AIR
VALUATIONS

# Wind farm valuation and solar farm valuation across the project lifecycle

**March 2022**

# Introduction and standards of value

## Interest in wind farm investments

There has been a surge in interest and investment in the wind renewable energy sector and many listed wind farm companies have been taken private at high prices.

Due to ongoing lower energy prices for solar, solar farms have not necessarily experienced the same increases in value.

At the same time, inflation and interest rates are increasing. This has the potential to affect funding and returns.

In the short term, supply chain issues are also impacting returns.

It is therefore important to understand drivers of risk and return across the project lifecycle.

This presentation will look at three stages in the project lifecycle:

1. greenfields/development
2. construction/seasoning
3. brownfields/operational

## Standards of value

It is important to bear in mind when valuing renewable energy generation assets that there are different standards of value, including liquidation value, fair value, market value, and special or synergistic value, amongst others. We will not cover each of these here, but market value and special value are worth discussing in the context of renewable generation valuations.

The concept of market value does not consider the circumstances of any specific buyer or seller, and does not include any strategic premium that may be placed on the business or asset by a particular buyer or seller. Special value on the other hand, does take into account the specific circumstances of the buyer or seller, and may include a strategic premium or discount.

The difference between market value and special value is important to know because some renewable generation transactions represent special value, not market value. For example, buyers want to test or showcase new technology, and so they may be prepared to pay more than market value.

It is also worth mentioning that portfolios of projects which are vertically integrated and have large and diverse development stage pipelines often trade at premia to individual renewable generation assets. We understand that some leading US investment banks estimate this premium over market value at 30-40% based on recent comparables.

The concepts of market and special value are relevant when we look at the different stages of the project, because at each stage there may be different investors with different goals.

# Greenfields/development stage

## Greenfields/development stage risks and returns

The greenfields/development stage involves feasibility studies, design, environmental impact assessment, agreements and applications, wind studies, establishment of procurement and contracts, a business case, and culminates in a final investment decision.

There are a few key sub stages within this phase:

- Pre Development Approval (DA) (i.e. land right only, maximum design optionality)
- DA (i.e. the DA envelope in terms of MW and technology is defined)
- Late stage development (i.e. close to or finished grid, pre-construction, may coincide with power purchase agreement (PPA) execution)

Developers are primarily involved in the early stages.

Banks tend to be involved at late stage development and typically only provide debt once a PPA is obtained.

Platform deals are also increasingly common, whereby a Developer will sell their entire platform of assets, or offer rights over the platform in return for development funding.

## Valuation approaches

Valuation approaches primarily are cost-based or multiples-based in the early development stages.

- The cost based approach applied by Developers tends to be a cost plus development margin approach.
- For multiples-based approaches we typically consider the enterprise value per megawatt.

At financial close however, projects are typically priced based upon agreed discounted cash flow (DCF) models.

Platform valuations tend to comprise a combination of DCF for more advanced assets, plus multiples for development assets. An overall multiple can also be applied as a cross check on value.

## Key valuation considerations

Key valuation considerations at this stage include (but are not limited to):

- Site location and access (transmission corridors are a key consideration),
- Approvals,
- Connection offers and time frames,
- Technology chosen,
- Generation forecasts, marginal loss factors (MLFs), curtailment etc.
- Construction schedule and supply chain issues,
- PPAs, if any. (It is important to understand pricing and risk sharing under a PPA, as well as the degree of merchant price exposure),
- PPA pricing and long merchant power price forecasts (where relevant for the asset),
- Large-scale generation certificates (LGCs) and any other carbon pricing support,
- CPI and interest rates,
- Optionality (see page 8),
- Regulation/politics.

# Construction/seasoning stage

## Construction stage risks and returns

The construction/seasoning stage involves equipment procurement, construction, an updated business case, and commissioning.

Buyers at this stage tend to be operators or financial investors. Over the last few years there have been more institutional investors involved at this stage.

At the construction/seasoning stage, risks, uncertainty and scope for "value add" in general have moderated. The cost of equity range tends to be lower than at the greenfields/development stage (before financial close).

Construction risks for solar farms are often lower than wind farms, as technology can be simpler (depending upon the technology). However, commissioning delays can impact both solar and wind farm returns.

## Valuation approaches

Common valuation approaches at the construction stage include cost-plus-margin based approaches, DCF and multiples.

Construction cost based valuation approaches may differ from transaction multiples and DCF valuations at the construction stage for a range of reasons, e.g. whether a fixed-price, turn-key EPC contract has been secured, along with updated energy pricing forecasts for uncontracted revenues.

To make uncertainties and assumptions clear, it is often better to start with a DCF approach and use multiples or a cost plus margin approach as a cross check. A DCF is almost always used if there is a PPA in place.

It is important to understand the unique characteristics of the asset, where the uncertainties lie and how robust data is when valuing generation assets, as multiples can vary materially.

## Key valuation considerations

Key valuation considerations at this stage include (but are not limited to):

- Site location (especially for MLF exposure),
- Engineering, procurement and construction (EPC) experience and credit risk,
- Construction schedule and delay risk, supply chain issues and handover,
- Commissioning time frames,
- Generation forecasts,
- Curtailment, MLFs and other generation risks,
- PPAs (if any) and degree of merchant exposure,
- PPA pricing and long merchant power price forecasts (where relevant for the asset),
- LGCs and any other carbon pricing support,
- O&M forecasts,
- Debt and gearing,
- CPI and interest rates,
- Optionality (see page 8),
- Regulation/politics.

# Brownfields/ operational stage

## Operational stage risks and returns

The brownfields/operational stage involves ongoing operation and maintenance, technical and commercial management, investment evaluation, and repowering or decommissioning at the end of the project life.

Investors at this stage are often operators or long-term financial investors looking for yield, such as super funds. Many financial investors have limited or no involvement in the day to day operations.

At the brownfields stage, risks, returns and uncertainty are generally lower than in prior stages, however there is a wide variation in value depending on the project, market, location, PPAs, degree of merchant exposure and remaining economic life. Solar farm generation is typically less variable than wind farm generation. However, factors such as curtailment, MLFs, Frequency Control Ancillary Services (FCAS) causer pays etc. can make both solar farm and wind farm generation less certain.

Risk can be very low (bond- like to investors) if there is no volume and price risk because operators, rather than investors, bear volume and price risks over the entire project life (e.g. the Hallett series of wind farms).

## Valuation approaches

Common valuation approaches include DCF with multiples used as a cross check.

As mentioned before, platform valuations tend to comprise a combination of DCF for more advanced assets, plus multiples for development assets. An overall multiple can also be applied as a cross check on value.

The scenarios considered at this stage under the DCF approach typically relate to capacity factor, yield and uncontracted revenue assumptions.

As discussed before, it is important to adjust for the specific characteristics of the generation asset. It is also important to understand where the uncertainties lie and how robust the data sources are.

For very highly contracted projects, above average returns are mainly possible through financing structures and the terminal value assumptions. Key valuation issues for very highly contracted projects are CPI assumptions, interest rates, hedging and degree of merchant exposure.

## Key valuation considerations

Key valuation considerations at this stage include (but are not limited to):

- PPAs (if any) and degree of merchant exposure,
- PPA pricing and merchant power price forecasts (where relevant for the asset),
- Generation forecasts,
- Remaining economic life,
- Curtailment, MLFs and other generation regulation risks,
- LGCs and any other carbon pricing support,
- O&M forecasts,
- Debt and gearing,
- CPI and interest rates,
- Optionality (see page 8),
- Regulation/politics,
- Post contract period,
- Post design life period options (such as repowering)

# Risk and return across the three stages: wind farms

## Greenfields/development stage

Valuation methodologies – cost-based, multiples adjusted for the particular nature of the asset, DCF at financial close

Multiple range:

- $0 to $150,000 per MW
- Typically circa $35,000/MW to 45,000/MW at site and DA
- Typically circa $110,00/MW to $130,000 at site, DA and grid.

## Construction

Valuation methodologies: DCF and multiples

Multiple range:

- $0.1m/MW to $2.1m/MW

WACC range: 6% to 11% (connection/commissioning an important driver of risk, level of contracted revenue/PPA a dominant driver for a lower WACC)

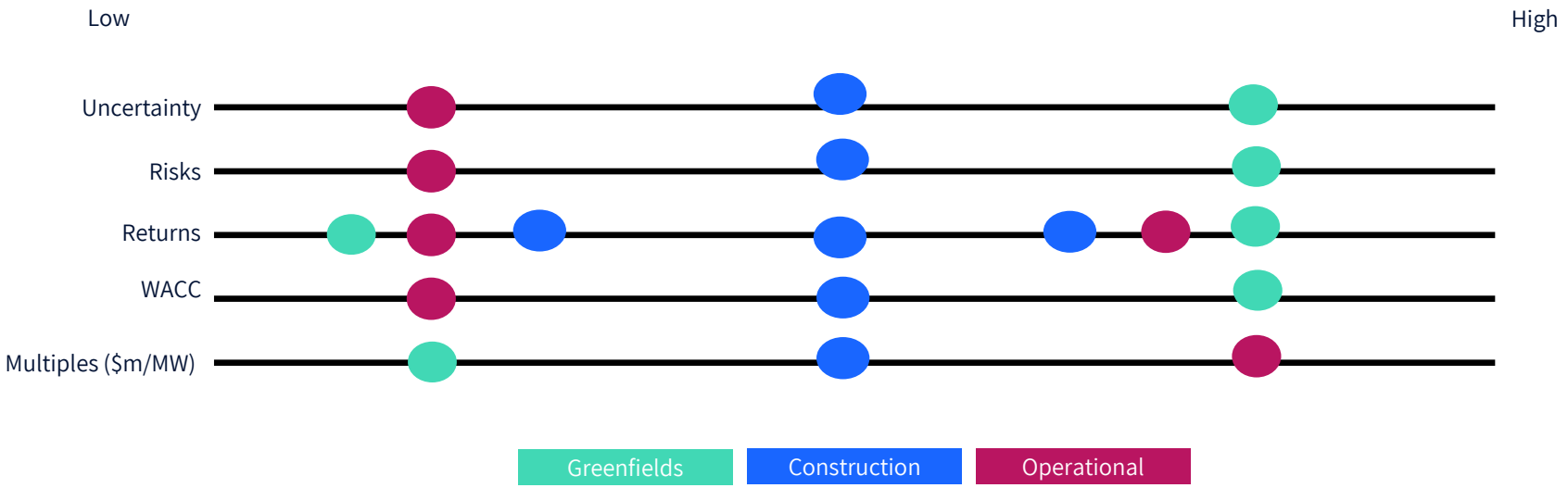
## Operating

Valuation methodologies: DCF and multiples

Multiple range:

- $1.7m/MW-$5.5m/MW
- median $2.4m/MW – $2.5m/MW

WACC range: 5% to 10% (level of contracted revenue/PPA a dominant driver for a lower WACC)



# Risk and return across the three stages: solar farms

## Greenfields/development stage

Valuation methodologies – cost-based, multiples adjusted for the particular nature of the asset

Multiple range:

- $0 to $60,000 per MW
- Typically circa $5,000/MW to $15,000/MW at site and DA
- Typically circa $40,000/MW to $60,000/MW at site, DA and grid approval

## Construction

Valuation methodologies: DCF and multiples

Multiple range:

- $0.1m/MW to $2.1m/MW

WACC range: 6% to 11%, (construction risk lower than wind farms, connection/commissioning an important driver of risk, level of contracted revenue/PPA a dominant driver for a lower WACC).

All else equal, solar has lower in-construction risk (lower WACC) and also lower multiples than wind farms. However, it really depends on commissioning issues, MLFs, PPAs, pricing etc.

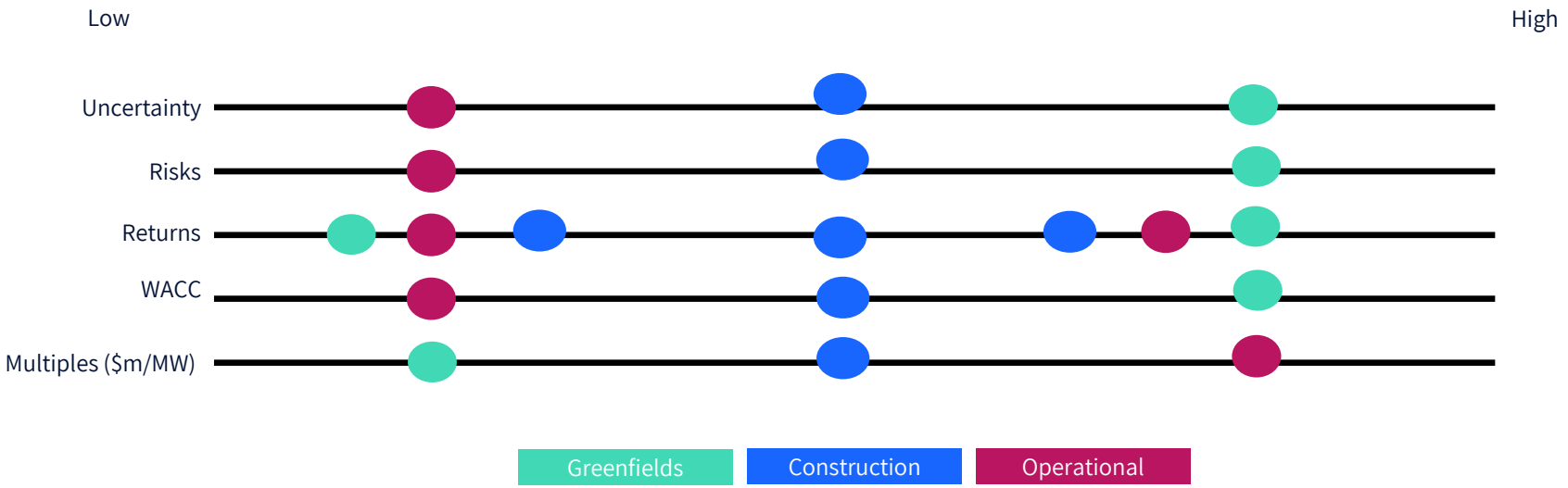
## Operating

Valuation methodologies: DCF and multiples

Multiple range:

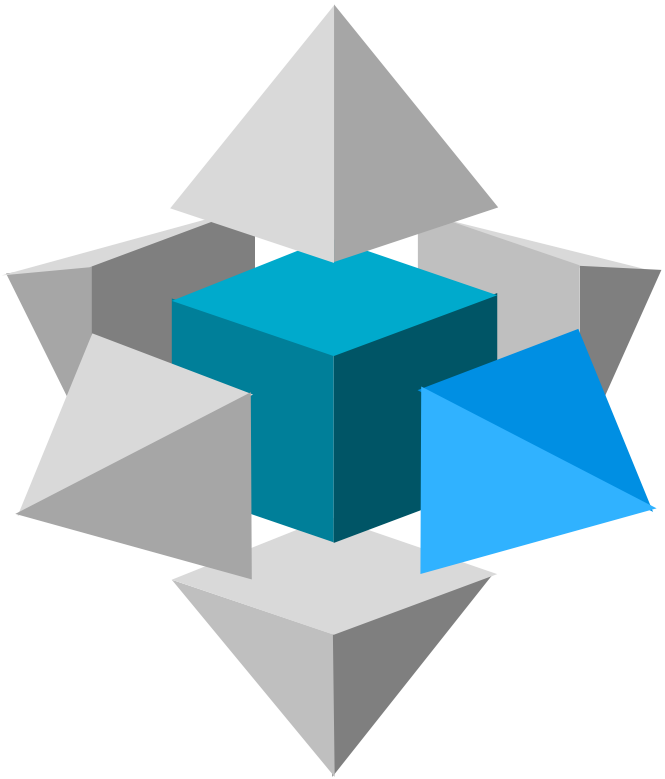
- $1.1m/MW-$2.5m/MW
- median $1.7m/MW

WACC range: 5% to 9% (level of contracted revenue/PPA a dominant driver for a lower WACC)




It is worth noting for solar that MWdc is usually the most reliable driver of build cost and so that is a key metric in construction. DC to AC ratios are also changing. For example, when solar projects were first developed the panels were the most expensive component and so it made sense to size everything else to maximise the return on that asset. However, now panels are a much smaller share (and grid connections are much more constrained) and so it is quite common to see say 1.4-1.5 to 1 DC to AC ratios. This is a case of maximising the value of the grid connection even if it means that some generation is curtailed.

# Optionality



Optionality can be a key driver of both market value and special value for renewable generation assets.

Renewable generation assets that are able to provide some firming through battery storage or other technology, such as pumped storage, are likely to be significantly more valuable.

Green hydrogen also provides a potential upside option for some renewable generation assets.

Some wind or solar farms have the option to add solar or additional wind turbines, increasing energy yield.

Land that wind farms are on, in particular, can be used for farming. There may be other ways to maximise land use to generate yield. To some extent this depends on land leases. There is often optionality around land leases.

New digitization technologies can add value to wind and solar farms, in terms of protection, control, automation and communication systems.

Community, businesses and distributed energy can add additional sources of demand.

Transmission and connection are key issues. New transmission networks can add value to generation assets or add additional risk.

Other examples of options could be related to demand, e.g. locating the wind farm in an area where demand is likely to grow or where a corporate PPA could be signed in future.

# Appendices

## Sources of information

Capital IQ

Maven Libera analysis and experience in valuing generation assets

WIndlab scheme booklet, 30 April 2020

Tilt Renewables ASX and press releases

Infigen Energy ASX and press releases

Zenith Energy ASX and press releases

Solar Energy Industries Association, Valuation of Solar Generation Assets

PwC, Utility Scale Solar PV Projects

Deloitte 2022 Renewable Energy Industry Outlook

Reneweconomy articles

AEMO and AER articles

Fitch renewable energy project rating criteria

Grant Thornton: Renewable Energy discount rate survey results, 2017

https://www.forbes.com/sites/feliciajackson/2021/01/27/top-technologies-transforming-energy-in-2021/?sh=37cab4f93775

Other articles

Discussions with industry participants

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**AIR Valuations is part of the Maven Libera group**

+61 413 900 094

Megan.r@mavenlibera.com.au

**www.mavenlibera.com.au**

Level 27, 101 Collins Street, Melbourne, VIC, Australia, 3000