Sustainability Reporting: A Science-Based Framework

5th Ontario Climate Symposium, York University
Toronto, May 12, 2017

Dr. Lotfi Belkhir
Associate Professor & Chair of Eco-Entrepreneurship
McMaster University
Canada’s Framework for Emissions Reductions

- **Carbon Pricing**: Applies to all emitters - $30/t in BC; $20/t in Alberta; cap-and-trade for Ontario and Quebec – By 2018, all provinces are expected to have some form of carbon pricing in place and applying to the same sources.

- **Complementary climate action**: Tightening of efficiency standards and codes for vehicles and buildings.

- **Adaptation and resiliency**: Adequately preparing for climate risks like floods, wildfires, droughts, and extreme weather events.

- **Clean technology, innovation and jobs**: Position Canada as a global leader on clean technology innovation.
Environment Canada report says we are on pace to miss emissions target

By 2030 we could be pumping out greenhouse gases at a rate at least 30 per cent higher than promised.

By ALEX BALLINGALL Ottawa Bureau
Mon., March 27, 2017

THE NAKED TRUTH

WHAT ABOUT SUSTAINABILITY REPORTING?
GRI IS THE DOMINANT ESAR REPORTING PLATFORM

Source: Data coming from the GRI Sustainability Disclosure Database

ESAR: Environmental & Social Assessment Report
What are GRI Key Objectives?

- “To plan activities, become more sustainable and position the company”

- “…the ultimate objective of becoming a more sustainable and more coherent organization. The GRI reporting process incorporates many elements specifically designed to contribute to setting up such a system.”

- “These organizations prepare a sustainability report to: (i) take early steps towards operating in a more sustainable fashion…”

Source: GRI Learning Series “GRI Sustainability Reporting: How valuable is the journey?”
Is It Working?... Our Study:

- Exclusively restricted to CO₂ emissions
- 65 companies in 5 industries (Only A+ Level):
  - Mining & Materials
  - Utilities
  - Energy
  - Chemicals
  - Automotive
- CO₂ emissions and Revenues data for period: 2007 - 2012
- Analyzed 2 metrics:
  - Absolute Emissions: Tons of CO₂-equivalent emissions: t-CO₂
  - Emission Intensity: t-CO₂/Annual Sales ($USD Millions) : t-CO₂/$MM

RESULTS

- NO statistical difference between GRI reporting and non-reporting companies as far as CO2 emissions are concerned.

- GRI-reporting companies showed an average 6% increase in absolute emissions, while the Kyoto target is an 8% to 21% reduction for the same period.

- Both sets of companies show about 16% decrease in emission intensity, but this seems to be almost wholly due to switching to cheaper and cleaner natural gas than any sustainability measures. Now that it’s done, there’s no more free ride.
### 7 Top Sustainability Issues for Businesses

<table>
<thead>
<tr>
<th>Original Report</th>
<th>Global Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Public Policy on Climate Change</td>
<td>1. Creating a Long-term Orientation</td>
</tr>
<tr>
<td>2. Collaborating for Sustainability</td>
<td>2. Public Policy and Climate Change</td>
</tr>
<tr>
<td>3. Respecting Aboriginal Rights</td>
<td>3. Collaborating for Sustainability</td>
</tr>
<tr>
<td>5. Sustaining Sustainability Programs</td>
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Survey conducted by the Network of Business Sustainability (NBS) - [http://nbs.net/knowledge/business-challenges-for-sustainability-a-global-perspective/](http://nbs.net/knowledge/business-challenges-for-sustainability-a-global-perspective/)
A SCIENCE-BASED MODEL FOR SUSTAINABILITY REPORTING
What We Need....

A Measurement & Reporting System that is:

- **Science-Based:** Objective, Rational, Rigorous & Quantitative
- **Goal-driven:** Closed-loop between target, action, results and assessment
- **Comparable:** Transparent, Consistent, and Standardized among same sector players
- **Equitable:** Burden commensurate with contribution
- **Actionable:** Provides clear short & long-term orientation to further improvements
\[ E(n) = E(0) - \Delta(n) \]

\[ \Delta(n) \text{: Cum. reduction in } n \text{ yrs} \]

\[ R_i(n) = R_i(0)(1 + d_i)^n; \]
\[ I_i(n) = E_i(n)/R_i(n) \]

\( R \): Revenues; \( d \): growth; \( I \): Emis. Intensity

\[ E_{i,j}(n) = I_{i,j}(n).R_{i,j}(0)(1+d_{i,j})^n \]
\[ I_{i,j}(n) = E_{i,j}(n)/R_{i,j}(n) \]

\( R_{i,j} \): Relative Intensity

\( RI_{i,j} = I_{i,j}/I_i \): Relative Intensity

\( RI_{i,j} - 1 \): Normalized Relative Intensity

\[ \text{Source: Jackson and Belkhir, Working Paper} \]
To meet the “sustainability test”, each entity must satisfy the following reductions in emission intensity and absolute emissions, year-over-year, respectively:

\[
\Delta I_{i,j}(n) = I_{i,j}(0) - \frac{E_i(0) - \Delta_i(n)}{R_i(0) \cdot (1 + d_i)^n}
\]

\[
\Delta E_{i,j}(n) = E_{i,j}(0) - r_{i,j}(0) \cdot (E_i(0) - \Delta_i(n)) \cdot \left(\frac{1 + d_{i,j}}{1 + d_i}\right)^n.
\]

Where \(r_{i,j}\) is the market share of entity \(j\) in sector \(i\).

**NOTE:** A company could have \(\Delta E_{i,j}(n)\) NEGATIVE (Increase in emissions) if \(d_{i,j} >> d_i\), and still be sustainable.

**NOTE:** If every entity meets the above reduction, then the sum total of all reductions would equal the National Level target reduction.
**EXAMPLE FROM AUTOMOTIVE SECTOR**

2-Year Change in Emissions in the Automobile Industry

<table>
<thead>
<tr>
<th>Company</th>
<th>% Change from 2015-2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>GM</td>
<td>-20%</td>
</tr>
<tr>
<td>YAMAHA</td>
<td>-15%</td>
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<td>DAIMLER</td>
<td>-10%</td>
</tr>
<tr>
<td>NISSAN</td>
<td>-5%</td>
</tr>
<tr>
<td>FORD</td>
<td>0%</td>
</tr>
<tr>
<td>RENAULT</td>
<td>5%</td>
</tr>
<tr>
<td>HONDA</td>
<td>10%</td>
</tr>
<tr>
<td>KIA</td>
<td>15%</td>
</tr>
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</tr>
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<td></td>
</tr>
</tbody>
</table>

*EXAMPLE FROM AUTOMOTIVE SECTOR*
A VERY DIFFERENT (MORE ACCURATE) PICTURE......

Normalized Relative Intensity - 2016 Automotive Industry

(Ri,j - 1 ) in 2016

GM  YAMAHA  DAIMLER  NISSAN  FORD  RENAULT  HONDA  KIA  BMW  MAZDA

Company
REQUIRED REDUCTIONS BY 2030

Automotive Sector - Emission Intensity
Reductions Required to Hit Target
**A MOVING TARGET ...**

2016 Emissions Intensity - Automotive Sector

**EMISSIONS INTENSITY (tCO₂/ $M)**

- **GM**
- **HONDA**
- **YAMAHA**
- **NISSAN**
- **FORD**
- **MAZDA**
- **KIA**
- **RENAULT**
- **DAIMLER**
- **BMW**

**Benchmark**

2016 Sector Intensity

- **2020**
- **2025**
- **2030**

**IF BMW CAN DO IT; SO CAN EVERYONE ELSE!**
**IN CONCLUSION:**

✧ **A SIMPLE AND PRACTICAL SCIENCE-BASED FRAMEWORK ALLOWING THE CASCADING OF A GHGE REDUCTION TARGET FROM THE NATIONAL TO THE ENTITY LEVEL**

✧ **THE FRAMEWORK IS DYNAMIC AND TAKES INTO ACCOUNT MARKET GROWTH AS WELL AS COMPETITIVE PRESSURE BETWEEN ENTITIES AT THE SECTOR LEVEL**

✧ **ALLOWS TO READILY SPOT ENTITIES HITTING THEIR SECTOR-SPECIFIC TARGETS FROM THE ONES THAT ARE NOT**

✧ **FINALLY, IT HELPS IDENTIFY THE BENCHMARK ENTITIES THAT COULD PROVIDE THE LEADERSHIP AND LONG-TERM ORIENTATION TO THE REST OF THE SECTOR.**
THANK YOU!
CHANGE IN ABSOLUTE EMISSIONS

GRI Companies
2008-2012 Cumulative Change in CO₂ emissions (Scope 1+2)

Non-GRI Companies
2008-2012 Cumulative Change in CO₂ emissions (Scope 1+2)

MEAN = 6.24% (INCREASE)

MEAN = -3.18% (DECREASE)
CHANGE IN EMISSION INTENSITY

Emission Intensity = Mt-CO$_2$/M-Sales

GRI Companies
2008-2012 Cumulative Change in CO$_2$ emission Intensity (Scope 1+2)

MEAN -15.18% (DECREASE)

Non-GRI Companies
2008-2012 Cumulative Change in CO$_2$ emission intensity (Scope 1+2)

MEAN = -16.7% (DECREASE)
Thanks to the hydro-fracking revolution, the switch to the cheaper (and cleaner) natural gas, accounts by itself in a reduction of CO2 emissions amounting to:

16% reduction/unit production from 2008-2012

15 years in – Is it Working?

- No known quantitative study of impact of reporting on any sustainability metric relative to non-GRI reporting companies.

- May papers researched impact of sustainability reporting on stakeholder engagement, environmentally friendly visibility and financial ROI, but none on direct impact on any key sustainability performance metrics.

- Difficulty in getting enough large sample of the non-reporting data.

- Of all the metrics, only CO$_2$ emissions data is available through the Carbon Disclosure Project (CDP).