

+ Identifying & Setting Priorities Through Road Mapping of Decarbonization Projects



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Investing in Decarbonization:

REGULATORY


BBC
Climate change: UK to speed up target to cut carbon emissions
 Climate change: UK to speed up target to cut carbon emissions ... Radical new climate change commitments will set the UK on course to cut ...
 1 week ago




B Bloomberg.com
EU Wants Tougher Climate Disclosure Rule as Firms Lag ...
 Under the proposal, an advisory group would draft new standards. A mandatory audit requirement would be incorporated, to ensure that ...
 1 week ago




Global News
Biden announces U.S. will halve its emissions by 2030
 The Biden administration on Thursday pledged to slash U.S. greenhouse gas emissions by 50 to 52 per cent from 2005 levels by 2030.
 1 day ago




Global News
China, Russia join U.S. promising emission cuts at virtual climate summit
 But the U.S. summit also marshaled an impressive display of the world's most powerful leaders speaking on the single cause of climate change.
 1 week ago



AFR
Australia's top emitters told to draw net zero road map
 The Investor Group on Climate Change, the Australian body closely linked to ... However, the pathway to scope 3 net zero by 2050 remained unclear. ... AGL, Santos, Woodside, Woolworths, Qantas, South32 and Wesfarmers.
 Sep. 14, 2020




CBC.ca
Ottawa to hike federal carbon tax to \$170 a tonne by 2030
 Climate Action Network Canada called the new pricing regime "essential" as it advocated more spending on climate initiatives. Clean Prosperity ...
 Dec. 11, 2020




SHAREHOLDERS


GreenBiz
BlackRock steps up investor pressure on its portfolio polluters ...
 "We may also support shareholder proposals that we believe address gaps in a company's approach to climate risk and the energy transition."
 1 month ago




Environment Analyst
ESG reporting mandatory for large EU companies
 Valdis Dombrovskis, executive VP of the European Commission for its 'an ... the financial system to support investments for climate change.
 3 days ago




The Telegraph
Barclays accused of bankrolling oil giants despite climate pledge
 The figures come as shareholders pile pressure on to the bank over its climate change policies for the second year in a row as it remains one of ...
 3 weeks ago



Financial Post
Mark Carney's big stumble at Brookfield intensifies focus on net-zero emissions claims
 A major stumble by UN climate adviser Mark Carney over the carbon accounting methods used by Brookfield Asset Management Inc., where he ...
 3 days ago




Reuters
BMO targets net zero emissions in lending by 2050, cautions against 'abrupt' change
 TORONTO (Reuters) - Bank of Montreal said on Wednesday it is targeting net zero emissions in its lending portfolio by 2050 and will double its ...
 1 month ago



CONSUMERS


Argus Media
US green aluminum premium to emerge in 2022: Rusal
 US green aluminum premium to emerge in 2022: Rusal ... US consumers of primary aluminum purchase metal by adding an upcharge, the ... year as tight supply and strong demand from the building and construction industry ...
 1 day ago








Bloomberg.com
Aluminum Buyers Are Going Green in Europe
 Buyers pay \$14-a-ton extra premium for low-carbon aluminum · Harbor Intelligence sees sharp demand by Europe's auto sector ...
 Feb. 5, 2021

American Metal Market
Low-carbon Al mart needs more transparency
 Stakeholders from aluminium producers to downstream consumers in ... Natixis green and sustainable asset originator Anne-Claire Lejeune ...
 1 week ago

Metabulletin.com
INTERVIEW: Aluminium consumers step up demand for ...
 INTERVIEW: Aluminium consumers step up demand for sustainable metal, Alcoa exec says. Aluminium consumers are stepping up demand for ...
 1 day ago




The road to net zero:

<p>F Forbes</p> <h3>A Fifth Of World's Largest Companies Committed To Net Zero Target</h3> <p>I write on climate change, environment and public health. 2 hours ago</p>	
<p>GB GreenBiz</p> <h3>EN+ Group vows net-zero emissions aluminum and energy</h3> <p>...</p> <p>In addition, the firm said that in order to put it on track for net-zero emissions across ... former U.K. energy and climate change minister Lord Gregory Barker. ... Barker emphasized that EN+ Group's metals business Rusal had a Jan. 21, 2021</p>	
<p>FT Financial Times</p> <h3>Alcoa steps up battle to cut emissions in deal with Audi</h3> <p>US industrial group Alcoa stepped up the battle to reduce emissions as it ... Audi using new technology that will involve a zero-carbon smelting process. ... agreed to buy aluminium produced using solar power from Emirates Global 1 month ago</p>	
<p>G The Guardian</p> <h3>Rio Tinto announces \$1bn spend to reach net zero emissions by 2050</h3> <p>Mining giant Rio Tinto says it wants its globe-spanning operations to reach net zero greenhouse gas emissions by 2050 and will spend ... Feb. 26, 2020</p>	
<p>FT Financial Times</p> <h3>Sanjeev Gupta pledges to invest €2bn as part of emissions fight</h3> <p>... to help the fight against climate change by reducing their carbon footprint. ... with offsetting measures, to his aluminium business, Alvance. Feb. 19, 2020</p>	

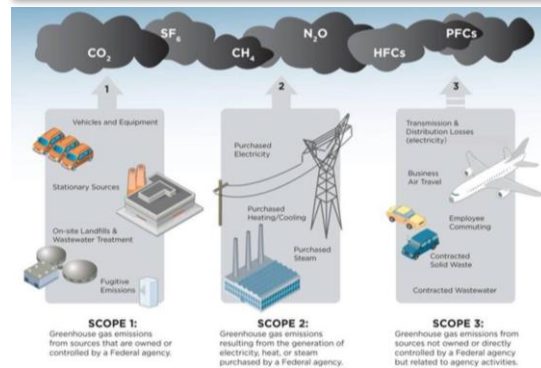


“You can’t build a road if you don’t know where you’re going, and without knowing what’s possible, you can’t set priorities”

- Michael Bloomberg, Climate of Hope

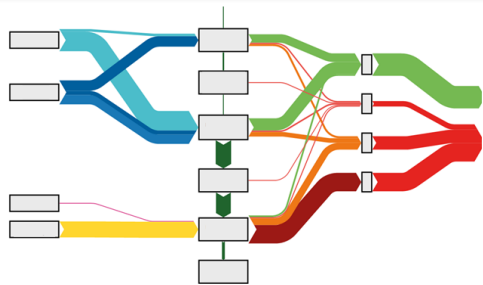
Leveraging engineering capabilities to develop & execute a decarbonization roadmap

From GHG inventories...



Source: GHG Protocol

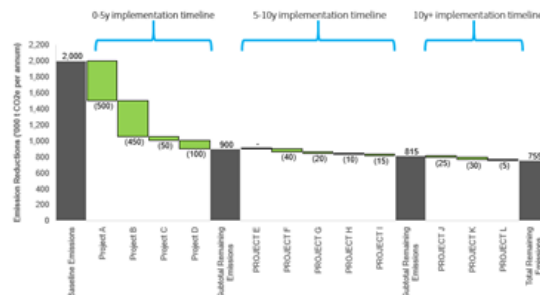
...to emissions insights



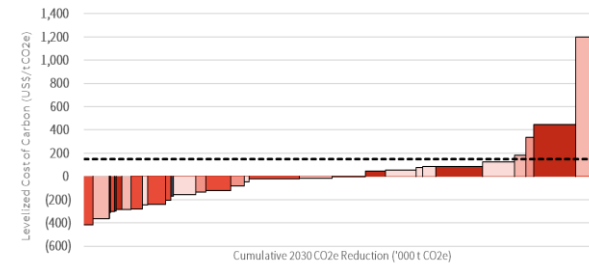
From climate change ambitions...



...to a decarbonization program



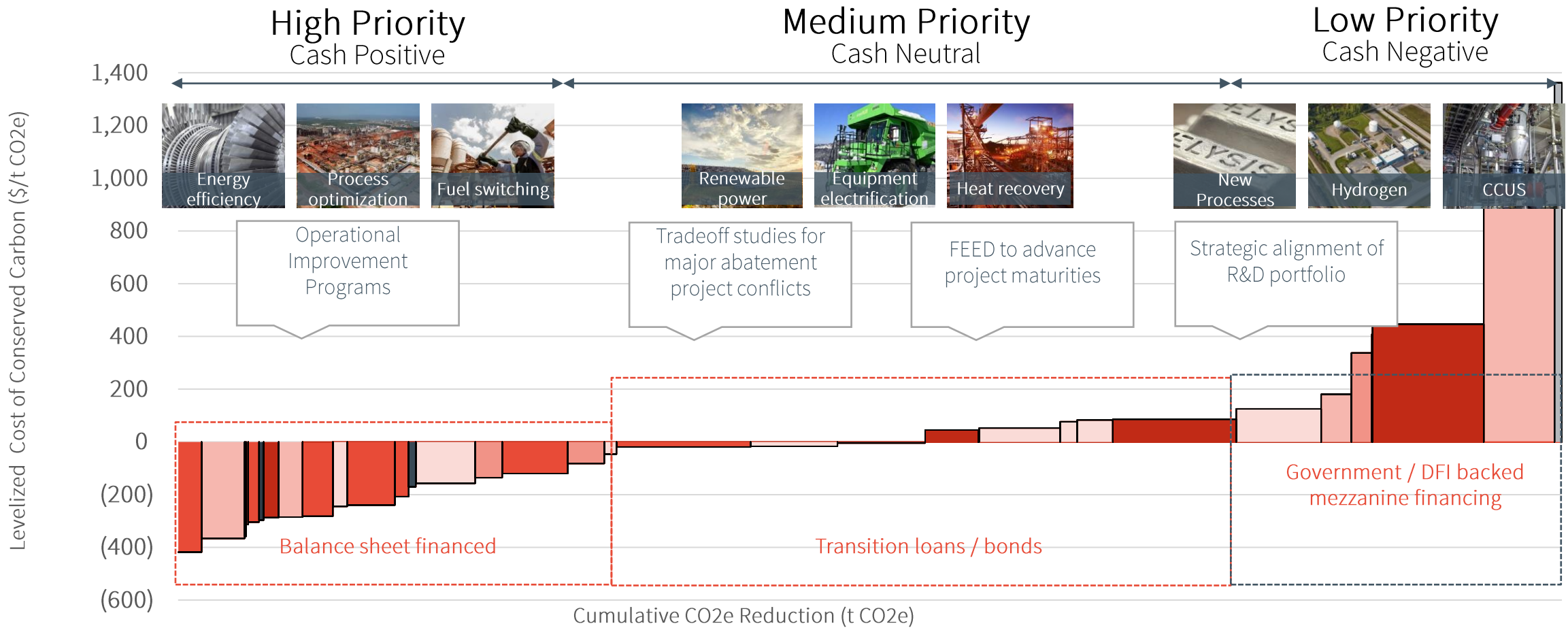
From mitigation options...



...to project execution

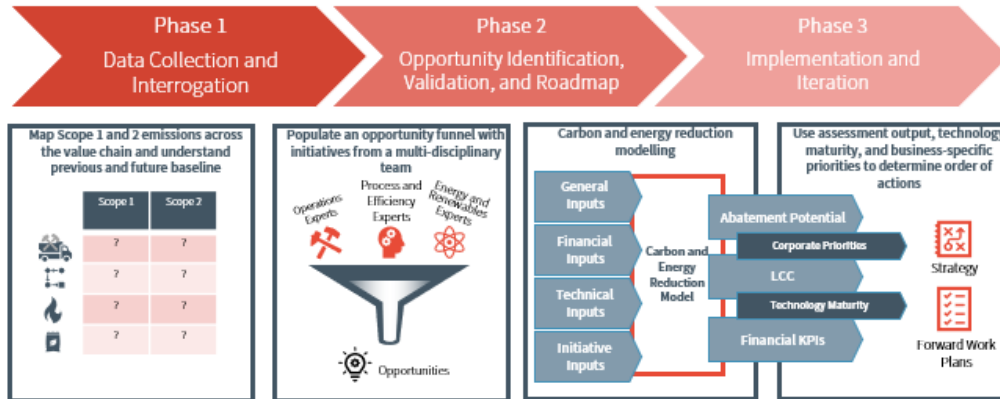


Identifying & implementing high priority projects that add value



+ Example – Vale Base Metals

20+ Mines, Process Plants, Smelters, Refineries



At least **US\$ 2 billion** investment in initiatives to reduce emissions over the next 10 years

Reduce the **carbon footprint by 33%** by 2030

2050 Carbon Neutral



Decarbonization Roadmap Learnings



Tools and methodologies designed to shift from systems for carbon emissions reporting to carbon emissions management



High level of data quality – emissions forecasts, carbon and energy flows, and capital and operating costs estimates – for decision-useful model outputs



Key project considerations – initiative interdependencies, implementation barriers, project risk profiles, and secondary KPIs – assessed during roadmap development



Financial modelling approaches aligned with organization's project life cycle process for actionable decarbonization roadmaps

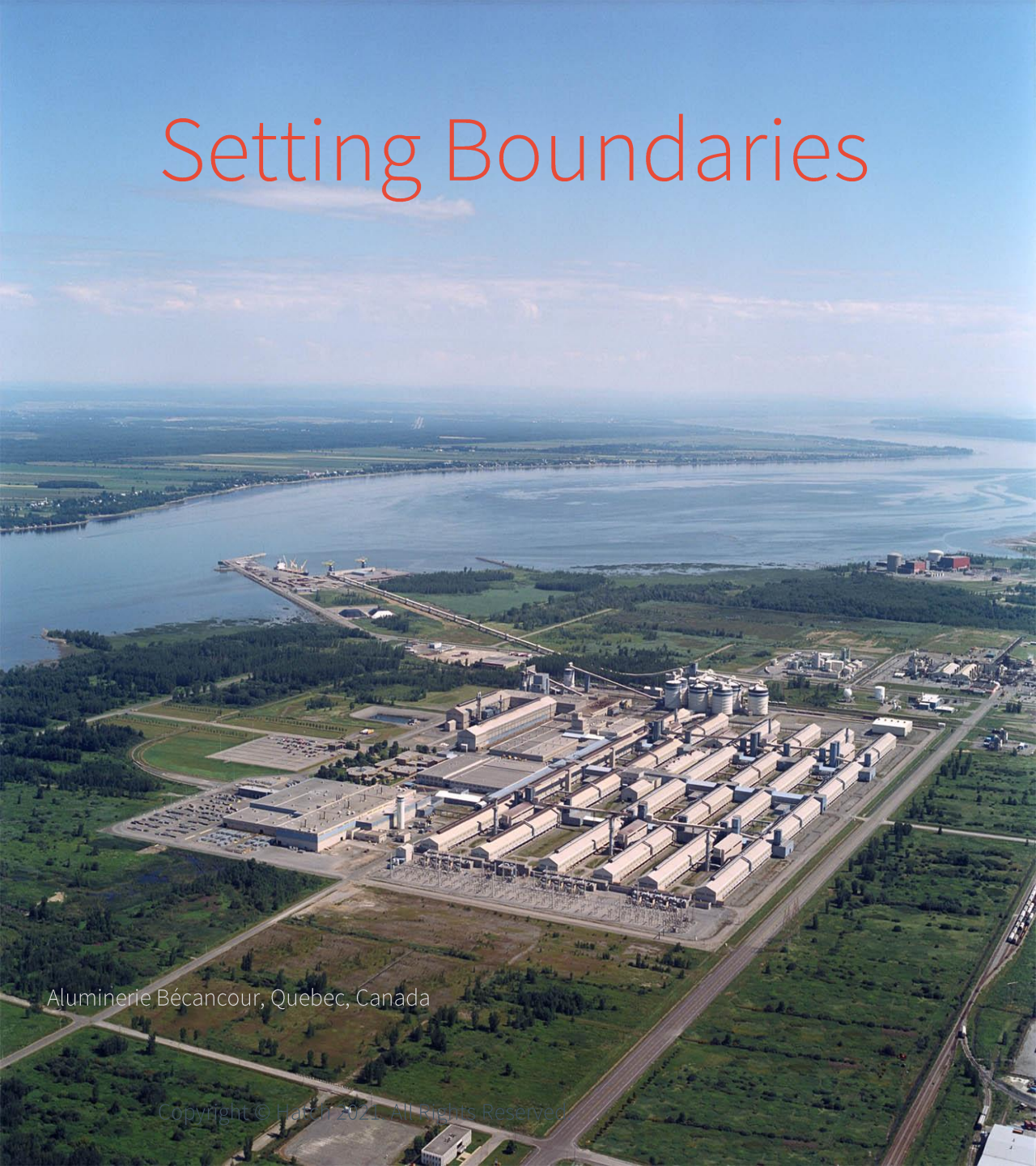


Reinforcing changing value drivers for operational performance, capital allocation, risk management, and target setting



A practical approach in primary aluminium smelting

Setting Boundaries

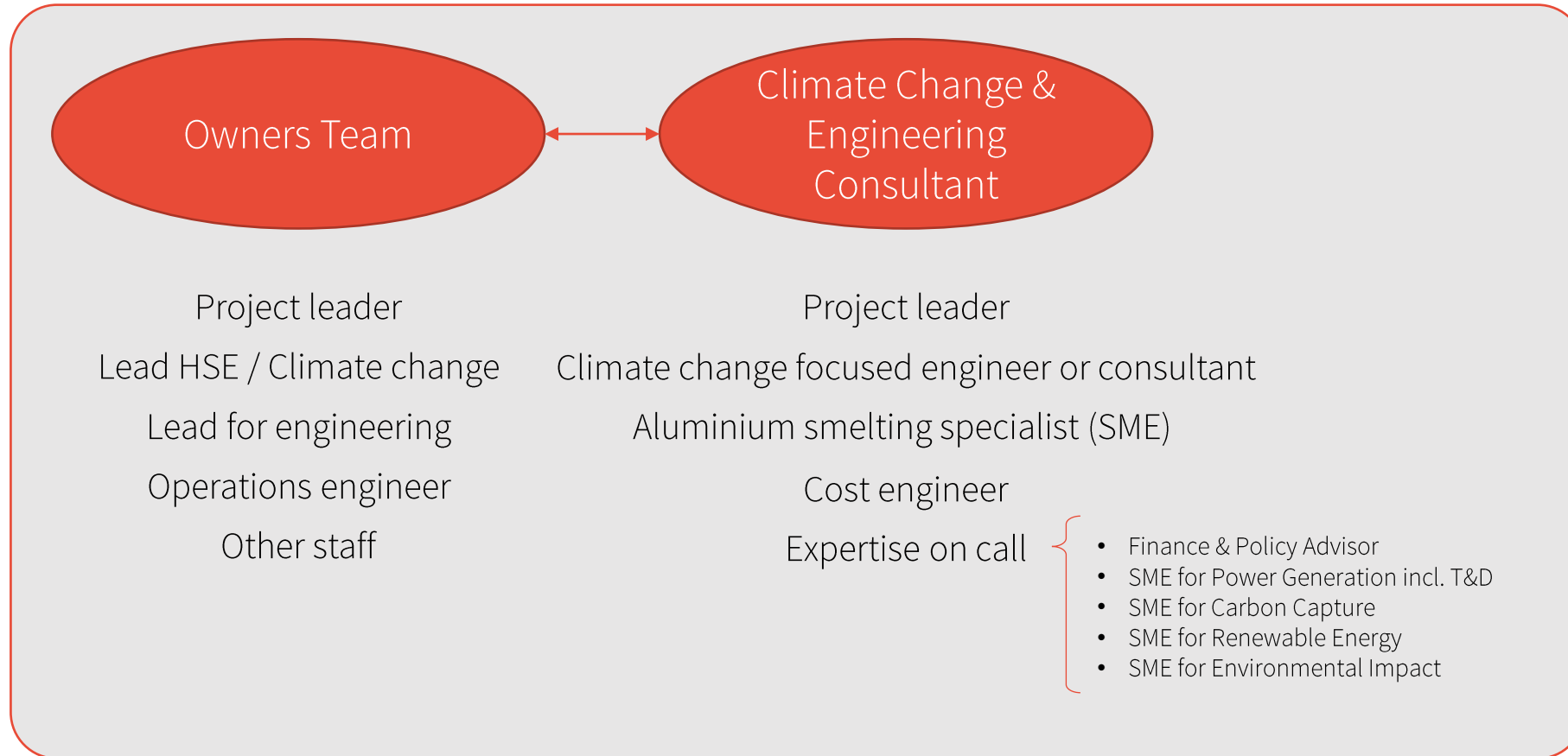


Aluminerie Bécancour, Quebec, Canada

Primary aluminium smelting complex:

- The focus is on Scope 1 and Scope 2 emissions
- Boundaries need to be set to define the task in hand:
 - Port facilities
 - Carbon facilities
 - HV power
 - Reduction facilities
 - Casthouse
 - Overall plant & general facilities

Getting organized



Finding the Opportunities

- What are all sources of GHG emissions – direct & indirect?
- How can we influence each source to reduce GHG emissions? The solutions.
 - Process and/or technology changes
 - New technology incl. out-of-the box ideas
 - End-of-pipe solutions
- The result is a long list of opportunities to reduce GHG emissions in various amounts!



Usine Alma, Quebec, Canada

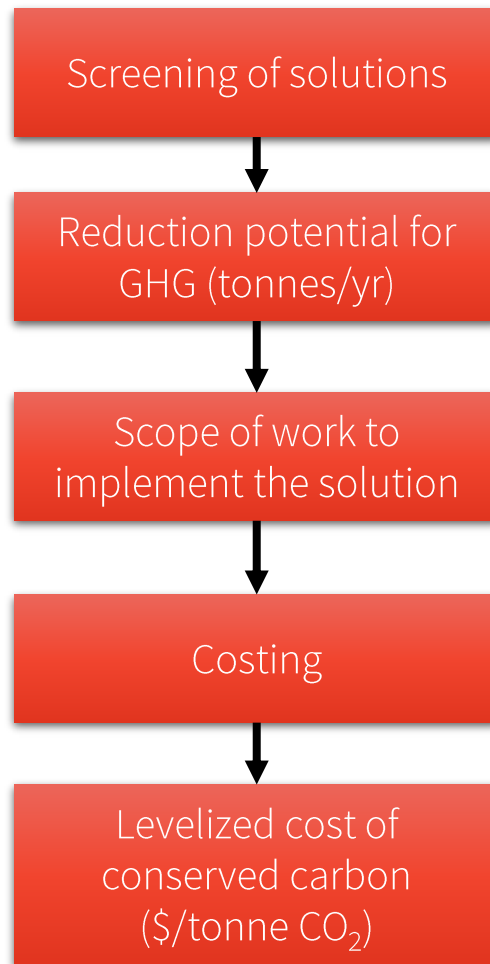
Examples of opportunities in aluminium smelting

- Electrification of vehicles incl. the idea of using AGVs
- Renewable or clean fuel in anode baking kilns
- Operational changes to lower the net carbon consumption (NCC)
- Cell design and busbar changes to lower the specific energy consumption (SEC)
- Energy efficiency improvements such as in casthouse furnaces
- The application of carbon capture
- Conversion or addition of potlines using inert anodes

...and many more



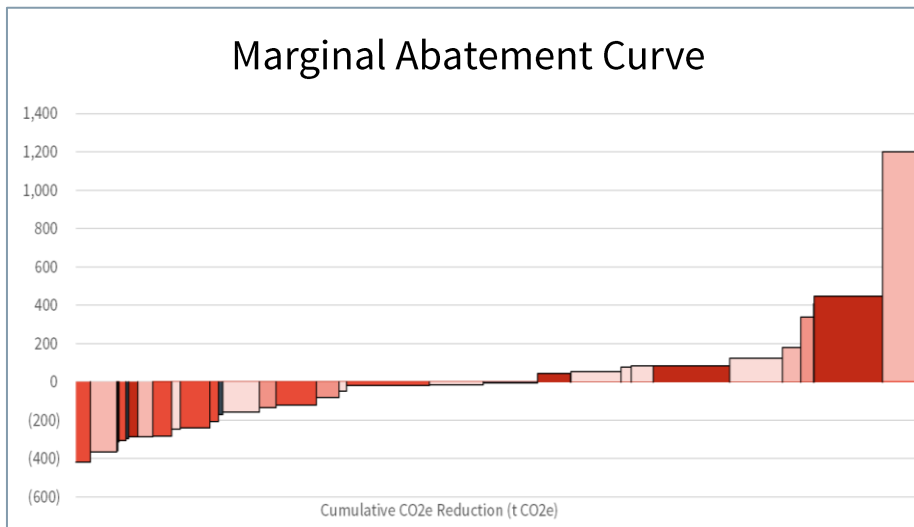
From opportunity to priority



- 1. Improved burner control
 - 2. Heat recovery for preheat of combustion gases
 - 3. New furnace
- ↓
- 1. Energy saved: 2.835 MMBTU/hr
 - 2. Fuel oil reduced: 720 m³/hr
 - 3. CO₂ reduction: 3 264 tonne/yr
- ↓
- 1. Improved burner control ✓
 - ~~2. Heat recovery for preheat of combustion gases~~
 - ~~3. New furnace~~
- ↓
- Vendor quotations for burner system upgrades
 - Project management, engineering, construction

Reference: Light Metals (2016), "FURNACE PRESSURE CONTROL TECHNOLOGY FOR FUEL EFFICIENCY", R. Voyer

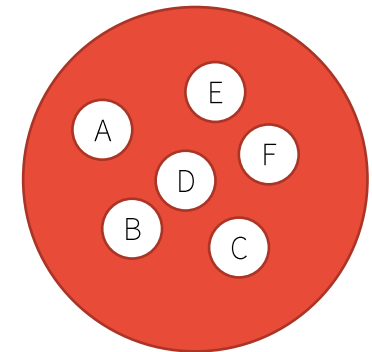
Set the priorities and identify the right target



Evaluation of
CAPEX vs. GHG
Reduction



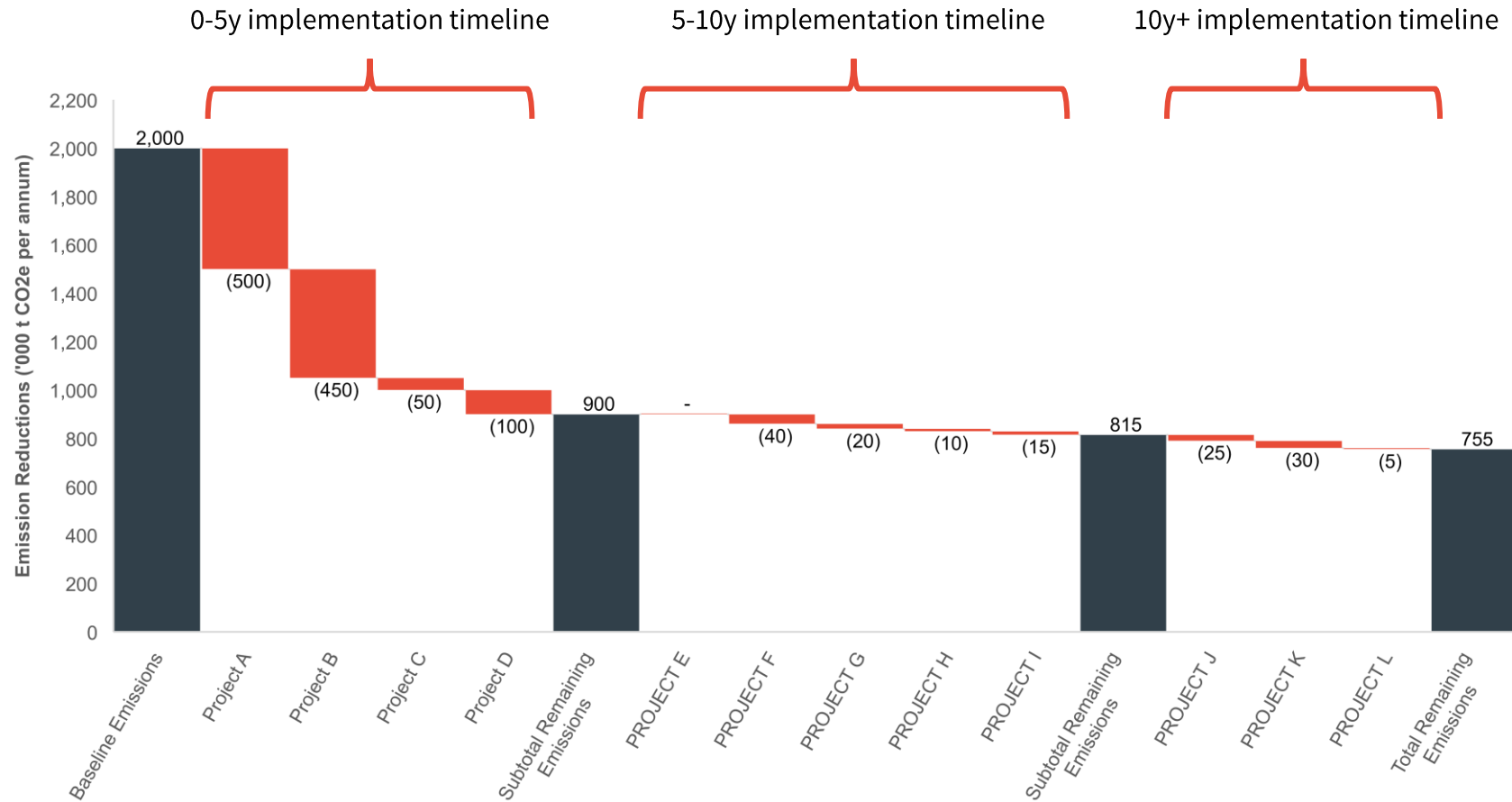
Final selection of projects



Questions asked:

- How much will this cost?
- How do we incorporate this in capital planning?
- How do plan to finance this?
- What combination of projects delivers a realistic target?
- How to align the timing of projects with meeting our target?

Building the roadmap



Ready for execution

- Once the priorities are set and the roadmap is clear, action can be undertaken to work towards achieving the target.
- Expenditures can now be properly planned for.
- Project teams can detail the scope of work for each selected project and finalize the strategy how to implement them.
- Well defined projects can now be implemented.
- Results are measured and checked back against the roadmap.
- Adjustments are made along the way.
- Once all projects are in place... (it is likely) that a new, lower target is set!



Conclusions

- Actions are needed to improve our footprint and impact on our current environment.
- Climate Change is complex, and foremost, it is new. There are still many discoveries to make.
- An increasing number of forces are building that require aluminium producers to develop and implement their own roadmaps to achieve new GHG emission levels.
- Presented is a practical approach based on structured methodologies can be applied to come to a realistic, attainable roadmap.
- Some important factors are:
 - Put the right team of people together
 - In-depth expertise in processes and technologies is of utmost importance
 - A good screening of solutions is key to finding the right tools for the roadmap
 - Once the pieces of the puzzle have been developed the road map can be constructed and a realistic target can be set.
- By doing the homework right, execution can start right away and the journey begins!



Thank you. Any questions?



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