Agenda

1. Welcome and introduction of new members (5min)

2. Review and status of the GRESB Data Quality Survey (10min)

3. Question Round (15min)

4. Discussion of 2020 implementation (25min)
   - Review discussion from in-person meeting
   - Possible idea: split surveys for (data) partners and participants

5. Planning and next steps (5min)
Introduction to the GRESB Data Quality Technical Working Group
An ESG Data Quality Standard

Why the time is right

Scale
- 80,000 buildings

Data availability
- 64% coverage

Service ecosystem
- 16 data partners
Project Scope

• Any measured value that is transmitted to GRESB
• Asset-level data
  • Performance data, building definitions, ratings, certifications, projects, audits
GRESB B.V. Governance

**GRESB BOARD OF DIRECTORS**
- Executive Director (MD, GRESB)
- 3 non-executive directors
  (GRESB’s investor members)
- 3 non-executive directors

**GRESB MANAGEMENT TEAM**

**GRESB TEAM**
- GRESB Real Estate | GRESB Infrastructure

**REAL ESTATE ADVISORY BOARD**
- Chair
- 4 Vice Chairs - chairs of regional B.C.
- Secretary – GRESB Staff

**INFRASTRUCTURE ADVISORY BOARD**
- Chair
- 3 Vice Chairs - chairs of regional B.C.
- Secretary – GRESB Staff

**REGIONAL BENCHMARK COMMITTEES**
(Americas, EMEA, Asia, Australia/New Zealand)
- Chair
- Secretary – GRESB Staff

**REGIONAL BENCHMARK COMMITTEES**
(Americas, EMEA, AsiaPacific)
- Chair
- Secretary – GRESB Staff

**INDUSTRY WORKING GROUPS**

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GRESB B.V.

Green Business Certification Inc.

100% shareholder
Governance of the Data Quality Standard

Technical working group

- >30 industry experts
- Two year period
- Tasked to develop technical standard

GRESB Governance Bodies

- Benchmark committees
- Advisory Boards
- Provide feedback and check

GRESB Data Quality Standard

- Recognize data quality in assessments and reports
- Improve data products for investors
# TWG Members

## North America

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Organization</th>
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</thead>
<tbody>
<tr>
<td>Conan O'Connor</td>
<td>Principal</td>
<td>Energy Profiles Limited</td>
</tr>
<tr>
<td>Carl Paulse</td>
<td>CTO</td>
<td>Refined Data Solutions Inc.</td>
</tr>
<tr>
<td>Tony Pringle</td>
<td>Partner &amp; Co-founder</td>
<td>Quinn &amp; Partners Inc.</td>
</tr>
<tr>
<td>Tena Yara Goodspeed</td>
<td>Director Sustainability</td>
<td>LORD Green Strategies</td>
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<tr>
<td>Dennis Krieger</td>
<td>Director of Engineering</td>
<td>Switchautomation</td>
</tr>
<tr>
<td>Lance Onken</td>
<td>CTO</td>
<td>Measurabl</td>
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<tr>
<td>Ari Frankel</td>
<td>Assistant Vice President of Sustainability &amp; High-Performance Buildings</td>
<td>Alexandria Real Estate Equities, Inc.</td>
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<tr>
<td>Matt Aberant</td>
<td>Senior Project Director</td>
<td>WSP</td>
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<tr>
<td>Chris Pyke</td>
<td>Research Officer</td>
<td>USGBC and ARC</td>
</tr>
<tr>
<td>Brian Trainor</td>
<td>ESG Analyst</td>
<td>Goby</td>
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<tr>
<td>Christopher Maddern</td>
<td>Senior Client Development Manager</td>
<td>Schneider Electric</td>
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<tr>
<td>Marta Schantz</td>
<td>SVP, Greenprint Center for Building Performance</td>
<td>ULI</td>
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<tr>
<td>James Lee</td>
<td>Consultant</td>
<td>iContinuum (Chongbang)</td>
</tr>
<tr>
<td>Hazel M. Sutton</td>
<td>Manager, Environmental Standards</td>
<td>BOMA</td>
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<tr>
<td>Joshua Kace</td>
<td>Director of Energy Solutions</td>
<td>CodeGreen Solutions</td>
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<tr>
<td>Hannah Tillmann</td>
<td>Associate Manager</td>
<td>RE Tech Advisors</td>
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<tr>
<td>Eric Duchon</td>
<td>Managing Director, Global Head of Sustainability</td>
<td>LaSalle Investment Management</td>
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<tr>
<td>Jeannie Renne-Malone</td>
<td>Vice President, ESG</td>
<td>Prologis</td>
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<tr>
<td>Ryan Tinus</td>
<td>Director of Sustainability</td>
<td>Tishman Speyer</td>
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<tr>
<td>Becca Rushin</td>
<td>Vice President, Sustainability and Corporate Social Responsibility</td>
<td>Jamestown LP</td>
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<tr>
<td>Michael Zatz</td>
<td>Chief, Market Sectors Group</td>
<td>ENERGY STAR</td>
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</table>
# TWG Members

## Asia-Pacific / EMEA

<table>
<thead>
<tr>
<th>Name</th>
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</thead>
<tbody>
<tr>
<td>David Solsky</td>
<td>CEO</td>
<td>Envizi</td>
</tr>
<tr>
<td>Maryham Farag</td>
<td>Sustainability Analyst, Property</td>
<td>Lendlease</td>
</tr>
<tr>
<td>Jorge Chapa</td>
<td>Head of Market Transformation</td>
<td>GBCA</td>
</tr>
<tr>
<td>Jenny TY Law</td>
<td>Senior Sustainable Development Officer</td>
<td>Swire Properties</td>
</tr>
<tr>
<td>Chungha Cha</td>
<td>Co-founder &amp; Chair</td>
<td>Re-imagining Cities Foundation</td>
</tr>
<tr>
<td>Kees van Alphen</td>
<td>Managing Partner</td>
<td>hello energy</td>
</tr>
<tr>
<td>Luuk Westerhof</td>
<td>Projectleider</td>
<td>Innax</td>
</tr>
<tr>
<td>Jakub Bartnicki</td>
<td>Investors ESG Lead</td>
<td>CBRE</td>
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<tr>
<td>Dan Skidmore</td>
<td>Senior Consultant</td>
<td>BRE</td>
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<tr>
<td>Nick Hogg</td>
<td>Product Owner</td>
<td>Evora</td>
</tr>
<tr>
<td>Colin Ma</td>
<td>COO, VP Customer Success</td>
<td>Fabriq</td>
</tr>
<tr>
<td>Christopher Hill</td>
<td>Head of Environmental Reporting</td>
<td>Verco Global</td>
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<tr>
<td>Henry Gilks</td>
<td>Consultant</td>
<td>Carbon Credentials</td>
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<tr>
<td>Thomas Saunders</td>
<td>EDGE Program Director</td>
<td>Thinkstep</td>
</tr>
<tr>
<td>Hanae Maeda</td>
<td>Senior Consultant</td>
<td>CSR Design</td>
</tr>
<tr>
<td>Christopher Botten</td>
<td>Programme Manager</td>
<td>Better Buildings Partnership</td>
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The 2019 Data Quality Survey
Goals and Scope for the 2019 Survey

Goals

Development towards a GRESB Data Quality Standard

- High-level assessment of data systems
- Identify what systems do to address data quality

Research

- Understand the current landscape of ESG data systems
- Identify approaches to data quality currently in use

Scope

Data:

- Environmental Performance
- Relevant building information

Aspects:

- Accuracy
- Completeness
- Timeliness
- Lineage
Aspects of Data Quality

Accuracy: Is the data in the system correct?

Completeness: Is the data that is expected in the system actually present?

Timeliness: Is the data available in the system when it is expected?

Lineage: Is the data in the system traceable to its source?
## Indicators by Aspect

<table>
<thead>
<tr>
<th>Accuracy</th>
<th>Completeness</th>
<th>Timeliness</th>
<th>Lineage</th>
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<tr>
<td>Accuracy metrics tracked for utility data</td>
<td>Completeness metrics tracked for utility data</td>
<td>Timeliness metrics tracked for utility data</td>
<td>Lineage metrics tracked for all data</td>
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<tr>
<td>Accuracy metrics tracked for non-utility data</td>
<td>Completeness metrics tracked for non-utility data</td>
<td>Methods for ensuring timely manual tasks</td>
<td>Ability of data system to cross-validate data sources</td>
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<tr>
<td>Calculation of GHG emissions</td>
<td>Identification and handling of missing data</td>
<td></td>
<td>Description of data audits</td>
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<tr>
<td>Identification and handling of anomalous data</td>
<td>Data integrity/validation rules</td>
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Implementation in 2019

Who can participate in the survey?
• GRESB Partners and Real Estate Participants

What are prerequisites for participation?
• Use of the GRESB Asset Portal

When is the survey be available?
• The survey is open from April 1 to July 1 outside of the GRESB portal:

How will the results be published?
• Results are confidential and will only be shared with the participants
• GRESB will publish aggregated results to inform further development of the standard

How will the results be recognized by GRESB?
• Participants will receive public recognition for completing the data quality survey
• Asset data submitted by survey participants will be recognized in GRESB reports

Recognition of participation: icon added to badge on benchmark reports
Question Round
Ideas for 2020
Quantitative Metrics for Data Quality
Translating high-level indicators to quantifiable metrics for 2020

<table>
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<td>Is the data in the system</td>
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<td>correct?</td>
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**Ideas for metrics**

- Outlier checks
- Intensity checks
- Reconciliation between actual + estimated values
- Thresholds for concern
- Identification of gaps in the data
- Comparison of actual + expected values
- How to deal with 100% missing data
- When data is collected by the provider
- When data is input into the system
- When the data is reported
- How many steps/points between origin and report?
- % data points traceable to the source
- Audit trail (timestamped data points?)
Implementation for 2020 and beyond

Environmental performance + building data
- Energy
- Water
- Carbon
- Waste
- Other

Data Quality Metrics
- Accuracy
- Completeness
- Lineage
- Timeliness

GRESB Asset Portal

GRESB Real Estate Score / Rating

Data Quality Score / Certification

API Endpoint for DQ metrics?
Discussion: Ideas for 2020

• On implementation:
  • Should there be separate surveys for (data) partners and RE Participants?
    • Partner survey focused on data software systems, narrative answers, what is possible
    • Participant survey focused on specific data transmitted to GRESB, quantitative metrics, what is done

• On metrics:
  • Should there be separate metrics for primary/measured data and secondary/calculated/estimated data?

• On alignment with existing standards:
  • What kinds of references should we look to align with?
Next Steps
Next Steps

TWG Activities:
• Comment period open until May 17
• Publication of slides and minutes on website by May 31
• Next online meeting: September after results launch
• Next in-person meeting: late 2019 or early 2020 (probably in Europe)

Data Quality Survey:
• April 1 – July 1: Survey open
• July 1 – September 4: Analysis of results by GRESB
• August: draft of results report circulated to the TWG
• September 4: Report on results published, participant recognition in benchmark reports

Feedback:
• Email Emma Storm e.storm@gresb.com
• Email Ragnar Martens r.martens@gresb.com