

FitchRatings

Renewable Energy Project Finance

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October 10, 2012

Infrastructure and Project Finance Debt Ratings

■ What is a Rating?

- Independent Assessment of Credit Quality
- Likelihood of Full and Timely Repayment
 - Fitch's Opinion of:
 - Issuer's **Ability** to Pay (quantitative)
 - Issuer's **Willingness** to Pay (qualitative)

Long-Term Rating Scale

	Rating	Definition
	AAA	Highest Credit Quality
	AA	Very High Credit Quality
	A	High Credit Quality
	BBB	Good Credit Quality
	BB	Speculative
	B	Highly Speculative
	CCC, CC, C	High Default Risk
	D	Default

Project Analysis

1. Structure & Information

- > Ownership & sponsors
- > Project vehicles status & project structure
- > Jurisdiction & other legal
- > Use of expert reports
- > Information Quality

2. Completion Risk

- > Contractors
- > Cost structure
- > Delay risk
- > Contract terms
- > Technology risk

3. Operation Risk

- > Operator
- > Costs
- > Supply risk
- > Technology risk
- > Tail risk

Project Analysis

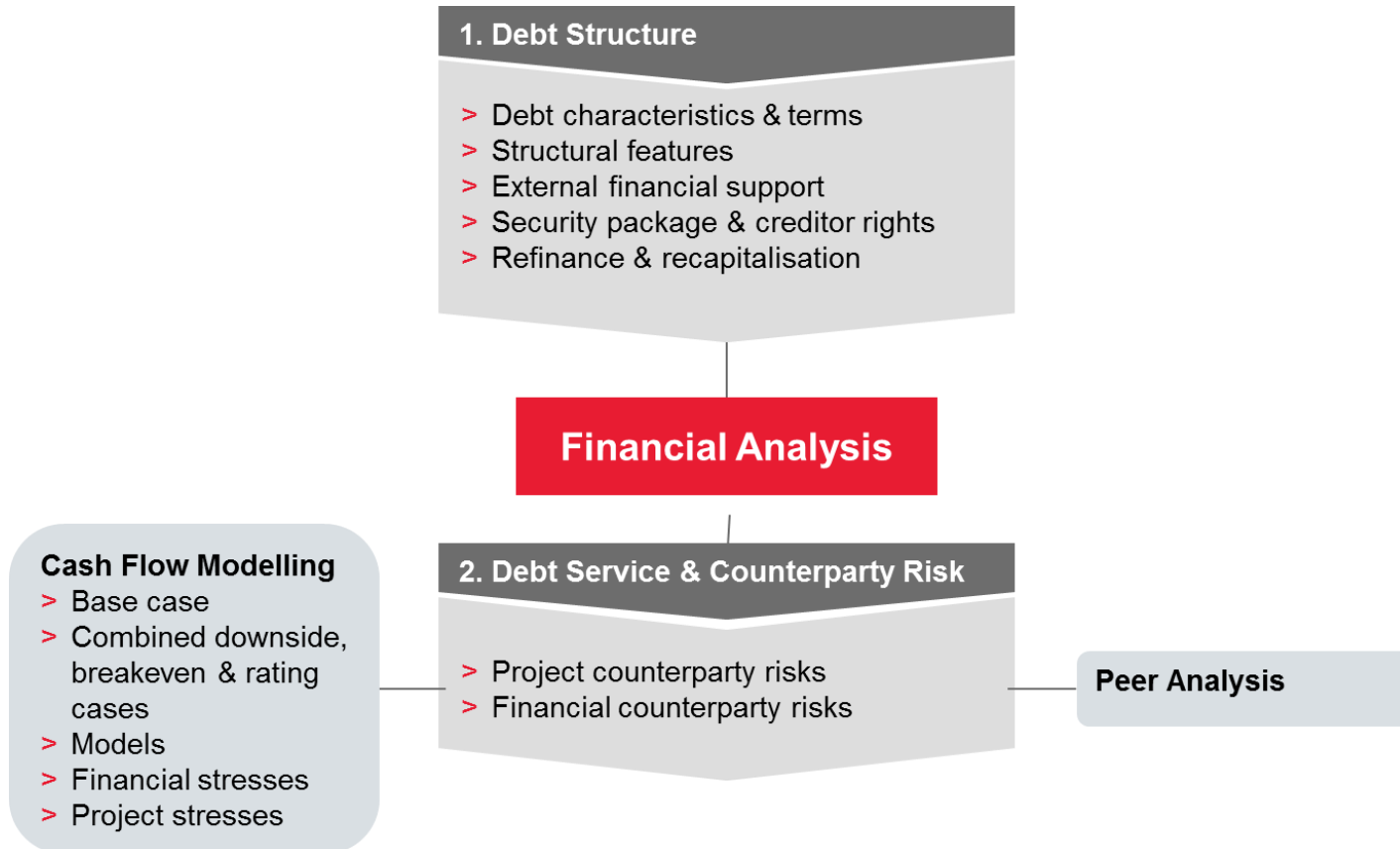
4. Revenue Risk

- > Gross revenue / off-take
- > Obsolescence / economic life / remediation
- > Termination event risk (pre-maturity)

5. Macro Risk

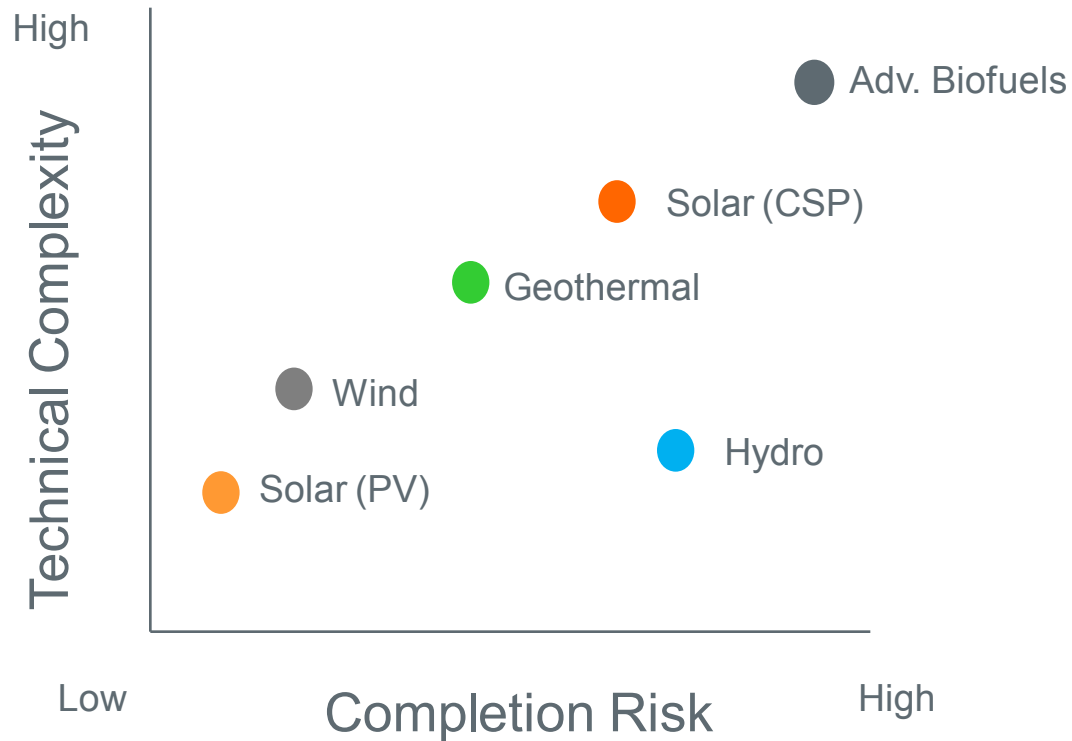
- > Country & political risks
- > Industry risk

Financial Analysis



Completion and Technical Risks Comparison

Renewable Projects



Power	Technology Status	Completion Risk	Operational experience	Revenue	Econ Life
Hydro Run of River Dams, Lakes Pumped Storage	Proven	High	Extensive experience	Competitive PPA Merchant	As much as 100 years or more
Wind	Proven	Low	Moderate at utility scale	PPA/FIT Subsidies	25-30 years
Photovoltaic (PV) Mono/Polycrystalline Thin Film	Proven Stronger Midrange	Low	Crystalline exp. Since 1960s, not much utility-scale experience	PPA/FIT Subsidies	25 years
Solar Thermal Parabolic Trough Power Tower Dish Engine	Mixed Proven Proven Demonstration	High Like traditional thermal plant	Lots/Lower risk Limited/higher risk. Higher risk	PPA/FIT Subsidies	30+ years

Completion Risk

Stronger	Midrange	Weaker
<p><i>Contractors</i> Investment-grade EPC or owner/constructor.</p> <p><i>Contract Terms</i> EPC or BOP & TS fixed price, date certain, turnkey. Completion guarantee from creditworthy party. Liquidity covers LDs, debt service. Ample scheduling allowance to achieve completion.</p> <p><i>Technology Risk</i> Proven technology; low construction risk.</p>	<p><i>Contractors</i> Experienced possibly investment grade.</p> <p><i>Contract Terms</i> Owner/contractor, strong budget contingencies, and creditworthy parent guarantees or bonding. Liquidity covers LDs and debt service. Adequate schedule for completion.</p> <p><i>Technology Risk</i> Proven technology; more complex.</p>	<p><i>Contractors</i> Multiple weak contractors.</p> <p><i>Contract Terms</i> Inadequate budget contingencies and weak parent guarantees. Delays easily lead to PPA termination or lower FIT; optimistic completion schedule.</p> <p><i>Technology</i> Unproven or demonstration-phase pose greater scale-up and completion risks.</p>

Operation Risk

Stronger	Midrange	Weaker
<p>Fixed-price, long-term O&M agreement with investment-grade providers.</p> <p>Major maintenance or O&M reserve is fully funded in advance to cover overhauls during the term of the debt.</p> <p>Technology is proven with a long operating history and, therefore, less performance uncertainty.</p>	<p>O&M agreement with experienced provider. Agreement is shorter than the debt term.</p> <p>Major maintenance is adequately funded on an accrual basis.</p> <p>O&M 6 month reserve</p> <p>Proven technology, limited commercial use, and midrange performance uncertainty.</p>	<p>O&M provider with little experience with the technology. Cost plus agreement.</p> <p>Inadequate maintenance reserves.</p> <p>Proprietary, new, emerging, or obsolete technology where parts are not easily replaceable or are expensive. High level of performance uncertainty over the long term. No utility scale operating experience.</p>

Renewable Resource Risk

Stronger	Midrange	Weaker
<p>Resource assessment applies most rigorous methods commensurate with project's technology. Includes at least one year on-site data correlated to longer industry data set for solar and at least 5 years for wind.</p> <p>Energy production under P50, 1-year P90, and 1-year P99 probability scenarios are developed.</p>	<p>Solar assessment is based upon ground-based data located close to the site and correlated to longer satellite data set.</p> <p>3-5 years on site wind data.</p> <p>Third-party reports adequately address energy production under P50 and one-year P90 scenarios</p>	<p>No independent electric output estimate or only P50 is provided.</p> <p>Solar assessment is based solely on satellite data without appropriate adjustments for data quality and technology; subject to material caveats; limited scope.</p> <p>Less than 2 years of on site wind measurement.</p>

Revenue Risk

Stronger	Midrange	Weaker
<p>No merchant market exposure. PPA/FIT* maturity exceeds debt maturity. PPA/FIT with strong investment-grade counterparty. Oversized solar field that exceeds PPA requirement for energy delivery to mitigate risk of less-than-projected solar insolation. Wind project not exposed to material curtailment.</p> <p>*PPA- Power Purchase Agreement *FIT- Feed-in tariff</p>	<p>PPA/FIT matches full term of debt with investment-grade counterparty.</p> <p>Merchant exposure covers small portion of debt for a project that is price-competitive under Fitch’s power price stress scenarios.</p>	<p>PPA/FIT with below investment-grade counterparty. Weak PPA termination provisions. Merchant exposure to cover significant portions of debt. Merchant project is not competitive under Fitch’s low-price merchant power projections.</p>

Debt Structure

Stronger	Midrange	Weaker
<p>Fully amortizing, fixed-rate debt matures prior to PPA/FIT maturity. Equity distribution at least 1.2x DSCR.</p> <p>DSRF greater than six months of debt service. Other covenants to ensure timely or early debt payment, limit leverage, and provide adequate liquidity.</p> <p><small>*DSRF- Debt Service Reserve Fund *DSCR- Debt Service Coverage Ratio</small></p>	<p>Fully amortizing, fixed rate, no tail risk.</p> <p>Distributions: 1.15x–1.19x DSCR. DSRF equal to six months debt service, funded upfront.</p> <p>Other covenants to ensure timely debt payment, limit leverage, and provide adequate liquidity.</p>	<p>Tail and/or refinance risk.</p> <p>Debt maybe within useful life of asset but longer than industry average.</p> <p>Distributions below 1.15x.</p> <p>Debt service reserve less than six months or not fully funded up front. Weak provisions on leverage of assets.</p>

Debt Service

Stronger	Midrange	Weaker
<p>Annual DSCRs remain stable or will increase in later years to support amortization profile and declining plant performance of older assets.</p> <p>Low net debt/EBITDA or CFADs*.</p> <p>No refinance risk</p> <p><small>*CFADS- Cash flow available for debt service</small></p>	<p>Annual DSCRs remain consistent throughout amortization schedule; few annual deviations from average over life of the debt.</p> <p>Moderate net debt/EBITDA or CFADs.</p> <p>Low refinance risk.</p>	<p>Annual DSCR pattern is declining trend in later years; material deviation from average in some years.</p> <p>High net debt/EBITDA or CFADs.</p> <p>Significant refinance risk.</p>

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