Vattenfall AB

Panel 3: Lessons from infrastructure finance in the renewable energy sector

Jonas Kollberg
Group Asset Management
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jonas.kollberg@vattefall.com
Investment assessment flow

- All bottom-up Investment proposals
- Required Investments needs (existing portfolios)
- Categorise
- Growth/New Investments
- Strategic evaluation/ filter
- Risk filters
- Financial Filter
- Mandatory investments
- Maintenance investments
- Out selected
- Put on hold
- Put on hold

Asset development and investment plan
Perspective on investment criteria and decisions

New investment analysis

- Technology attractiveness
- Country /market attractiveness
- Business case attractiveness

Assessment of new investments

Portfolio benefits
- Synergies
- Production
- Vertical integration
- Skills
- Financial risk diversification

Market attractiveness
- Size, Growth
- Regulatory climate and risks
- Market profitability

Scenarios and uncertainty modeling capability

Scenario Description

A - Middle case
- Moderate economic recovery from economic crisis
- EU countries push for fulfilling 20-20-20 targets
- Commodity prices in the long term at reinvestment cost levels

B - Unreached targets
- 20-20-20 targets softened as implementation barriers materialize and opposition to subsidies increases

C - Great depression
- Strong backlash of economic crisis
- Focus on energy efficiency as protectionist measure to decrease dependency on fossil fuel and stimulate local business (e.g., construction)

D - New commodity peak
- Stronger economic recovery and deferred upstream investments lead to new peak in commodity prices
- Development of electric vehicles and CCS and nuclear renewal stimulated

WACC-3% WACC WACC+3%

Business case attractiveness

Portfolio benefits
- High
- Low

Scenario
- A
- B
- C
- D
Future investments turn toward clean production


- **2010**: 20% clean (wind, bio, hydro, nuclear, ccs), 24% fossil (hard coal, lignite, gas, mining), 56% others (dso, pump-storage, IT & non-core)
- **2011**: 30% clean, 11% fossil, 59% others
- **2012**: 23% clean, 24% fossil, 53% others
- **2013**: 23% clean, 38% fossil, 39% others
- **2014**: 31% clean, 35% fossil, 34% others

After finalizing investments in Moorburg (Q3 2012/Q2 2013), Magnum (Q2 2013), Boxberg (Q1 2011) the portion of CAPEX for clean energy rises substantially.
Impact on CO2 emissions by investments

spec. CO2 emission (in g/kWh_{el})
## Support systems play an impotent roll

<table>
<thead>
<tr>
<th>Support system</th>
<th>Risk assessment</th>
<th>Price level</th>
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<tbody>
<tr>
<td><strong>UK</strong></td>
<td>Certificate system with market pricing of certificates in addition to electricity price. Offshore generation receives 150% of base support</td>
<td>Low price risk</td>
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<td></td>
<td>• Price slide brakes incorporated</td>
<td>• Quotas automatically increase if system hits targets to avoid price collapse</td>
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<td><strong>Denmark</strong></td>
<td>Feed-in premium on top of electricity price for generation. For offshore wind, fixed tariff set by auctioning, and is valid for ~13 years</td>
<td>Medium to very low price risk</td>
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<td>• Onshore only electricity price risk</td>
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<td>• Very low price risk offshore</td>
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<td>– Price risk only the last ~7 years of operation (electricity)</td>
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<td><strong>Germany</strong></td>
<td>Fixed tariff, higher offshore. Tariffs decrease with time, after 5 yrs onshore and 12 yrs offshore</td>
<td>No price risk</td>
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<tr>
<td><strong>Sweden</strong></td>
<td>Certificate system with market pricing of certificates in addition to electricity price</td>
<td>Very high price risk</td>
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<td>• Complex certificate market with low liquidity</td>
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Sources: DTI (UK system), NFPA (UK ROC Price), Department for Business, Enterprise and Regulatory Reform (UK electricity price), Nordpool (Swedish certificate price and Nordic electricity price), Draft for German law EEG (German prices and system)