Sustaining values

Driving the sustainability agenda on C-level

2020
Sustainability is a highly relevant topic with a substantial impact on businesses and their stakeholders ...
... and can become an issue if not addressed adequately

**Siemens’ involvement with Adani coalmine**
12 January 2020: Due to a supply contract for the new Adani coalmine in Australia Siemens CEO Joe Kaeser issued a statement justifying its commitments.
Climate activists had urged Siemens to review its role in the controversial project given its commitment to sustainability – in 2015, Siemens has committed carbon neutrality by 2030.

“While I do have a lot of empathy for environmental matters, I do need to balance different interests of different stakeholders, as long as they have lawful legitimation for what they do!” (Financial Times)

**Climate lawsuit against large carbon emitting countries**
23 September 2019: Five of the countries with the highest carbon emissions in the world – Argentina, Brazil, France, Germany and Turkey – get sued by the Greta Thunberg Association for allegedly violating their children rights by failing to adequately reduce emissions. Angela Merkel and Emanuel Macron distance themselves from Thunberg.

**BlackRock includes climate change as integral part of investment thesis**
14 January 2020: BlackRock, the world's largest asset manager, says that it will now make climate change central to its investment considerations. And not just for environmental reasons but because it believes that climate change is reshaping the world's financial system.

“The evidence on climate risk is compelling investors to reassess core assumptions about modern finance. In the near future – and sooner than most anticipate – there will be a significant reallocation of capital.” (Annual Letter to CEOs)
Increasing consideration of sustainability in society, economy and environment has led to a major rise in ‘responsible investments’

**Sustainable development**

- **Sustainable development** addresses the needs of the present to ensure the ability of future generations to meet their own needs
- The **17 UN Sustainable Development Goals (SDGs)** of the UN provide a shared blueprint to achieve peace, prosperity and a better future for people and the planet
- **Corporate Social Responsibility (CSR)** encompasses all the practices put in place by companies in order to uphold the principles and goals of sustainable development

**Sustainable investment and decision making**

- **Environmental, social and governance (ESG) principles** have been agreed to provide a framework for companies and investors to analyze, address and communicate sustainability
- **ESG aspects are the baseline of the UN Principles for Responsible Investment (PRI)** – Member organizations follow these principles to align investment activities with the broader interests of society

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Source: PRI Association, United Nations, IATF

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Sustaining values Strategy

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2020 4
UN wants “net zero by 2050” – momentum accelerated in 2019 as governments respond, especially in EU and US

**UN leads way to “net zero by 2050”**

“Secretary General António Guterres has convened leaders to New York on Sep 23 bringing concrete, realistic plans to enhance their nationally determined contributions by 2020, in line with reducing greenhouse gas emissions by 45 per cent over the next decade, and to achieve net zero emissions by 2050.”

**EU/US governments respond**

**EU – net zero by 2050 laws**
- Norway – by 2030 (2016)
- Sweden – by 2045 (2017)
- United Kingdom (2019)
- France (2019)

**USA – 100% clean power by 2050 laws**
- California – by 2045 (Dec 2018)
- New Mexico – by 2045 (2019)
- Nevada (2019)
- Maine (2019)
- Puerto Rico (2019)

**Support accelerated from other parties**

- European Commission and 24/28 EU members (all but CZ, HU, PL, EE) (2019)
- State governments of CT, NJ, MD, CO, MN, WI push 100% clean energy; discussions in NC, MA, IL, AZ… (2019)
- All US Democrat presidential candidates have plans for net zero by 2050 (2019)
- Switzerland (2019)
- Australia – all states support (2019)
- Japan commits to net zero as soon as possible after 2050 (2019)
- Laws proposed in Chile, Uruguay, New Zealand, Fiji, … (2019)
- Pope Francis/Catholic Church (2019)
- International Chamber of Commerce (2019)
With regards to decarbonization, carbon pricing and regulation play a major role and relevant initiatives increase

Deep-dive: Regulation on decarbonization and sustainability

Carbon pricing ($/tCO$_2$e, 2019)

- 45 national and 25 subnational jurisdictions are putting a price on carbon, covering approx. 20% of global GHG emissions
- 57 carbon pricing initiatives are implemented or scheduled for implementation, thereof 29 are emission trading systems and 28 carbon tax initiatives
- The EU ETS introduced in 2005 covers 45% of the union’s emissions, with a specific focus on the energy, industry and aviation sector

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$/CO_2e$ = Dollar per ton of CO$_2$ equivalent
All market scenarios see a strong growth in renewables – fossil continues to play a relevant role at least until 2040

Installed capacity 2018 and 2040, in GW

Main findings

- Doubling of installed capacity
- Paradigm shift from fossil to renewables – from fossil to renewables dominance
- Despite decreasing capacity share, gas capacity continues to increase by +35% to 70%
- No increase of oil and coal fired capacity (decrease in scenarios with strong renewables focus)
Power generation customers set own aggressive targets to show leadership and minimize risk

Customers set their own aggressive targets in US/EU

Customers with set targets by 2050 (not exhaustive):

<table>
<thead>
<tr>
<th>Power Generation Company</th>
<th>Target by Year</th>
<th>Year Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>nrg</td>
<td>90% (2014)</td>
<td></td>
</tr>
<tr>
<td>FirstEnergy</td>
<td>90% by 2045 (2016)</td>
<td></td>
</tr>
<tr>
<td>IVA</td>
<td>70% by 2030 (2017)</td>
<td></td>
</tr>
<tr>
<td>AEP Energy</td>
<td>80% (2018)</td>
<td></td>
</tr>
<tr>
<td>Southern Company</td>
<td>80-100% (2018)</td>
<td></td>
</tr>
<tr>
<td>Xcel ENERGY</td>
<td>100% (2018)</td>
<td></td>
</tr>
<tr>
<td>ENGIE</td>
<td>85% (2017)</td>
<td></td>
</tr>
<tr>
<td>VATTENFAL</td>
<td>100% by 2045 (2017)</td>
<td></td>
</tr>
<tr>
<td>Orsted</td>
<td>99% by 2025 (2018)</td>
<td></td>
</tr>
<tr>
<td>EDF</td>
<td>100% (2018)</td>
<td></td>
</tr>
<tr>
<td>IBERDROLA</td>
<td>100% (2019)</td>
<td></td>
</tr>
<tr>
<td>enel</td>
<td>100% (2019)</td>
<td></td>
</tr>
<tr>
<td>Shell</td>
<td>50% (2017)</td>
<td></td>
</tr>
<tr>
<td>equinor</td>
<td>20% by 2030 (2018)</td>
<td></td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>

Proof points:

- **6 of 9 highest emitting** US power producers have set aggressive carbon reduction targets
- Xcel repositions coal-heavy portfolio directly into renewables to reach 100% carbon reduction → no significant “coal to gas”
- Southern Company’s CEO, Tom Fanning, didn’t think CO\(_2\) was the primary culprit for climate change in 2017; in 2019, his bonus is linked to progress on reaching “low to no carbon” by 2050
- Vistra does not (yet) have a carbon target but is pushing a “coal to solar” bill in Illinois where regulations are leading to coal plant closures
- 13+ smaller US producers also have 80%+ targets
- Iberdrola and Enel have signed on to UN targets for “net zero” which will be acknowledged at the UN Climate Summit
- Shell’s CEO gave a speech supporting “net zero” by 2050 in the EU, Engie and others also support these targets
Interviews with thought leaders confirmed the observed trends by highlighting the importance of decarbonization technologies

Summary thought leader interviews

28 renowned experts from all around the globe …
… and placed their bets on future key technologies¹)

<table>
<thead>
<tr>
<th>Technology</th>
<th>Bets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen and synfuels</td>
<td>16</td>
</tr>
<tr>
<td>Batteries</td>
<td>6</td>
</tr>
<tr>
<td>Carbon capture</td>
<td>6</td>
</tr>
<tr>
<td>Photovoltaic</td>
<td>6</td>
</tr>
<tr>
<td>Wind</td>
<td>5</td>
</tr>
</tbody>
</table>

… provided their insights on the energy sector …

**Generation**
- Peakers vs. storage
- Carbon capture and coal-phase out?

**Distribution**
- Renewables integration and grid stability
- Aging grid infrastructure

**Oil and gas**
- Hydrocarbons significant until 2040-50
- Renewables investments grow

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¹) Some interviewees provided more than 3 bets

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H₂ and synfuels
- “Investment hype will come”

Storage
- “Storage will compete […] with other forms of flexibility.”

Carb. capt.
- “DAC – no project made it past the drawing board.”

Photovolt.
- “PV incredibly powerful source, significant increase.”
H₂ is suited for a deep decarbonization of the whole energy sector with already current use case examples

H₂ allows a deep carbonization of the total energy sector

- Power storage
- H₂ electrolys
- H₂ storage
- Feed into gas grid
- Methane/methanol synthesis
- Carbon capture
- Carbon sequestration
- (Dispatchable RES) Power
- <95%
- Hydrogen
- 70-80%
- NatGas w/ H₂
- Methane/methanol and derivates
- 35-45%
- (Negative CO₂ emissions)
- end-to-end efficiency

**FCEV taxi fleet (600 taxis by 2020)**
**Zeroavia H₂ aircraft**
**Project Portal: 12 H₂ trucks, Toyota NA**
**Alstom H₂ trains**
**Rotterdam H₂ heating**
**Industrial parks: heat, power, feedstock**

**Power gen: H₂-capable gas turbines and fuel cells**

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Strategy

Biological generation of green H₂ not considered, ammonia pathway not shown here but still relevant for fertilizer
Meanwhile a strong increase in hydrogen related investments indicates growing importance of fuel cell and Power-to-X

**H₂ investment trends – Hydrogen**

**Investment by segment (US$ bn)**

<table>
<thead>
<tr>
<th>Segment</th>
<th># of Deals</th>
<th>Total Deal Value ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>65 Companies</td>
<td>210¹</td>
<td>~200 Investors</td>
</tr>
</tbody>
</table>

Regional split: 71% North America | 23% Europe | 5% Asia

**Trend**

<table>
<thead>
<tr>
<th>Year</th>
<th># Deals</th>
<th># of Companies</th>
<th>Total Deal Value ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-12</td>
<td>45</td>
<td>33</td>
<td>104</td>
</tr>
<tr>
<td>2013-15</td>
<td>81</td>
<td>95</td>
<td>704</td>
</tr>
<tr>
<td>2016-18</td>
<td>70</td>
<td>270m Largest deal</td>
<td></td>
</tr>
<tr>
<td>YTD 08/2019</td>
<td>15</td>
<td>1.2</td>
<td>95</td>
</tr>
</tbody>
</table>

**Main deals and investors (US$)**

- **Bloomeneray** 270m (2018): IPO ($1.8bn valuation); solid oxide fuel cell manufacturer
- **Hydrog(e)nics** 236m (2019): Fuel cell producer and electrolyzers acquired by Cummins
- **NIKOLA** 210m (2018): Fuel cell trucks manufacturer funded by NEL + other undisclosed investors
- **Ballard** 183m (2018): Fuel cell products funded by Weichai Power (Diesel engines) and Zhongshan Comp. (manuf. electric AC and DC motors)
- **HQHP** 157m (2015): IPO Shenzhen SE ($550M valuation), hydrogen mobility, e.g. refueling stations
- **MONOLITH** 114m (2018): Manufacturer of carbon black and hydrogen gas in the US funded by Warburg Pincus (PE)

**Companies and deal volume by region (#, US$)**

<table>
<thead>
<tr>
<th>Region</th>
<th># of Companies</th>
<th># of Deals</th>
<th>Total Deal Value ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td>33</td>
<td>104</td>
<td>2,195</td>
</tr>
<tr>
<td>EU</td>
<td>27</td>
<td>95</td>
<td>704</td>
</tr>
<tr>
<td>ME</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Asia</td>
<td>2</td>
<td>6</td>
<td>162</td>
</tr>
<tr>
<td>Oceania</td>
<td>2</td>
<td>3</td>
<td>17</td>
</tr>
</tbody>
</table>

**Note:**
- Total raised: >0.5m; Deal date after 01/2010; Deal types: all Buyout; Private Equity; VC; M&A/Control Transactions; IPO; excl. bankrupt, out of business and failed deals
- ¹ Including 40 undisclosed deals; Source: Pitchbook

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Strategy&
Storage technologies have received large investments in recent years – volumes strongly driven by North America and Europe.

**Investment trends – Energy storage**

**Investment by segment (US$ bn)**

<table>
<thead>
<tr>
<th>Segment</th>
<th>2010-12</th>
<th>2013-15</th>
<th>2016-18</th>
<th>YTD 08/2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium</td>
<td>1.2</td>
<td>1.5</td>
<td>0.8</td>
<td>0.0</td>
</tr>
<tr>
<td>Other chemical</td>
<td>0.9</td>
<td>0.4</td>
<td>0.6</td>
<td>0.1</td>
</tr>
<tr>
<td>Power electronics</td>
<td>0.1</td>
<td>0.1</td>
<td>1.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Other</td>
<td>0.1</td>
<td>0.3</td>
<td>0.2</td>
<td>0.8</td>
</tr>
<tr>
<td>Not specified</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Regional split: 48% North America | 29% Europe | 22% Asia

**Companies and deal volume by region (#, US$)**

- **US$ m**
  - NA: 97
  - EU: 199
  - Asia: 3,579
  - ME: 17
  - Oceania: 24

- **Number of companies**
  - NA: 97
  - EU: 374
  - Asia: 14
  - ME: 5
  - Oceania: 2

- **Number of deals**
  - NA: 97
  - EU: 199
  - Asia: 14
  - ME: 5
  - Oceania: 2

- **Total deal value ($M)**
  - NA: 97
  - EU: 3,579
  - Asia: 25
  - ME: 4
  - Oceania: 24

**Main deals and investors (US$)**

- **ferroamp**
  - 602bn (2019)
  - Power optimization for real estate, went public on Stockholm Stock Exchange

- **LithoTech**
  - 451m (2010)
  - Manufacturer of lithium-ion batteries; Rusnano and other undisclosed investors

- **BYD**
  - 450m (2016)
  - Rechargeable batteries; investors include Samsung, AMP Capital and SDIC Innovation Investment Mgmt.

- **Microvast**
  - 400m (2017)

- **VARTA**
  - 240m (2017)

- **Maxwell Tech**
  - 235m (2019)

**Note:** Total raised: >0.5m; Deal date after 01/2010; Deal types: all Buyout, Private Equity; VC, M&A/Control Transactions; IPO; excl. bankrupt, out of business and failed deals

1) Including 86 undisclosed deals; Source: Pitchbook

**Strategy**

Sustaining values

Deep-dive energy market

2020

12
Investments into carbon capture picked up in 2019 – deal volumes mainly driven by North America

Investment trends – Carbon capture

**Image Description**

- **Investment by segment (US$ bn)**
  - Pre-combustion: 0.1
  - Carbon Storage: 0.2
  - Direct Air Capture: 0.2
  - Allam Cycle: 0.3
  - Biotechnologies: 0.3
  - Post-combustion: 0.5

- **Companies and deal volume by region (#, US$)**
  - North America: 23 companies, 67 deals, 1.434 US$ m
  - Europe: 10 companies, 21 deals, 1.434 US$ m
  - Asia: 1 company, 1 deal, 1 US$ m

- **Main deals and investors (US$)**
  - **Sapphire Energy**
    - 144m (2012)
    - Grows algae that capture CO₂ in ponds, investor i.a. Monsanto Growth Ventures
  - **LanzaTech**
    - 188m (2014)
    - CC from biomass and waste plants, deal lead by Mitsui Global Investment
  - **NetPower**
    - 90m (2014)
    - Operates post-combustion CC facility, received $190m from the U.S. Dep. of Energy
  - **Sapphire Energy**
    - 92m (2015)
    - Grows algae that capture CO₂ in open ponds, deal led by ARCH Venture Partners
  - **LanzaTech**
    - 188m (2014)
    - CC from biomass and waste plants, funding received from Novo Holdings on August 6, 2019
  - **Sapphire Energy**
    - 144m (2012)
    - Operates Allam Cycle power plant in Texas, USA. Received the whole deal sum from Exelon (power generation company)

**Note:**
- Total raised: >0.5m; Deal date after 01/2010; Deal types: all Buyout, Private Equity, VC, M&A/Control Transactions; IPO; excl. bankrupt, out of business and failed deals
- Source: Pitchbook

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**Sustaining values**

**Strategy &**

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**Deep-dive energy market**

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2020
Despite strong performance in previous years, investment in PV technology plummeted in 2019

Investment by segment (US$ bn)

<table>
<thead>
<tr>
<th>Segment</th>
<th>Value (US$ bn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>~210 Companies</td>
<td>~3.1</td>
</tr>
<tr>
<td>~580 deals</td>
<td>~2.5</td>
</tr>
<tr>
<td>~800 investors</td>
<td>~2.5</td>
</tr>
<tr>
<td>1.1bn</td>
<td>~4.1</td>
</tr>
<tr>
<td>~10bn capital invested</td>
<td>~0.3</td>
</tr>
<tr>
<td>~2.9m median deal</td>
<td>~0.3</td>
</tr>
</tbody>
</table>

Companies and deal volume by region (#, US$)

<table>
<thead>
<tr>
<th>Region</th>
<th># Companies funded</th>
<th>Number of companies</th>
<th>Number of deals</th>
<th>Total deal value ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia</td>
<td>~25</td>
<td>~25</td>
<td>~50</td>
<td>~4.3bn</td>
</tr>
<tr>
<td>EU</td>
<td>~5</td>
<td>~10</td>
<td>~25</td>
<td>~300m</td>
</tr>
<tr>
<td>Oceania</td>
<td>~5</td>
<td>~5</td>
<td>~10</td>
<td>~10m</td>
</tr>
<tr>
<td>ME</td>
<td>~5</td>
<td>~5</td>
<td>~30m</td>
<td>~300m</td>
</tr>
<tr>
<td>NA</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Main deals and investors (US$)

- **Trinasolar**: 190m (2017) - Mainly producing and selling solar modules in China, acquired by Red Viburnum
- **Jiangsu Zongyi**: 188m (2014) - Supplier of solar photovoltaic system integration, undisclosed investors
- **SPI Group**: 144m (2012) - Photovoltaic solutions for all customer classes, investment by GSR Ventures via private placement
- **JA SOLAR**: 92m (2015) - Manufacturer of solar power products, acquired by Mr. Sealing Jinn and Jingling Group Company
- **Silevo**: 90m (2014) - Manufacturer of solar panel plates, acquired by SolarCity (backed by Capital One, DFJ Growth and Draper Fisher)

Note: Total raised: ~>0.5m; Deal date after 01/2010; Deal types: all Buyout, Private Equity; VC, M&A/Control Transactions; IPO; excl. bankrupt, out of business and failed deals;
1) Including ~120 undisclosed deals; 2) Excluding undisclosed deals; Source: Pitchbook
An exploding production of plastics and regulatory pressure requires industry leaders to develop recycling solutions

Deep dive: Circular economy and plastic waste

Global Plastic Production

- 8.3 bn t Virgin plastic produced to date
- 79% Accumulated (landfills)
- 9% Recycled
- 12% Incinerated

Increasing pressure concerning recyclability and eco-friendliness translating into new initiatives:

- European strategy for plastics in a circular economy
- Ecoloop certification program
- EU plastics regulation
- Ban on single-use plastics
- ...

Sustaining values 2020

Regulatory Pressure

Circular chemical recycling and industry examples

1. Plastic waste supply to recyclers
2. Conversion into Feedstock
3. Reutilization for polymer creation
4. (Plastic) product creation
5. Product disposal
6. Waste collection and sorting

- Alliance To End Plastic Waste
  - 40+ global chemicals and CPG companies partnering with finance community, government, and NGOs, tackling entire plastic value chain
- Lyondellbasell/QCP/SUEZ
  - Increasing alliances across the value chain, e.g. chemical companies and recyclers
- Covestro/BASF
  - ChemCycling: plastic waste broken down to oil and gaseous products
- Nestle/PureCycle Technologies:
  - Polyprene restorage in collaboration with Nestlé and Milliken for products-to-market
- Uniliver/Fraunhofer
  - CreaSolv®: Recovering plastics from sachets in Malaysia

1 Geyer et al. “Production, use, and fate of all plastics ever made”, Science Advances 2017; Strategy& Analysis
2) mismanaged waste (= either littered or inadequately disposed) by population within 50km of coast line/high risk of entering the ocean; https://ourworldindata.org/plastic-pollution

Deep-dive circular economy
As a result, sustainability quite obviously impacts the agendas of CEOs across industries

<table>
<thead>
<tr>
<th>Key drivers</th>
<th>Impact</th>
<th>Examples</th>
</tr>
</thead>
</table>
| EU Action Plan on Sustainable Finance (2018) | • Urgency to **grow number of Zero Emission Vehicles**  
• Adaption to **CO₂ neutral production** (e.g. 37.5% less CO₂ emissions in 2030 for newly produced cars)  
• Investment in **intelligent transport systems** to enhance shared mobility | • **Mercedes**: CO₂-neutral car production in Europe by 2022  
• **VW** announced target share of e-cars of 40% by 2030 |

| The Paris Climate Agreement (2015) | • Investment in **sustainable supply chain** with focus on green procurement and CO₂ neutral production  
• Emphasis on holistic (downstream) value chains as enabler for **sustainable solutions** and **circular economy** | • **ArcelorMittal**: Carbon neutral by 2050 in Europe  
• **BASF**: CO₂-neutral growth between 2019-2030 |

| 17 UN Sustainable Development Goals (2015) | • Germany: Nuclear phase-out as of 2022; coal phase-out as of 2035 (2038)  
• Development/implementation of **new business models** in energy efficiency, renewable production, storage, smart infrastructure and cities | • **Iberdrola**: Pioneer in focusing on renewable projects  
• **E.ON**: Focus on grid and new business models (innogy deal) |

| EU Emissions Trading System | • Investment in **new technologies** (e.g. e-mobility, smart infrastructure)  
• Investment in **sustainable supply chain** with focus on green procurement and CO₂ neutral production | • **Siemens**: Carbon neutral by 2030  
• **Bosch**: Work climate-neutral within one year and is investing on billion  
• Investment in **e-mobility start-ups** |
| EU Action Plan on Human Rights and Democracy (2012) | • Development of **sustainable packaging models**, e.g. plastic-free household, reduced packaging, design for recycling and reuse  
• Investment in **sustainable inventory management models**  
• Investment on **social responsibility at workplaces** | • **H&M**: Old cloths can be turned in at H&M stores; vouchers in return  
• **IKEA**: Wood from sustainable forests, net energy exporter by 2020; solar panels powering stores |
Thyssenkrupp aims to decarbonize its entire steel production by following two distinct CO₂ reduction approaches

**Case study: Thyssenkrupp’s journey to carbon neutral steel production**

**CO₂ usage (Carbon2Chem)**

**From 2018**
With the “Carbon2Chem” project, waste gases that accrue during steel production are further processed. In 2018, ammonia and methanol were produced in this way for the first time.

**From 2020**
From 2020 the industrial pilot phase will begin, in which methanol will be produced from the actual steel mill gases.

**2025**
By 2025 Thyssenkrupp will have established a large-scale plant on an industrial level. The German government is supporting the project with more than 60 Mio EUR.

**From 2019**
Injection coal at the first blast furnace is successively replaced by hydrogen. With this measure in the production process about 20% of the CO₂ emissions that would otherwise occur can be saved.

**From 2022**
All three other blast furnaces are gradually being converted to hydrogen. The supply is ensured by a network of pipelines operated by Air Liquide.

**From 2024**
Change in the production process: hydrogen-powered direct reduction plants produce so-called sponge iron instead of liquid pig iron, which further reduces CO₂ emissions.

**2025 - 2050**
Sponge iron is processed into crude steel in a climate-neutral way using new electric arc furnaces, supplied with electricity from renewable energy sources.

**CO₂ avoidance (Hydrogen)**

**2030 - 30% CO₂**

**Total transformation costs until 2050:** ca. 10 bn EUR
With its “Value-to-Society” method, the negative and positive effects of BASF’s business operations can be made measurable.

Case Study: BASF’s Value-to-Society accounting

BASF
We create chemistry

“Business success tomorrow means creating value for the environment, society and business”

(Saori Dubourg, BASF Board Member)

- Value-to-Society is BASF’s approach in the market to provide a comprehensive picture on value creation
- Human well-being the yardstick provides a new perspective on company performance
- Monetary metrics enable direct comparison and improve understanding of interdependencies of economic, social and environmental aspects
- Represents the most promising concept to integrate sustainability in management accounting so far

BASF is founding member of the Value Balancing Initiative®, which is also supported by PwC

Sustaining values
Strategy&
Source: BASF company publications, website, executive speeches

2020

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With our complete and differentiated offering from strategy through execution we are able to provide end-to-end support

<table>
<thead>
<tr>
<th>Sustainable value creation</th>
<th>Responsible investment</th>
<th>Sustainable supply chain</th>
<th>Corporate digital responsibility</th>
<th>Sustainable transformation</th>
<th>Holistic consulting approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy</td>
<td></td>
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<tr>
<td>• Company values and contribution</td>
<td>• Investment criteria to decide on the right investments</td>
<td>• Sustainable supply chain integration</td>
<td>• Overarching strategy for digital value creation</td>
<td>• Definition of identity and transformation strategy</td>
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<tr>
<td>• Sustainability and climate strategy</td>
<td>• Sustainable portfolio</td>
<td>• Sustainable supply chain (source, make, deliver) set up</td>
<td>• Connectivity and technology implementation in daily business</td>
<td>• Purpose-led and impact organizations</td>
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<tr>
<td>• New biz models and technology</td>
<td></td>
<td>• Partnerships in the ecosystem</td>
<td></td>
<td>• Capability requirements</td>
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<tr>
<td>Operating model</td>
<td></td>
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<tr>
<td>• Governance and steering</td>
<td>• Allocation of capital/deals selection</td>
<td>• Sustainable supply chain (source, make, deliver) set up</td>
<td>• Connectivity and technology implementation in daily business</td>
<td>• Change Management</td>
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<tr>
<td>• Organizational embedment</td>
<td>• Integration in processes</td>
<td>• Partnerships in the ecosystem</td>
<td>• Partnerships in the ecosystem</td>
<td>• Change Management</td>
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<tr>
<td>• Strategy execution</td>
<td>• Strategy execution</td>
<td>• Partnerships in the ecosystem</td>
<td>• Change Management</td>
<td>• Change Management</td>
<td></td>
</tr>
<tr>
<td>Steering, reporting, assurance</td>
<td>• Integrated P&amp;L and reporting based on future accounting</td>
<td>• Monitoring of company value based on sustainable investments</td>
<td>• Adherence to transparency and standards (e.g. with suppliers)</td>
<td>• Transformation impact measurement</td>
<td></td>
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<tr>
<td>• Impact valuation</td>
<td>• Monitoring of company value based on sustainable investments</td>
<td>• Sustainability impact measurement</td>
<td>• e.g. data protection, privacy</td>
<td>• Behavioral change measurement</td>
<td></td>
</tr>
</tbody>
</table>

- Continue with existing internal initiatives
- Focus area internal investment
- Potential further internal investment
We can support your sustainability agenda end-to-end, addressing what matters to you

**pwc**

- How can the value and sustainability of a company be measured?
- How can we define worldwide comparable standards?
- How should the future company reporting look like?
- How will future auditing look like considering the increasing importance of sustainability?

**strategy&**

- What are key factors to act sustainable?
- How can companies integrate sustainability in strategic decisions (trade-offs/optimization)?
- How can a company increase its competitiveness in a sustainability-oriented landscape?
- How can a company steer its business to creating lasting value?

**pwc**

- How strong will investors be influenced in the future by sustainability?
- What will be the main KPIs for a sustainable investment portfolio?
- How can investors decide on sustainable investments?
- Which external factors like regulatory will force investors to act sustainably?

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