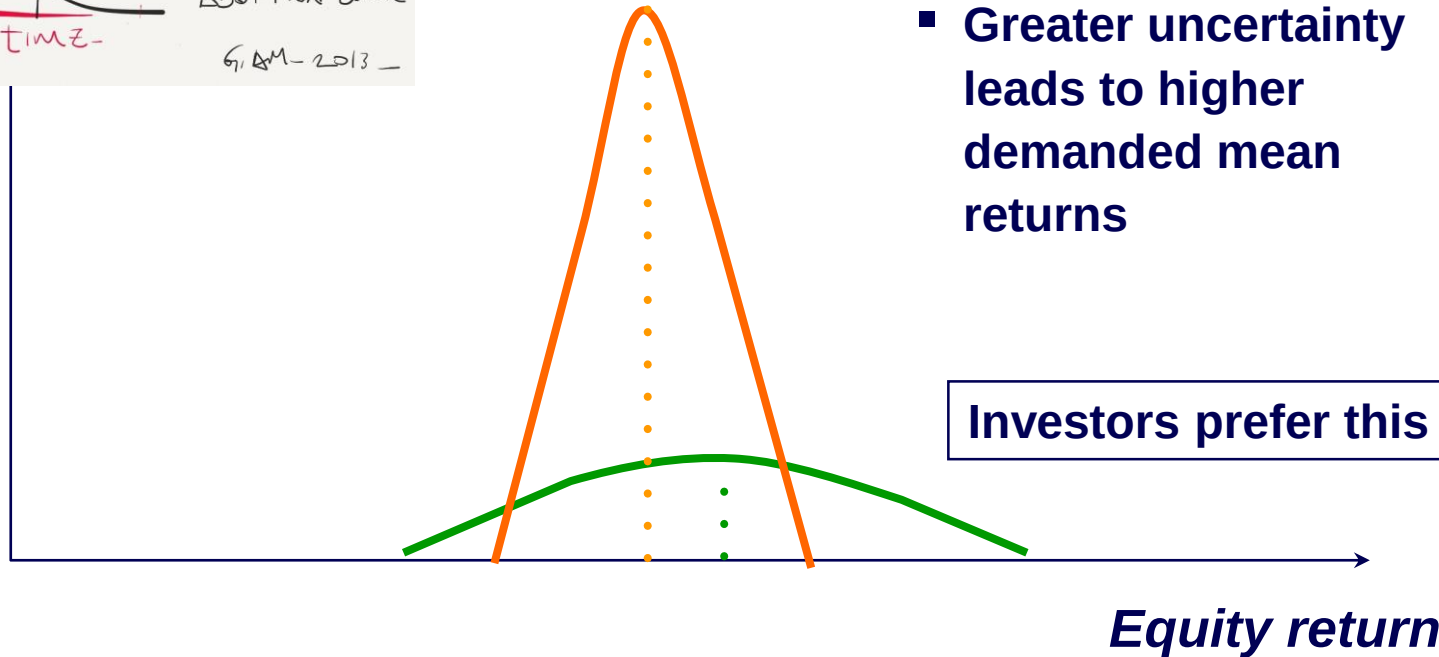
Analysing Risk - Investors' Perspective



Lenders prefer this

- Investor prepared to balance “upside” and “downside”
- Greater uncertainty leads to higher demanded mean returns

Investors prefer this



Conclusion

Project Finance is:

- **Debt, rather than equity driven**
- **Adaptable to circumstances**
- **Risk analysis is core**
- **Valuable risk management tool for investors**
- **Can restrict commercial freedom**
- **Banks are aligned with Government**



3. FUNDAMENTALS

CONSTRUCTION MANAGEMENT

INDUSTRY 4.0

SIRI)))

GOOGLE

Holmes & P.

1784 -
1800's

INDUSTRY 1.0

MECHANIZATION
STEAM POWER
WEAVING LOOM

1870

2.0

MASS PRODUCTION
ASSEMBLY LINE
ELECTRICAL ENERGY

1969

3.0

AUTOMATION
COMPUTERS & ELECTRONICS



TOWARDS INTEGRATION

Taking the Australian construction industry forward



TOWARDS INTEGRATION

WHERE WE WERE

WHERE WE ARE

NEXT STEP

WHERE WE ARE GOING

0 - 2D

Manual and CAD based (2D or 3D)

1 - MODELLING

Single-disciplinary use of object-based 3D modelling software within one discipline

2 - COLLABORATION

Sharing of object-based models between two or more disciplines

3 - INTEGRATION

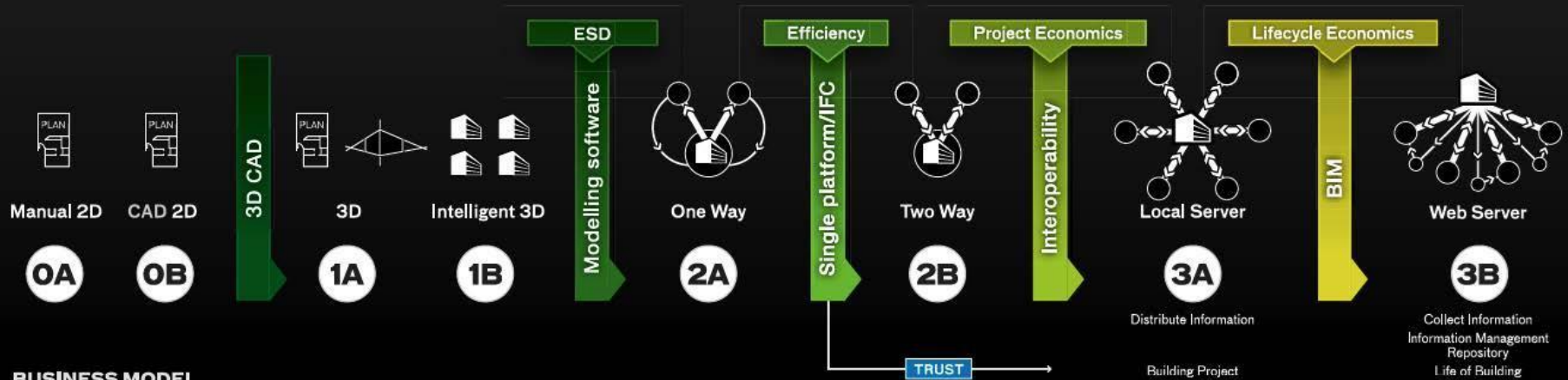
Integration of several multi-disciplinary models using model servers of other network-based technologies



Representation

Prototype

Full Information Capture

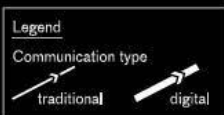


BUSINESS MODEL

ISOLATED

COLLABORATIVE

INTEGRATED



UPTAKE



Australian
Institute of
Architects



CRC Construction Innovation
BUILDING OUR FUTURE

Universal and User-centred design



Construction Procurement and Major Projects Group

[PPP + CLUB]

Guillermo.Aranda-Mena@RMIT.EDU.AU

G. Aranda M.



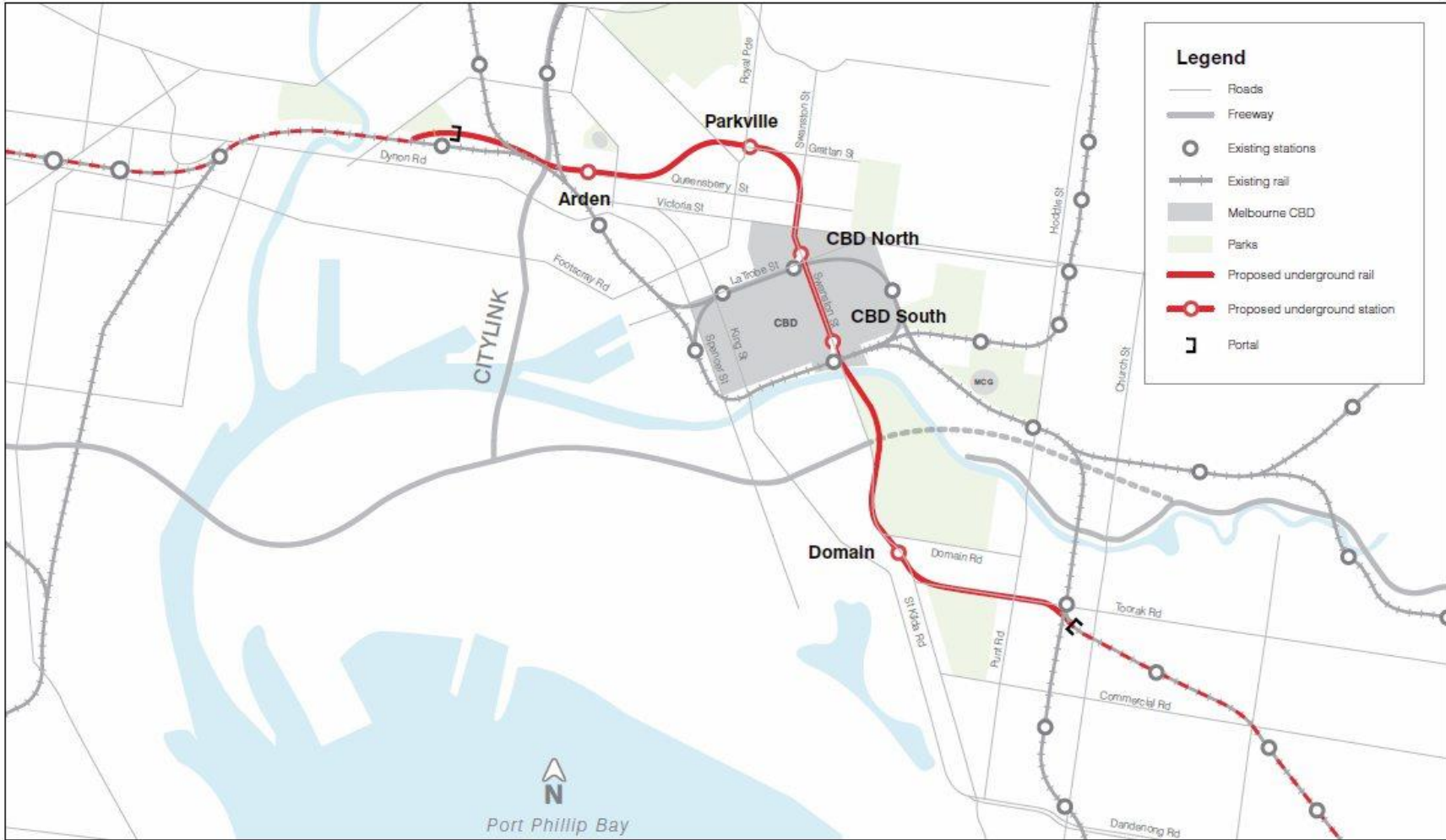
VCCC MMRA

.... previous projects

- Biosciences Research Centre \$185m
- Bendigo Hospital \$700m
- VCCC – Victorian Comprehensive Cancer Centre
- Flinders Street Station \$1b



Melbourne Metro alignment

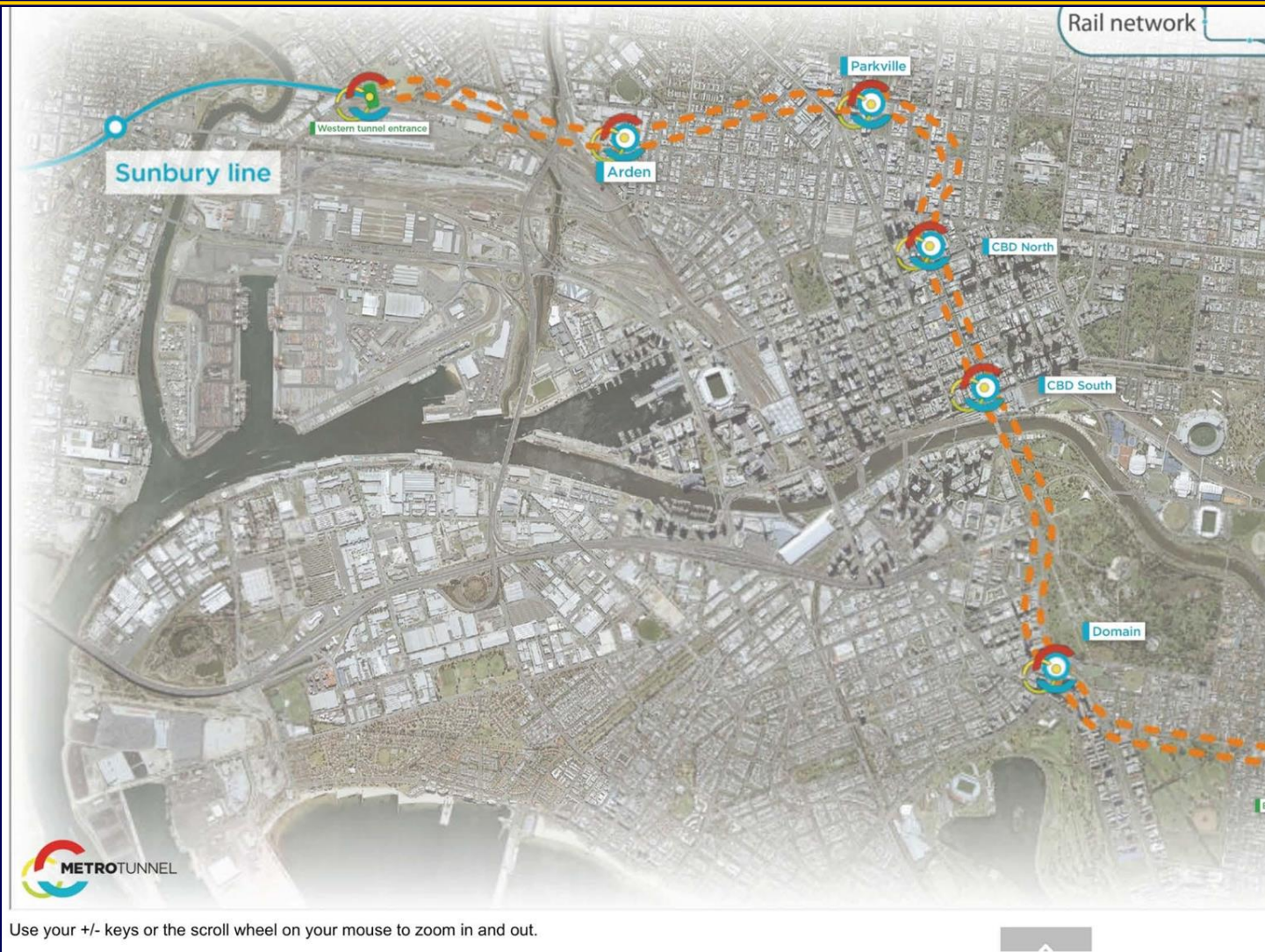


An architectural rendering of The Victorian Comprehensive Cancer Centre at dusk. The building features a prominent, curved glass facade with a white, sculptural, branching structure that wraps around it. The interior lights are visible through the glass, and some areas are illuminated with purple light. The building is situated on a street with other modern buildings in the background and bare trees in the foreground. The sky is a deep blue with some clouds.

The Victorian Comprehensive Cancer Centre

A Case Study

MELBOURNE METRO LINE 1, 2, 3...



Opportunities: Major Projects in Australia

Public-Private Partnerships

Overview of financing markets

Key points

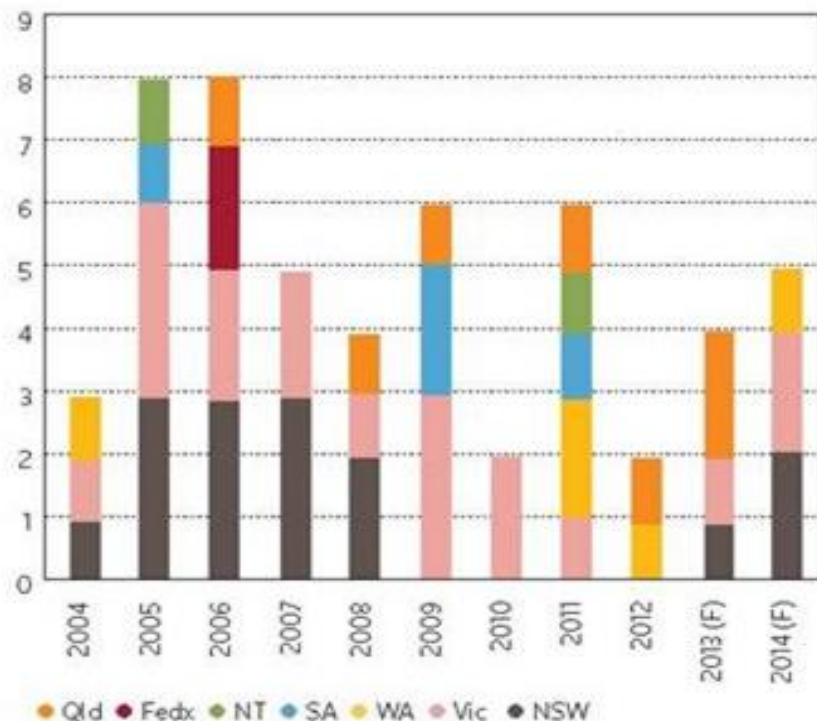
- ▶ Continuing signs of improvement in debt markets and significant increase in equity interest with best market conditions since GFC...
- ▶but conditions remain **challenging** relative to pre-GFC projects.
- ▶ The focus has moved from **liquidity constraints** to maximising **value for money**.
- ▶ The **rationale for pursuing PPP** has not changed...
- ▶ ...nor has the private sector's capacity to deliver.

Financial issues – market context

Australian PPP Market

A lumpy market, with 7 buyers ...

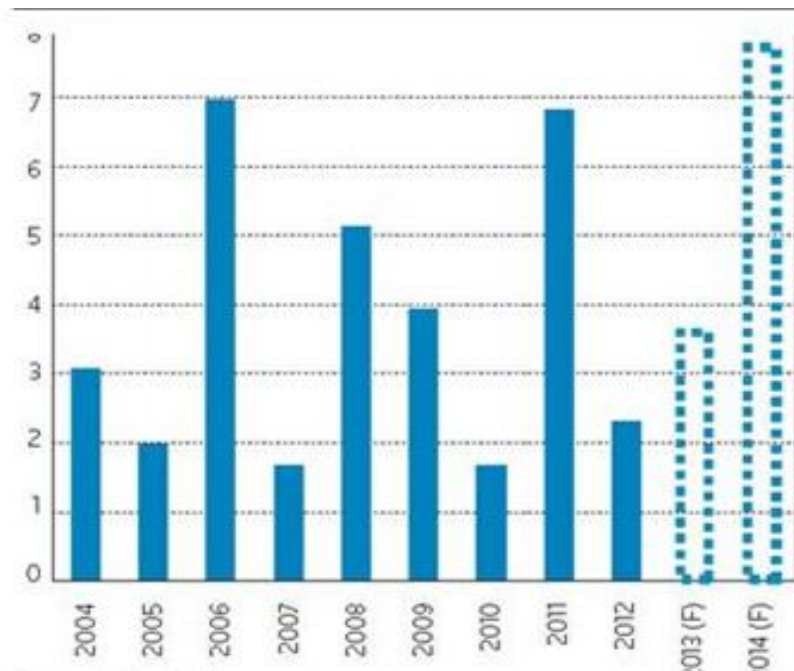
PPP Transactions closed by State



Source: EY analysis

But a resilient financing market ...

Value of PPP Transactions (\$AB)

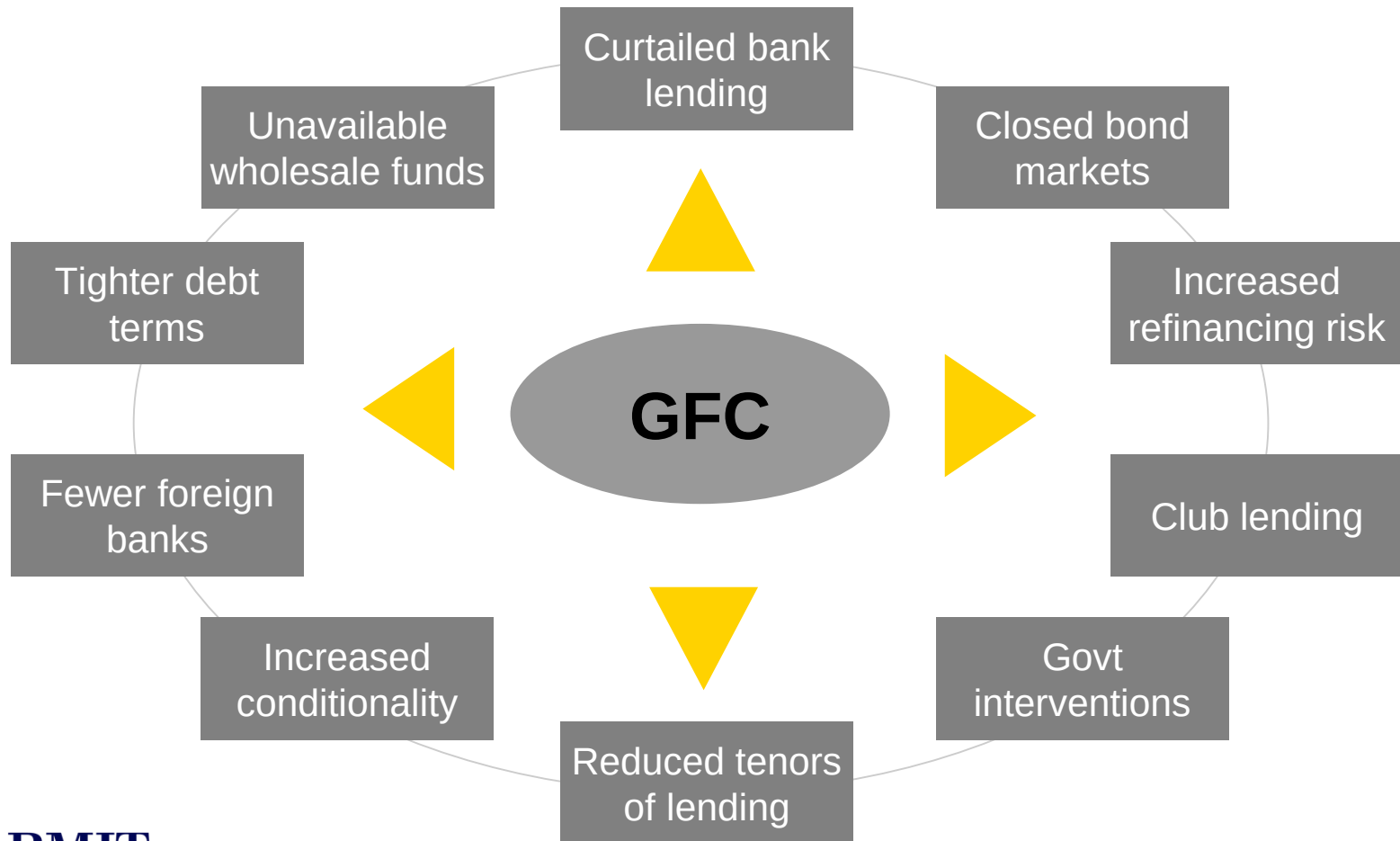


Source: EY analysis

Despite financial market challenges PPPs remain fundamentally good credit risks and present attractive lending and investment opportunities
[Grimsey, 2016]

Mature debt markets

Impacts of the GFC on private finance for PPPs:



Debt markets

Today's market

Financiers have **less appetite for risk**

- ▶ recent project difficulties have not however changed financiers' view of specific risk issues but have heightened focus on
 - ▶ due diligence
 - ▶ contractor governance
 - ▶ over-bidding risks (particularly in BAFO setting)

The GFC has heightened the importance of **achieving VfM**

- ▶ smaller pool of lenders
- ▶ less favourable terms
- ▶ absence of any real competition to bank debt
- ▶ demise of capital markets and monolines

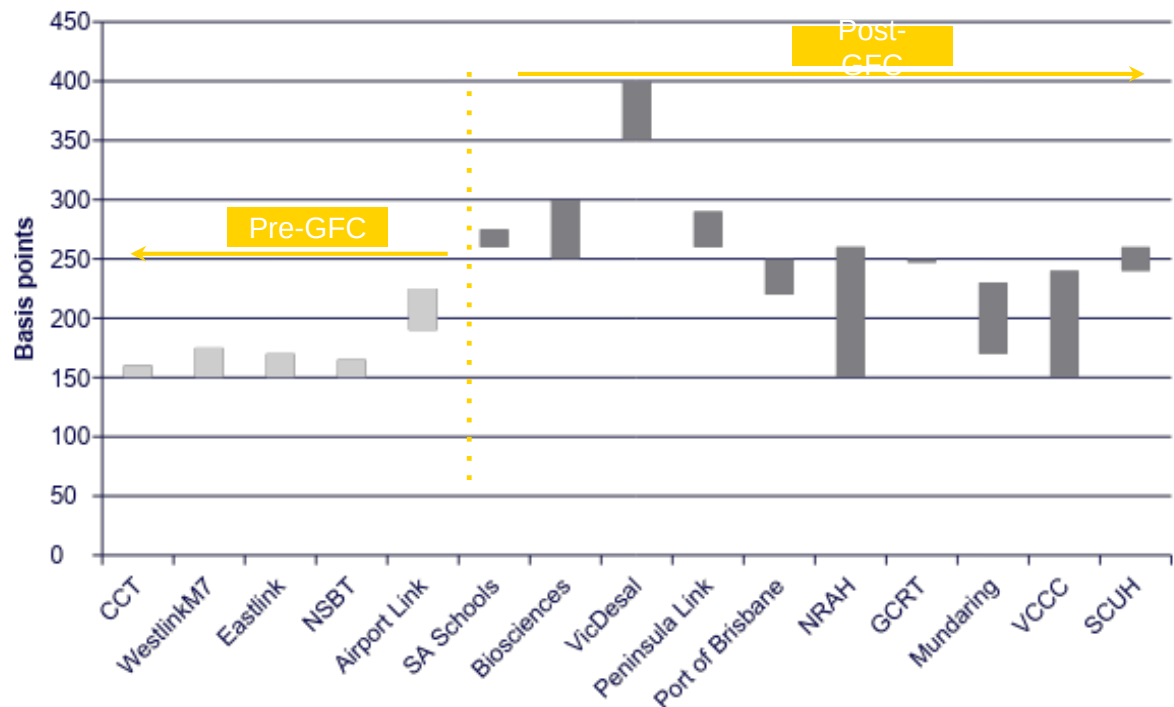
Put simply, projects procured now **cost more** than they would have before the GFC.

Debt markets - pricing

Pricing levels

- ▶ Pricing levels remain higher than pre-GFC
- ▶ In Australia, bank-led debt financing margins continue to remain high with many projects having margins in excess of 200 basis points over the bank bill rate.
- ▶ Debt margins in FY13 have been on a slight downward trend and are expected to remain relatively stable over the near term in the low 200s

Debt margins – Australian PPPs pre and post GFC



Debt markets – appetite

Appetite - PPP interest:



But for how much?

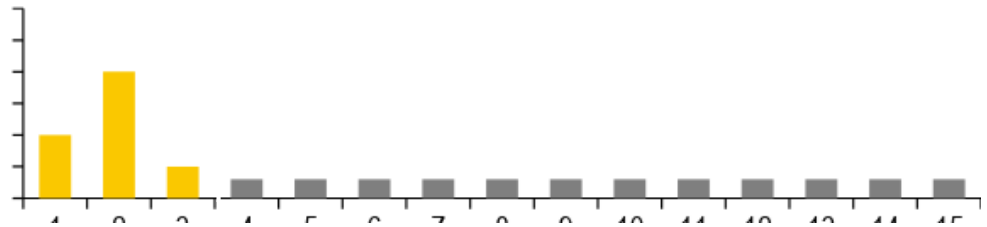
- ▶ Club lending arrangements remain at the fore: Market feedback on the amount of private finance achievable for a single project is generally **\$3 billion - \$3.5 billion**
- ▶ However, key constraints remain
 - ▶ the ability of D&C contractors to support large works packages with balance sheet strength and effective joint venture arrangements
 - ▶ lenders' willingness to take large exposures to D&C contractors on a single project
- ▶ Short listing to two bidders is a key preference

Debt market trends – alternative structures

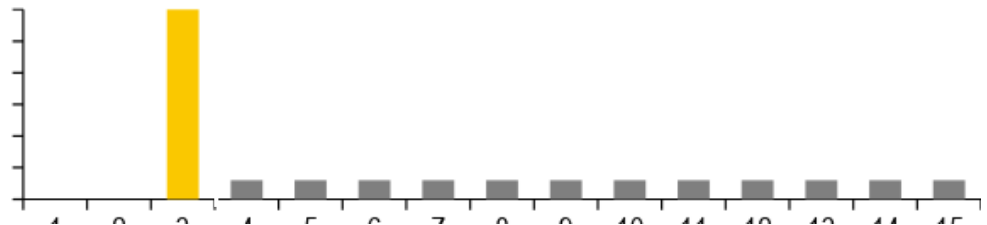
Capital contributions and upfront QSPs

- ▶ A number of jurisdictions have implemented alternative financing structures to improve value for money including

- ▶ Capital contributions over construction



- ▶ Capital contributions on completion



- ▶ Contribution after 1-2 years of stable operations

