NEW ENERGY FOR INDUSTRY

NEFI IMPACT ASSESSMENT

Methodology explained

NEFI is an Energy Model Region funded by the Austrian Climate and Energy Fund.

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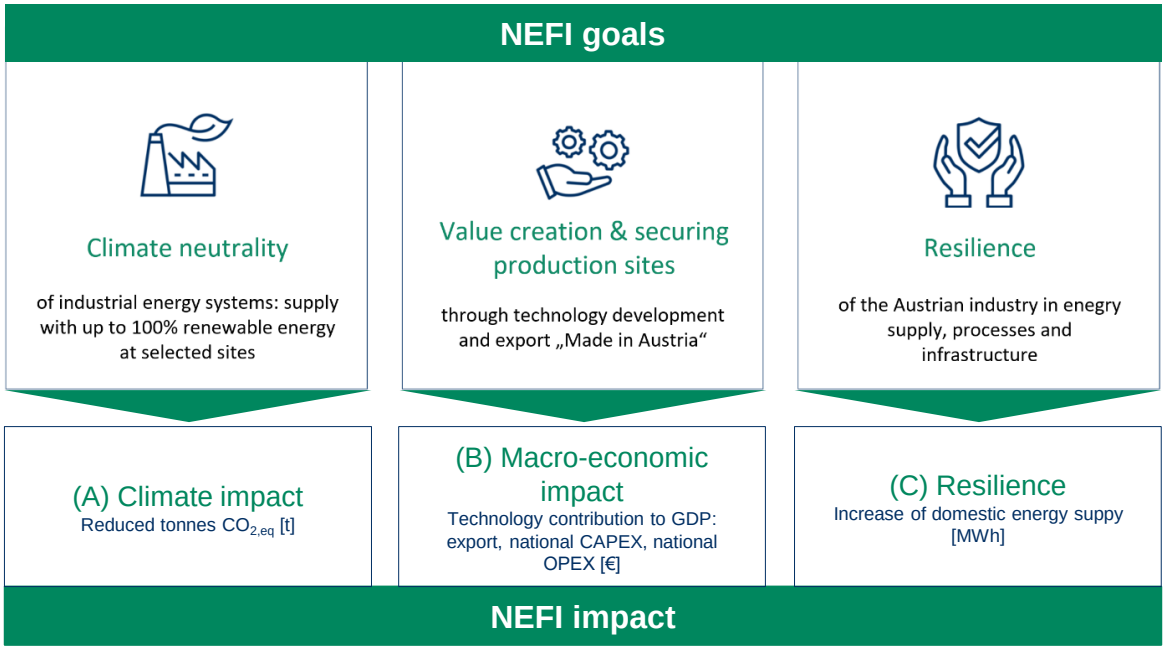
KPI Assessment Framework on Project Level

BACKGROUND IMPACT ASSESSMENT

WHAT IS THE UNDERLYING GOAL?

The Impact Assessment aims to capture the impact of the energy model region NEFI – New Energy for Industry. In the initial phase, a methodology is being developed to assess the impact along three key dimensions: (A) climate impact, (B) macroeconomic effects, and (C) resilience. These dimensions align with the goals of the NEFI program:



METHODOLOGY

HOW IS THE IMPACT ASSESSED?

(1) A specific solution is identified

(2) The impact of the specific solution at the project site is assessed along three dimensions

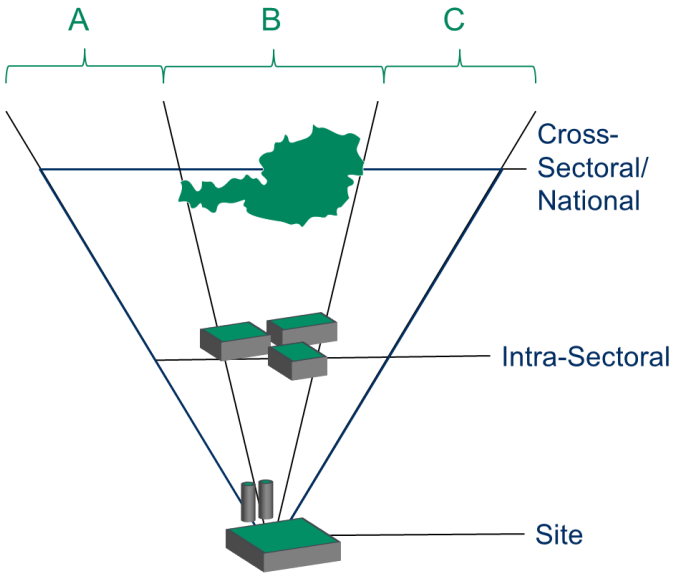
   a. Climate impact: Reduced tonnes CO2,eq [t]

   b. Macro-economic impact: Technology contribution to GDP i.e. export, national CAPEX, national OPEX [€]

   c. Resilience: Increase of domestic energy suppy [MWh]

(3) The effect of each specific solution is scaled up from project site to industry sector and cross-sectoral i.e. on national level applying key assumptions such as

   - Emission factors
   - Market size
   - Market growth
   - Diffusion of the technology



Aggregated Impact until 2030/2040

SPECIFIC SOLUTION

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DEFINITION AND CRITERIA

A specific solution is a concrete approach developed to address a certain industrial decarbonization challenge, focusing on reducing carbon emissions through practical, scalable, and measurable methods.

Criteria

- Measurable outcome along the three dimensions assessed (with (A) climate impact being a must)
- Technical, economic and operational feasibility
- Defined scope e.g. regarding industrial sectors it can be applied to
- Scalability:
    - Replicability: The solution should be replicable across similar contexts or industries.
    - Expandability: The solution should have the potential to be scaled up, both in terms of technical capability (handling larger volumes or more complex processes) and economic viability (decreasing costs as adoption grows).
- Compliance with regulations: The solution must align with existing regulations or anticipate foreseeable regulatory changes. In this regard, it should identify regulatory barriers, providing recommendations accordingly.

SPECIFIC SOLUTION

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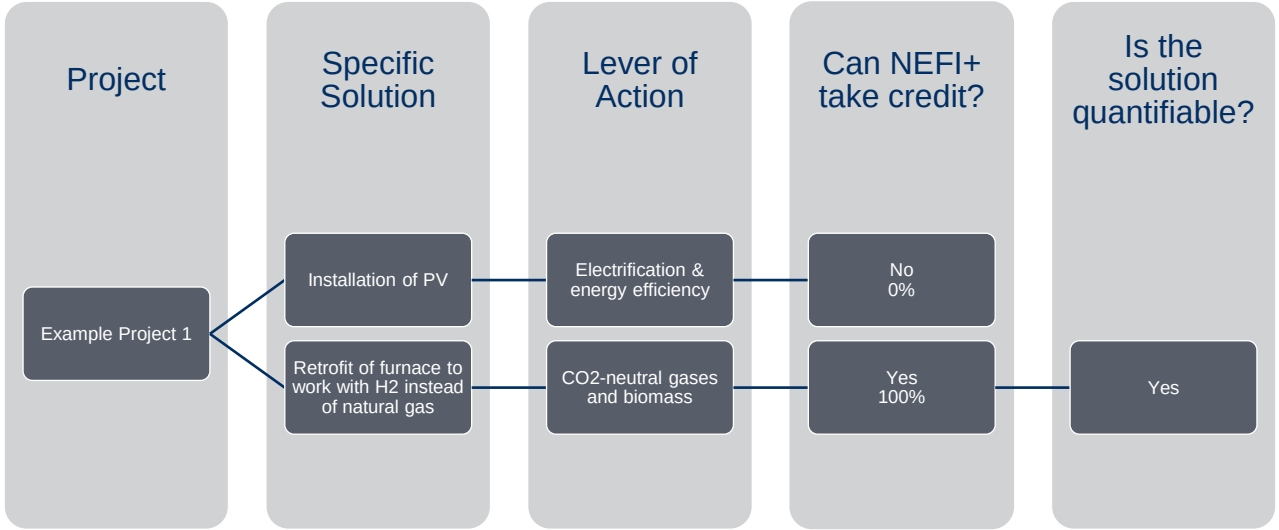
IDENTIFY AND QUANTIFY SPECIFIC SOLUTIONS

- In a reasearch project one or more specific solutions can be developed
- All the specific solutions are assessed independently from each other
- Two or more projects can address the same specific solution. A cross-check must be performed in order to avoid overestimation of the solution‘s effect or double-counting
- One specific solution can have an impact on multiple dimensions. However, since NEFI‘s overarching goal is the decarbonisation of the Austrian industry, a specific solution MUST have an effect along the climate dimension.
- A specific solution can also have a qualitative impact (e.g. increase of acceptance, academic learings etc.)

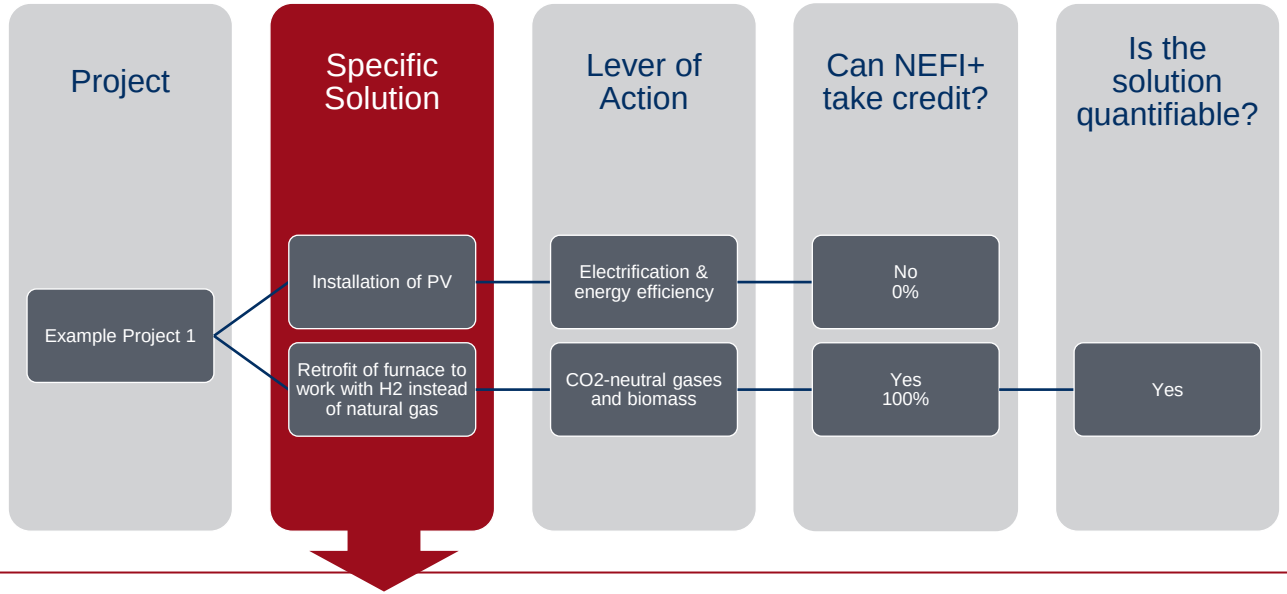
Data gathered for the quantitative assessment of a specific solution (input project leader)

- Quantified direct impact along dimensions: (A) climate impact, (B) macroeconomic impact, and (C) resilience.
- Scaling potential within sector and across sectors
- Expected diffusion factor (2025-2040 in 5-year steps)

HOW TO ASSESS A SPECIFIC SOLUTION



IDENTIFICATION OF SPECIFIC SOLUTIONS IN A PROJECT



Please list all solutions you used to address the research question. A specific solution should be clearly distinct and quantifiable and should be the result of the research project. One project can have severable specific solutions.
In the following, each of these specific solutions will be evaluated individually

CONNEX TO THE NEFI LEVERS OF ACTION FOR INDUSTRIAL DECARBONISATION

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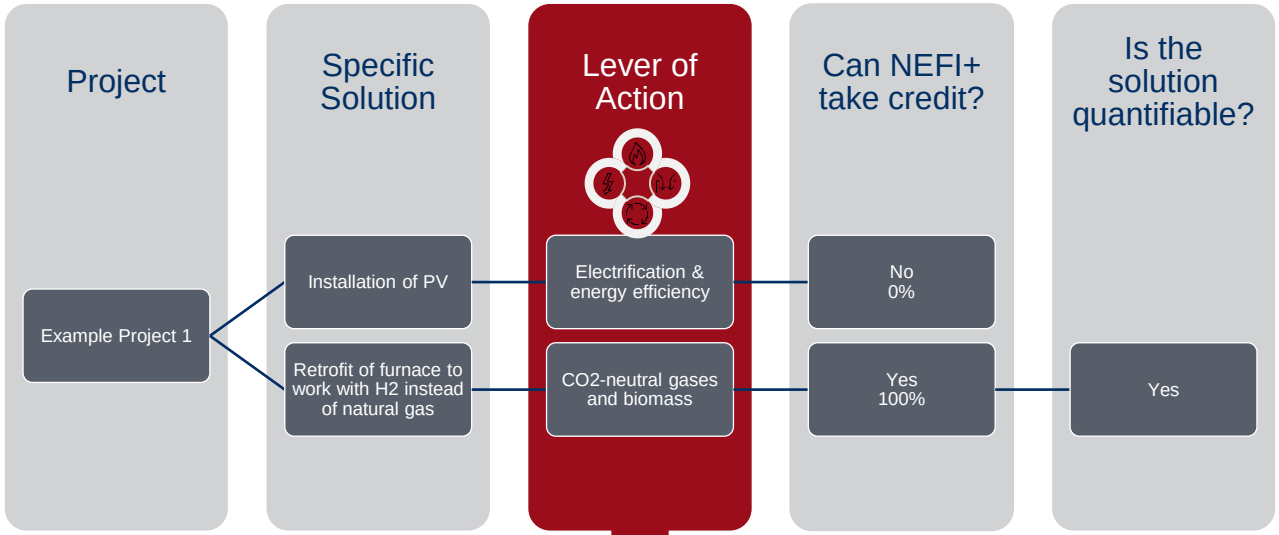
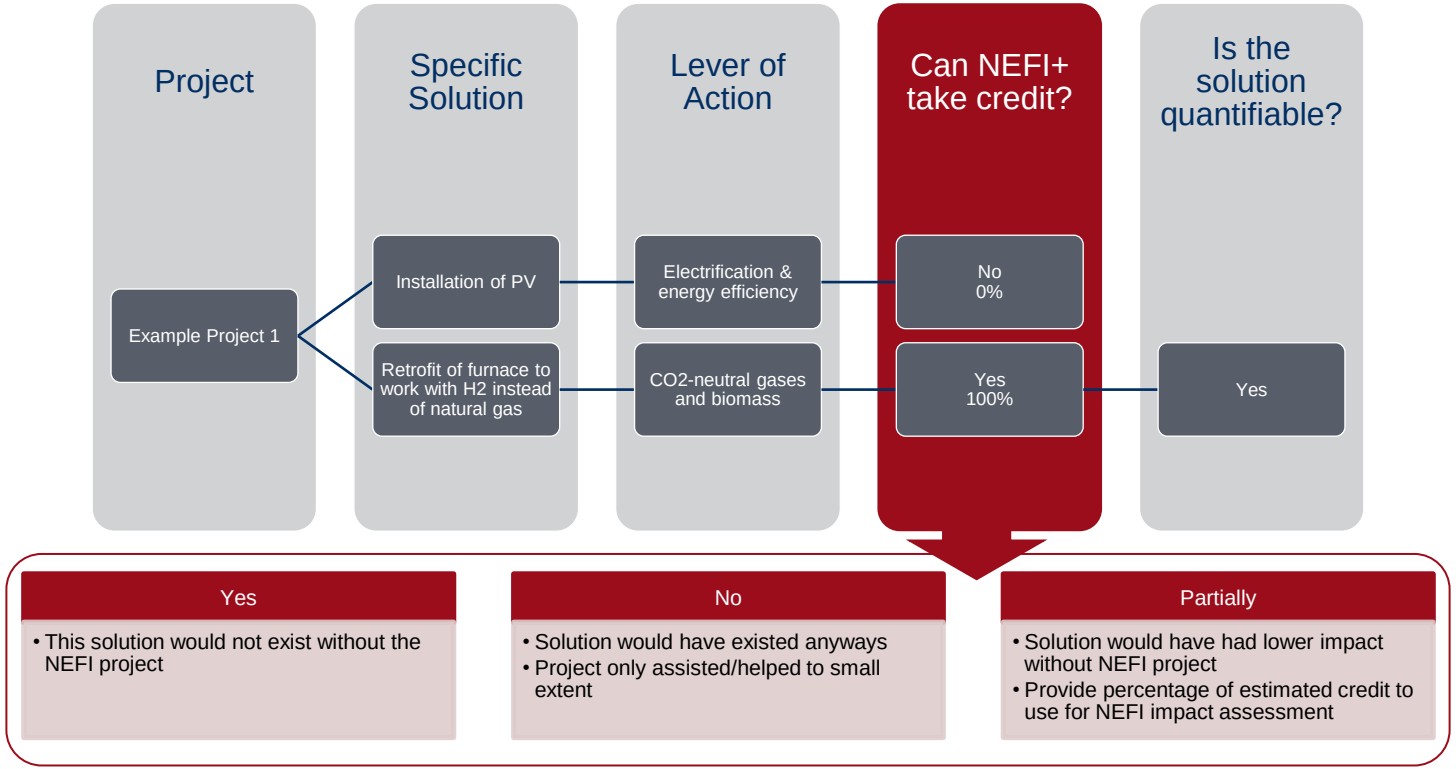
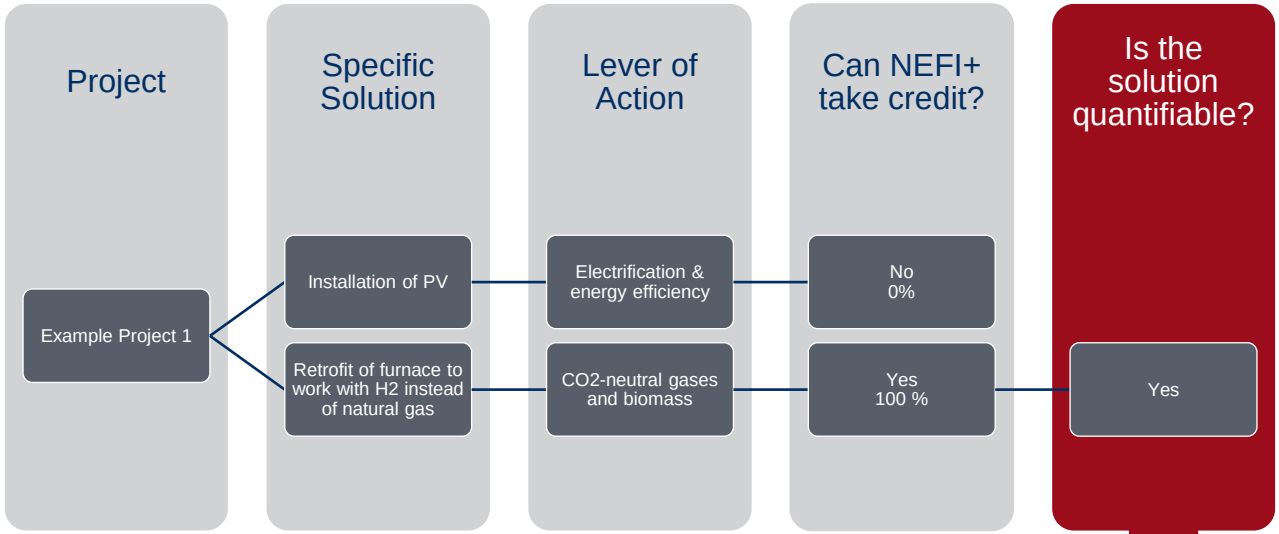


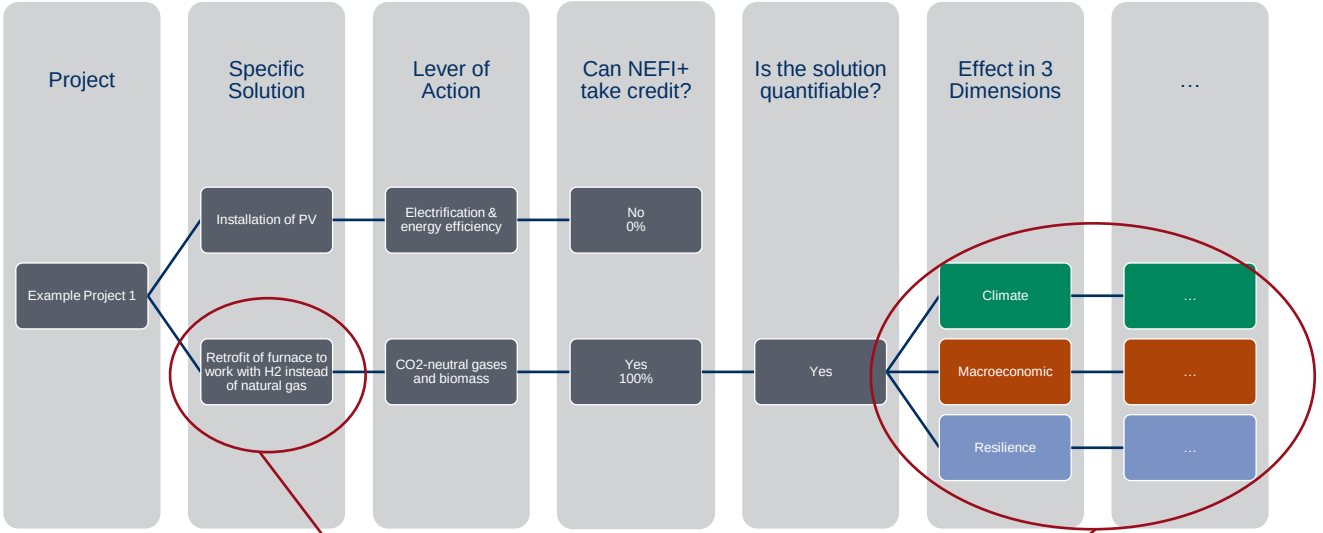
THE ROLE OF NEFI IN DEVELOPING THE SPECIFIC SOLUTION



QUANTIFICATION OF THE SPECIFIC SOLUTION



CALCULATION OF THE IMPACT OF ONE SPECIFIC SOLUTION



Now we will focus on the impacts of **one** quantifiable specific solution.

CALCULATION OF THE IMPACT OF ONE SPECIFIC SOLUTION

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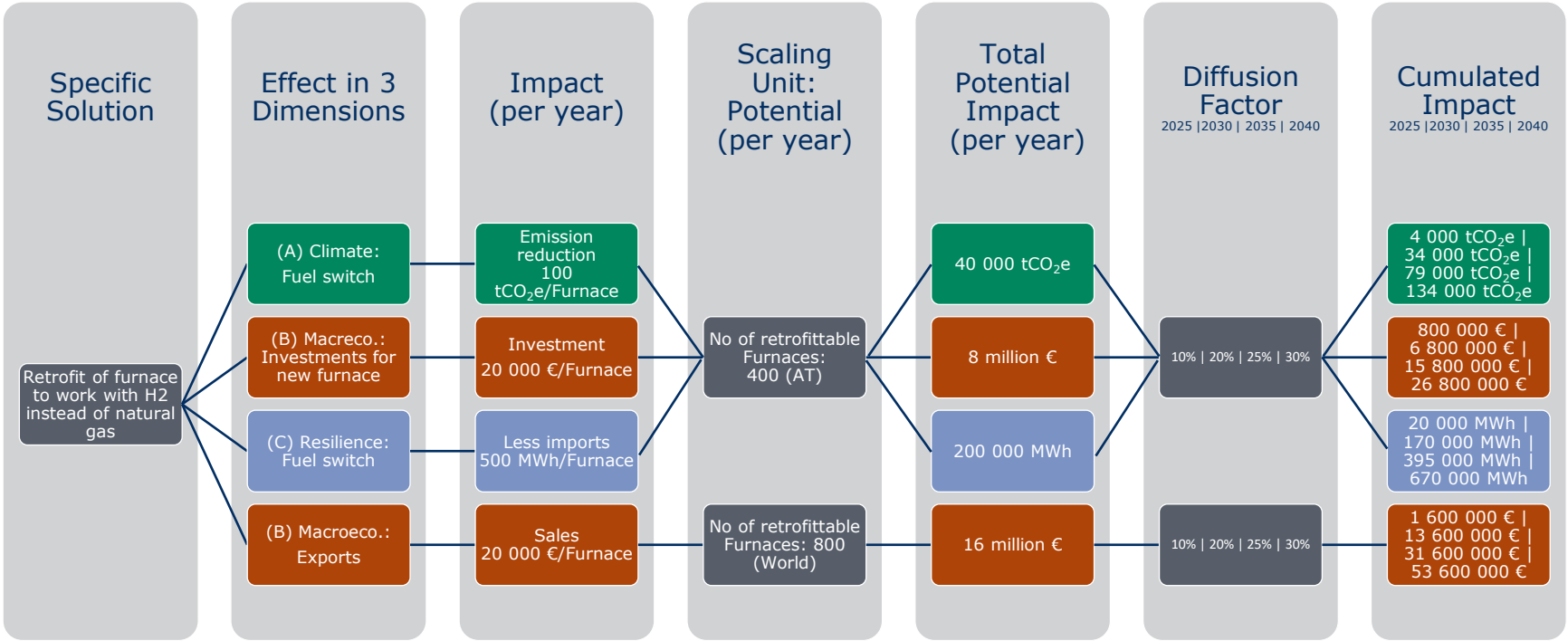
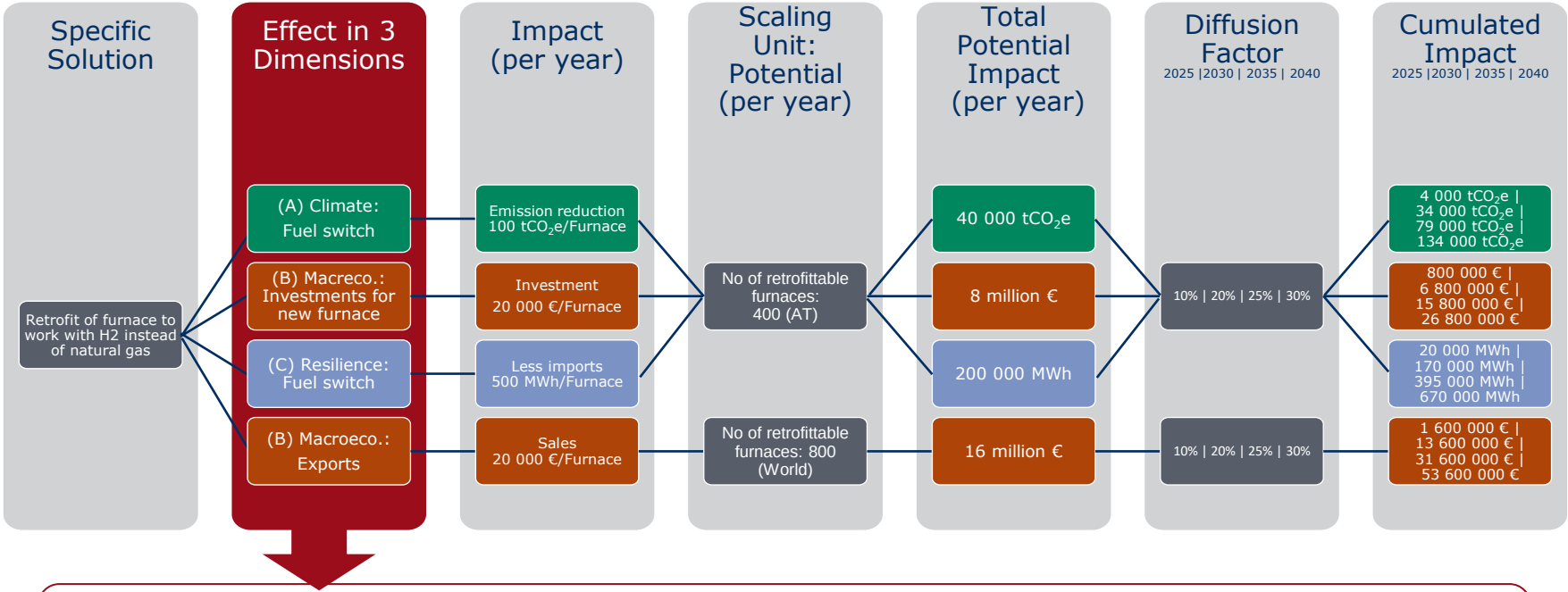
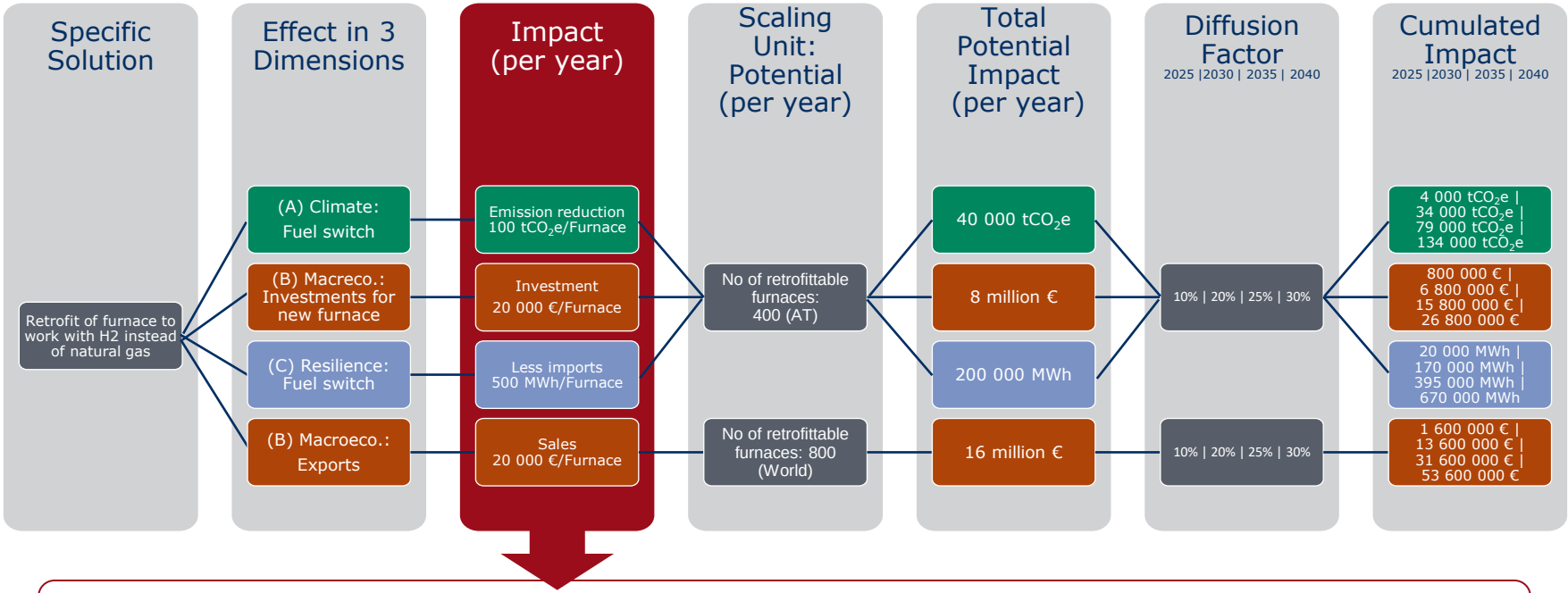


RELEVANT DIMENSIONS FOR SPECIFIC SOLUTION



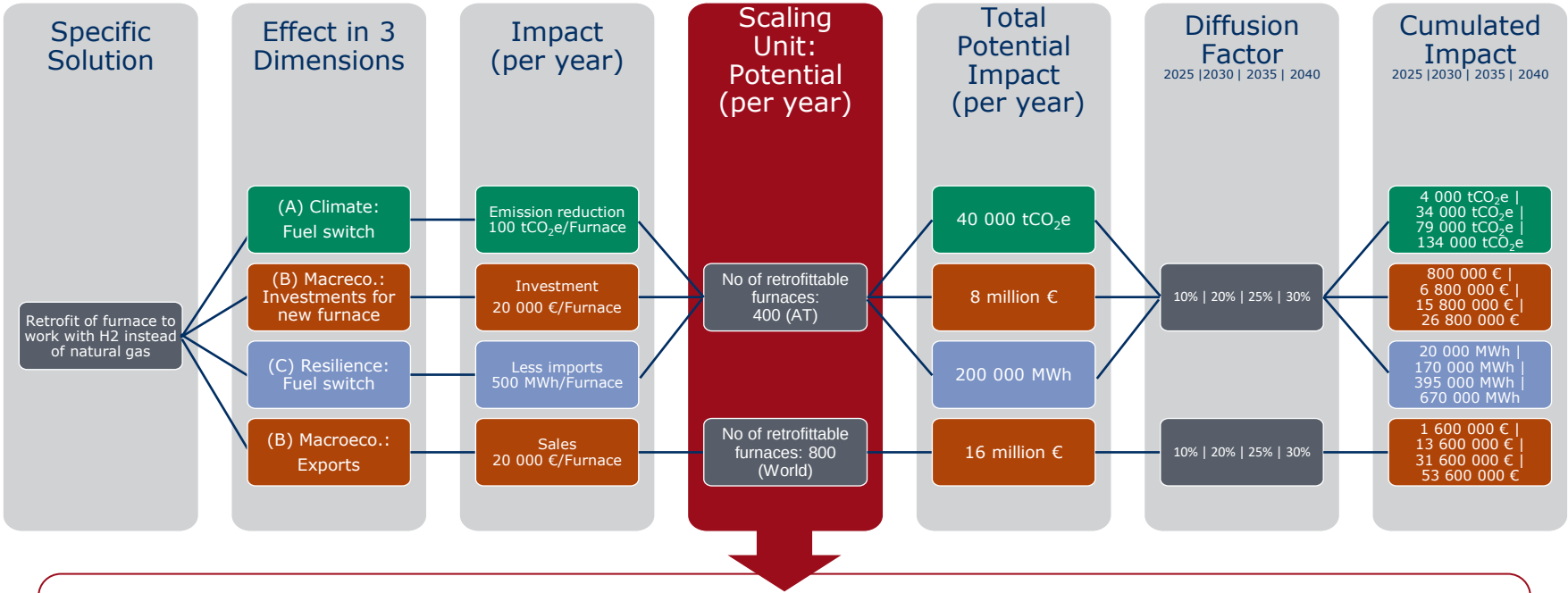
One effect of the specific solution (e.g., fuel switch) can have an impact in multiple dimensions (e.g., climate and resilience). Vice versa, two different effects (e.g., domestic investment and exports) can both be accounted for in one dimension (e.g., macroeconomic).

IMPACT ON PROJECT LEVEL



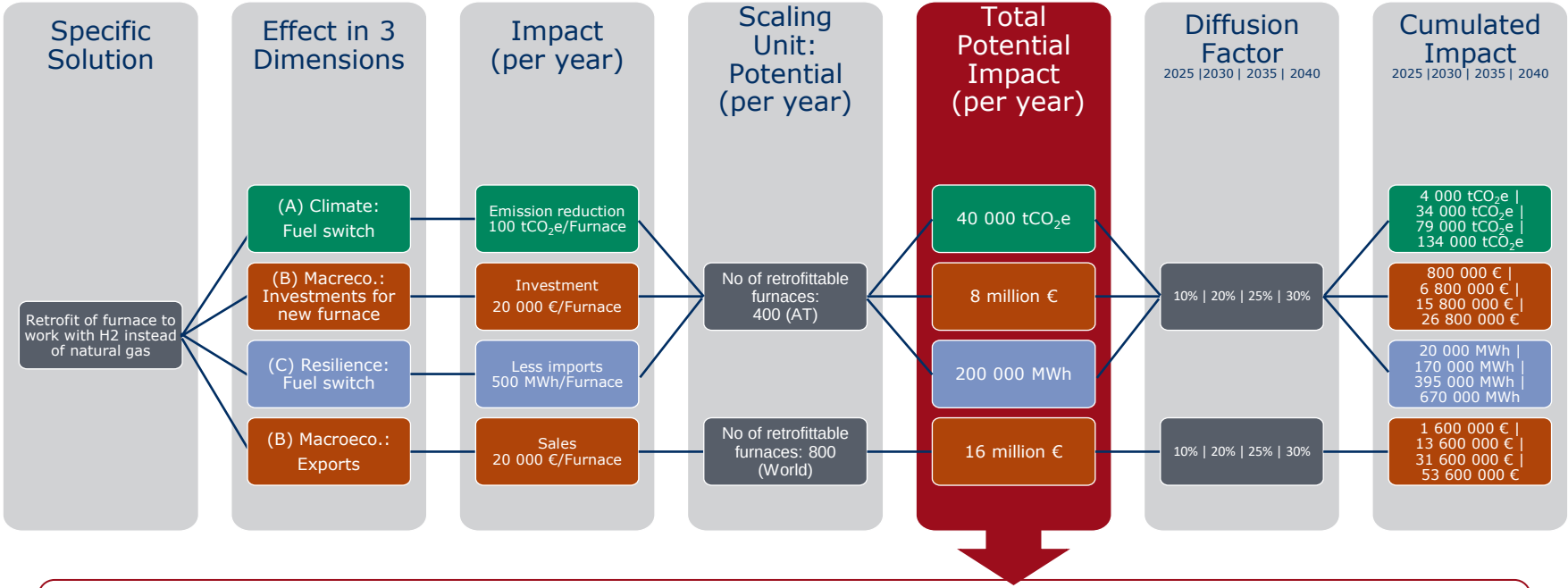
Quantified impact and including respective unit (tCO2e, MWh, €, etc.) per scaling unit (furnace, plant, area, etc.) per year as calculated/estimated in the project.

SCALING POTENTIAL



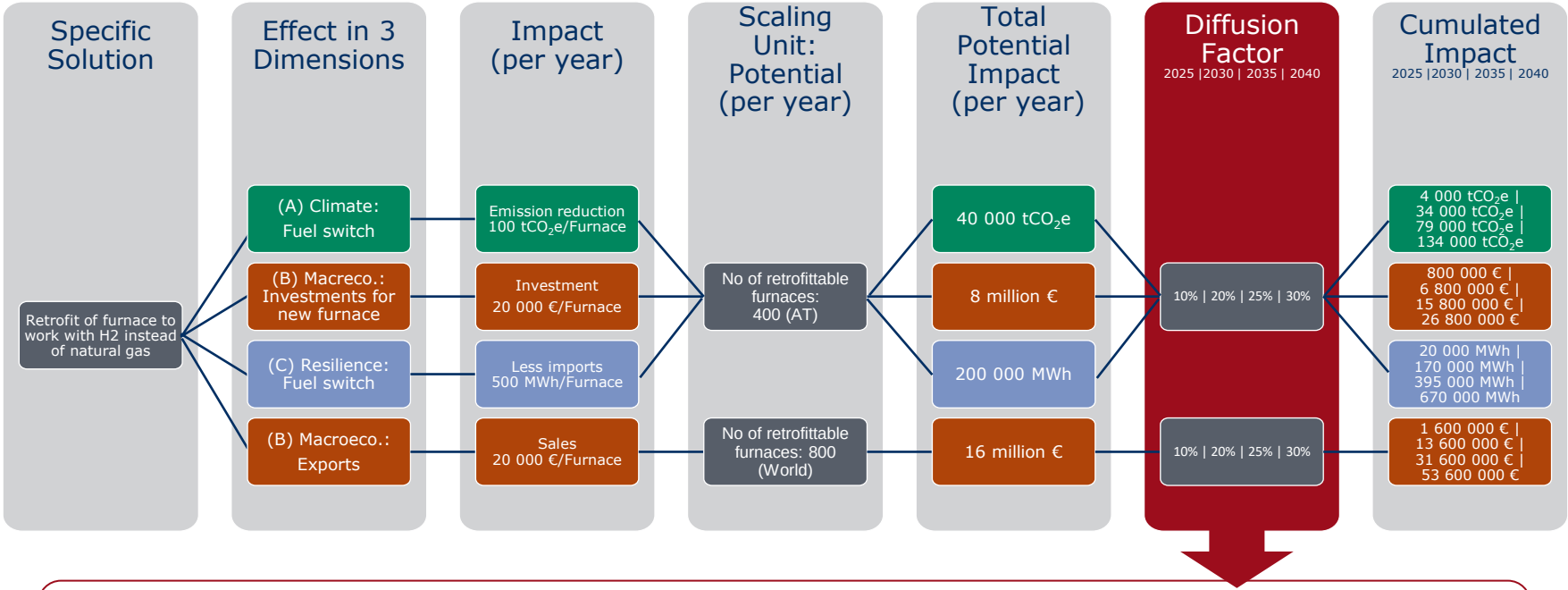
What is an appropriate scaling potential for Austria (or in case of exports, for the world)? In our example, the furnaces had to be retrofittable to be accounted for – as we cannot scale a retrofit solution on every furnace but just on retrofittable ones.

TOTAL POTENTIAL IMPACT



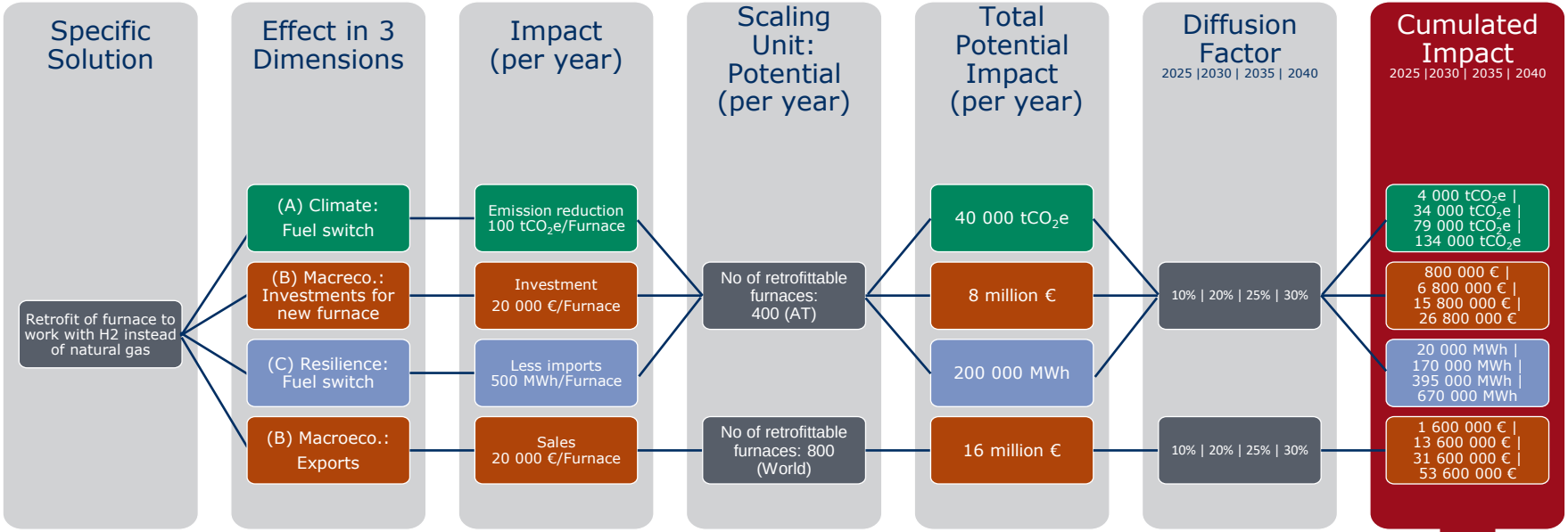
The total potential impact on Austria level is then calculated as a simple multiplication from the impact on the project level with the scaling potential on Austria level.

TOTAL POTENTIAL IMPACT



The diffusion factor reflects the implementation speed of the specific solution. This is a rough estimate and depends on several factors like TRL, efforts of the implementation, investment needs, innovation affinity of the industrial sector, etc.

TOTAL POTENTIAL IMPACT



Finally, the cumulated impact is calculated depending on the total potential impact and the diffusion factor. The exact formula for the calculation is as follows: $I_{\mathrm{dim}} = \int_{t=2025}^{2040} I_{\mathrm{dim},p}(t) \cdot \frac{s_{\mathrm{dim,tot}}}{s_{\mathrm{dim,p}}} \cdot \delta_{\mathrm{dim}}(t)dt$ where I_{dim} is the cumulated impact in dimension *dim* of project *p*, $I_{\mathrm{dim},p}(t)$ is the impact in dimension *dim* on project level at time *t*, $s_{\mathrm{dim,tot}}$ is the scaling factor for the total potential impact (e.g., 400 furnaces), $s_{\mathrm{dim,p}}$ is the potential scaling factor on the project level (e.g., 1 furnace) and $\delta_{\mathrm{dim}}(t)$ is the time dependent diffusion factor.

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THANKS!

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