Cyber Risk to Financial Stability
## Cyber risk and ratings methodology

How a cyber event could impact a sovereign’s credit profile

<table>
<thead>
<tr>
<th>Ratings Methodology Factor Scores</th>
<th>Hypothetical cyber event</th>
<th>Credit impact</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Economic strength</strong></td>
<td>An attack on critical infrastructure could disrupt economic activity, or an attack could be perpetrated on a smaller, less diverse government that relies on a single industry as a source of growth.</td>
<td>Economic growth could slow significantly and economic strength could be impaired.</td>
</tr>
<tr>
<td><strong>Institutions &amp; governance strength</strong></td>
<td>A cyberattack could expose sensitive information that reveals institutional arrangements that are weaker than previously thought.</td>
<td>Our assessment of institutional effectiveness and quality of governance could decline materially.</td>
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<tr>
<td><strong>Fiscal strength</strong></td>
<td>While rare, fiscal costs associated with a cyberattack could be so large that they result in weaker overall fiscal strength for sovereigns, or weaker financial performance and debt profiles for RLGs.</td>
<td>Financial resources and fiscal strength could decline.</td>
</tr>
<tr>
<td><strong>Susceptibility to event risk</strong></td>
<td>A cyberattack could attempt to disrupt domestic or geopolitics, including through direct or indirect election interference.</td>
<td>Political risk could rise.</td>
</tr>
</tbody>
</table>

Source: Moody’s Investors Service
Factor 1: Economic strength

Example of how a number of conditions would need to be met for an attack to impact the economy:

- Economy’s size and diversity can reduce the impact.
- Duration of the attack is key, as well as interconnectivity of the targeted infrastructure.
- Risk is higher for small local and regional governments.

Source: Bank of England
Survey provides consistency

1. **Survey designed to raise analytical expertise**
   Primary objective is to raise analyst knowledge, to help engage issuers in better discussion of risk – in turn, this increases value of analyst opinion to capital markets.

2. **Research based on anonymized and aggregated survey results is the #1 thing issuers ask us when we raise the survey**
   First “insight” publication in Q4 2020 – Project and Infrastructure Finance, followed by Financial Institutions Group, Corporate Finance Group sub-sectors, and the Public Finance Group.

3. **Best Practices!**
   Reminder → Analysts are obligated to request and gather data and information that we deem important to getting the rating right!
Cyber Risk Insight Continues to Develop

February 2019

Cybersecurity Heat Map

In this report, we assess the inherent cyber risk exposure of 35 broad sectors. We determined that infrastructure debt issuers have medium-high exposure to cyber risk, mostly because of the high vulnerability of electric utilities to cyberattacks.

Cross-Sector - Global

“Credit implications of cyber risk will hinge on business disruptions, reputational effects”

November 2020

Cyber Risk of PPIF

We conducted our inaugural cyber risk survey of infrastructure issuers to gauge cybersecurity preparedness among infrastructure issuers

Survey Questionnaire

- Governance
- Management
- Transfer
Cybersecurity Survey – Global Electric Utilities

Survey Group by region

- EMA: 32% (37 issuers)
- ASA: 6% (7 issuers)
- AMR: 62% (71 issuers)

Survey Group by size

- Small (<$1B): 22% (22 issuers)
- Medium ($1-$10B): 49% (49 issuers)
- Large ($10-$100B): 30% (30 issuers)
- Very large (>$100B): 10% (10 issuers)

Survey Group by rating

- Aa: 12 issuers
- A: 37 issuers
- Baa: 54 issuers
- Ba-B: 12 issuers

- Investment grade: 90%
- Speculative-grade: 10%

Survey Group by sector

- Regulated utilities: 43% (43 issuers)
- Not-for-profit utilities: 37% (37 issuers)
- Unregulated utilities: 21% (21 issuers)

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Greater financial resources give very large utilities an edge over smaller counterparts.

Cybersecurity reporting & background
- Board of directors has at least one with cyber expertise:
  - Very large ≥$100B: 12%
  - Large ≥$10B-$100B: 0%
  - Medium ≥$1B-$10B: 0%
  - Small <$1B: 0%
- One-level reporting directly to C-suite:
  - Very large ≥$100B: 80%
  - Large ≥$10B-$100B: 67%
  - Medium ≥$1B-$10B: 70%
  - Small <$1B: 63%

Cybersecurity resilience
- % that completed tabletop simulation last 12 months:
  - Very large ≥$100B: 100%
  - Large ≥$10B-$100B: 83%
  - Medium ≥$1B-$10B: 75%
  - Small <$1B: 44%

Supply chain management & Insurance
- Cyber Risk Assessments of Current Vendors:
  - Very large ≥$100B: 90%
  - Large ≥$10B-$100B: 70%
  - Medium ≥$1B-$10B: 67%
  - Small <$1B: 33%
- Cyber Risk Assessments of New Vendors:
  - % with explicit cyber coverage through insurance policy:
  - Very large ≥$100B: 100%
  - Large ≥$10B-$100B: 87%
  - Medium ≥$1B-$10B: 76%
  - Small <$1B: 33%
State-owned utilities use of cyber defense tools lags that of their privately owned counterparts

Cybersecurity resilience

- % that have completed a tabletop simulation in last 12 months: Privately owned 81%, State-owned 58%
- % that require cyber risk assessments of M&A targets: Privately owned 67%, State-owned 54%
- % of online applications subject to a penetration test in the last 12 months: Privately owned 63%, State-owned 33%
- % that have completed red team testing in the last 12 months: Privately owned 88%, State-owned 50%
- % that have a formalized process to address issues found during red team testing: Privately owned 60%, State-owned 46%

Supply chain

- % that require cyber risk assessments of new vendors: Privately owned 92%, State-owned 75%
- % that require periodic cyber risk assessments of current vendors: Privately owned 77%, State-owned 58%
- % that receive timely notification of incidents and vulnerabilities that affect vendors: Privately owned 96%, State-owned 83%

Insurance

- Privately owned utilities: 71% has stand-alone cyber insurance
- State-owned utilities: 38% has stand-alone cyber insurance

Median coverage as % of 2019 EBITDA: Privately owned 3%, State-owned 2%
Rating levels and regional differences are not major distinguishing factors
Access is everything™

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