

FRAMEWORK CONCEPT TOWARDS A REDUCTION OF GHG EMISSIONS FROM ETH ZURICH RELATED AIR TRAVEL

EXECUTIVE SUMMARY

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DECEMBER 16, 2016

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Executive Summary

There is a broad consensus that international aviation needs to contribute to fulfilling the goal of the Paris Agreement and it can be expected that these emissions will inevitably be accounted for.

ETH Zurich is aware that air travel causes a high percentage of its total GHG emissions and thus ETH Zurich sees the need to explore ways for reducing these emissions. The framework concept, prepared on behalf of the Mobility Platform of ETH Zurich, addresses this need in a holistic manner and under consideration of previous and ongoing activities as well as the general sustainability strategy of the ETH Zurich.

The framework concept is based on the key assumption that ETH Zurich is willing and has the resources for an internal process towards establishing, implementing and monitoring targets and concrete actions (measures) related to GHG emission reduction from air travel by ETH staff and students. Further, the framework concept recognises the specificities of the governance structure of ETH Zurich, especially the high level of autonomy at the level of institutes and chairs.

The framework concept proposes a participative process from setting targets to implementing and monitoring concrete actions (see Figure 1). The process (Figure 1, right side) includes four major, to certain extent iterative, steps: i) setting targets, ii) designing pathways; iii) comparing and selecting pathways and iv) implementing and monitoring specific measures of the selected pathway. The framework concept explains the rationale of each step and presents suitable methods for conducting each of them (Figure 1, left side).

i) Setting targets

ETH Zurich needs to agree on SMART targets, i.e. **S**pecific, **M**easurable, **A**greed upon, **R**ealistic and **T**ime-based. SMART targets have two main components: characteristics and values. The characteristics of the GHG emission reduction targets for the ETH Zurich include a) unit (e.g. TC or TCO_{2eq}); b) what to refer to (base year, base period or baseline scenario); c) target year (e.g. by 2025); d) system boundaries, i.e. which sources are to be included (air travel by academic staff, administrative staff, students, guests, invited presentations...); and e) normalisation (reduction per what?). While it is important that the targets' characteristics are identical for all organisational levels at ETH Zurich, targets' values can be individually defined at different organisational levels (e.g. a specific target for each Chair, Department, Staff Unit and the Executive Board) who's potentials for GHG emission reductions might vary widely. Thus target characteristics should be set once and for the whole ETH while specific values can be set using a combination of bottom-up and top-down approaches. For instance ETH Zurich can start the definition of target values with an auction, where each chair or department offers its concrete contribution to the overall target. If the auction of values doesn't result in the expected overall reduction, the process can be either repeated or steered by e.g. the Executive Board of the ETH Zurich or by a legitimate task force.

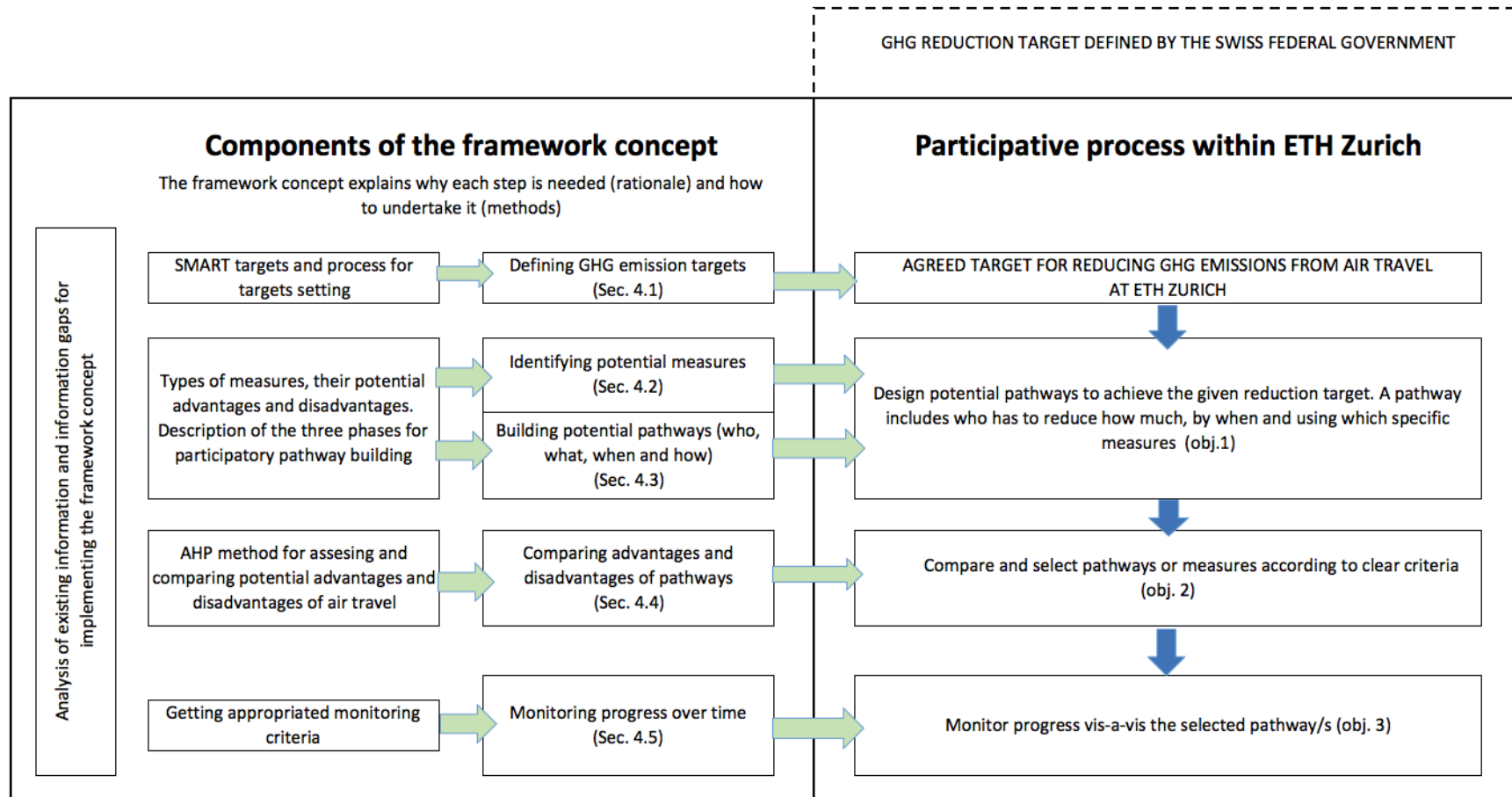


Figure 1: Concept framework in a nutshell.

The right side presents the proposed participative process within ETH for preparing, selecting and monitoring pathways for GHG emission reductions from air travel and the left side presents the corresponding rationale and methods for each step

ii) Designing pathways

For the purpose of this framework a “pathway” includes who has to reduce emissions (ETH organizational unit/level), how much (specific target) and using which measures (how). Pathways don’t need to be identical for the whole ETH Zurich and can be designed at a lower organizational level, i.e. department or even chair.

In order to facilitate the design of pathways the framework concept presents a typology of potential measures as follows:

- *Regulatory measures*: including carbon budgets, normative restrictions or pricing GHG emissions from air travel.
- *Non-regulatory measures*: which includes awareness campaigns, increasing attractiveness to alternatives to air travel (e.g. video-conferencing or travel by train) or creating reward mechanisms.
- *Compensation*: either through a third party or internal.
- *Changes in enabling conditions*: aimed at reducing institutional incentives fostering air traveling.

The framework discusses not only the type of measures, but also their potential advantages and disadvantages. When selecting measures, ETH Zurich needs to identify specific trade-offs and consciously accept them. This can only be done by legitimate group(s) representing the corresponding organizational level (department, chair,...). Since some measures like introducing an emission trading system within ETH Zurich can affect the target values which can be achieved, it is possible that the design of specific pathways provides additional information for adjusting the target values at the given organizational level.

iii) Comparing and selecting pathways

It can be difficult to select “the” most appropriate measures or group of measures (pathway) for a given organizational level, because all measures have advantages and disadvantages. Consequently, every choice of measures for reducing emissions can be regarded as arbitrary. The concept framework proposes to use the *Analytical Hierarchy Process (AHP)*, developed in the 1970s by Thomas L. Saatay, for facing the challenge of making a decision considering various and sometimes contradictory criteria. AHP has been used extensively in academic and commercial contexts and it proved particularly useful in group decision making.

The basic principle of AHP is to decompose a complex decision problem into a hierarchy of more easily comprehended sub-problems and to analyse them separately. Thus, the decision maker can compare the various alternatives to each other, two at a time, with respect to their impact on various criteria.

Criteria for selecting a pathway could include e.g. impact on quality of research, impact on availability for teaching, cost of the measure, efficiency, fairness, acceptance, etc. AHP also can be used to analyse how the ranking of alternatives would change if some characteristics of the alternatives were changed. For example, if monetary incentives shall be used to

reduce business flights, one can use the AHP method to find how much additional cost (or benefits for the alternative) would be needed to make the alternative more attractive than flying.

The framework concept proposes to use AHP as a facilitation tool when the selection of measures or pathways is not clear i.e. when this decision can create tension within a given organizational level (e.g. department).

iv) Implementing and monitoring

Monitoring is needed for assessing efficiency and effectiveness of pathways. Monitoring activities will need to include a) monitoring progress in implementing measures per pathway and b) monitoring (reductions in) GHG emissions related to air travel at ETH Zurich.

Monitoring progress in implementing measures should be done at the organizational level(s) where measures are implemented, while monitoring emission reductions should be done at all levels where targets are set.

A final section in the framework concept deals with concrete next steps, starting with the need to clarify which entity within ETH Zurich is responsible for the implementation of the concept. After that this entity should facilitate setting SMART targets for a reduction of GHG emissions from air travel and promote the design, comparison and selection of pathways at the specific institutional level (e.g. department or chair). Once these three steps have been taken, the concrete measures and monitoring activities can start. It is possible that ETH Zurich decides to run pilot projects at e.g. one or two departments before implementing all steps for the whole institution.