

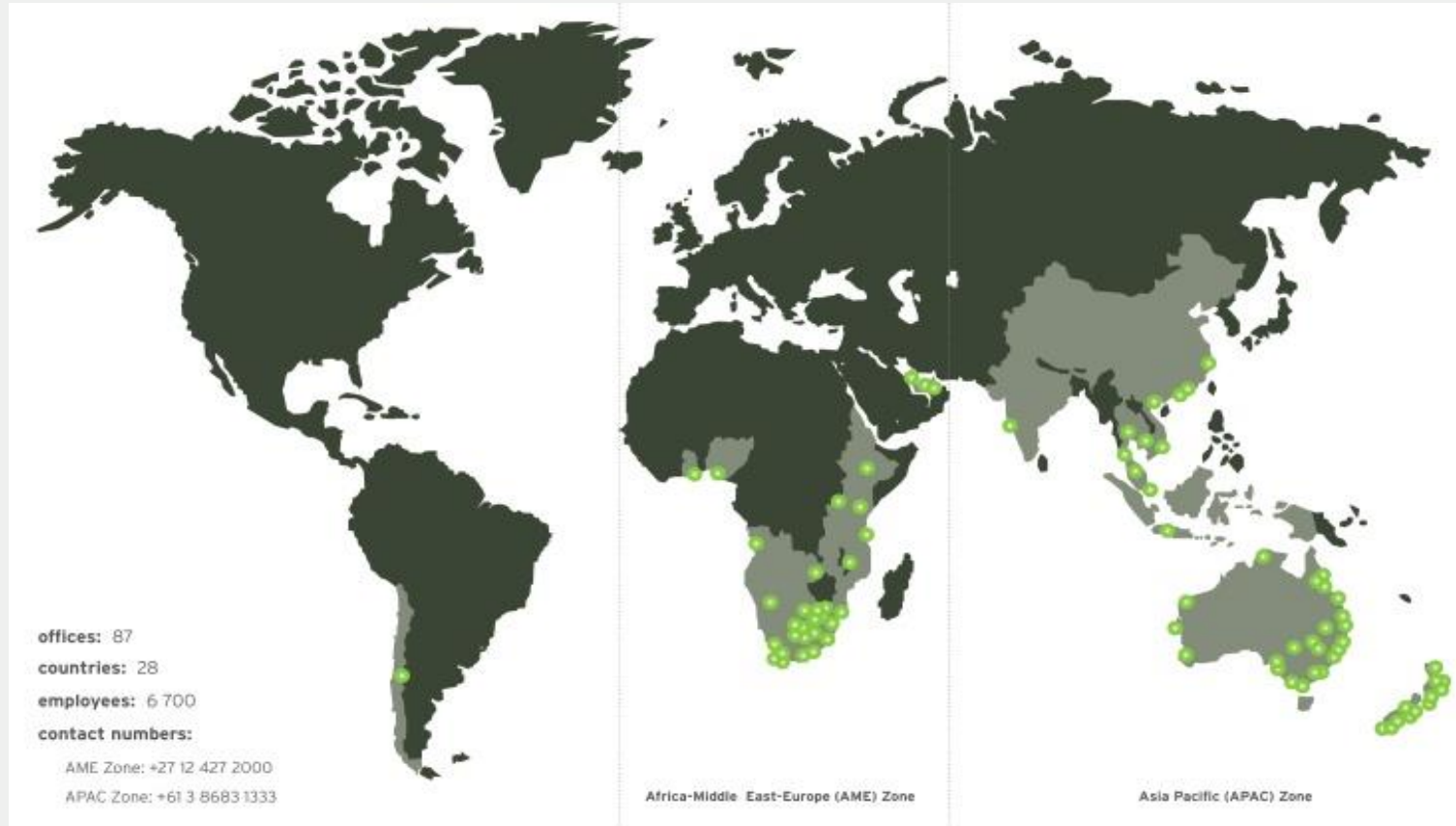


Leading. Vibrant. Global.



**Getting Wind Projects
Across the Line –
Observations from a
Technical Advisor**

Aurecon: Engineering, Management and Specialist Technical Services



International wind qualifications

Technical advisor

- Advised on many NZ and Australian wind projects
- Energy yield and due diligence on European onshore and offshore wind farms
- Owner's engineer for development of wind projects in South Africa
- Due diligence and finalisation on two wind projects in Kenya
- Energy yield analysis and finalisation on wind projects in Thailand
- Developed our own 30 MW wind farm in Lesotho (approaching financial close)





Development models

Development models

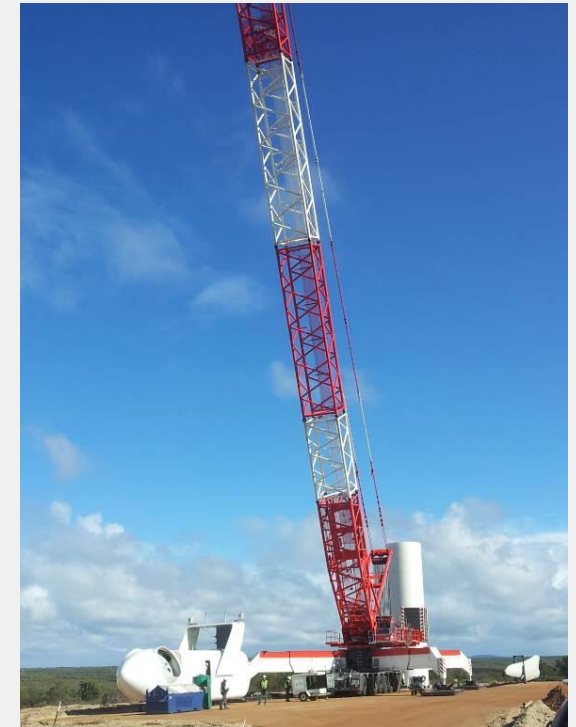
Stage gate approach to confirming project feasibility

- Three main investment phases
 - Early stage: site identification, concept design, feasibility, consenting
 - Finalisation: optimisation, procurement, financing
 - Construction: capital expenditure
- Early stage development is all about exploring the full potential of a site and creating maximum value opportunity
- Finalisation is about refinement of the project for best returns
- Construction is about delivering the project value by managing construction risks effectively

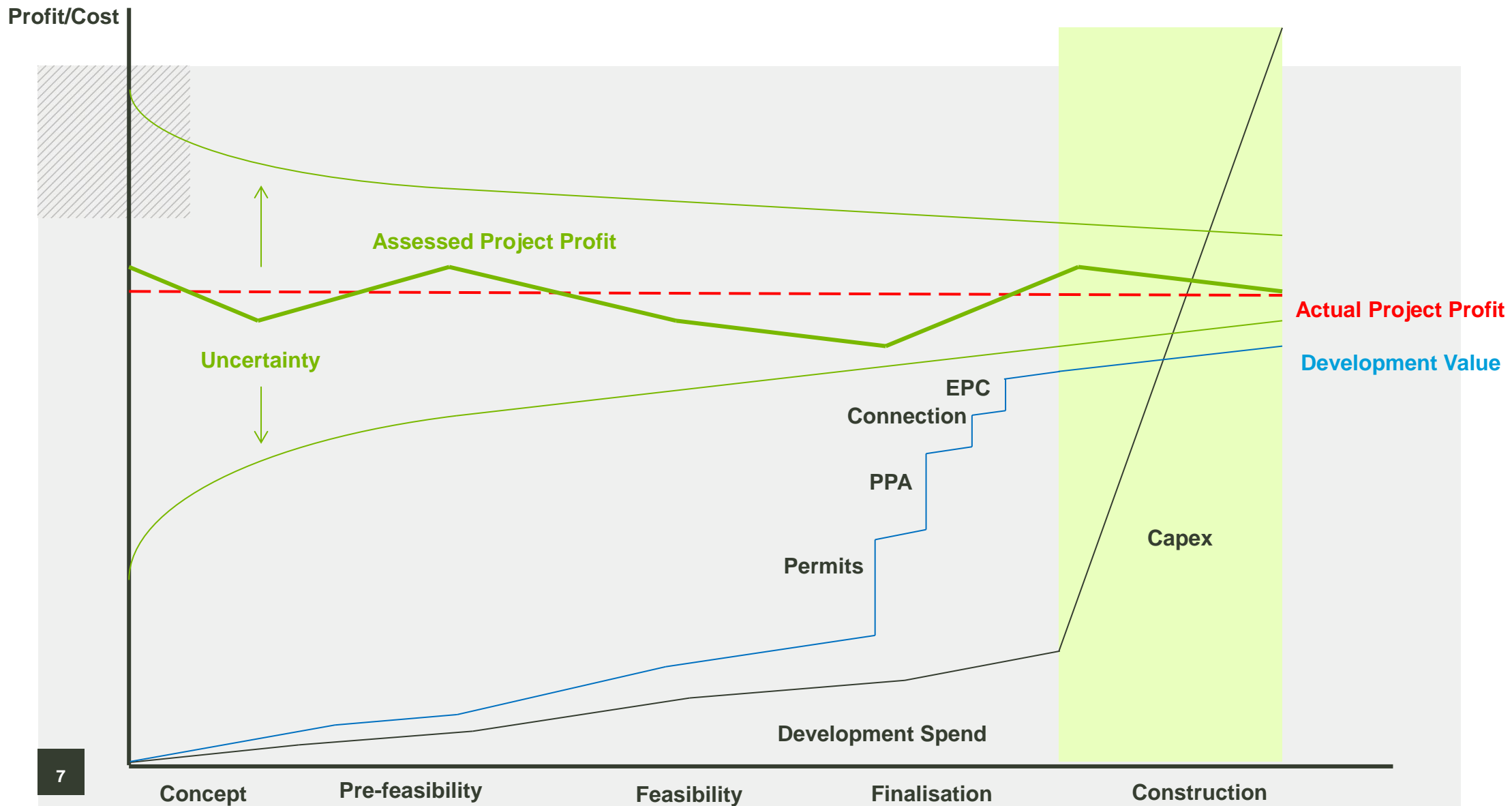
Development models

Exit strategy influences value creation

- Some developers do all three stages eg NZ gentailers
- In more economic markets, developers often exit and attempt to extract a development margin
- Early stage developers can recover a modest return on expenditure by selling development options
- Finalisation and construction experts enter to leverage their expertise and extract a margin from future operating profits
- Long-term investor in a constructed wind farm requires only a low return on investment eg superannuation fund



Value creation



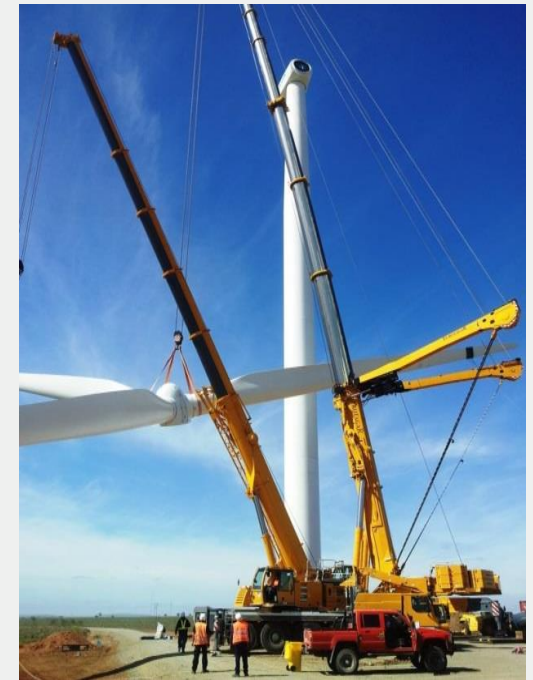


Market structuring

Market structure affects development model

No offtake market in NZ

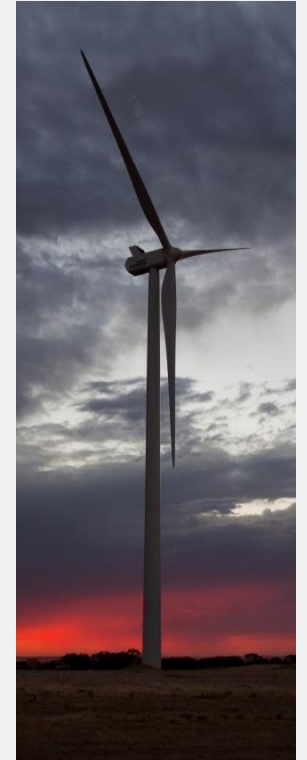
- Very limited market for power purchase agreements
- Very limited futures market
- Most wind farms built by gentailers needing generation base to balance retail commitments
- Limited IPP involvement due to lack of offtake certainty
- No fat development margins available due to low wholesale electricity price
- Limited confidence in future electricity price as a signal for new generation



Market structure affects development model

Regulatory uncertainty on offtake in Australia

- In theory, Renewable Energy Target provides required total purchase price to underwrite project economics
- IPPs have been successful to date in developing and constructing projects with PPAs and finance
- No demand growth over last few years due to GFC, rooftop PV schemes and energy efficiency drivers have kept wholesale price low
- Structural issues have suppressed REC prices for last few years (oversupply of RECs from rooftop solar)
- Political uncertainty depressing future REC expectations (RET review later this year may cut target or dilute liabilities)
- Limited market activity at present but should recover



Market structure affects development model

Offtake certainty in Feed-In Tariff markets but policy uncertainty

- Renewables markets in developing countries often underpinned by a fixed feed-in tariff for different forms of renewables
- Feed-in tariffs often generous, driven by need for bulk additional generation rather eg Kenya US\$250/MWh non-indexing
- High feed-in tariff compensates other risks such as sovereign risk (government underwrite of power purchases by the government owned utility)
- Kenya and Thailand are good examples with robust renewables policy, however policy can be changed in future eg European FIT removal
- Harder to secure PPA and grid connection in less developed countries with high bureaucracy eg Tanzania
- Tanzania about to launch FIT programme

Market structure affects development model

Offtake certainty in South Africa but price competitive

- Originally selected a FIT model but unconstitutional
- Reverse auction to procure specified volumes of wind and solar capacity
- Lots of delays and challenges in getting started
- Well structured agreements including bankable PPA
- Technically compliant projects are scored 70% on price, 30% on economic development (local jobs)
- Very competitive on electricity price, good for government to procure lowest cost renewable supplies
- Encourages innovation by developers to put together the best projects (or desperation)



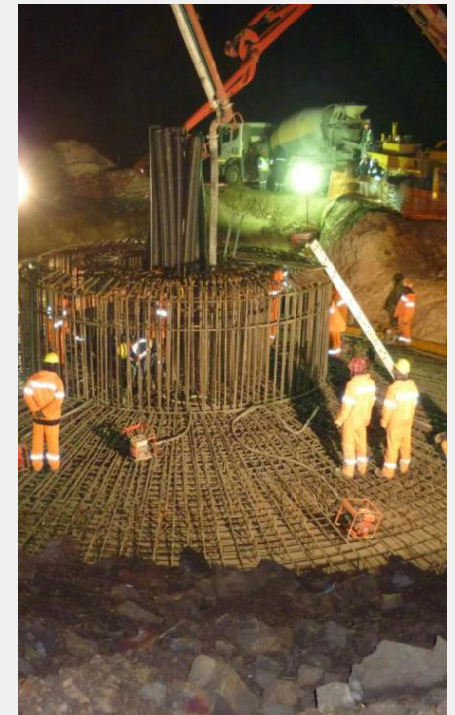


Market timing

Market development stages

Timing has been important in NZ and Australia

- NZ projects have been able to proceed when NZ dollar was strong and forward price path looked OK
- Limited government support means ability to proceed is largely driven by forecast wholesale electricity price
- Australia projects have been subject to restructuring of incentive schemes
- National and state politics
- Significant project development and construction
- Stuck in a rut for last few years



Market development stages

Timing is key in South Africa

- In South Africa, the projects that were ready for Round 1 could bid high tariffs as not enough projects were ready to bid
- Developers earned good returns, even with low wind sites.
- Some developers missed out for silly reasons eg printing
- Rounds 2 and 3 highly price competitive and winner determined by access to cheap capital eg Enel, Longyuan
 - Round 1 average tariff: R1.14/kWh, some much higher
 - Round 2 average tariff: R0.90/kWh
 - Round 3 average tariff: R0.70/kWh
- Seen as a successful market, procuring nearly 4 GW of wind and solar to date
- But.....

Market development stages

Timing is key in South Africa (continued)

- High risk market for developers : 93 bids submitted for Round 3, only 17 successful
- Race to the bottom
- Looking at split contract approach to try to reduce costs
- Most of the grid connections now at 400 kV
- Best wind sites will be most competitive
- Financing arrangements have major influence on competitiveness
- Round 4 tariffs expected to be R1/kWh due to high interest rates



Market development stages

Timing is important in Kenya too

- One small demonstration project built by KPLC, two stages
- First IPP project now underway: Kinangop 60MW
- Not the best wind site but was the most advanced
- Lake Turkana 300MW started development earlier but has taken much longer due to its size and infrastructure challenges
- Projected to deliver cheaper electricity to Nairobi than Kinangop despite being over 400 km away!
- Kipeto 100 MW is nearing financial close: closer to load, good access good wind speed, but got worse PPA due to being last
- Demand projected to grow strongly but future PPAs uncertain
- In late 2013 Kenya suspended issuing new wind and solar licenses to 2017 while it builds some cheap conventional power



Main observations

Understand the market

Balancing best practice against market development

- Market risk will always be dynamic and somewhat unpredictable
- Market situation can be more important than project fundamentals of wind speed and grid connection
- Can you survive the ups and downs of the market and play the long game?
- Is it better to focus on doing one market or technology well or diversify across technologies and countries/regions?
- Good projects should get built eventually!



Thank you