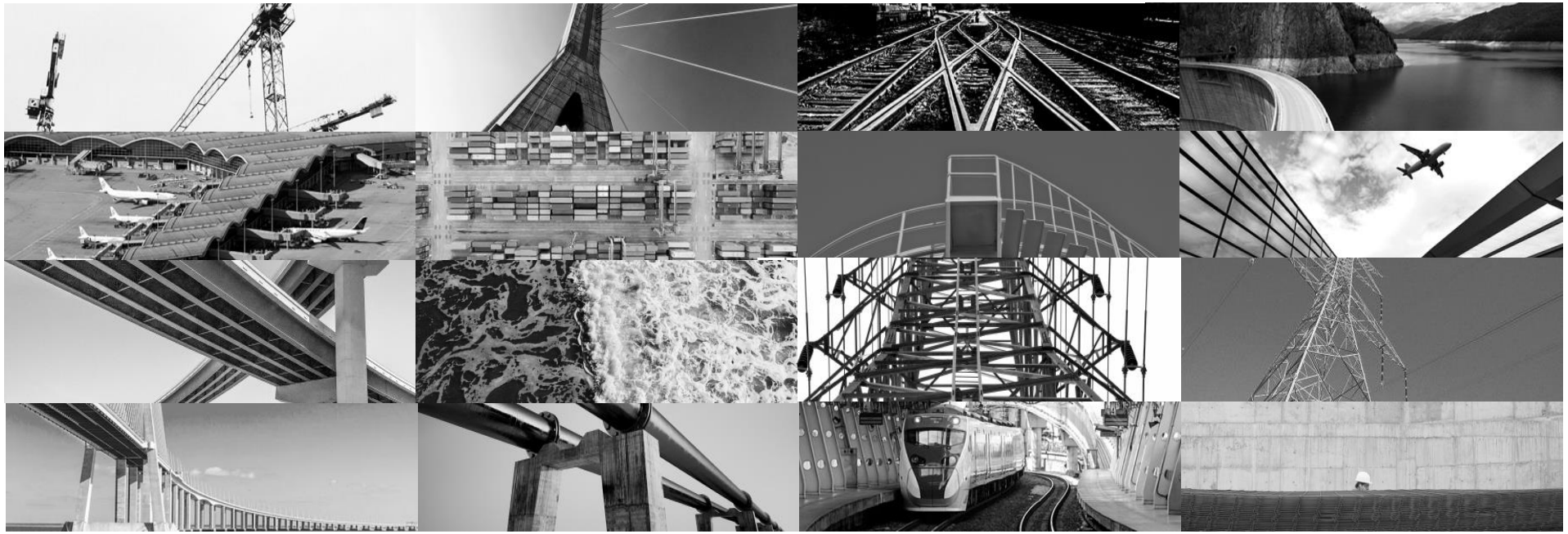
Project Bonds



S&P TRIS Infrastructure Seminar

20 November 2018, Bangkok

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Agenda

1. Project Bonds
2. Project Finance Framework
3. Construction Risk
4. Operations Risk
5. Project Defaults (Second Session)

1 Project Bonds

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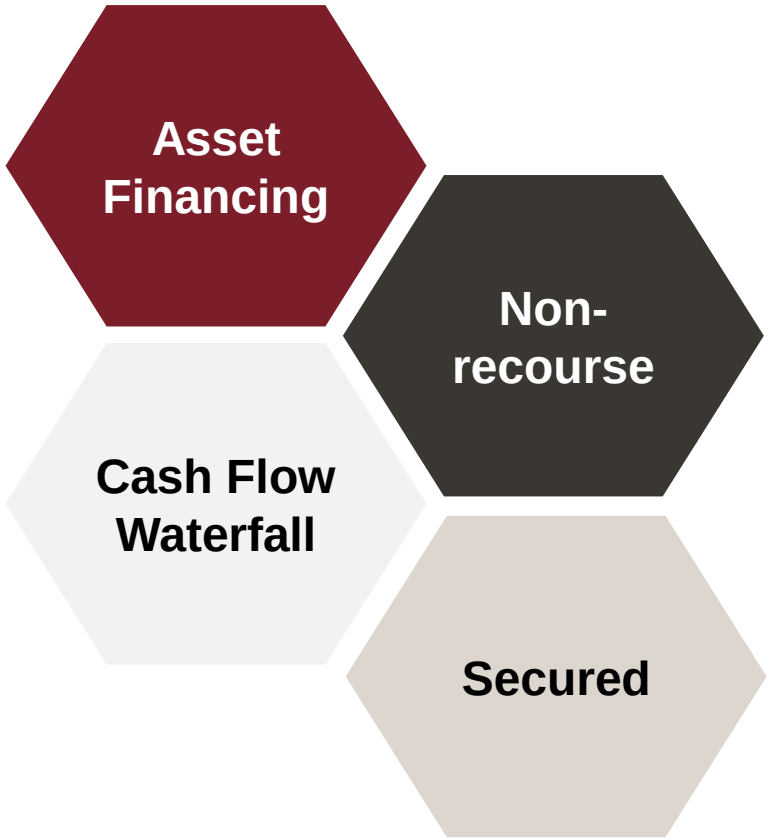
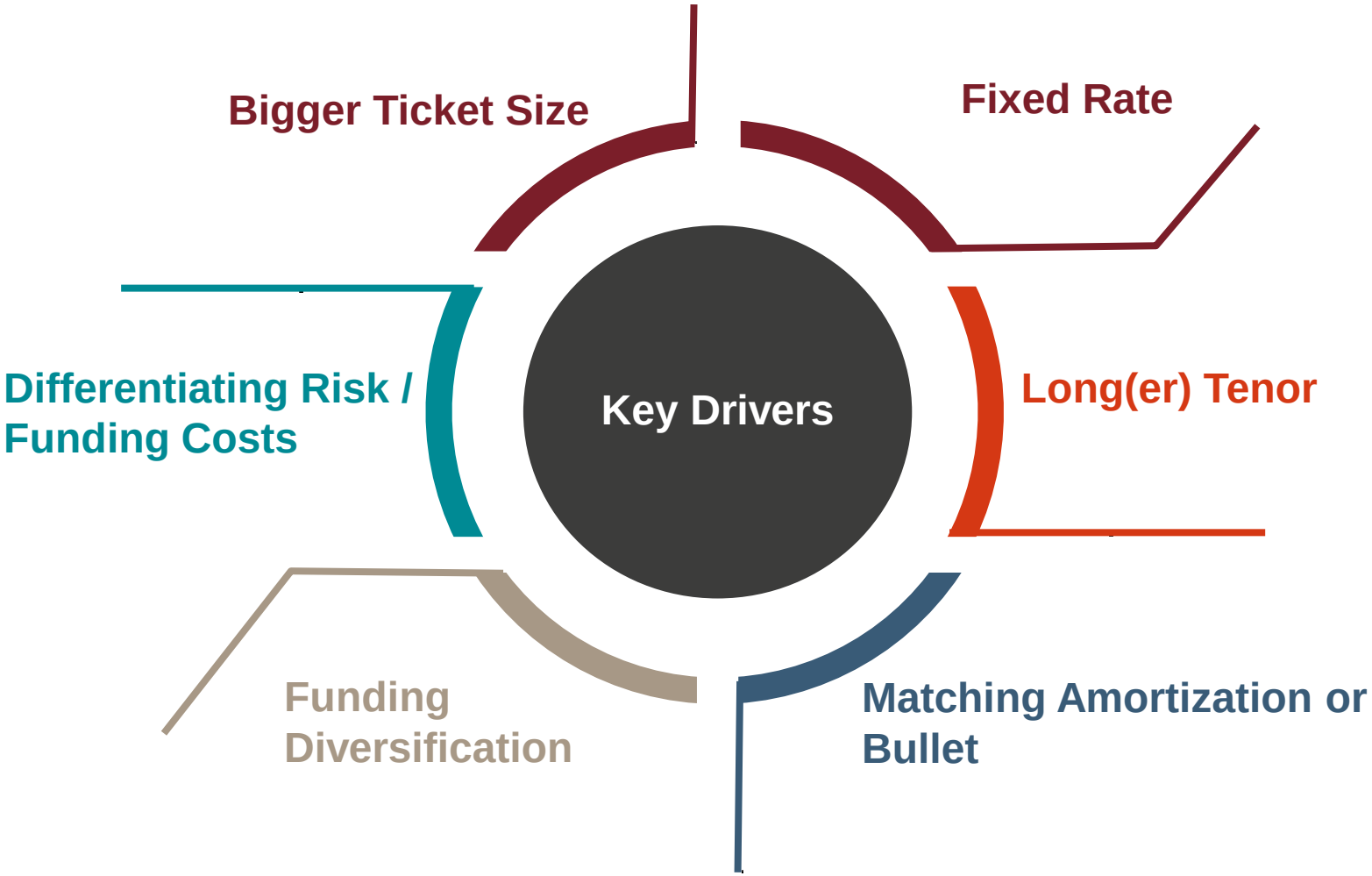
What is a Project Bond?

Key Characteristics of a Project Bond



Issuers' Perspective

Advantages



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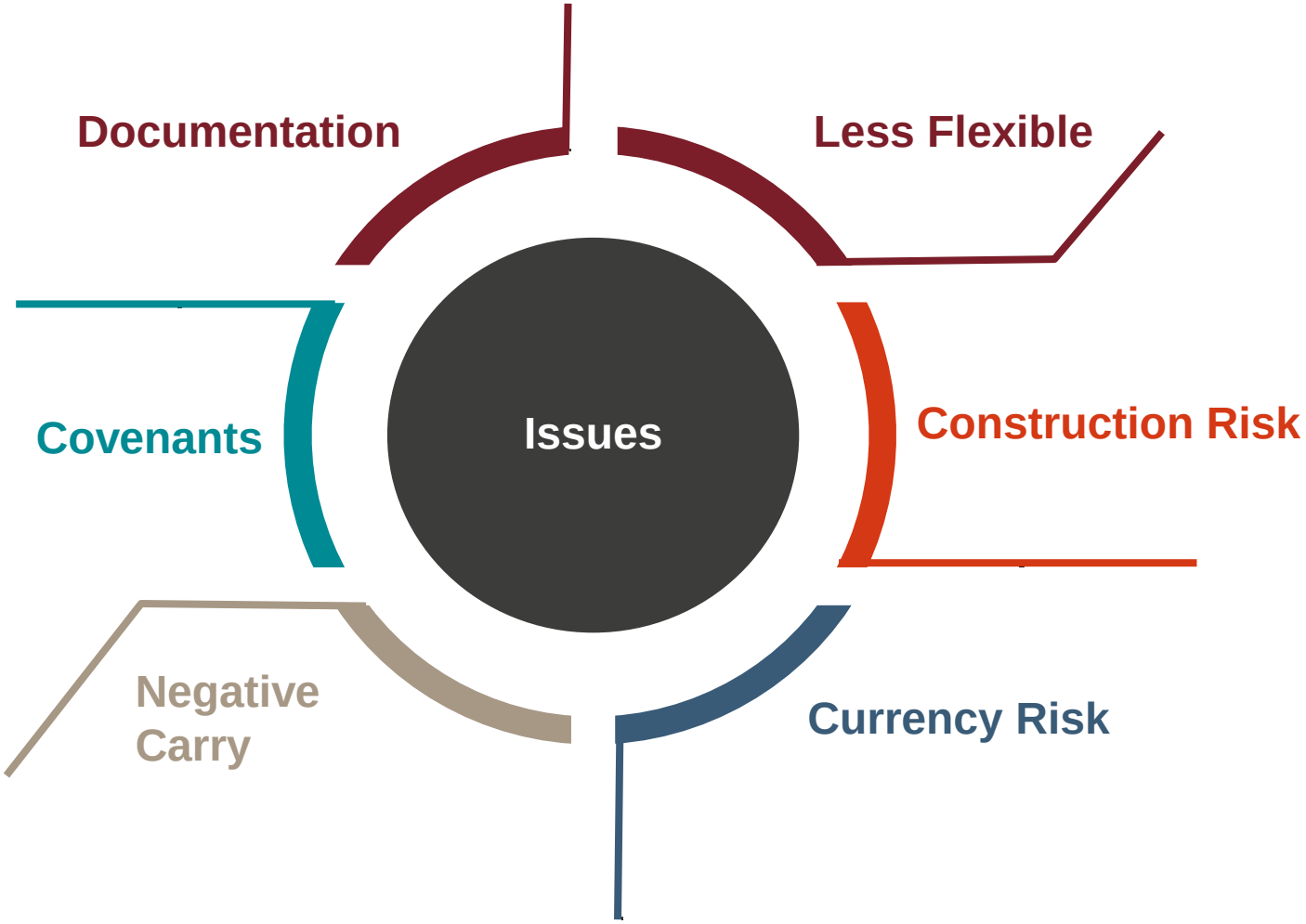
Issuers' Perspective

Challenges



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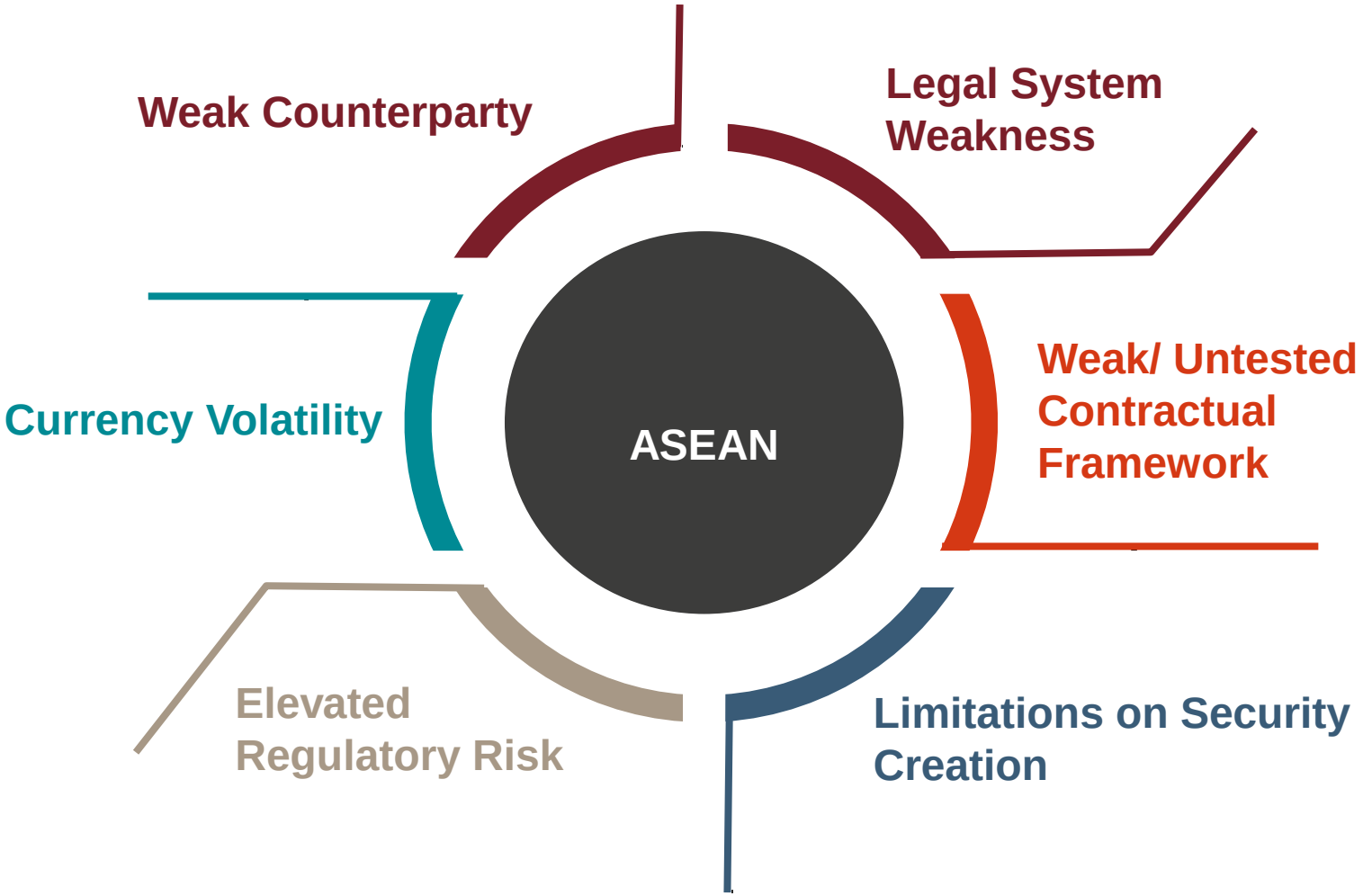
ASEAN Project Bonds

Diverse Legal Contractual Challenges



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Paiton – Project Bond - Indonesia

Landmark Deal

Size

- US$ 2 billion
  - US$800mn
  - US$1.2 bn
- Book was US$9bn+

Tenor & Rate

- 20 year – 5.625%
- 13 year – 4.525%

Capacity

- 2045MW
- 10% of Java

Offtaker

- Take or Pay - 2042
- PLN

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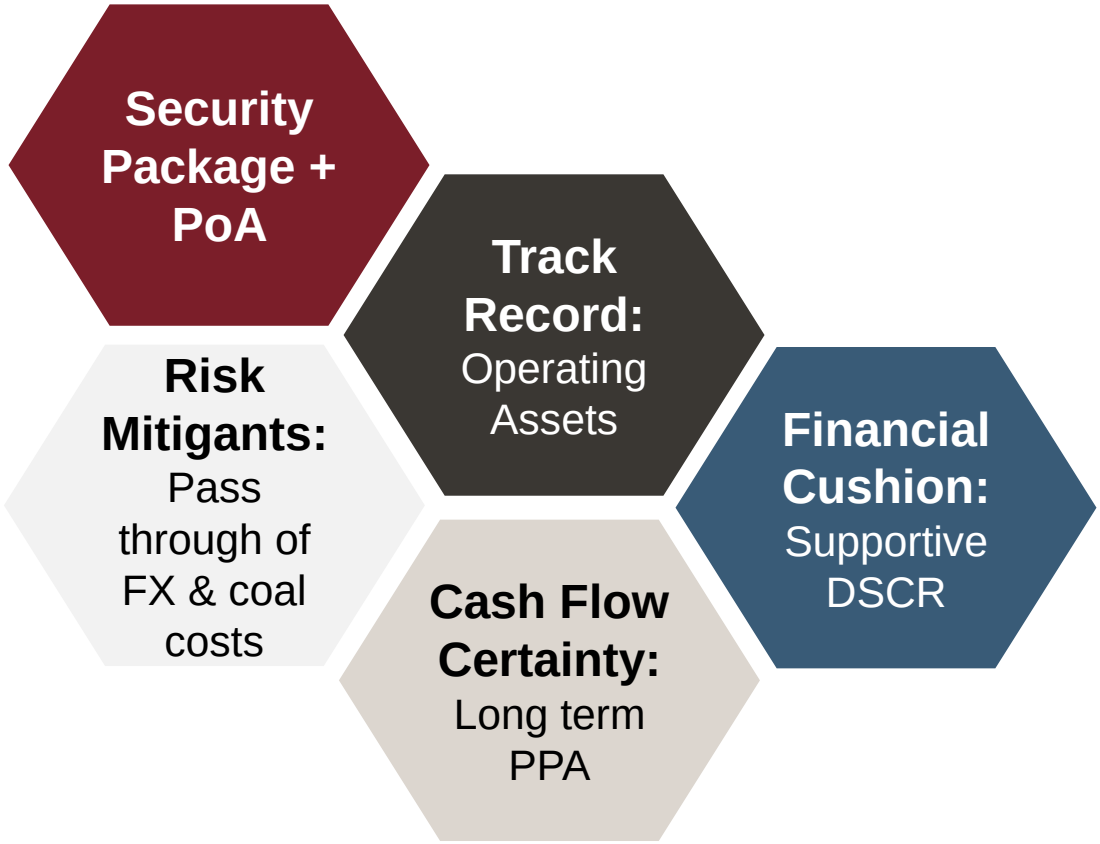
Icons from Yaroslav Samoylov, Becris, the Noun Project.

The Paiton Project

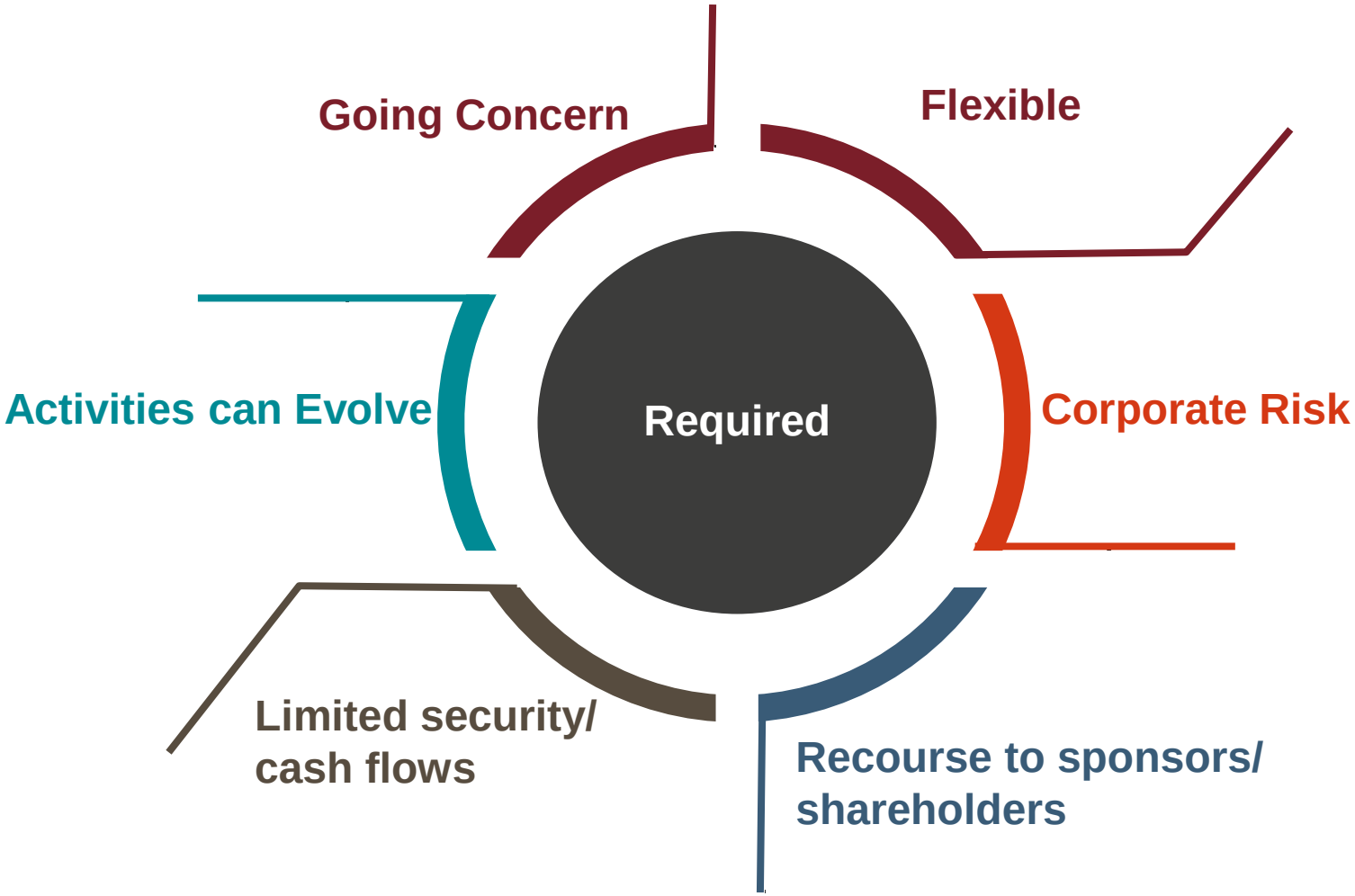
Key Enablers & Supporting Factors



2 Project Finance

Corporate Finance Transaction

Usual Elements



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Poll Question

1 **Key reasons for Corporate Funding**

1. Cheaper
2. Faster
3. Easier
4. Others

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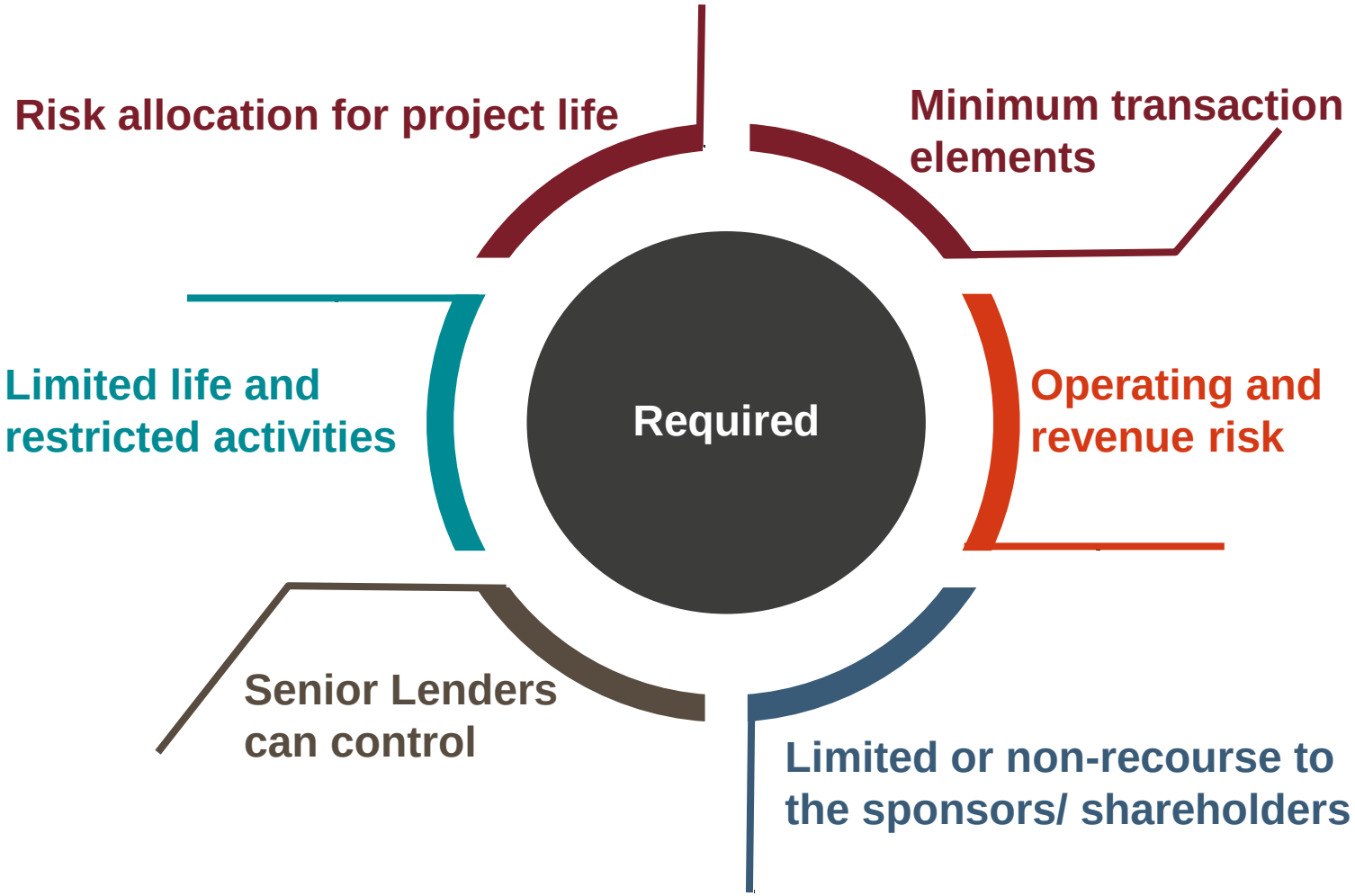
Determining a Project Finance Transaction

Essential Elements



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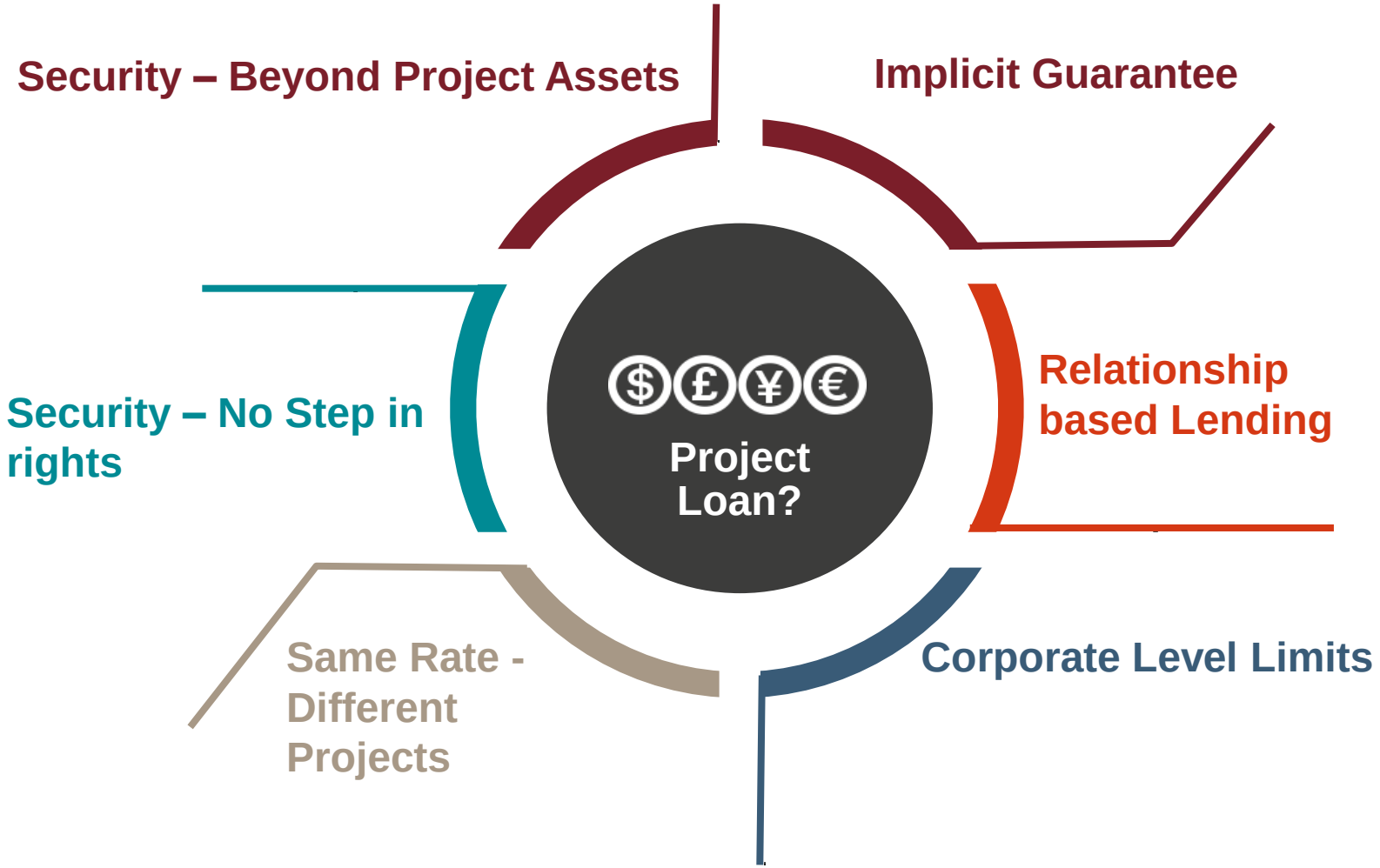
When your bank loan is NOT a Project Loan?

Is bank funding driven by project?



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Risk Allocation and Sharing

Allocation and responsibility of the risks amongst participants

Example of risk sharing in a toll road concession:

	Authority	SPV	Contractor	Operator	Insurance
Construction overruns			X		
Construction delays			X		
Access to the land	X				
Latent defects		Beyond year 5	Up to year 5		
Change in Law	X				
Traffic		X			
Tariffs		X			
Operation				X	
Minor maintenance				X	
Major maintenance			X		
Financing		X			
Force Majeure	X				
Insurance					X

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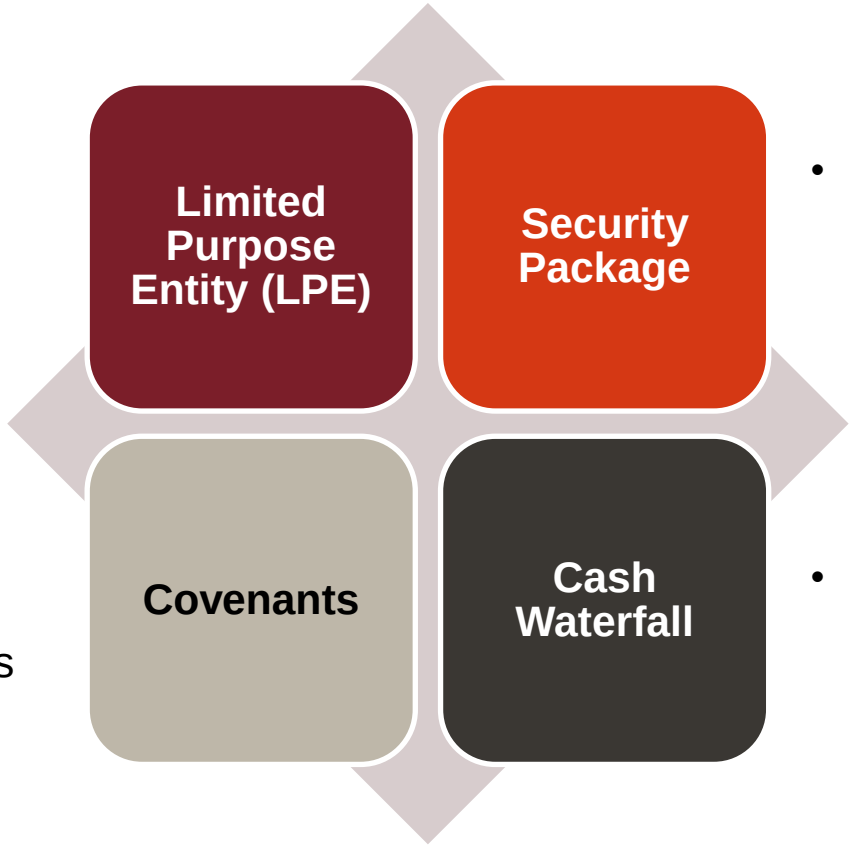
Minimum Transaction Elements

Identified Activities and Risks

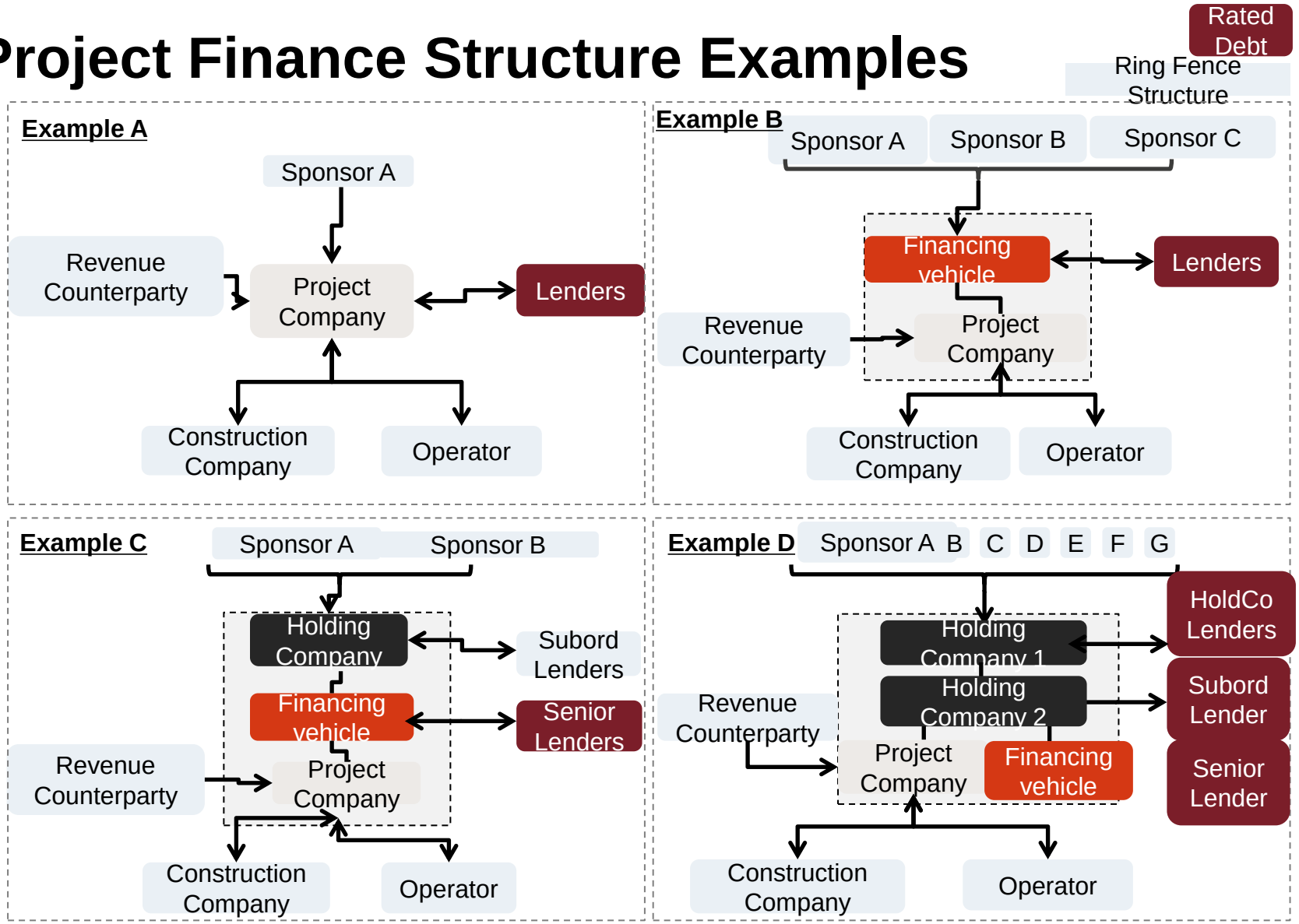


- Secured ranking on key project assets

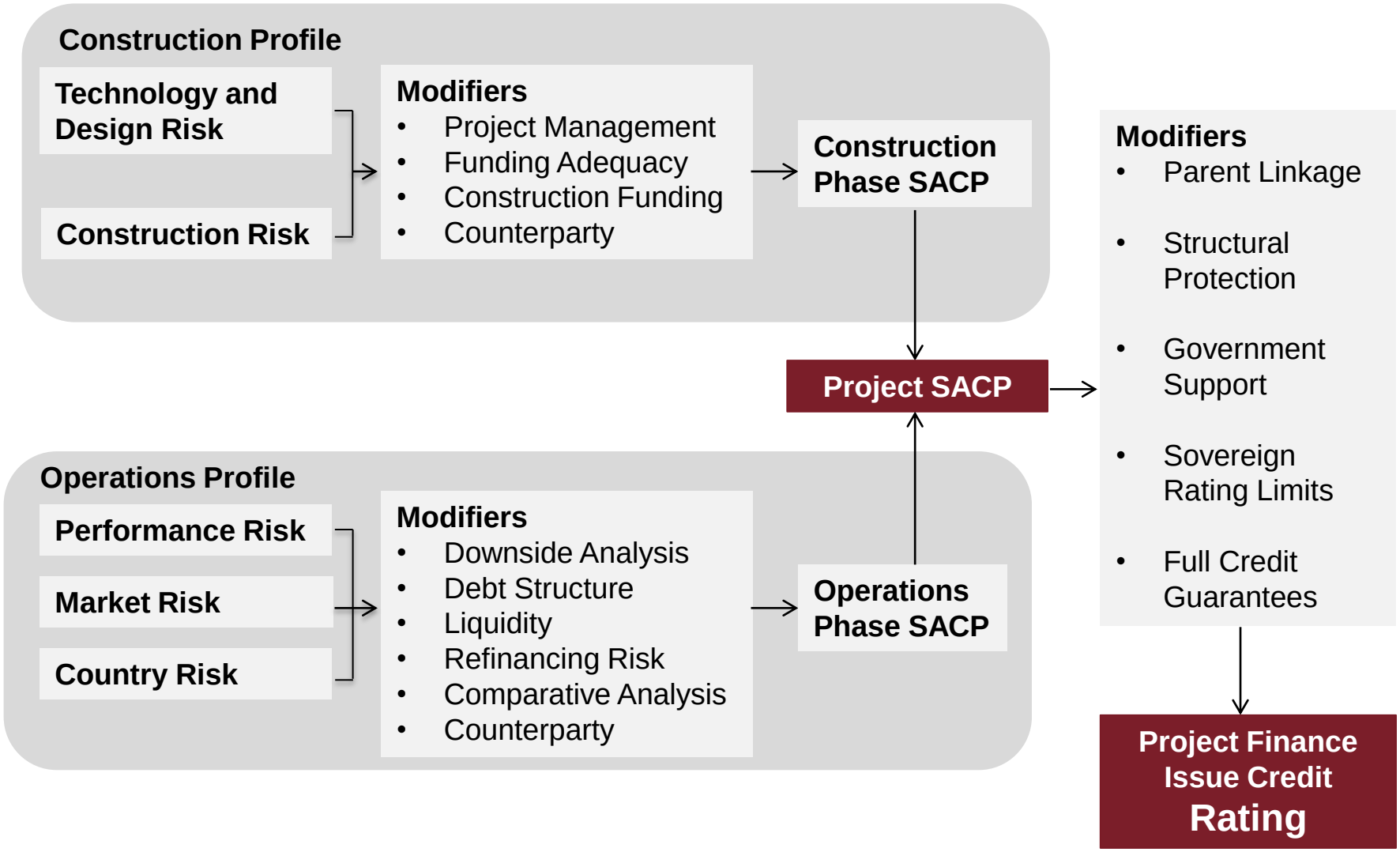
Limit project's range of permitted actions

- Prioritizes payment of senior debt service

Project Finance Structure Examples



Project Finance Ratings Framework



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Poll Question

2 **Which is a bigger risk for Projects?**

1. Construction Risk
2. Operations Risk

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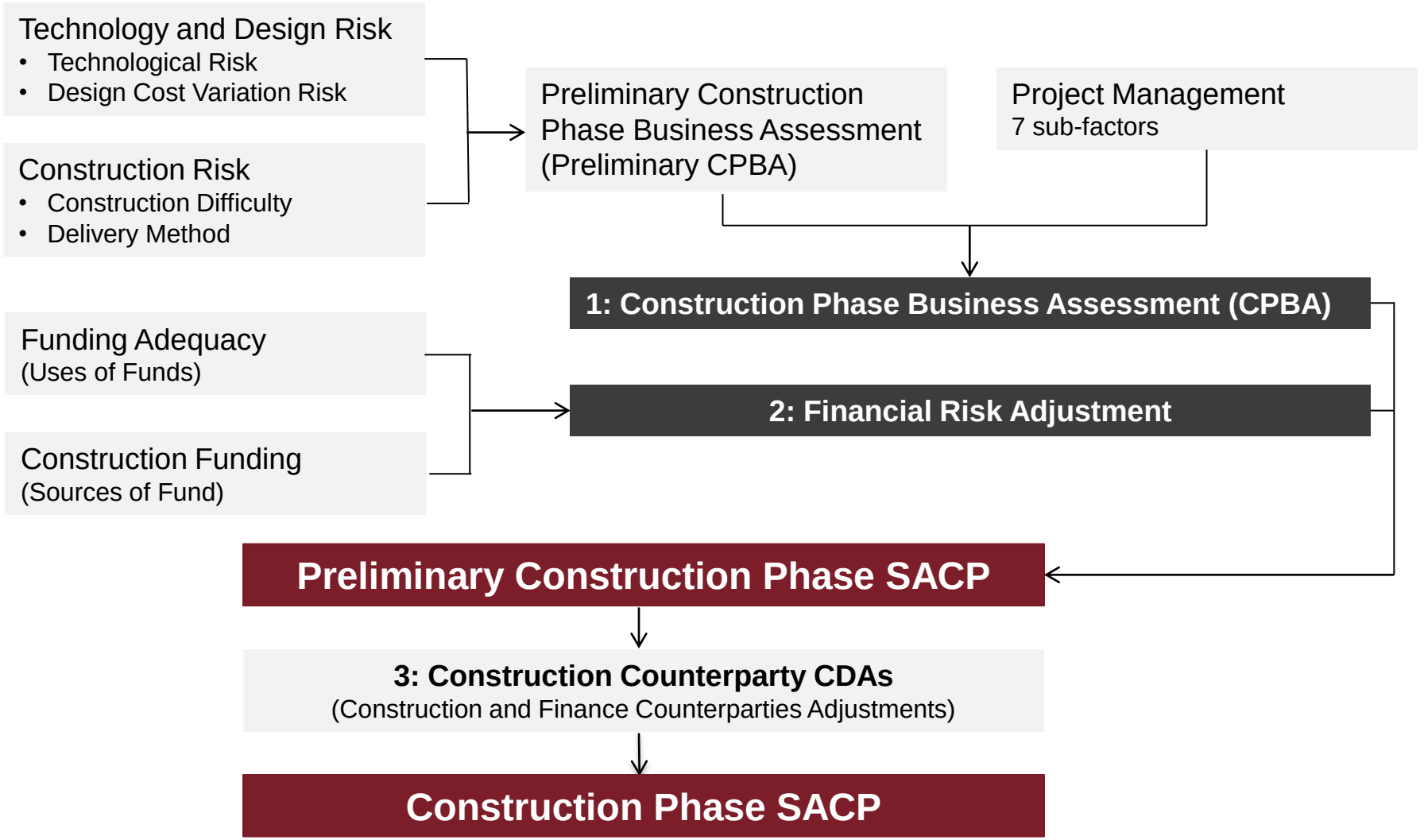
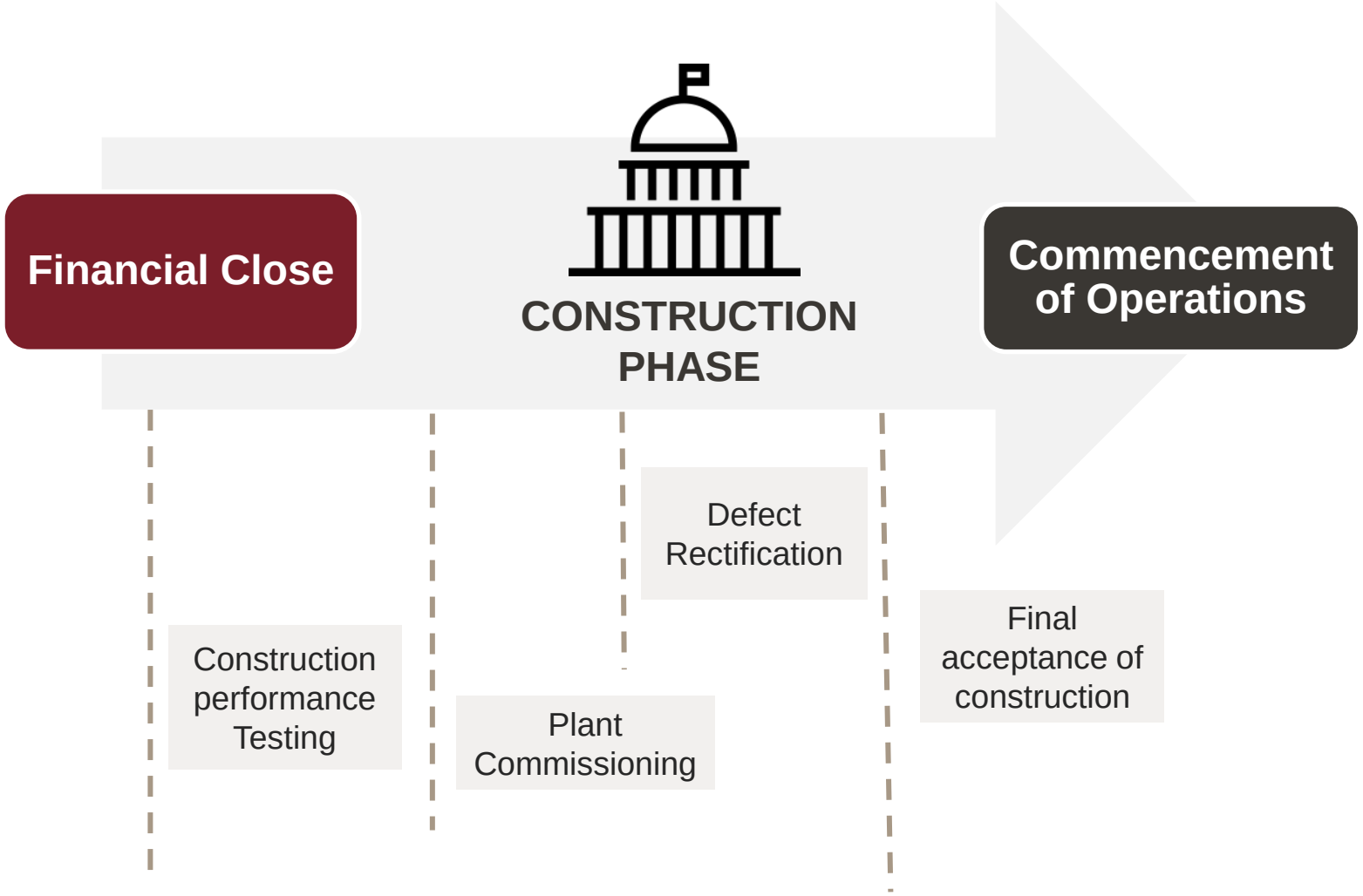
3 Construction Risk

Project Finance Construction Methodology



Construction Phase



Poll Question

3 **Biggest challenge for Construction?**

1. Approvals, Land Acquisition
2. Contractors, 3rd parties
3. Technology
4. Design
5. Others

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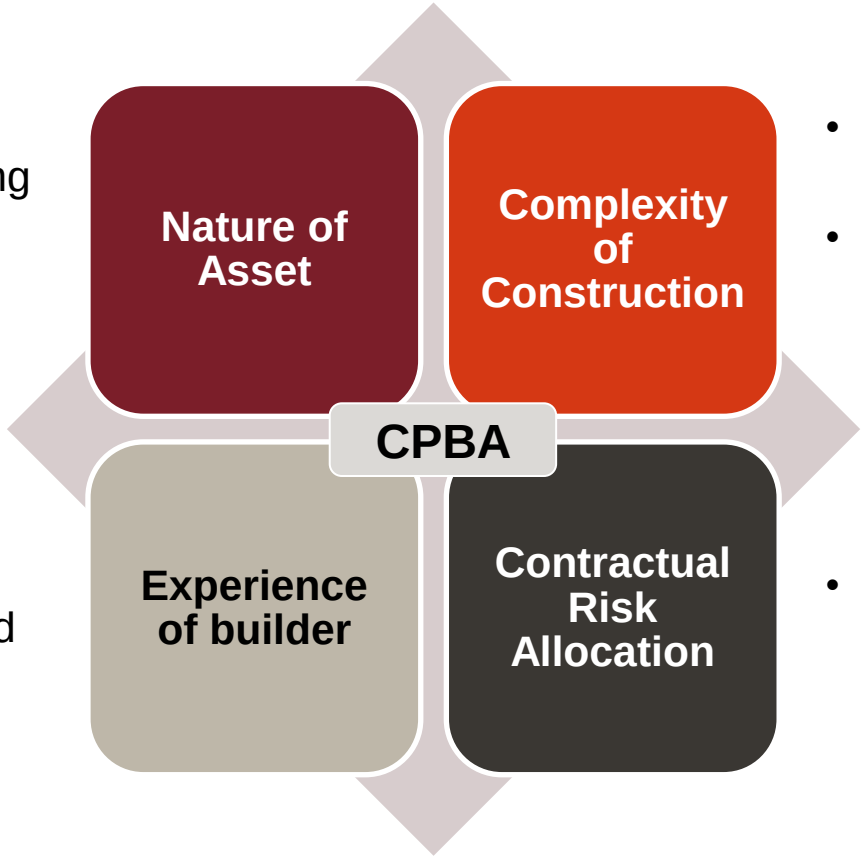
Construction Phase: Business Assessment (CPBA)

Simple building or complex engineering task?

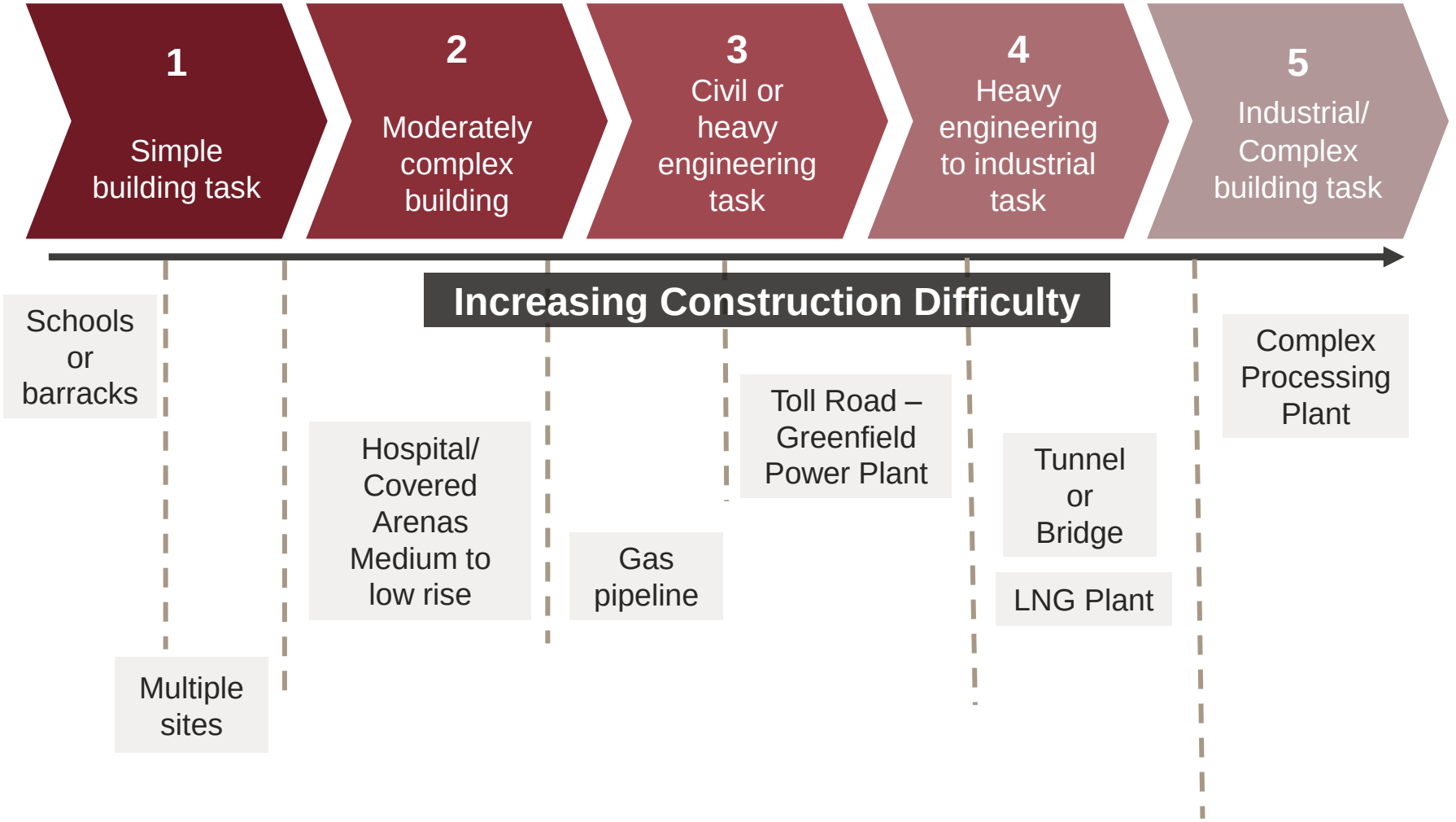


- Track record of technology?
- Are designs well advanced?

Is builder experienced with asset type?

- Is construction timetable reasonable or is there elevated risk of breach of longstop date?

Construction Difficulty is a Key Determinant



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Construction Risks in Renewables

More Challenging Construction Tasks

- Mega hydroelectric projects
- Solar collecting tower power plants
- Offshore wind plants
- Other renewable energy projects

Relatively Simple Building Tasks

- Small-scale solar photovoltaic (PV)
- Completed construction with mainly operational considerations

Construction Phase "Business Assessment"

Preliminary Construction Phase Business Assessment*

	Construction risk				
Technology & Design Risk	**1**	**2**	**3**	**4**	**5**
1	a+	a	a-	bbb+	bbb-
2	a	a-	bbb+	bbb	bb+
3	a-	bbb+	bbb	bbb-	bb
4	bbb+	bbb	bbb-	bb+	bb-
5	bbb-	bb+	bb	bb-	b+

Schools

Simple roads

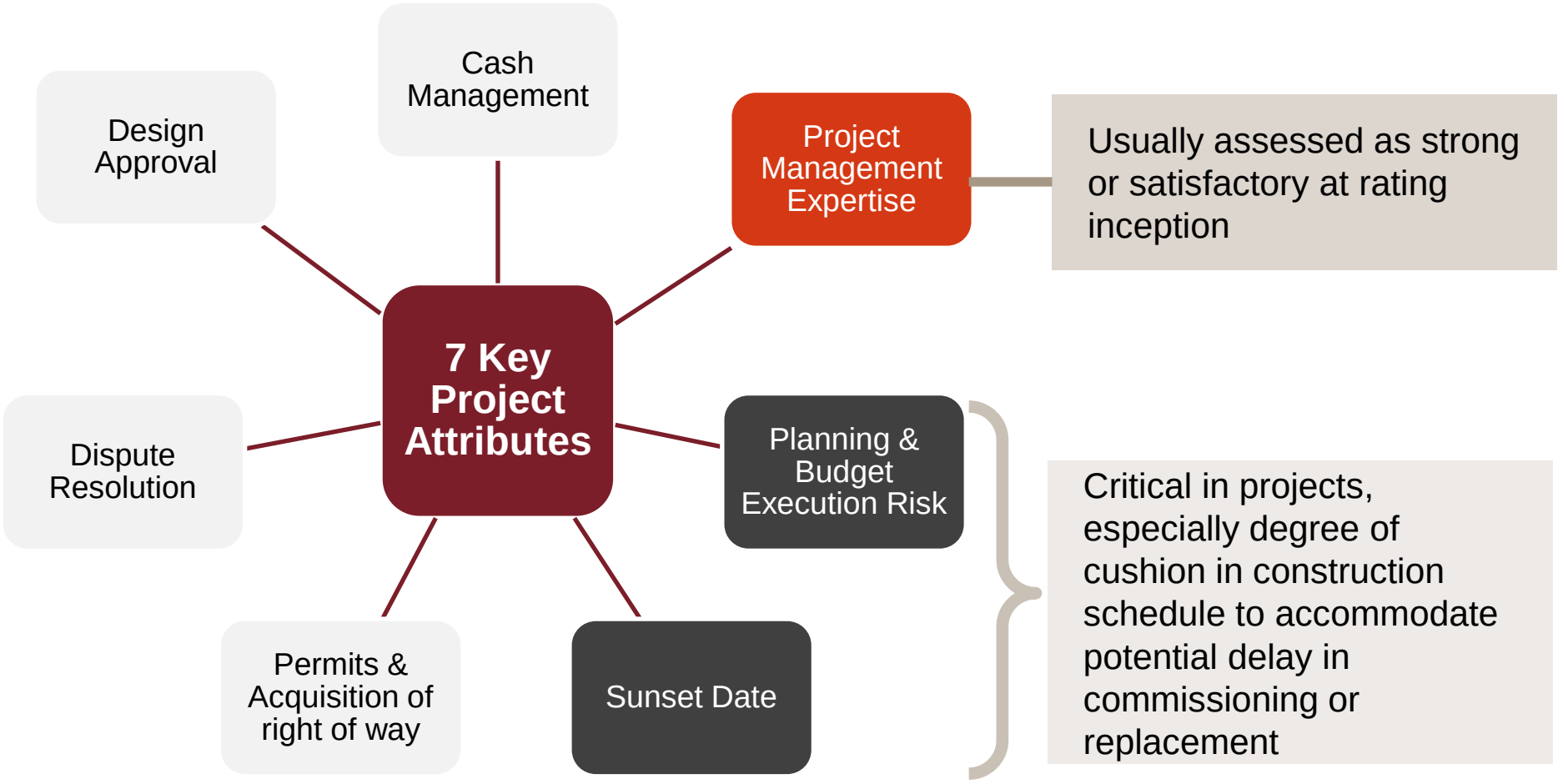
Accommodation

Heavy Engineering tasks

Large power plants

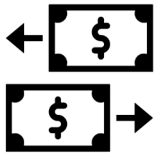
*Subject to caps described in following tables

Project Management Risks



Construction Phase: Financial Assessment

Sources & uses of funds, security package, builder counterparty risk



1 **Enough cash to complete construction, even under a stress scenario?**

2 **What security package is in place?**

3 **What happens if project is delayed?**

4 **What happens if builder goes out of business prior to completion?**

Financial Risk Adjustment - Uses of Funds

1 **Fixed Price**

2 **Certain Date**

3 **Construction Contracts**

Illustrative construction phase budget:

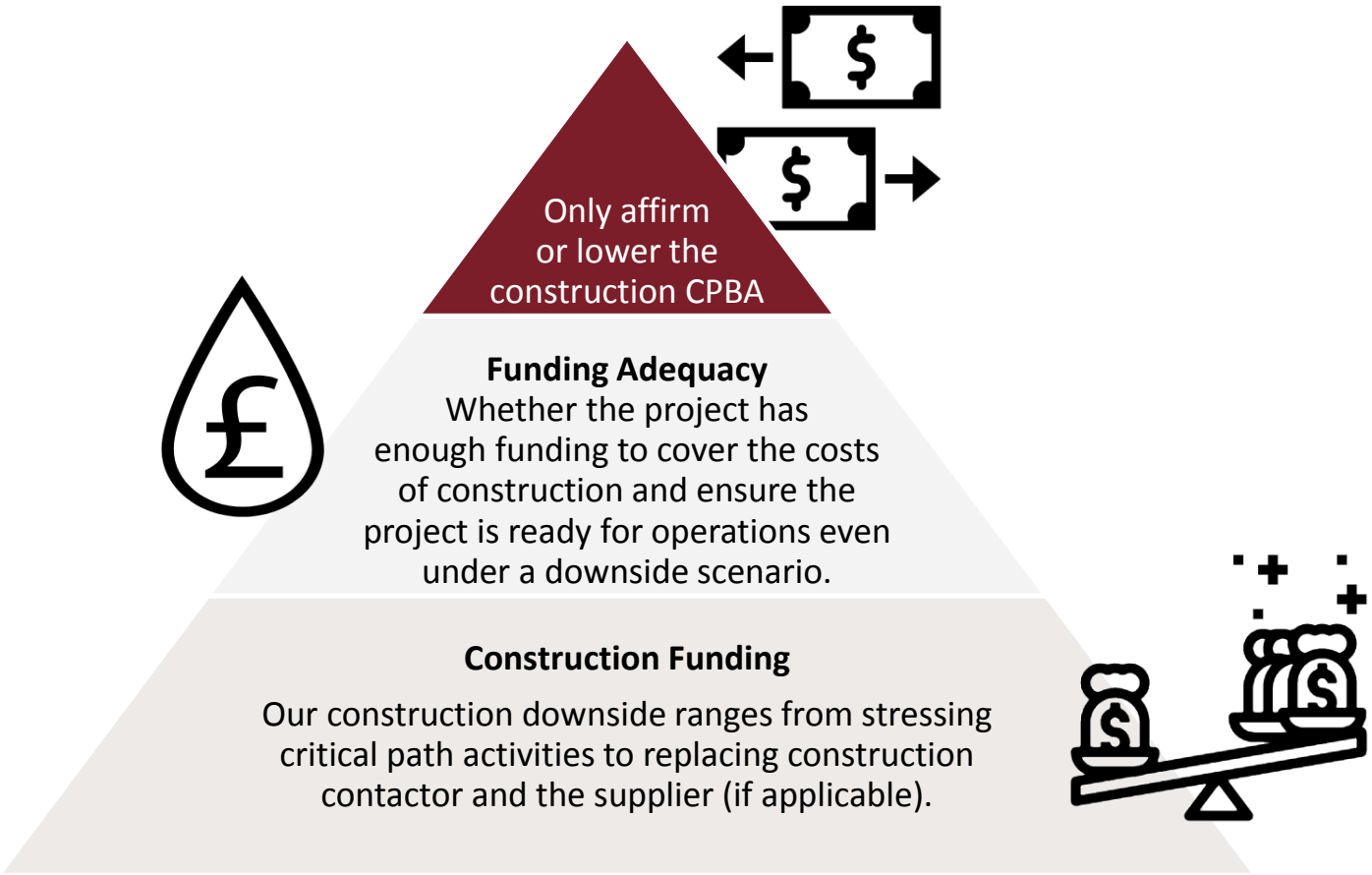
Uses of Funds	Note:	% of total budget
Construction cost	*Fixed-price EPC contract*	85%
Operating costs during construction	*Often fixed (under O&M agreement)*	2%
SPV management costs	*Overheads (not fixed)*	2%
Interest during construction	*Typically fixed-rate or hedged debt*	8%
Funding of opening reserve balances	*MRA, DSRA (fixed – known amounts)*	1%
Working capital	*Fixed*	1%
Advisors' fees (legal, technical)	*Partly variable, but not material*	1%
Total		**100%**

Financial Risk Adjustment - Sources of Funds

Illustrative construction phase sources of cash:

Sources of Funds	Note:	
Senior debt	Bonds generally issued upfront	80%
Shareholder loans (SHLs)	90% leverage is not uncommon	9%
Pinpoint equity		1%
Revenues during construction	If applicable	9%
Interest income during construction		1%
Total		**100%**

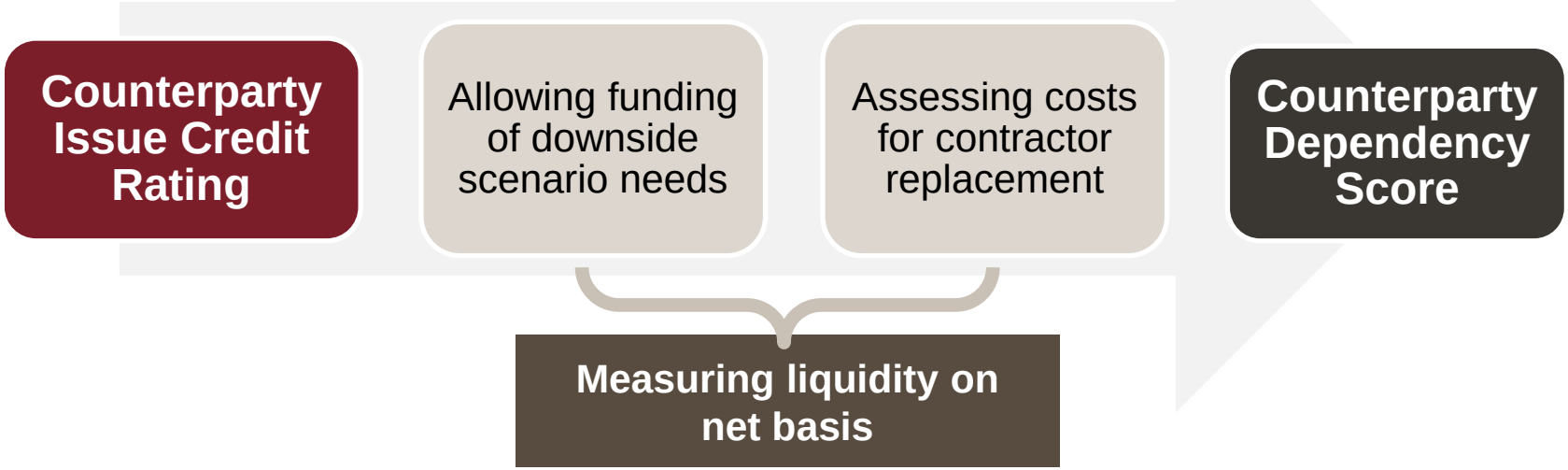
Financials Risks



Counterparty Adjustment

Construction Counterparty Dependency Assessment (CDA)

- To assess creditworthiness of counterparties that are material or cannot be easily replaced without significant time or cash flow impact.
- Applied based on degree of credit enhancement provided to replace counterparty and subcontractors in a timely manner and complete project



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Builder Replacement Cost Analysis

Project issue rating can be rated higher than builder if builder can be replaced at any point without putting debt service at risk

Replacing builder requires:

1. Time
To avoid breaches of any longstop dates and subsequent termination.

2. Money
To pay replacement builder for remaining works + overheads.

Based on assumptions that:

1. Builder has not incurred a **cost overrun**

2. No **significant delay** to the construction program

at time of replacement

Replacement costs estimates do not hold up when program is already delayed, over budget, and builder goes insolvent simultaneously.

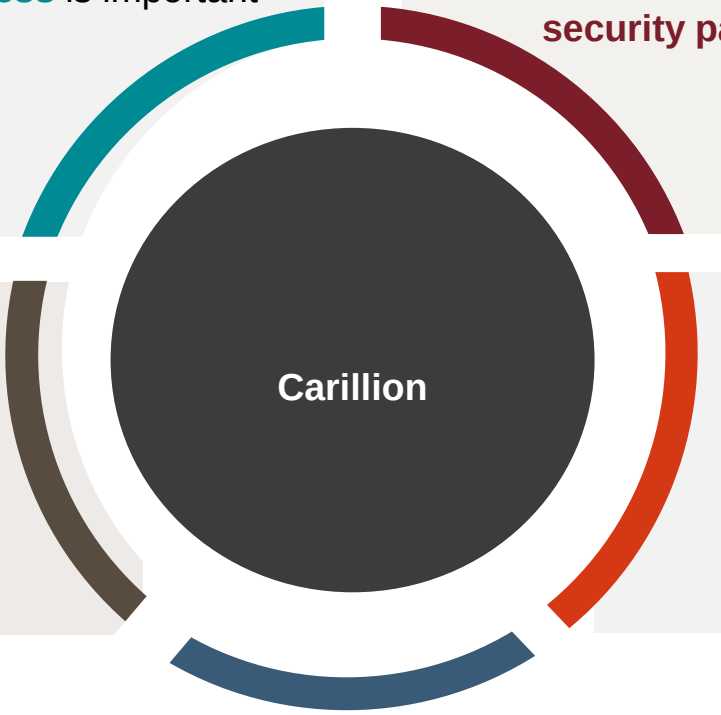
? Is builder's project-level performance truly independent of creditworthiness? Or are they correlated?

What are lessons learned for assessing construction risk following Carillion?

Counterparty Creditworthiness is important

Current **market standard security packages** may be insufficient to fund replacement

Joint and several construction joint ventures (interface risk).



If under-priced / cost overruns, **liquid security** is unlikely to be sufficient to fund replacement.

Replacement of a builder often takes longer than expected and costs more than expected

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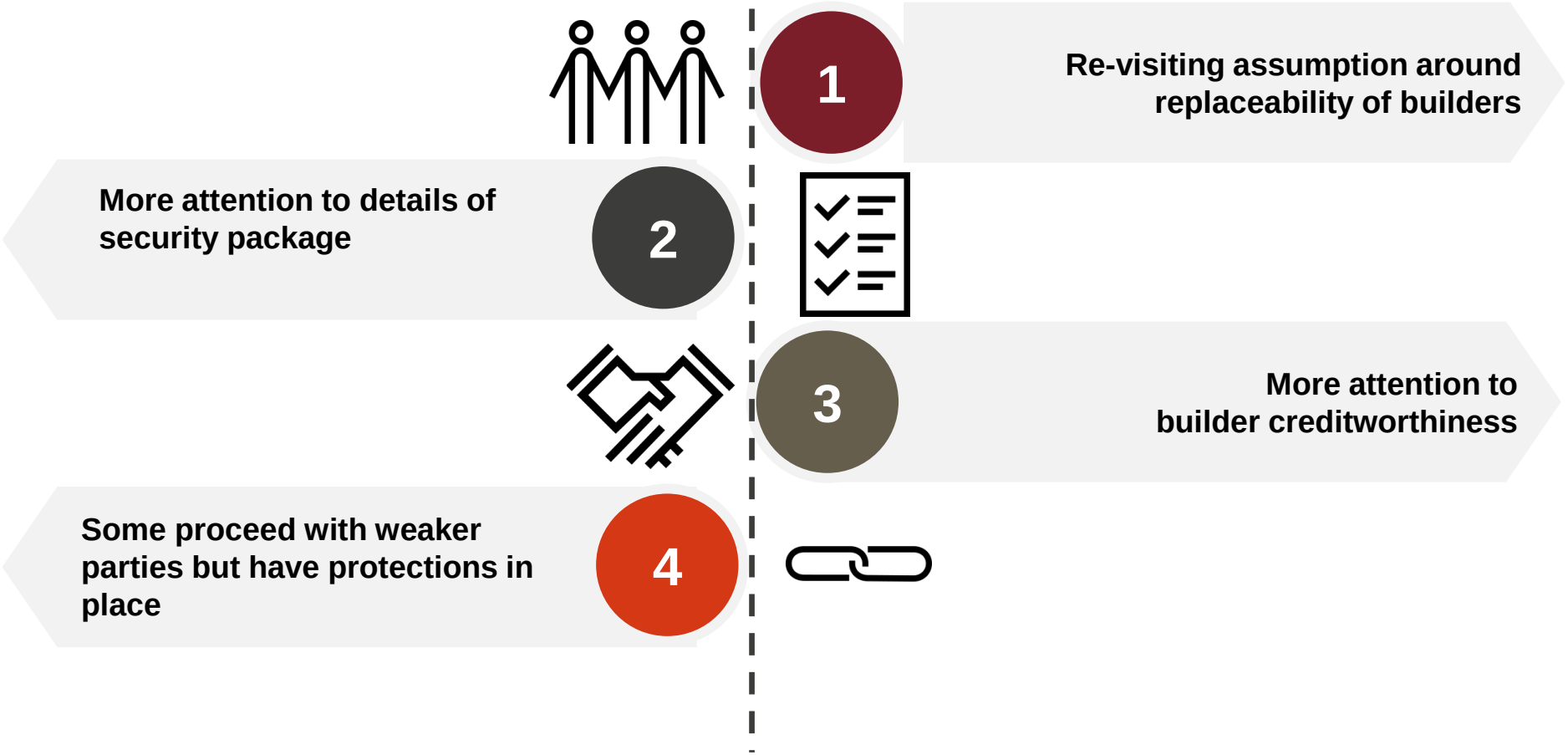
Carillion's possible impact on future construction projects



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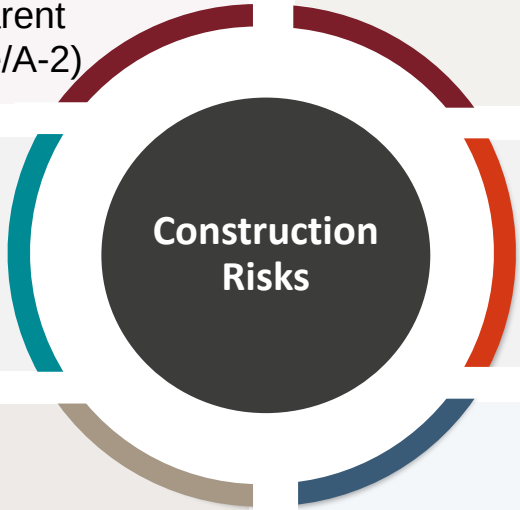
US Rail – Purple Line Transit Partners LLC

Rating: BBB+

Construction Period:
Entire construction risk (incl. vehicle supply) and operational risk are supported by a parent guarantee from Fluor Corp. (A-/Stable/A-2)

Agreement's termination provisions
Would compensate lenders (incl. all outstanding principal and breakage costs).

Large scope and site constraints
Includes building structures and utility relocations in developed urban corridors while managing traffic congestion

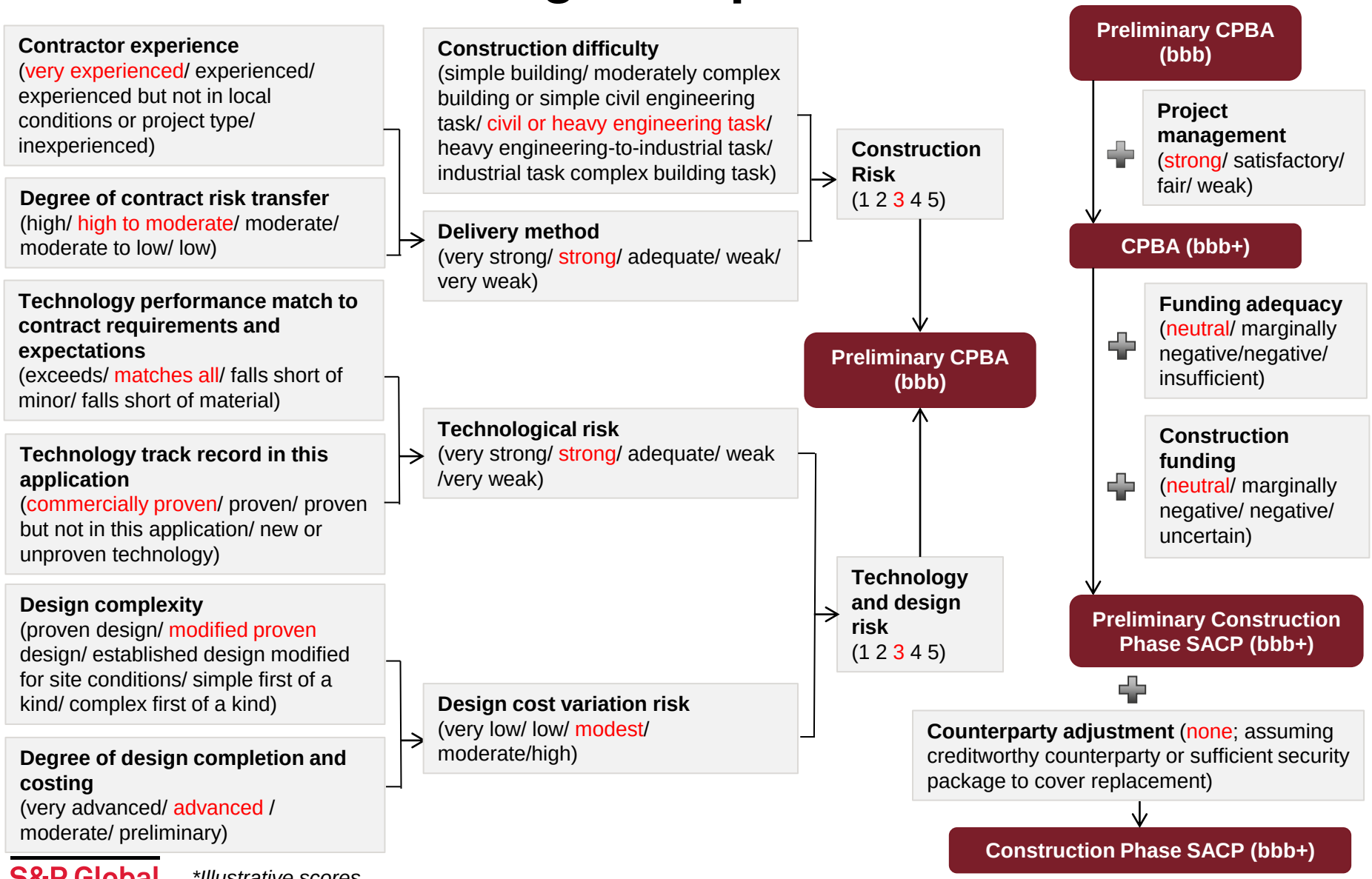


Stalled Construction
Due to environmental issues

Operations:
Availability-based payments with no patronage/ridership

Strength and experience of the contractor.

Construction Scoring – Purple Line



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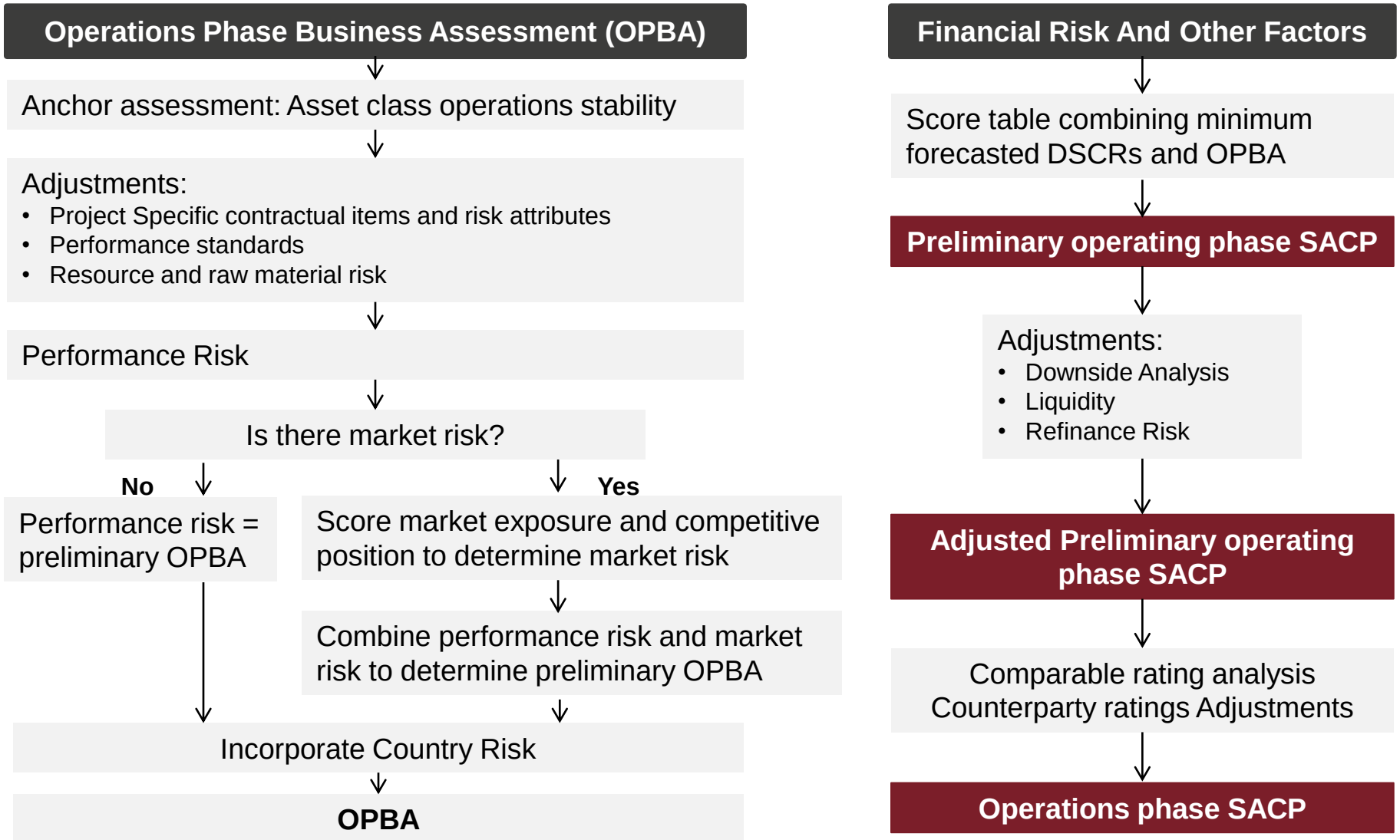
**Illustrative scores*

4 Operations Risk

Project Finance Operations Methodology



Poll Question

4 **What is the key Operations Risk?**

1. Resource Risk
2. Market Risk
3. Refinancing/Debt Structure
4. Counterparties
5. Others

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Asset Class Operations Stability

Project Type Cash Flow Volatility – General, Inherent

Increasing Risk & Complexity

1-2	3-4	5-6	7-8	9-10
• Schools • Office • Roads • Hotels • Simple Bridges • **PV Solar**	• Complex Bridges • Simple Ports • On Shore Wind • **Simple Industrial Projects** Cement	• LNG Plants • Simple Oil Refineries • Natural Gas Projects • Hydro Projects • **Super critical Projects**	• Moderately complex Chemical projects • Nuclear power plants • Complex Chemical plants	• **Unusually complex** projects • New Asset Classes • Untested

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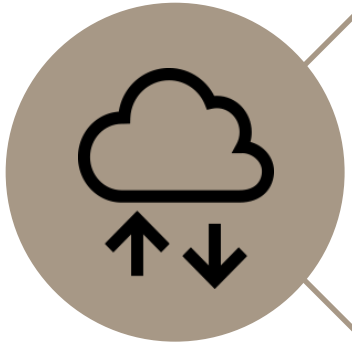
Asset Class Operations Stability – Cash Flow Volatility

Solar PV '2', the strongest score of all power technologies, as its operations are relatively simple.



Wind project '4' if it is onshore and '5' or more if it is offshore.

Project Specific Contractual Elements

Project Type Cash Flow Volatility – Project Specific

O&M Management

- Skill and experience level
- Minimal Interruption – On site spares etc.?
- More complex plant?

Performance Redundancy

- Likelihood of underperforming
  - Roads?
  - Portfolio of Assets?

Technological Performance

- Technology Employed
- Material Underperformance?

Operating Leverage

O&M, maintenance capex

- Minimal Interruption – On site spares etc.?
- More complex plant?

Other Operating Factors

- Labor inefficiency etc.
- Gas fired plants, more frequent start/stops?

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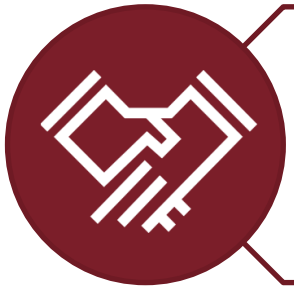
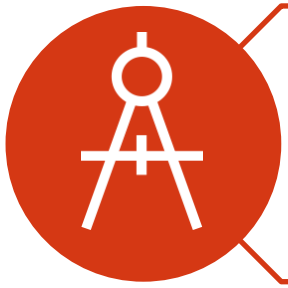
Resource Risk Assessment - Renewables



Biggest risks, PPA or FiT paid only for the volumes they deliver.

Solar resource risk - "modest“, when high confidence in estimates, reliable analysis from multiyear resource data at the site.



Geothermal technologies - Modest resource risk - solid and reliable data on actual performance, proven resource life covering expected needs.

Resource Risk Assessment – Geographical Diversification

Project diversification - Not always a better resource risk assessment

- Continental Wind LLC with 13 wind power projects in various locations, but more than 55% capacity has operating history of < 2 years.
- Resource risk "moderate," adds +2 to the asset class operations stability assessment, leading to an assessment of '5'.

Portfolio of assets, meaningful diversity, low correlation

- Positive adjustment for Performance Redundancy.
- Continental Wind, ACOS '3' adjusted for performance redundancy, from '4'.

Portfolios of assets benefit from a more favorable resource assessment

- FPL Energy American Wind, six U.S. wind power projects in different wind regimes. Benefit from portfolio effect.
- Resource and raw materials "modest," adding a +1 adjustment to arrive at an asset class operations stability assessment of '5'.

Market Risk

1

Majority Renewable - Minimal market risk

- PPAs structured to cover fixed price, fully hedging against market risk.

2

Salton Sea--a geothermal project in Southern California

- Exposed to market risk, paid by long-term offtaker based on a formula set by the state regulator, linked to gas prices and updated monthly.
- Potential market price changes substantial, market exposure is "high."
- Drop in gas market prices, cash flows could decline > 50% from base case

3

When market risk is present

- Competitive and cost position key.
- Project Specifics, Merit Order, Grid Priority

Country Risk Assessment

**The list is not meant to be exhaustive and it is subject to review from time to time; As of Dec. 19, 2016*

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Operations Phase

Offshore Wind

Base Case

- One–year P-90 wind resource assessment (probability of exceedance)
- Availability of 95%
- Contracted price (if contracted)
- Long term sustainable power price (if merchant)
- Operating costs slightly higher than the issuer's expectations

Downside

- One–year P-99 wind resource (probability of exceedance)
- Availability 6% below base case persistently
- Operating costs increase by 15%; this exceeds our useful stress for power projects due to its remoteness

Operations Phase

Toll Roads

Base case

- Traffic forecast based on the traffic report and historical data provided
- Macroeconomic assumptions in line with our current forecasts (GDP and CPI)
- IPI growth in line with the sponsor's traffic report
- O&M costs in line with the sponsor's base – case
- No interest income under ADSCR calculations

Downside

- Traffic forecast: Market Downside (Price and Volume)
- O&M increase: 10%
- Lifecycle costs increase: 10%
- Lifecycle timing: Lifecycle brought forward by 1 year
- Inflation: -1% during the first 10 years
- No interest income under ADSCR calculations
- RPI +1%/-1% for the first five years

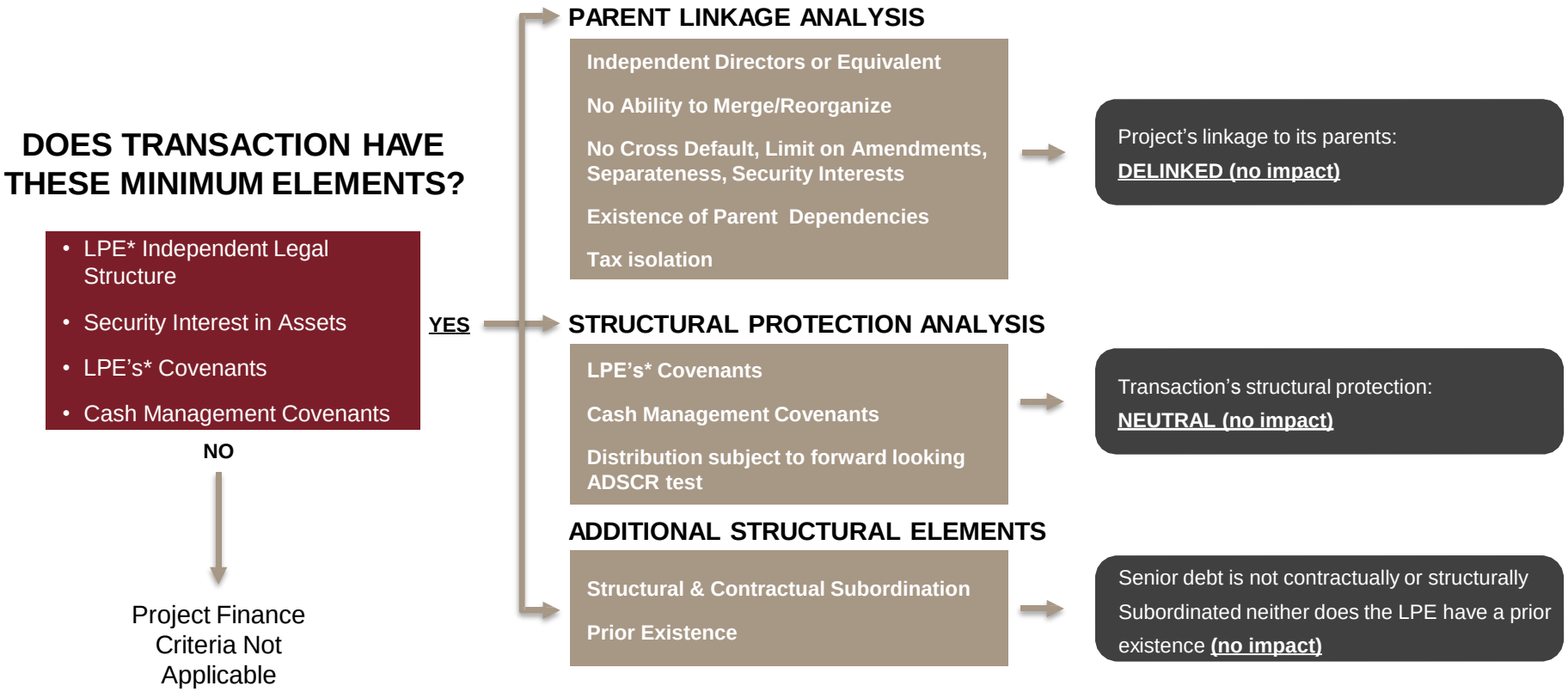
Operations Phase

Preliminary Operations Phase SACP

Driven by the analysis of the minimum DSCR under our Base Case scenario.

Preliminary Operations Phase SACP					
	--Preliminary operations phase SACP outcome in column headers--				
	--Minimum DSCR ranges shown in the cells below*--				
	aa	a	bbb	bb	b
OPBA					
1-2	=> 1.75	1.75-1.20	1.20-1.10	<1.10	<1.10
3-4	N/A	=> 1.40	1.40-1.20	1.20-1.10	< 1.10
5-6	N/A	=> 2.00	2.00-1.40	1.40-1.20	< 1.20
7-8	N/A	=> 2.50	2.50-1.75	1.75-1.40	< 1.40
9-10	N/A	=> 5.00	5.00-2.50	2.50-1.50	< 1.50
11-12	N/A	N/A	N/A	=> 3.00x	< 3.00

Transaction Structure Methodology



*LPE Limited Purpose Entity

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Refinancing Risk

1

Tenor

- Project Debt for shorter tenor than Project Life.

2

Project Performance

- Weaker Project Performance will make refinancing even more challenging.

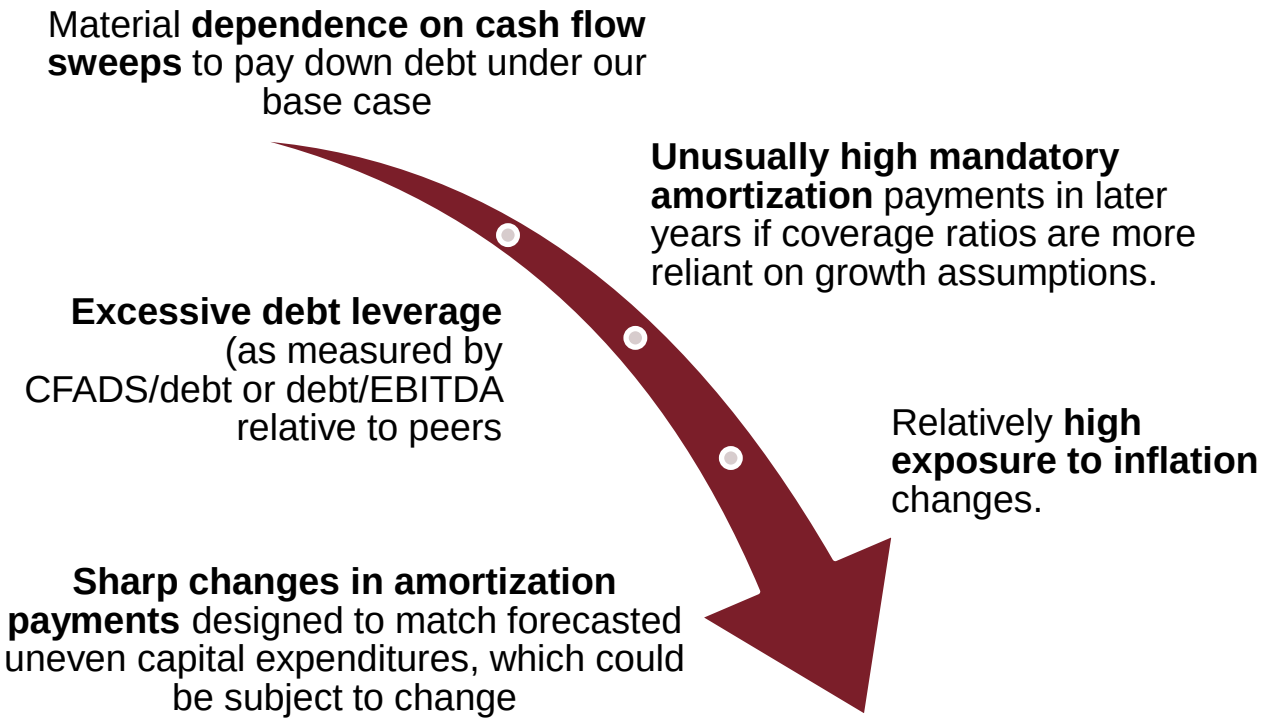
3

Market Risk

- Interest rate, funding environment can change significantly.

Debt Structure

In certain cases, we may lower the preliminary operations phase SACP because of the project's debt structure. Examples of when we make such adjustments include



Peer Comparison

1

Ratings above the 'BBB' category

- Solar PV assets need to establish a track record of stable performance.

2

Topaz Solar Farms LLC and Solar Star

- 'a' and 'a-' stand-alone credit profiles (SACPs)
- One-notch reduction to the ratings, large solar PV projects have limited operating track record.
- Ratings are nonetheless capped by the ratings on their counterparties.

3

When market risk is present

- Each year, we assess whether to continue to apply the adjustment.

Counterparty Constraint

1

Offtaker risk

- In most cases, the ratings on utility-contracted projects are capped by the rating on the utility company.

2

Fully contracted offtake structures

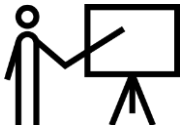
- Mitigate market risks but typically above market rates.
- No assurances that without the offtaker, the project would be able to get the same prices or have access to transmission lines.

3

Example

- Weak State Distribution Utilities in India.
- Differentiate counterparty credit risk of stronger entities like NTPC

Project Finance – The New Mexico City Airport Case Study



Background

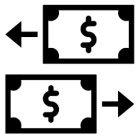
- Existing capacity: ~45 million passengers
- Phase 1: ~57 million passengers. LT: Up to 120 million

Construction Cost

- First phase: ~ US$13 billion
- Funded by US$6 billion of debt to be issued by the trust
- US$7 billion from the Mexican government

Structure

- Sponsor, GACM is the holder of the concession for construction & operations by AICM
- Existing airport concession for 50 years from 1998



Cash Inflows

- All airport passenger charges
- TUA: Existing and New
- Repayment of debt, ahead of any operating costs
- Paid in Mexican pesos, but the TUA captures fluctuation between the pesos and the U.S. dollar, providing a natural hedge
- TUA is adjusted periodically in line with U.S. inflation.

Project Finance – The New Mexico City Airport Case Study

Rating: BBB+

Construction Risk

- Limited similarities with traditional project finance transactions
- Construction Risk – To be borne by the Govt. of Mexico through GAC

Operation Risk

- Don't incorporate the new airport's potential capacity and cash flows.
- Existing Airport Cash Flows- Whether sufficient to service all debt including new airport?

Government Support – Very High

- Very important **role** because of the economic and political importance of existing and future airports
- Very strong **link** as airports are managing infrastructure assets of the country per government's plans.
- Supervision, management, and strategic decisions, including BoD.
- Annual financial contributions

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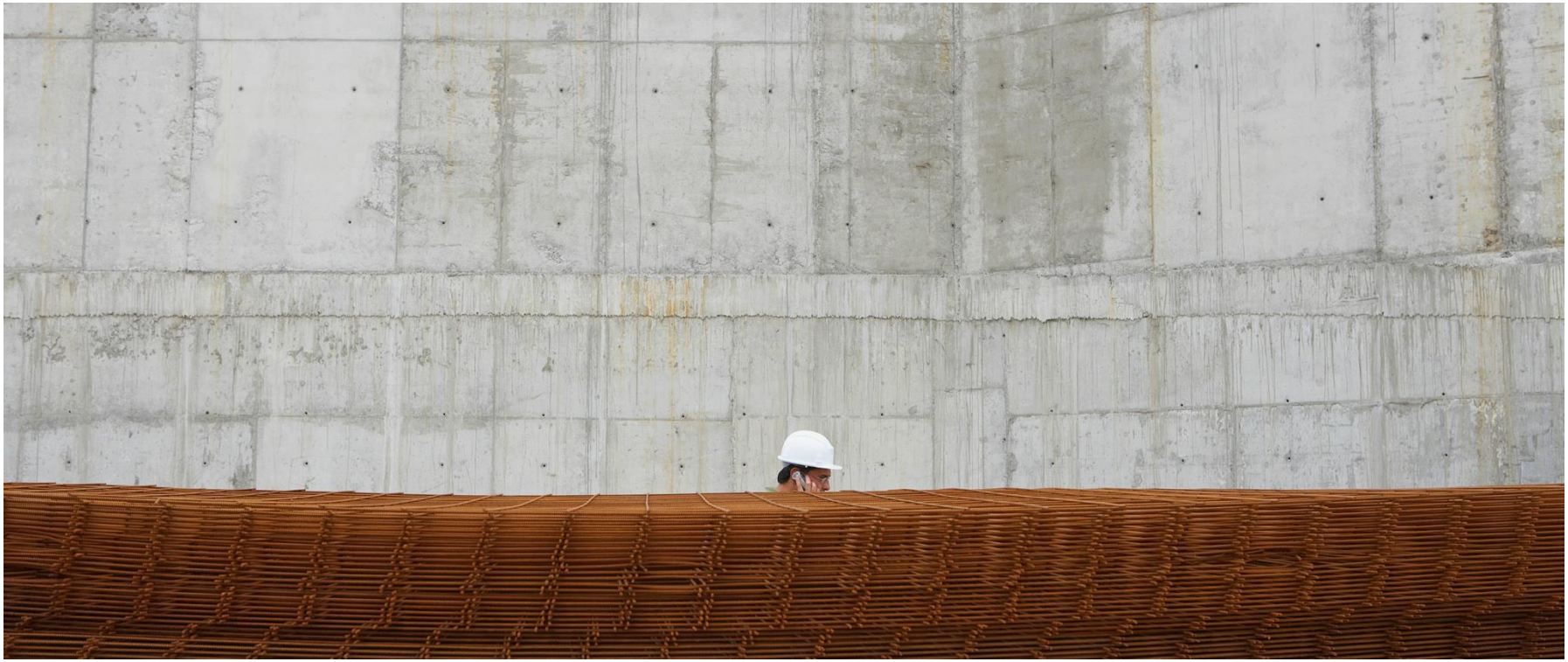
Video Links

https://www.spratings.com/en_US/video/-/render/video-detail/investor-briefing-mexico-city-airport

https://www.spratings.com/en_US/video/-/render/video-detail/investor-briefing-part-2-mexico-city_airport

Q&A



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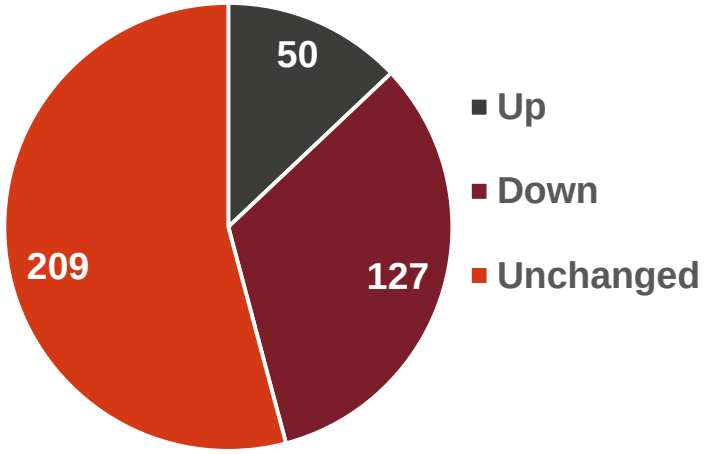
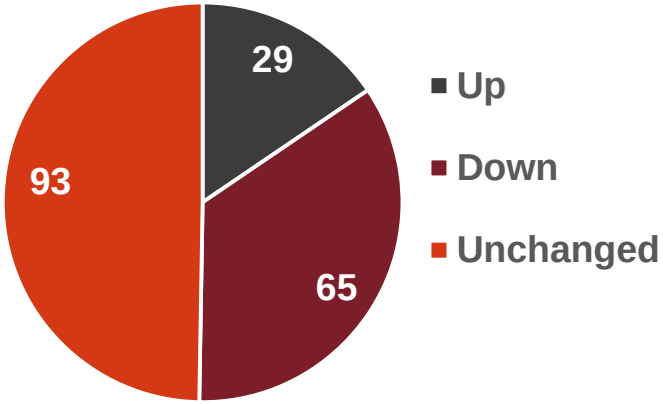
5 Project Defaults

Issuer and Issue Default History

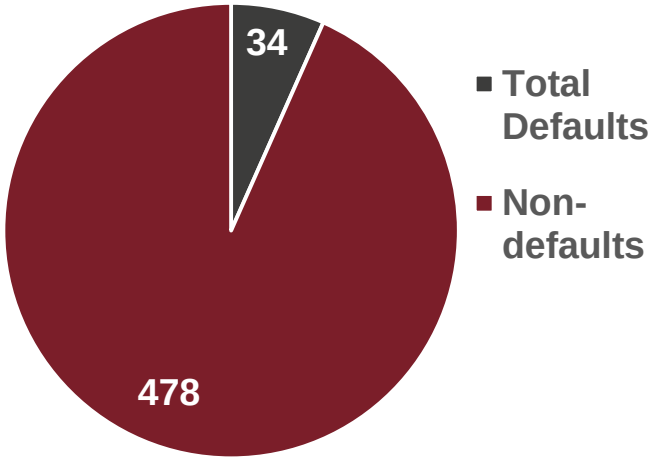
Investment Grade Rating Changes



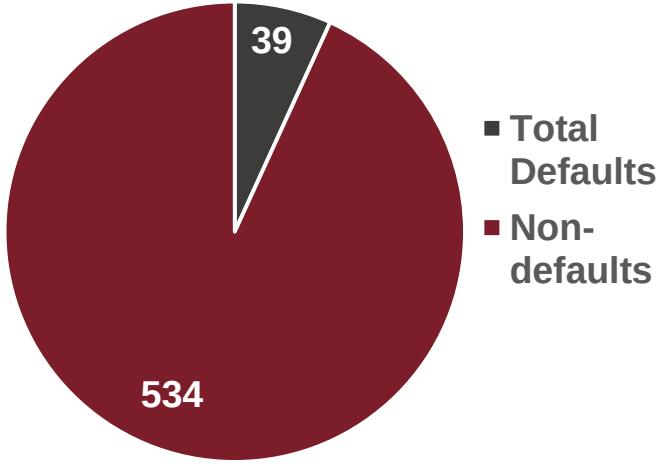
Non-investment Grade Rating Changes



Issuer



Issue



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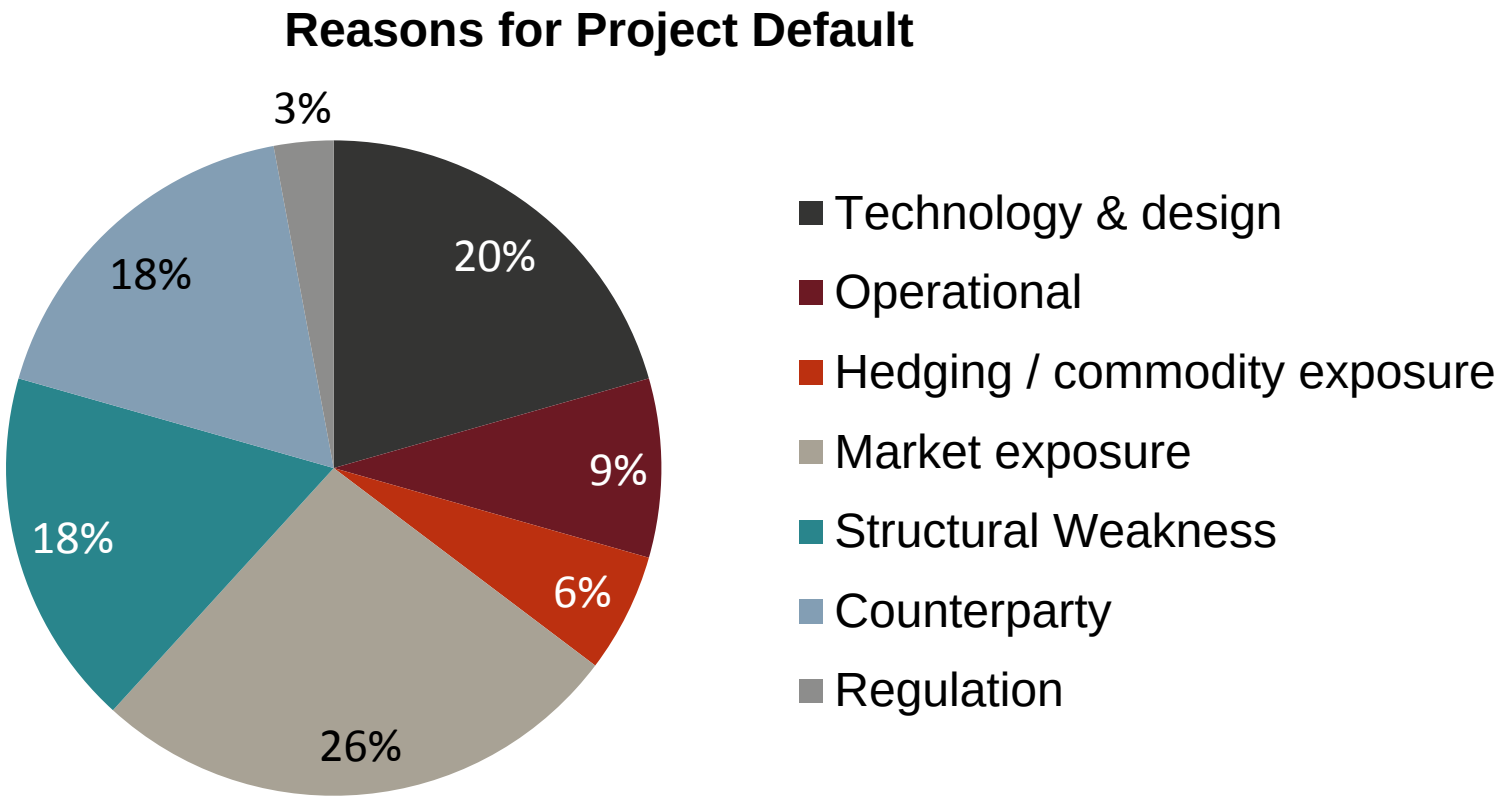
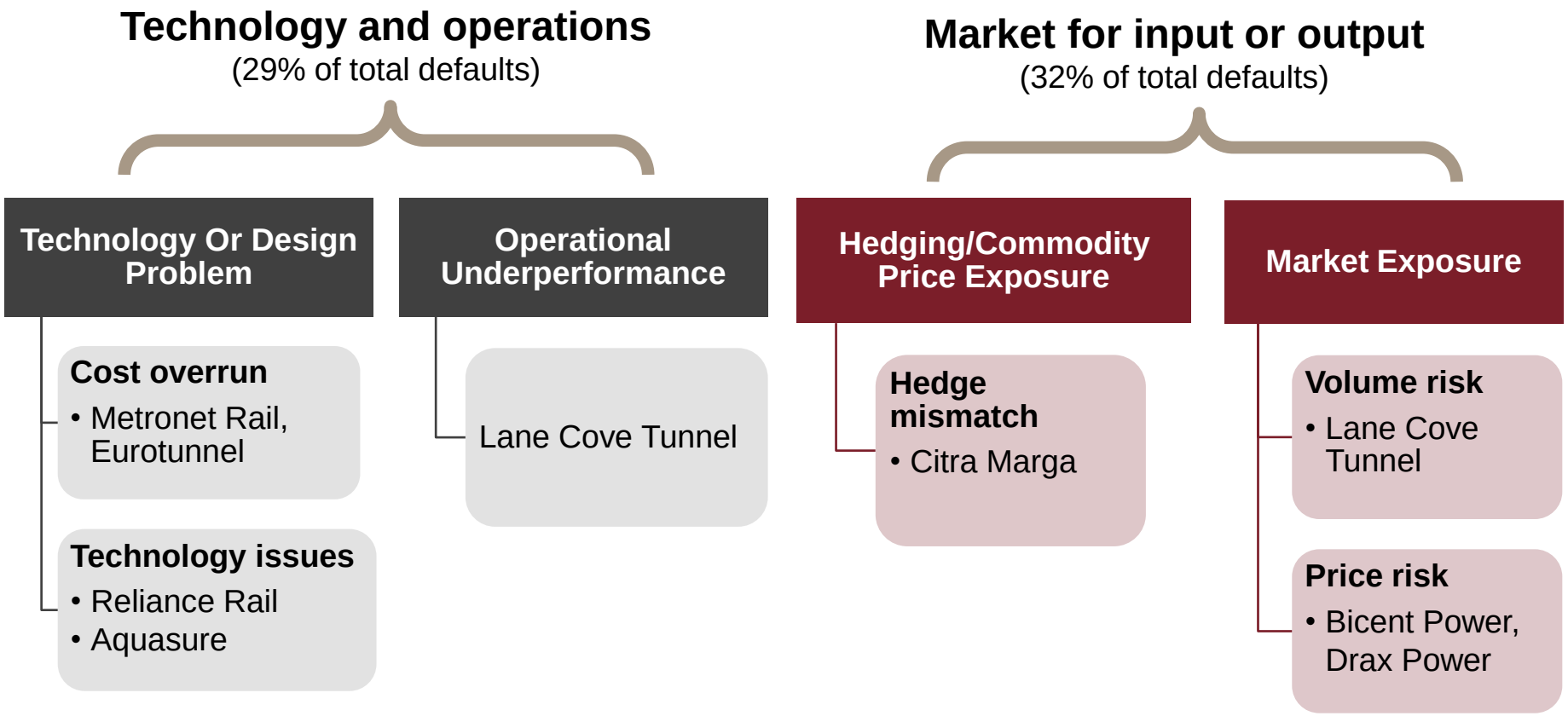
Key Reasons for Project Default



Note: There are often more than one reason for a project reaching default

Why Projects Fail



Why Projects Fail

Structure
(18% of total defaults)

Failure Of A Parent Company Or Counterparty

- RockGen Energy, Tiverton Power Associates, Broad River Energy
- Reliance Rail

Counterparty/ Regulation
(21% of total defaults)

Counterparty problem

Off taker/Builder problem
- Carillion
- Reliance Rail

Government support not as expected
- Lombard project, Greater Beijing First Expressways

Regulation

Tariff regulation
- Panda Global Energy

Emissions regulation
- Homer City Funding

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Poll Question

5 **Do you expect different reasons for Project Defaults in APAC?**

1. Higher Political Risk
2. Weaker Counterparty
3. Legal and Regulatory Risks
4. Others

pigeonhole.at/IF2018

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Analytical Team

Abhishek Dangra
Director
Sector Lead, Infra, SSEA

Abhishek Dangra is a Director in S&P Global Ratings team; based out of Singapore. He is the Sector Lead for all Infrastructure and Utilities companies in South & South-East Asia region (mainly India + ASEAN) covering Regulated Utilities, Renewables, IPPs and Transportation Infra companies like Airports, Ports, Toll Roads etc.

Abhishek is also increasingly involved in sharing S&P views on Infrastructure sector trends, Green Finance/Green Evaluation and Project Finance transactions in the region.

Abhishek has around 14 years of credit experience; joining S&P in 2010 with over seven years of work experience in credit related profiles. Before joining S&P, he was heading the Industry Research Group - Credit at Kotak Mahindra Bank. Abhishek has also worked with Lehman Brothers in the Global Risk Management function.

Abhishek is a Management Graduate from the Indian Institute of Management (IIM) – Indore and a Chartered Accountant (CA) from The Institute of Chartered Accountants of India. He also has a Bachelor of Commerce (B.Com) degree from Gujarat University and is a Certified FRM by the Global Association of Risk Professionals (GARP).

Analytical Team

Mary Anne Low
Associate Director
Infrastructure Ratings, S.S.E.A.

Mary Anne Low is an Associate Director in the Infrastructure team in Singapore. She has primary analytical responsibilities for infrastructure and utilities sectors in South & South-East Asia region.

Mary Anne joined S&P Global Ratings in Singapore in 2018 with more than ten years of work experience in credit related profiles. Before relocating to Singapore, she was most recently a Director of credit research covering the infrastructure and resources sectors at Australian-based company, FIIG Securities.

Prior to that, Mary Anne also spent ten years at Moody's Investors Service in Australia as an Analyst in the Project and Infrastructure team, covering regulated utilities (electricity, gas, water), coal terminals and rail haulers, PPPs and other esoteric project finance – primarily in Australia and New Zealand.

Mary Anne also worked in various roles based in Kuala Lumpur, Malaysia, including her role as an equities sell-side research associate with Citigroup.

Mary Anne holds a Bachelor of Business in Economics and Finance from RMIT University in Melbourne, Australia. She is fluent in English and Bahasa Malaysia.

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