

Rating Methodology for Electric Utilities Industry

Summary

This rating methodology adopted by China Chengxin (Asia Pacific) Credit Ratings Company Limited (“CCXAP”) applies to global electric utilities companies whose principal business being generation, transmission, distribution and/or sale of electricity. These companies include operating companies and holding companies. This rating methodology provides general guidance that helps companies, investors, and other interested parties understand the key determinants but not exhaustively that affect the rating result for electricity companies. CCXAP assigns credit ratings to them using its rating scale.

This new rating methodology replaces the “Rating Methodology for Electricity Industry” published by CCXAP in April 2015. The new version follows the core rating principles of the previous version with some amendments, which helps better reflect the overall credit quality of global electric utilities companies. No rating changes will be resulted from the implementation of this new rating methodology.

Introduction of Rating Methodology

The key rating determinants for the assessment on electric utilities companies are divided into qualitative and quantitative determinants. The rating methodology provides a summarized guidance for the important factors used in assigning ratings, but it does not include all aspects of rating consideration. As a result, the mapped rating may not match the final rating of each company.

In this rating methodology, there are three rating factors comprising 12 sub-factors, as follows:

Rating Factors	Sub-factors
Operational Environment	Stability and Predictability of Regulatory Environment Economic and Industrial Environment
Business Profile	Operating Scale and Market Position Operating Efficiency Business Diversification Business Sustainability
Financial Profile	EBITDA/Revenue Return on Assets Total Debt/Capitalization RCF/Capex

Rating Factors	Sub-factors
	EBITDA/Interest
	Debt/EBITDA

Key Rating Determinants

Rating factors and sub-factors are discussed in details in this section, including their rationale, measurement and how they will affect the rating.

1. Operating Environment

In the evaluation of operational environment, CCXAP reviews the broader electric utilities market as a combination of the stability and predictability of regulatory environment as well as economic and industrial environment. Electric utilities sector typically provides a de facto monopoly service in certain regulatory or economic regions, which is under close monitoring from regulators for public consideration. The regulator or local government may consider the financial capability and willingness to pay when deciding the tariff level and mechanism. Thereby electricity tariffs are normally set in a political or regulatory process rather than a competitive or free-market process. The regulatory framework is a key determinant of the success of electricity companies. Moreover, economic and industrial environment also have a fundamental influence on the electric utilities companies' business environment.

(1) Stability and Predictability of Regulatory Environment

CCXAP believes that the stability and predictability of regulatory environment has a vital impact on the success of electricity utility given its de facto monopoly power granted by its regulator or the local government. The sector is being regulated in various aspects, including tariff setting mechanism, fuel mix regulation and environmental ordinance. Thus, change of regulatory environment will give a significant impact on the utilities' operating environment. If the regulatory regimes have a long track record of well-established regulations together with clearly defined risk and rewards, which have been consistently applied and disclosed to the public with sufficient transparency, this sub-factor will obtain a higher score. Conversely, if there is an immense regulatory change in the service region or the industry has under a severe reform, the uncertainty of business environment may give higher business risk to the electric utilities companies. We also take into account of the level of legal protection in the regime like how the law enforcement in practice. If a company is located in a very weak legal protection region or with high political intervention, it may result in a lower score as expected.

(2) Economic and Industrial Environment

Electricity demand growth of a region is fundamentally correlated to its economic growth and the power consumption structure in the service region. Strong economic growth, high level of urbanization and popularity density are supportive to the demand of electricity. We also consider the economic structure of the utilities service area. In general, heavy industry bases and high-loading centers have relatively strong growing electricity demand that the power generating capacity can be fully utilized in these regions; consumers in developed regions can afford higher electricity tariffs, creating a more flexibility to tariff increase with less obstacle form political influence. In addition, the degree of infrastructure

coverage and the level of sector development are other factors to influence the business environment. Production of electricity generally requires other utilities and infrastructures support such as water supply, transportation and grid networks to facilitate the operation process. If an electric utilities company operates in a mature and well-developed region, it will obtain a higher score in this sub-factor.

2. Business Profile

In the assessment of business profile, CCXAP reviews the broader electric utilities in the company's operating scale & market position, operating efficiency, diversification of generation and fuel source, and business sustainability. The business profile factor reflects the non-financial aspects of the company.

(1) Operating Scale & Market Position

The electricity industry benefits by economics of scale. Large-scale companies have strong bargaining power with fuel suppliers and strong market position in the electric grid. To some extent, large economic scale may also improve the company's cost structure and strengthen its competitiveness. In addition, the scale of the electric utilities give strong resilience on certain risks including the exposure to natural disasters, customer concentration, construction risks associated with large projects. CCXAP generally use equity installed capacity and total revenue to measure the scale of electricity companies. Equity installed capacity measures the production capability of electricity companies. Scale of revenue measure the productivity and market share of an electricity company. We also consider the vitality of the electric utilities companies to the service areas. Therefore, the electric utilities company with sizable operating, revenue scale and high importance in service areas will obtain a higher score in this sub-factor.

(2) Operating Efficiency

Operating efficiency can be representative of the electricity company's business performance and its competitive strength. Good and reliable operating performance will help enhance its monopoly power. CCXAP may consider this factor by the company's utilization hours and its track record of operating asset condition. In terms of operating asset utilization, we will consider utilization hours comparing with industry average as a key metric to the operating efficiency of its power generations. Deteriorating of other performance metrics like high fuel consumption ratio, charged by regulators for failing to meet environmental requirement, and weak generation output in the company's key electricity assets may reflect a poor asset condition or asset monitor. With a stable performance in its electricity assets, it could also help reduce the impact of unexpected expenditure on emergency asset repair. Some companies may be fined significantly for not complying with related regulations and performance metrics. In some severe cases, regulators may deprive the company operating right for material asset failure or under-performed assets, which not only affect its financial stability but also the probability of sustainability. CCXAP may consider that if a company historically exhibited a serious asset failure, the more likely to obtain a very low score.

(3) Business Diversification

In this sub-factor, we consider the company's diversification in terms of power generation structure and

operation region. For power generation companies including thermal power, hydropower, nuclear power, wind power, and solar power, have business limitations in nature. Generally, hydropower, wind power and solar generations are sensitive to the natural environmental factors such as change of precipitation, hours of sunshine and blowing rate, resulting in a weak operating stability and certainty. Thermal power ones is subject to the impact of fluctuations in fuel costs and the severity of environmental policies, which lead to volatile profitability. Moreover, with regional concentration in a single or a few economic service areas, electric utilities companies will expose high operating risks from the change in economic conditions or regulatory environment. Therefore, CCXAP believes companies with a balanced mix of different power generations and operations in various economic regions will have strong resistance to natural risks and operational risks, which will be scored high in this-factor. Evidence of high regional and power structure concentration will incur lower scores. For electric utilities companies that have no electric generation, such as electric transmission and distribution companies, we will weigh more in diversification of operating regions and asset allocations in this sub-factor.

(4) Business Sustainability

This sub-factor is evaluating a company's business sustainability as a combination of cost and investment recovery and the foreseeability and stability of its monopoly power. Tariff level and related adjustment mechanism decide the business sustainability of an electric utilities company, which help measure the recovery on the company's viable costs and its long-term capital investments. The company cannot sustain its business if the tariff is in a very low level. Particularly, we assess the level of cost and investment recovery in relation to timeliness and sufficiency. The timeliness is important in a period of rapid rising cost. For instance, fuel prices, as a component of electricity generation viable cost, are highly volatile, which may create a financial distress to a company when appropriate tariff adjustment is not in place. Sufficiency of tariff to cover its capital investment with reasonable return can give assurance to its long-term business sustainability. Thus, if the tariff mechanism can provide a timely and fully cost recovery on the utility's cost and investment, it will be more likely to obtain a higher score in this sub-factor. In addition, we also evaluate the likelihood of the company to maintain its monopoly power in the service regions. Given its large portion of revenue coming from its monopoly-type business, it may significantly affect to its business survival if the monopoly is not in effect.

3. Financial Capability

In the evaluation of financial strength, CCXAP measures EBITDA Margin, Return on Assets, Total Debt/Capitalization, RCF/Capex, EBITDA/Interest and Debt/EBITDA. The main purposes of this rating factor are to assess the issuer's profitability, financial leverage and coverage as well as the capability of generating internal funding to meet its capital expenditure.

(1) EBITDA Margin

This indicator is calculated by EBITDA dividing by revenue, which measures the company's competitive position and the cost efficiency in operation. By ignoring the depreciation and amortization expenses, we consider EBITDA Margin is more reflective to the Company's variable operating cost, which help to access cost control management. To some extent, EBITDA can also be an indicator to

reflect the level of the Company's operating cash flow. The higher the EBITDA Margin, the better the company profitability and cost control.

(2) Return on Assets

We define the return on total asset as EBIT dividing by average total assets, which indicates the company's profitability generated by its overall resources. This indicator reflects operating asset efficiency and production utilization, which is important to electricity companies with a large proportion of fixed assets. The higher the return on total asset is, the better the company profitability and cost asset utilization.

(3) Total Debt/Capitalization

To assess the financial leverage of an electricity company, CCXAP uses the capitalization ratio, which is calculated by dividing total debt by total capital. Total debt refers to interest bearing debt including bonds, notes, short-term and long-term borrowings. Total capital is the sum of total debt and shareholders' equities (including minority interests). Electric utilities companies typically finance their projects by issuing interest-bearing debts. Thus, a higher leverage exerts pressure on the company's ability to raise additional funds and the probability of repayment of debts in a given period of time.

(4) RCF/Capex

This sub-factor reflects the ability of the company generating retained cash flow to meet its capital expenditure. RCF/Capex reflects a company's ability to cover capital expenditure by internal operations. RCF is calculated by FFO minus cash dividend paid. In some regions, dividend may be substantial as a proportion of its profit, resulting in a permanent cash outflow to a company, thus RCF is a more representative indicator for measurement. Generally speaking, electric utilities companies have a relatively stable capital expenditure in asset maintenance and improvement. If the capex significantly exceeds RCF, it will exert a great capital pressure on the company. Thus, the higher the ratio of RCF/Capex, the higher score in this sub-factor.

(5) EBITDA/Interest

CCXAP considers the EBITDA interest coverage as a material indicator of the company's ability to meet interest payments by potential cash flows from operations. Electric utilities companies generally require huge initial investments in their projects, resulting in an extended period to amortize such costs, thus we believe EBITDA interest coverage is reflective to business nature of the sector. The company will obtain a higher score in higher ratio of EBITDA/Interest.

(6) Total Debt/EBITDA

We use Total Debt/EBITDA to measure the Company's ability to cover total debts by its potential cash flows from operations. The smaller the indicator is, the greater debt coverage from its profit is, and thereby the company should deserve a higher score in this indicator.

Other Rating Considerations

Other than the factors and sub-factors discussed as above, the ratings may consider a number of

additional factors that are included but not limited to: investment and acquisition strategy, corporate governance, non-core business risk, event risk as well as liquidity and access to capital markets.

Investment and Acquisition Strategy

We take into consideration of the management's investment strategy when assessing the Company's credit risk. Good investment strategy can strengthen a company's business profile. However, it may have adverse impact on the Company's credit profile if the investment strategy goes wrong. In our credit assessment, we may consider the management's risk appetite, share buy-back activity, commitment to specific leverage targets, acquisition activities, and past and future operating business volatility.

Corporate Governance

In this aspect, we generally evaluate the audit committee financial expertise, incentives structure of executive compensation packages, related party transactions, reliability of financial information, executive dynamics and expertise, and the ownership structure.

Non-core Business Risk

Other than its primary activity of generating electricity, an electric utilities company may seek to diversify its business to other business types, such as water, gas, environmental services, fuel trading and other utilities, which may post higher credit risk than its core business to the company. Thus, we will consider the impact of such diversification on the company's credit quality.

Event Risk

CCXAP will consider the possibility of unexpected events that could cause a sudden and sharp decline in the issuer's overall credit profile, including asset sales, spin-off, capital restructuring program, change of major shareholders, mergers and acquisition and significant restructuring program.

Liquidity and access to capital markets

The liquidity and access to capital markets of the company are of particular importance to the electricity utilities industry. Given its extended construction cycle and high non-discretionary capex (including maintenance, regular asset upgrade and meeting changing environmental requirements), electric utilities companies generally need to finance large portion of debts externally to meet its capital needs. However, company with strong liquidity may not warrant a rating distinction while it may weight significantly in a weak liquidity management and limited access to capital markets.

Government or Parental Support

Given high business relation with regional government in the electric utilities sector, CCXAP gives consideration to the company background and external support when assessing a company's overall credit strength. CCXAP believes that a company with government background may benefit from government support in the economic downturn. CCXAP also views that a company with strong shareholders background may receive parental support in terms of capital and asset injection or other credit enhancements.

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