Improving investment outcomes in the development and commercialisation of 'clean' energy technologies within Australia

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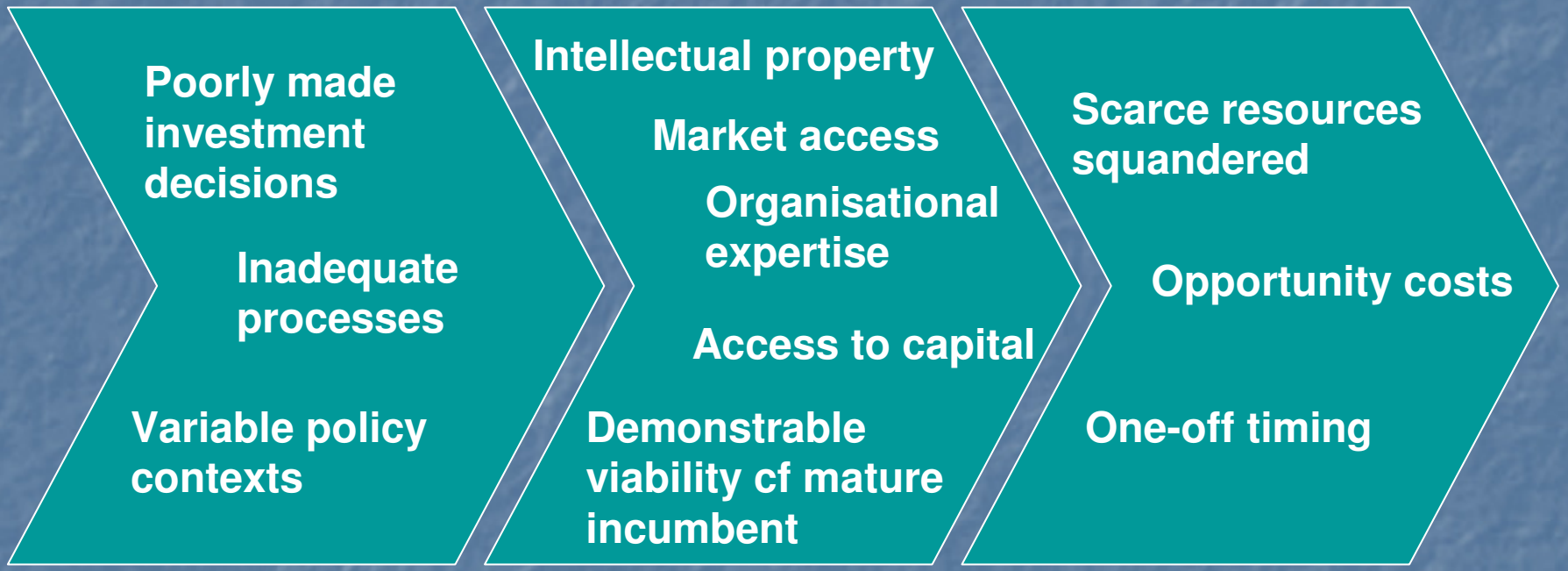
Outline

1. Key Questions
2. Our Approach
3. Proposed Analysis
4. Emerging themes

1. The Questions

- Where does capital come from?
- Which technology sectors are most prospective?
- How should investment decisions be made?
- What commercial/technical/organisational frameworks should we apply?
- What market mechanisms and industry support should policy makers consider?

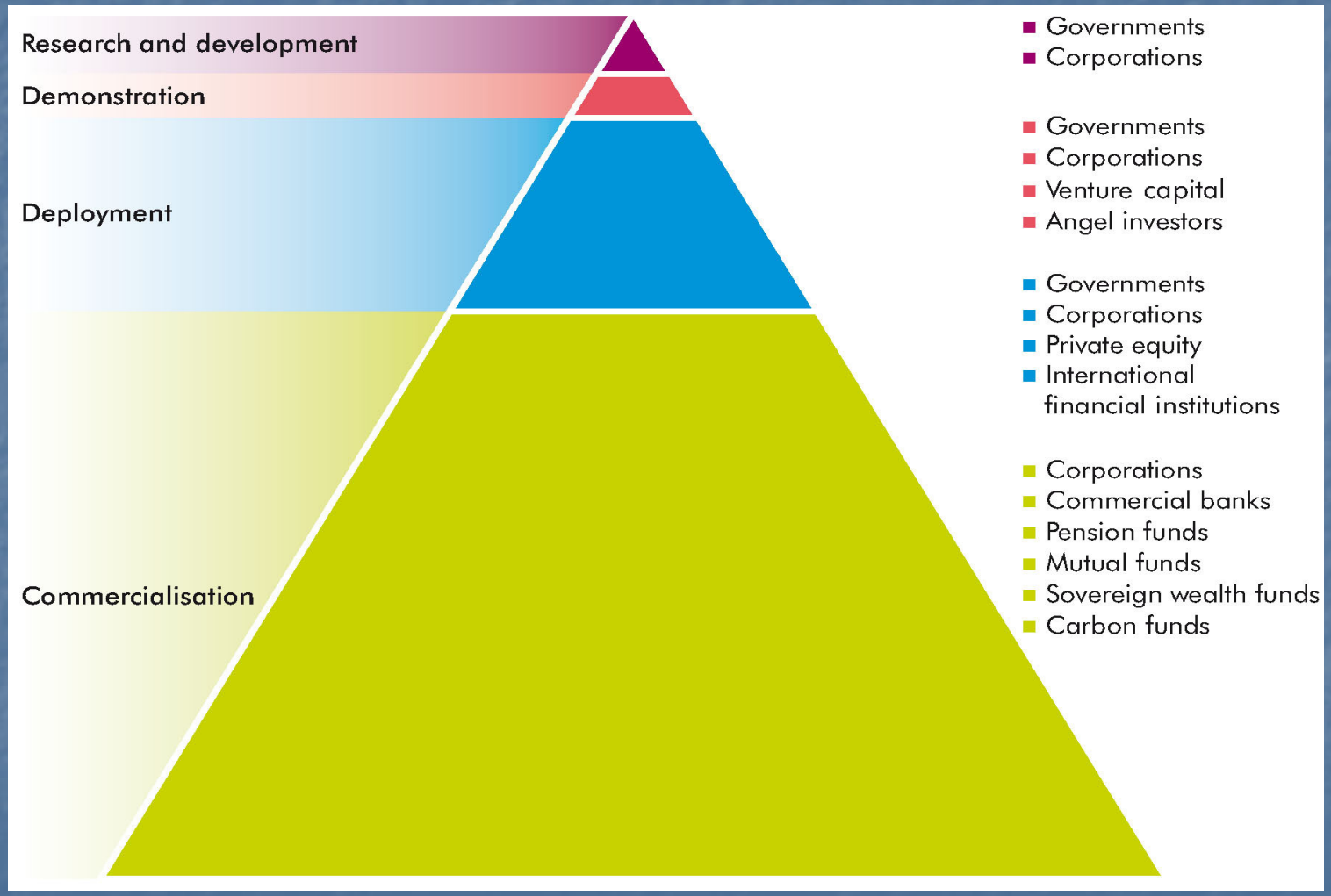
Current Investment Processes



Who is this of interest to?

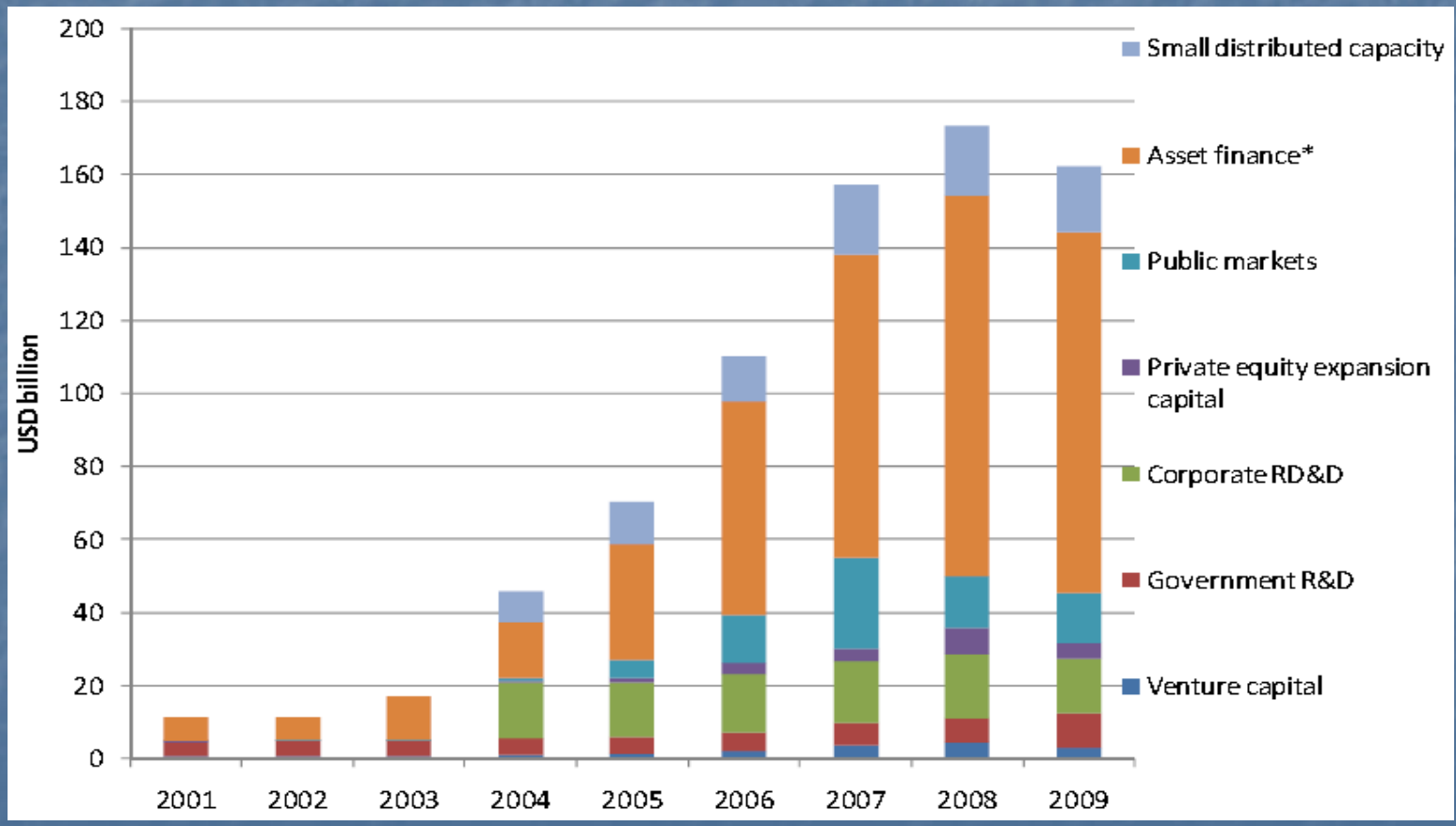
- Policy makers
  - What is the correct policy and institutional framework for policy makers to consider?
- Financial investors
  - What are the correct internal processes and decision criteria for investment?
- Project promoters
  - What are the attributes most likely to attract adequate capital and support?

Substantial capital is required for commercialisation



Source: IEA, International Energy Agency (2010) *Global Gaps in Clean Energy RD&D*, IEA Report for the Clean Energy Ministerial, Paris.

Private sector investment appears independent of public sector support



Source: IEA, International Energy Agency (2010) *Global Gaps in Clean Energy RD&D*, IEA Report for the Clean Energy Ministerial, Paris.

Funding Requirements

	Annual investment in RD&D needed to achieve IEA BLUE Map Scenario outcomes in 2050		*Estimated Annual public RD&D spending*	*Estimated annual RD&D spending gap*	
	Min	*Max*		*Min*	*Max*
Advanced vehicles (note 1)	22500	45000	1860	20640	43140
Bioenergy	1500	3000	740	760	2260
CCS (note 2)	9000	18000	540	8460	17460
Energy efficiency (industry)	5000	10000	530	4470	9470
Higher-efficiency coal (note 3)	1300	2600	850	450	1750
Nuclear fission	1500	3000	4030	-2530	-1030
Smart grids	5600	11200	530	5070	10670
Solar energy (note 4)	1800	3600	680	1120	2920
Wind energy	1800	3600	240	1560	3360
Total across technologies	50000	100000	10000	42530	91030

1. EVs, PHEVs + FCVs; energy efficiency in transport
2. Power generation, industry, fuel transformation
3. IGCC + USCSC
4. PV + CSP + solar heating

2. Approach

- Create an analysis framework for identifying most promising clean energy investment options
- Analyse private financial decision making tools, processes and measures of success
- Identify key gaps in private funding mechanisms and public policy
- Create a framework for better financial decision-making specific to clean energy investments
- Test the decision-making framework by case study and prototype fund

Scope

Constituents

Financial institutions (mutual funds, venture funds, infrastructure funds, superannuation funds, other)

- Investment size, risk, return expectations and liquidity

Corporations (SME, large diversified, sector specific, transnational)

- As above, plus diverse strategic intentions (Competitive information, Future investment/acquisition options, Corporate social responsibility)

Public sector (research institutions, universities, SOE's, government programs)

- social benefit, industry development, job creation, value added, emission reduction, political popularism

Sectors

Stationary energy

Transportation

Current approaches

- Portfolio and capital market theory
- Security & derivative valuation
- Market efficiency analysis
- Behavioural theory
- Socially responsible investing
- .....

Applicable to mature industrial and resource markets but not satisfactory in clear energy sector

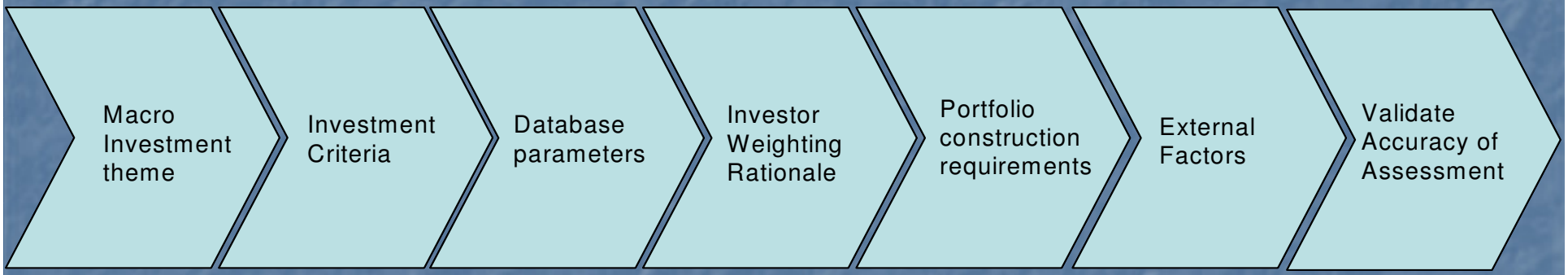
Infinite and emerging choices in investment opportunities

- Sources and nature of technology
- Stage of development
- Technological risk
- Geographic location
- Political risk
- Organisational capability
- Prospective growth
- Public sector support
- Market adoption uncertainties

Diverse funding parameters

- Sources
- Risk preference
- Proximity of investment
- Investment expertise
- Vehicle structure
- Tax regime
- Competing investment products

Investment Evaluation Framework



- Sectoral factors
- Market factors
- Regional factors

- Scale of investment
- Liquidity
- Return Potential
- Risks

- Discrete investment parameters
- Mutually exclusive
- Collectively exhaustive

- Basis for investment assessment

- Portfolio concentration (size vs # of investments)
- Balance across stage, technology, market, etc
- Trading and investment management strategy

- Access to investments
- Perfect market information
- Perfect investment evaluation process
- Investment/ market dynamics

- Portfolio evaluation
- Market (non-portfolio) evaluation
- Sector/ market/ geography benchmarks

Investment criteria

Scale of investment	Liquidity	Return Potential	Risk
Total expected investment Timing of expected investment Equity/debt mix Availability of non-dilutive capital Application of funds	Volume and value of equity (if traded) Number and likely interest of counterparties (if not traded) Time to maturity and stable cashflow Likely liquidity profile when mature Time to liquidity (operational or technological maturity, market)	Anticipated strategic value Value to acquirer Value of assets Market positioning Ability to deliver future value Market value (NPV) Value creation potential Organisational capital	Likelihood and impact of: - external risks (competition, market preferences, etc) -internal risks (management, product failure) -technological limitations -financial market events -funding limitations

4. Emerging Themes

- Public Policy Impact
  - Inform
  - Supplement demand
    - Government incentives and intervention
    - Demonstrate social and political will
  - Facilitate supply
    - Availability of publicly funded capital
    - Financial market mechanisms
    - Planned frameworks
    - Market frameworks
    - Skills development
- Enablers to Attract Financial Investment
  - Analysts
  - Returns history
  - Specialist skills
  - Processes