The roadmap to decarbonization

The Zero Carbon Project by Schneider Electric

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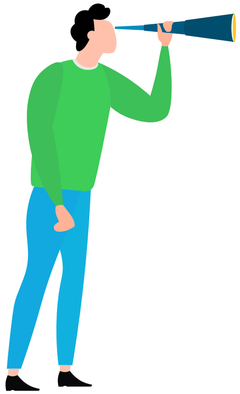
Life Is On Schneider Electric

At the heart of The Zero Carbon Project are 3As

Analytics

Quantify the carbon footprint



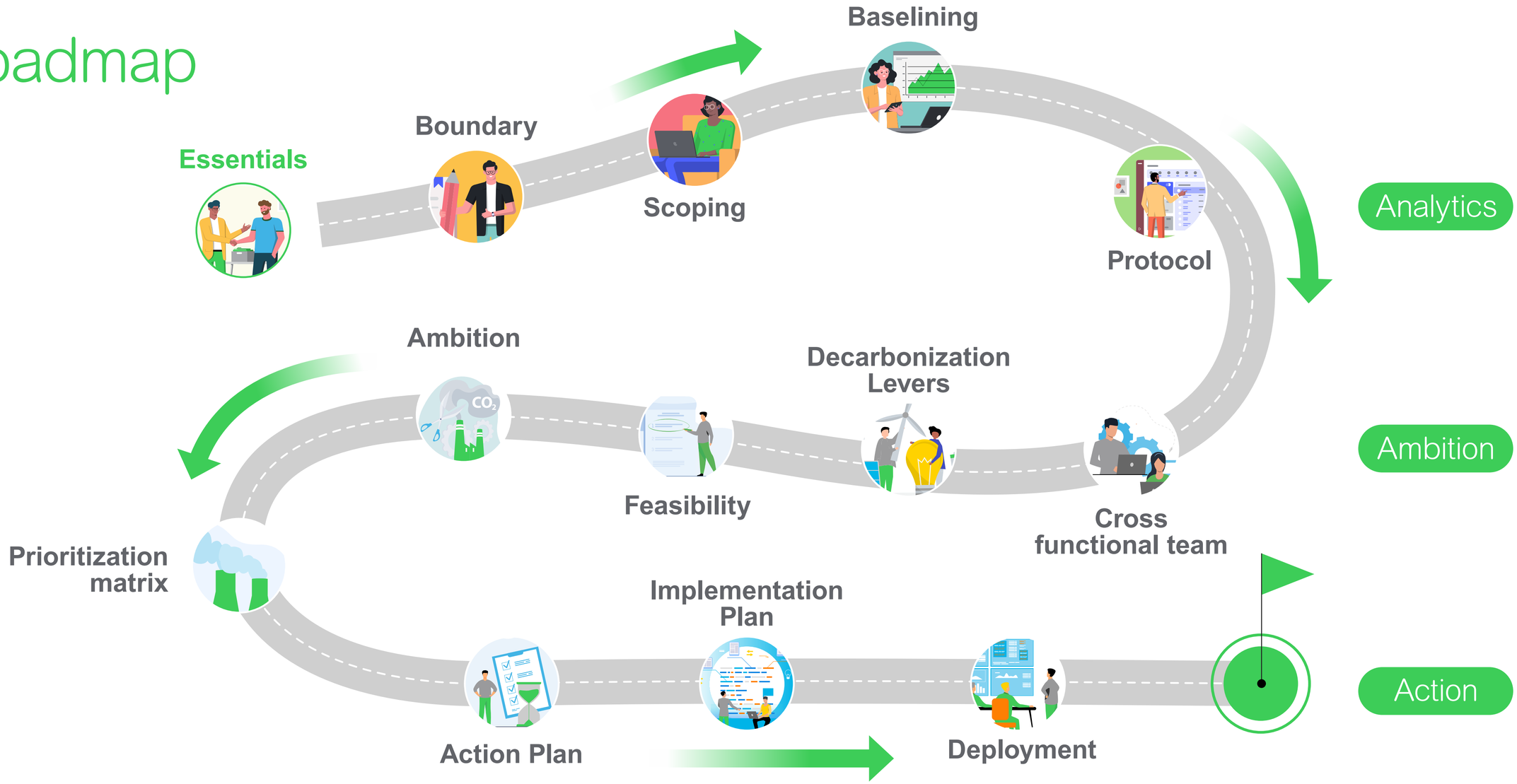
Ambition

Take ambitious targets for emission reduction

Action

Create implementation plan to achieve

Roadmap


Essentials
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Ambition
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Action Plan
Implementation Plan
Deployment
Action

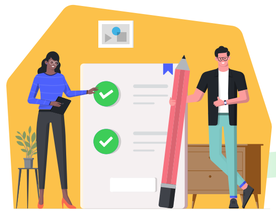
Analytics

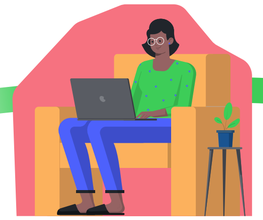
Essentials

Governance

- Obtain sponsorship from company leadership.
- Nominate a climate leader to coordinate actions and calculate/report carbon emission.
- Constitute group of senior leaders (representing key functions) to authorize company wide actions.
- Build capacity of the Climate Leader - this could be a gradual process.

Analytics - Important 1





Boundary

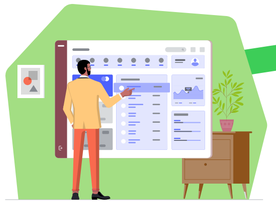
- Select the entities for which carbon emissions will be measured and reported (boundary).
- These entities form the boundary of The Zero Carbon Project.
  - E.g. factory, office, warehouse, rented space/owned space.
- Exclusions if any need to be reported.
- Record as a Word document.

Scoping

- Identify network of SPOC (single point of contact) for each entity within boundary – as owners of relevant data/site info.
- Identify and record the sources of carbon emissions at each site.
- Review the availability of data at all in-boundary sites:
  - Scope 1- fossil fuel consumption
  - Scope 2- purchased electricity/heat

Scoping - Basic understanding

Scoping - Emission boundary



Protocol

- Establish the frequency/template for collecting relevant data at site level and protocol for communicating centrally.
- In case of missing data, either declare or make assumptions to report estimated data.
- Maintain the evidence trail for the energy data reported.
- Review the reported data periodically (quarterly) to identify anomalies.

Protocol - Important 2

Baselining

- Select the historical year for which most of the data is available with evidence.
- Create sitewide inventory of all energy sources and volumes consumed for the year.
- Convert the energy sources into CO_2e by using relevant emission factors:
  - Ensure consistency of the units of measurement

Baselining - Calculation 1

Baselining - Calculation 2

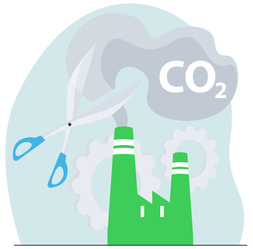
Ambition

Cross-functional team

- Create cross functional team of key departments at each site.
- E.g. Operations, Engineering, R&D, Maintenance, Planning etc.

Decarbonization levers

- Conduct process review at each site to identify actions that can be implemented to decarbonize:
  - Gather suggestions from cross functional team.
- Use the three levers to identify potential actions:
  1. Efficiency – potential options for increasing energy efficiency
     - behavioral
     - process
  2. Electrification – potential to electrify fuel intensive processes
  3. Decarbonization – Explore instruments to “green” the purchased electricity (PPA, Renewables-on/offsite, EACs etc)



Ambition

- Collate the list of actions screened through the feasibility analysis.
- Quantify the cumulative CO_2 reduction potential
- Compare the CO_2 reduction with baseline CO_2 emissions.
- Declare the percentage of CO_2 emissions reduction along with target year.

Feasibility

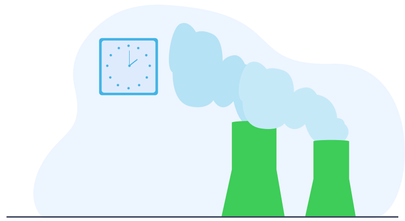
- List all identified action and conduct feasibility analysis (financial, technical, CO_2 saving potential) for each action.
- Classify all identified actions based on scale of implementation time frame:
  - Short term - within 1 year
  - Medium term - 1-3 years
  - Long term - 4-5 years

Useful resource:

Methodology guidance:
Science Based Targets Initiative

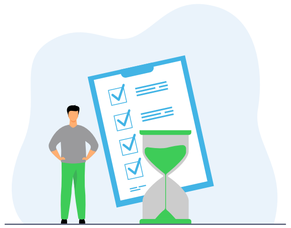
GHG datasets:
We Mean Business
EV100
RE100

Action



Prioritization matrix

- Create prioritization matrix for all actions by combining timeline and decarbonization lever.

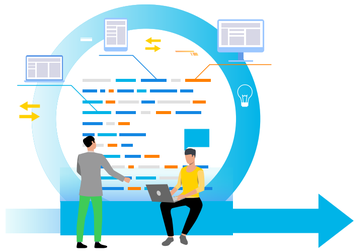


Action plan

- Combine all identified actions in timebound action plan:
  - Action to be implemented
  - Lever
  - Time of implementation (month/year)

Deployment

- Activate the implementation.
- Monitor the implementation plan.
- Keep company leadership apprised of the progress.
- Communicate to external audience the commitment and the progress.



Implementation plan

- For each action create an implementation plan, including:
  - Preparatory steps
  - Approvals required
  - Human resources involved
  - Timelines
  - Risks/challenges
  - Resolution mechanism

Analytics – Important

Back to Analytics

Start the journey with basics, dont wait to get everything right at first

- If gathering data for any activity stream is not possible in year 1:
  - exclude it for year 1 and declare it
  - Put in process to gather data
  - Include in the baseline and restate when the data available (pro rata basis)

Key quality parameters:

- Transparency – documentation on boundary, scope, data, emission factors
- Completeness – All emission sources to be covered; exclusions to be stated/reasons
- Consistency – Same approach/categories reported Year on Year – any changes require redoing baseline
- Comparability – Follow standard approach for comparability with other companies
- Accuracy – Calculations based on primary data – estimations to be reported

Analytics – Important

Back to Analytics

Quality check

- When using excel sheets
  - Clearly reference to the data source of any numbers typed into the spreadsheet
  - Provide formulae for subsequent calculations, to track results to the source data
  - Clearly mark cells in the spreadsheet containing derived data as ‘results’ and annotate them as to how and where they are then used
  - Document the spreadsheet itself specifying its name, version, authors, updates, intended use and checking procedures so that it can be used as a data source of the derived results and referenced further on in the inventory process

- When using databases:
  - Clearly reference the source data tables
  - Document the database by specifying its name, version, authors, intended use

Analytics – Basic understanding

Back to Analytics

Green House Gases

- CO_2, CH_4, N_2O (~fuel combustion)
- SF_6, NF_3 (~process gasses)
- HFCs, PFCs (~refrigerant/process gasses)

Key sources

- Stationary combustion
- Mobile combustion
- Purchased electricity
- Purchased heating/cooling
- Process and refrigerant gasses

Data Sources

- Metered: Utility bills for electricity, heating etc
- Consumption: Purchase and consumption records, mileage data
- Estimation: Where accurate data not feasible, use estimates (electricity consumption in premises maintained by 3rd party- based on use intensity)

Analytics – Emission boundary

Back to Analytics

Scope 1

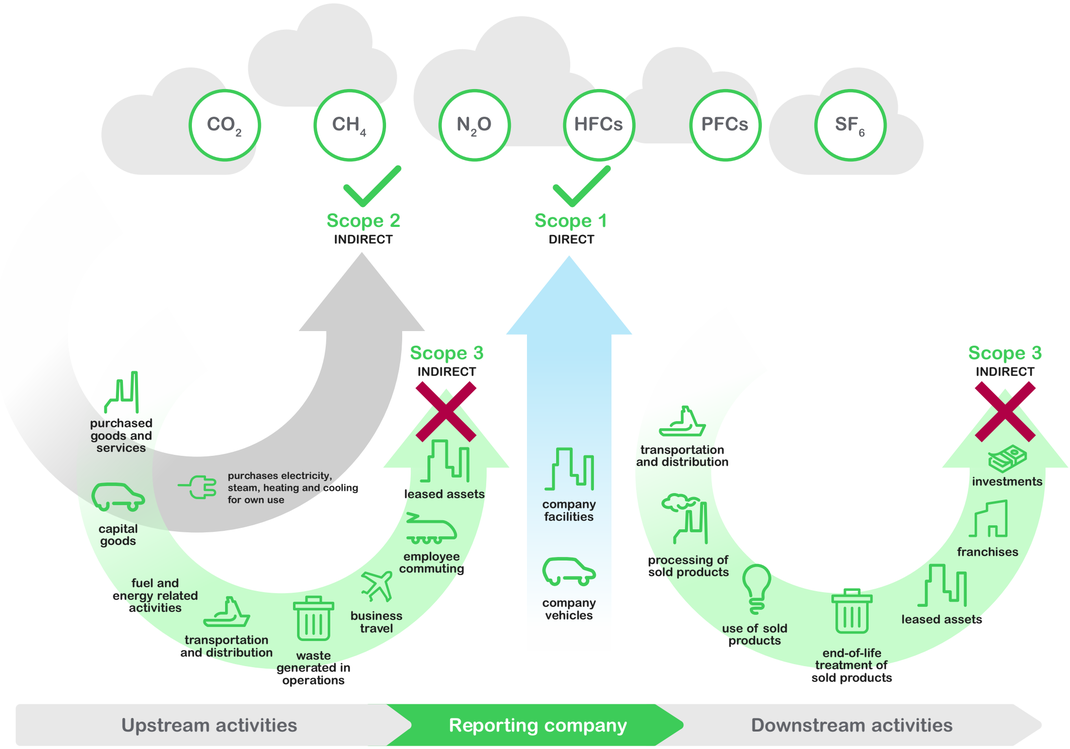
- Direct emissions resulting from combustion of fossil fuels within facility + leakage of refrigerant gases + vehicle usage
- Natural gas, Fuel oil, High Speed Diesel, Gasoline, Propane,
- Refrigerant and process gasses
- Vehicular use of Gasoline, High Speed Diesel

Scope 2

- Indirect emissions resulting from purchase of electricity and heating/cooling
- Electricity, Steam/Heat, Chilled water

Scope 3

- Indirect emissions in value chain resulting from purchase of goods and services + use of products
- Upstream- Purchased goods/services, capital goods, upstream transport, waste generated, business travel, employee commuting, leased assets
- Downstream- transportation, processing and use of products, end of life treatment



Analytics – Calculation

Back to Analytics

Scope 1 Emissions: Stationary and mobile combustion

1. Identify various types of fuels consumed at the site
2. List the quantity of various types of fuel along with units of measurement
3. Convert fuel into carbon emissions

i. Fuel (vol/mass/energy) X CO2e Emission Factor

Fuel into CO_2e conversion

i. Fuel volume (litre) X density (kg/litre) = Fuel mass (kg)
ii. Fuel mass (kg) X energy (net calorific value) = Energy (TJ)

Option 1- When combined CO_2e emission factor available

i. Energy (TJ) X CO_2e Emission Factor = CO_2e emissions (1)

Option 2- When emission factor available for individual gases

i. Energy X Carbon emission factor = **CO_2 emissions**
ii. Energy X CH_4 emission factor = CH_4 emissions
   - CH_4 emission X GWP = **CO_2e CH_4**
iii. Energy X N_2O emission factor = N_2O emissions
   - N_2O emission X GWP = **CO_2e N_2O**

Refrigerant gasses into CO_2e conversion

i. Volume consumed X GWP (2)

Add (1) + (2) = Total scope 1 CO_2e emissions

Links for emission factors ,GWP

i. Carbon Emission Factors (DEFRA)
ii. Carbon Emission Factors (ADEME)
iii. Carbon Emission Factors (US EPA 2)
iv. US EPA 1
v. Global Warming Potential Values
vi. GHG emissions calculation tool

Analytics – Calculation

Back to Analytics

Scope 2 Emissions: Purchased energy

1. Gather the units of electricity from the utility bill
2. Select the carbon emission factor for the electrical grid based on region

Electricity into CO_2e conversion

i. units of electricity as per utility bill X grid emission factor

Links for emission factors ,GWP

i. UNFCCC Harmonized Grid Emission Data Set
ii. Global Grid Emission Factors (ADEME)
iii. US EPA 1
iv. US EPA 2
v. China Grid Emission Factors
vi. GHG emissions calculation tool

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