METHODOLOGICAL NOTE
FOR QUANTIFYING THE CARBON IMPACT OF PROJECTS

This note is intended to help users fill in the "low-carbon project" forms. It recalls the main concepts for assessing the carbon impact of a project. Several simple examples are also provided.

For more detail and precision, the reader can refer to the report "Net Zero Initiative: a reference framework for collective carbon neutrality".

In case of need or misunderstanding, the reader can also contact Margaux Coudour (m.coudour@afep.com) and Nicolas Boquet (fn.boquet@afep.com).

1. Reminder of definitions

To make the climate impact of a project carried out by a company visible, it is necessary to measure several characteristic variables.

A. The way in which the project reduces a company's dependence on carbon. This concerns the reduction (in absolute terms compared to an initial "pre-project" situation) of emissions induced by the project according to the different scopes described below:

- Scope 1: direct emissions generated by the company's activities.
- Scope 2: indirect emissions linked to the use of imported electricity or heat (i.e. electricity or heat taken from the local network ≠ self-consumption).
- Scope 3: indirect emissions induced by the company's activities, products, services at its suppliers or customers.

For example: if a company launches a project to transform its production facilities in order to use heat produced from (low-carbon) electricity rather than coal on its site:

- *It significantly reduces its scope 1 (it no longer uses coal to produce heat)*
- *It marginally increases its scope 2 (it now uses low-carbon electricity that it did not use before)*

In the end, it is indeed a reduction of its carbon dependency that has been achieved.

B. How the project reduces the carbon dependence of others, or avoided emissions. A project avoids emissions if there is a positive gain between the emissions of the project on the one hand, and the emissions of the baseline scenario that would have occurred in the absence of the project on the other. An avoided emission is therefore the difference between a physical greenhouse gas flow that actually takes place (that of the project), and a fictitious greenhouse gas flow that, by definition, did not take place but corresponds to the reference scenario.

NB1: Avoided emissions can result from a project carried out directly by the company or from a project carried out by other actors but financed by the company.

NB2: Avoided emissions do not affect (either upwards or downwards) the company's carbon dependency. In other words, **avoided emissions are not added to or subtracted** from the emissions induced by the project; the flow of avoided emissions should be distinguished from the flow of induced emissions, **without ever adding or subtracting them**.

NB3: In the vocabulary of avoidance, one only avoids emissions for actors other than one's own organization: one cannot avoid emissions for one's own organization, one can at most "reduce" one's own emissions.

C. **How the project contributes to creating carbon sinks (or negative emissions), i.e. absorbing emissions from the atmosphere.** This refers to projects whose purpose is:

- The development of "direct" carbon sinks, i.e., "net carbon sequestering" assets owned directly by the company.
- The development of "indirect" carbon sinks, i.e. those financed by the company at its suppliers or customers or outside its value chain.

NB: Negative emissions do not affect (either upwards or downwards) the company's dependence on carbon and must be accounted for separately.

2. Suggested approach for a successful calculation of greenhouse gas emissions gains

Step 1: Clearly define the starting point (pre-project)

It is necessary to specify the physical quantities involved, especially those that lead to CO2 emissions. Generally, these quantities are the following, depending on the decarbonization levers used

- The **amount of energy consumed** (expressed in MWh) by source (fuel oil, natural gas, electricity, etc.) and if necessary by use (manufacturing process, transport, heating of buildings, etc.). For electricity, the grid from which it is drawn should be specified (national grid, self-consumption).
  *Activated Decarbonization levers: this concerns in particular **energy decarbonization, energy efficiency or energy sobriety projects***
- The **quantity of raw materials consumed** (expressed in tons or m3)
  *Activated decarbonization levers: this concerns in particular **projects for efficiency or sobriety in non-energy resources***
- The **quantity of products sold**
  *Activated decarbonization levers: this concerns in particular **non-energy resource efficiency or sobriety projects***
- The **quantity of CO2 absorbed** (in the case of a forest expansion project for example)
  *Activated decarbonization levers: this concerns in particular **carbon sink creation projects***

Step 2: Define where we are going (post-project)

This consists of describing how the situation at the end of the project will have changed, compared to the situation before the project was implemented. Several cases are possible:

- *Case of a project that focuses on reducing the company's carbon dependency (direct and indirect):*

  At the end date of the project, the evolution of the physical quantities expected to reduce the company's carbon dependence by activating the different decarbonization levers must be described. See above.

- *Case of a project that reduces the carbon dependence of other actors (outside the company itself) :*

  In this case, in addition to describing the evolution of the physical quantities involved (see above), we must also describe the baseline scenario (which would have occurred in the absence of the solution) against which the company's project will be compared. This can consist in saying that the initial situation constitutes the reference. In this case, it should be stated that: "the gain is calculated by comparison with the pre-project situation, all other things being equal".

Step 3: Be clear about the emissions factors used

The factors characterize the "carbon intensity" of the physical quantities that evolve thanks to the project. They are expressed in tons of CO2 equivalent per physical quantity considered. For example: teCO2/MWh or teCO2/Tproduct. They allow to calculate the carbon impact.

Step 4: Evaluate the carbon impact

The carbon impact is measured by comparing the pre-project situation with the post-project situation. Most often this consists of :

- Evaluating the reduction in physical carbon quantities and multiplying it by the associated emissions factor;
- If relevant, assess the change in non-carbon physical quantities and multiply it by the associated emissions factor.

3. Examples

NB: the emission factors below are purely indicative.

3.1 Case of projects that reduce the company's carbon dependency

Company A uses coal in a boiler to generate steam used in the production process of its products. It launches a project to partially replace the use of coal (-50%) with electric preheating.

Activated lever: decarbonization of energy

Pre-project situation	**Post-project situation**
Coal consumption (in tons/year) = 100 Electricity consumption (in MWh/year) = 0 Coal emission factor = 2.7 teCO2/ t_{coal} Electricity emission factor (taken from the grid) = 0.5 teCO2/MWh	Coal consumption (in tons/year) = 50 Electricity consumption (in MWh/year) = 50 Coal emission factor = 2,7 $teCO_2/t_{coal}$ Electricity emission factor (taken from the grid) = 0,5 $teCO_2$/MWh
Initial CO_2 emission = 270 $teCO_2$	Final CO2 emission = 160 $teCO_2$ **That is a gain of 110 tCO2 distributed as follows:** • Scope 1 = - 135 $teCO_2$ • Scope 2 = + 25 $teCO_2$

Company B, located in Poland, heats its buildings with a natural gas boiler and consumes electricity for all other uses of the buildings. It is launching a project to thermally insulate its buildings, install a heat pump (PAC) and install solar panels on its roof to cover its uses (incl. operation of the PAC). It is also training its employees in good energy consumption practices.

Activated levers: energy decarbonization; energy efficiency; energy sobriety

Pre-project situation	**Post-project situation**
Natural gas consumption (in t/year) = 100 Grid electricity consumption (in MWh/year) = 10	Natural gas consumption (in t/year) = 0 Grid electricity consumption (in MWh/year) = 0

Gas emission factor = 0.5 $teCO2/t_{gas}$ Electricity emission factor (taken from the Polish grid) = 0.8 teCO2/MWh	Consommation d'électricité panneaux PV (en MWh/an) = 50 Gas emission factor = 0.5 $teCO2/t_{gas}$ Electricity emission factor (taken from the Polish grid) = 0.8 teCO2/MWh Electricity emission factor PV panels= 0,01 teCO2/MWh
Initial CO_2 emission = 58 $teCO_2$	Final CO2 emission = 0.5 $teCO_2$ **That is a gain of 57 tCO2 distributed as follows:** • Scope 1 = - 50 $teCO_2$ • Scope 2 = - 7 $teCO_2$

Company C uses carbon-intensive material X in the manufacture of its products, which it purchases new. The project launched aims to use 50% of the lower carbon intensity recycled material X in the manufacturing process.

Activated lever: non-energy resource efficiency

Pre-project situation	Post-project situation
Product production (t/year) = 100 Quantity of material X per ton of product ($t_X/t_{product}$) = 0.8 Consumption of new material (t/year) = 80 Consumption of recycled materials (in t/year) = 0 New material X emission factor = 0.5 $teCO_2/t_{material\ X}$ Recycled material X emission factor = 0.2 $teCO_2/t_{material\ X}$	Product production (t/year) = 100 Quantity of material X per ton of product ($t_X/t_{product}$) = 0,8 Consumption of new material (t/year) = 40 Consumption of recycled materials (in t/year) = 40 New material X emission factor = 0.5 $teCO_2/t_{material\ X}$ Recycled material X emission factor = 0.2 $teCO_2/t_{material\ X}$
Initial CO_2 emission = 40 teCO2	Final CO_2 emission = 28 teCO2 **That is a gain of 12 tCO2 distributed as follows:** • Scope 3 = - 12 $teCO_2$ (émissions indirectes amont)

3.2 Case of a project that reduces the carbon dependence of others

Company D manufactures vehicles equipped with hydrogen (H2) engines in France. The project consists of equipping a customer's fleet with 100 vehicles to replace vehicles with diesel engines.

Activated lever: decarbonization of energy (H2 replacing diesel)

Pre-project situation	Post-project situation
At customer level No. of diesel vehicles = 100	At customer level No. of diesel vehicles = 0

Nb of H2 vehicle = 0 Diesel consumption = 1000L/year H2 consumption = 0 L/year Average distance travelled = 10000 km/year <u>At company D level</u> Number of H2 vehicles manufactured = 0 <u>Carbon intensity</u> Diesel emission factor = 150 geCO2eq/L H2 emission factor = 5 geCO2eq/L Carbon intensity of diesel vehicle = 100 kgeCO2/ vehicle H2 vehicle carbon intensity = 90 kgeCO2/vehicle	Nb of H2 vehicle = 100 Diesel consumption = 0L/year H2 consumption = 1000 L/year Average distance travelled = 10000 km/year <u>At company D level</u> Number of H2 vehicles manufactured = 100 <u>Carbon intensity</u> Diesel emission factor = 150 geCO2eq/L H2 emission factor = 5 geCO2eq/L Carbon intensity of diesel vehicle = 100 kgeCO2/ vehicle H2 vehicle carbon intensity = 90 kgeCO2/vehicle
Initial CO2 emissions (at customer level) = 15 $teCO_2$ Initial CO2 emissions (at company D level) = 0 $teCO_2$	Final CO2 emissions (at customer level)) = 0,5 $teCO_2$ Final CO2 emissions (at company D level) = 9 $teCO_2$ **Finally, the distribution is realized as follows (from the point of view of company D):** • Scope 1 = + 9 $teCO_2$ • Avoided emissions = 14,5 $teCO_2$