"Policy Maker Meets the Engineer" Workshop
Energy Efficiency at LafargeHolcim

Bernard Mathieu
Head Sustainable Development
UN ECE, 18 January 2017
Energy spend in 2015
MCHF

Group : 4 290
Our Sustainability Strategy
Strong focus on CO₂ emissions, over the life cycle

We will generate 1/3 of our turnover from solutions with enhanced sustainability performance

**Climate**
In house: We will reduce net specific CO₂ emissions by 40% per tonne of cement (vs. 1990).

**Circular Economy**
We will use 80 million tonnes of waste-derived resources per year.

**Water & Nature**
We will reduce freshwater withdrawal in cement operations by 30%
We will implement The WASH Pledge on all sites

**People & Communities**
We want zero fatalities
We will reduce LTI FR < 0.20
We will reduce TIFR by 50%
We will reduce our disease rate < 0.1
We will have 30% minimum gender diversity at all management levels

**In house**
We will help our customers avoid 10 million tonnes of CO₂ being released from buildings each year through our innovative solutions.

**Beyond our fence**
We will provide end-of-life solutions for our products and will supply 4 times more recycled aggregates from CDW/RAP

**Innovative solutions**
Low-carbon cement & concrete
Insulating concrete
Thermal-mass solutions
Recycled aggregates
Urban mining solutions
Waste management services
Rainwater harvesting
Pervious concrete
Stormwater protection
Vertical green solutions

Affordable housing materials and solutions
Affordable sanitation solutions

(CDW: Construction & Demolition Waste; RAP: Recycled Asphalt Pavement; WASH: Water, Sanitation, and Hygiene; LTI FR: Lost Time Injury Frequency Rate; TIFR: Total Injury Frequency Rate. The reference year is 2015 unless stated otherwise.)
LafargeHolcim’s improvements since 1990
Energy efficiency clinker and cement production

Average improvement rate:
-1.0 % per year

Average improvement rate:
-0.4 % per year
Mainly driven by new plant projects as well as continuous process improvement

<table>
<thead>
<tr>
<th></th>
<th>Group Average 2015</th>
<th>Average New plants*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Thermal Energy Consumption</td>
<td>[MJ/t clinker]</td>
<td>3533</td>
</tr>
<tr>
<td>Specific Electrical Energy Consumption</td>
<td>[kWh/t cement]</td>
<td>95</td>
</tr>
</tbody>
</table>

* Average of new plants built since 2007

Keep in Mind: the theoretical energy required for clinker production can be calculated based on standard enthalpies of formation of the input and output materials and is around 1719 MJ/t clinker.

Further Energy Efficiency improvement can be expected, but it gets more and more challenging.
CO₂ performance per region at LafargeHolcim

<table>
<thead>
<tr>
<th>Region</th>
<th>Net CO₂ [kg/t cement]</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>643</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>601</td>
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<tr>
<td>Latin America</td>
<td>531</td>
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<tr>
<td>Europe</td>
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<td>Africa</td>
<td>585</td>
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<tr>
<td>India</td>
<td>533</td>
</tr>
<tr>
<td>Group</td>
<td>573</td>
</tr>
</tbody>
</table>

- 1990
- 2010
- 2015
Global Cement Database on CO$_2$ and Energy Information

The Cement Sustainability Initiative (CSI) is a global effort by 24 major cement producers with operations in more than 100 countries.

- The "Getting the Numbers Right" (GNR) is a voluntary, independently-managed database of CO$_2$ and energy performance information on the global cement industry.

- 934 individual facilities producing 889 million tonnes of cement = 21% of global cement production.
CSI figures
Improvements in Thermal Energy Consumption

Average improvement rate since 1990: -0.8% per year
CSI figures
Improvements in Electrical Energy Consumption

Cement plant power consumption - Weighted average
Grey and white cement (33AGW)
All GNR Participants - World (coverage: 25% in 2010, 21% in 2013, 21% in 2014)

Average improvement rate since 1990:
-0.5% per year
Our four strategic pillars: cost leadership and asset light are essential. Sustainable development and commercial transformation are great opportunities.
Focus on Return On Invested Capital

**Free Cash Flow**
- At least CHF 10.0bn cumulative 2016 – 2018
- CHF 3.5-4.0bn run rate by 2018
- At least CHF 6 per share run rate by 2018

**Capex**
- Max CHF 3.5bn cumulative 2016 – 2017

**ROIC AT**
- At least 300bps improvement from 2015 level by 2018 from operational improvement

**Operating EBITDA**
- At least CHF 8.0bn in 2018

**Credit Rating**
- Maintain solid investment grade rating

**Cash Returns to Shareholders**
- Progressively grow DPS and 50% pay-out over cycle
- Return excess cash to shareholders commensurate with a solid investment grade credit rating

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Targets assume constant scope (except for India) and FX. FCF after maintenance and expansion capex. Capex target excluding capitalized merger implementation costs. Operating EBITDA before restructuring costs.
Asset Light Growth

**Strategic Positioning**
- Positioning in strategic advantageous locations, markets
- Leverage on trading
- Focus on supply chain
- Building grinding stations, terminals instead of integrated cement plants

**Retail Franchising**
- Branded Networks
- Sales Service and support
- Protect Volume and Premium Price

**Smart Building of plants**
- Build pre-fabricated modular plants
- „Mobile“ plants to enter and exit profitable markets quickly
- Turn-key solutions
- Small plants for small reserves

**RMX, AGG Partnership – Franchising - Licensing**
- Offer product expertise, IT systems, technical equipment, spare and wear part suppliers, brand and sales training
- Extend footprint
- Long-term supplier relationship
- Production Joint Ventures
Waste management as a business opportunity

Waste as an energy source gaining importance

- Growing and more urban population producing more waste
- Fuel price volatility and increase to persist in future

LafargeHolcim uniquely positioned to valorize waste

- Focus on developing and fast urbanizing markets
- Strong demand for energy
- Broad cement plant network

Multiple business models emerging

- Waste to Fuel: Full treatment solution
- Waste to Raw material
  Full fledge Construction & Demolition Waste offer
Geocycle Investment Roadmap
530 Mio CHF CAPEX till 2020

<table>
<thead>
<tr>
<th></th>
<th>FC2016</th>
<th>B2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
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<tr>
<td>CAPEX Market Segment (mCHF)</td>
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<td>MSW</td>
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<td>TDF</td>
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<tr>
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<td>15.9</td>
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<tr>
<td>Total CAPEX (mCHF)</td>
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<tr>
<td></td>
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<td>TSR (%)</td>
<td>17.8</td>
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Investments in energy efficiency and alternative energy reduces our CO₂ exposure

Positive EBITDA impact using alternative fuel

- Alternative fuels reduces energy costs and thereby adding value
- Increasing replacement of traditional fuels and raw materials

Reduced exposure to CO₂ costs in Europe

- Improved carbon efficiency in EU since 1990, overall exposure to CO2 ETS reduced by CHF 22 m
- In the future, carbon trading will expand to further geographies rewarding carbon efficiency even further

1 Measures the positive impact on EBITDA from use of alternative fuels and raw materials
2 Theoretical cost in the EU ETS with carbon efficiency levels in 1990 vs 2015 using 2015 production volume.
3 Based on a price of CHF 5 per ton Excluding free allowances
LafargeHolcim develops low carbon solutions for the construction sector

Up to 70% lower CO2 emissions

Reduced energy consumption during production

Carbon uptake during concrete curing

Green Building Centres

Integrated affordable housing solutions for rural and semi-urban India