Proposal paper for the promotion of Thermal Activated Buildings

Why thermal component activation?

Thermal Activated Buildings (TAB) refers to systems that use solid building components for temperature regulation and are used as surface heating or cooling. In contrast to underfloor heating, which is installed in the screed, the pipelines are installed in the concrete core, which activates the entire building component. Due to the large transfer areas and the component mass, TAB is excellently suited for the use and storage of renewable energy.

The expansion of renewable energy leads to temporal disparities in energy production and consumption. The capacity of existing building components to store heat can be used to compensate for this imbalance through thermal component activation:

- the TAB can make a relevant contribution to the development of a sustainable energy system based on renewable sources through its storage function.
- The management of the storage masses additionally enables a cooling function that is easy to implement, comfortable for the user and energy-efficient at the same time. Cooling will be increasingly necessary in the coming years for climate change adaptation.
- The system temperatures are significantly lower in heating mode (max. 30 °C flow compared to 35 °C with underfloor heating). The same applies in cooling mode: high system temperatures (18 °C supply compared to 14 °C for ventilation, for example).

For these reasons, a more widespread use of TAB can directly support the transformation of the energy system.

Due to the storage effect, thermally activated buildings offer a high degree of **energy efficiency, flexibility and security of supply**. As a **cost-effective** heating and cooling system, they are therefore interesting for all countries in the Alpine region.

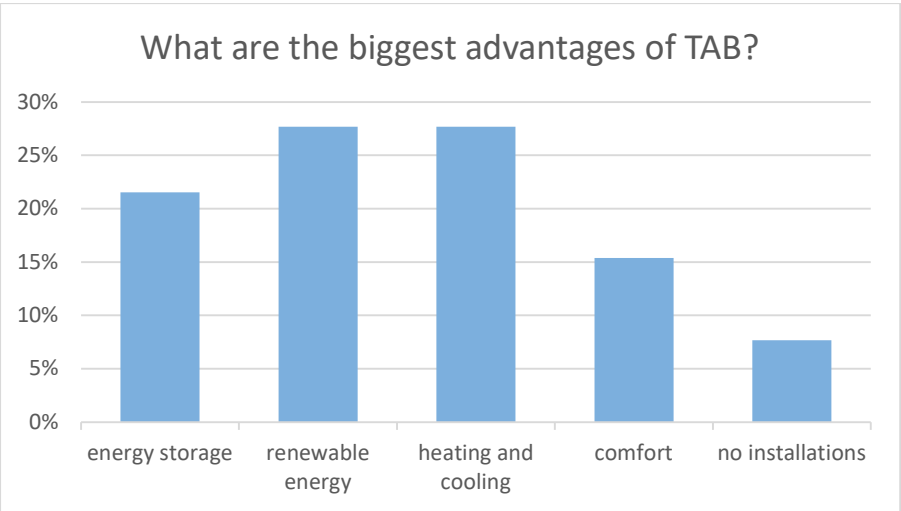


*Figure 1: Advantages of thermal component activation according to qualitative interviews in the Interreg Alpine Space project 'Cool*Alps' with 65 experts from the building industry in Italy, Germany, Switzerland and Austria.*

What should be promoted?

Representatives of the building industry state that above all the adherence to existing building practice and the lack of expert knowledge of the planners represent the greatest obstacles in the planning and optimization of innovative TAB projects (see Figure 2). Above all, knowledge of thermal dynamic building simulation is considered necessary for the successful planning of larger TAB building projects.

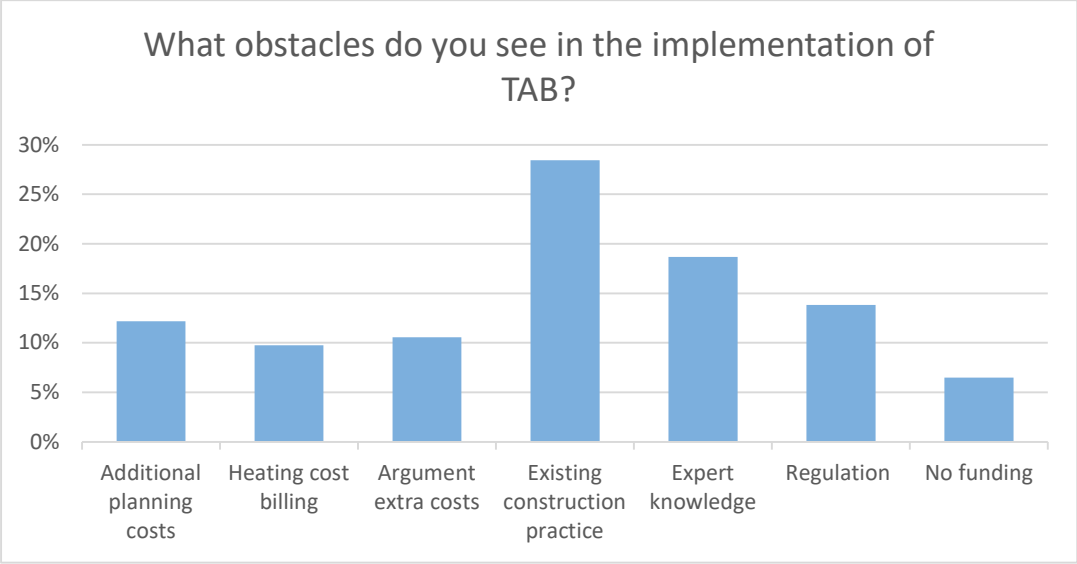


*Figure 2: Barriers to the implementation of TABs according to qualitative interviews in the Interreg Alpine Space project 'Cool*Alps' with 65 experts in Italy, Germany, Switzerland and Austria.*

Comprehensive and high-quality planning is highly relevant for the effective use of TAB. The promotion of planning services can cover the corresponding effort and, in this way, ensure the quality of implementation projects.

Currently, there are different levels of experience in the individual regions, which are related to the respective building practice and the knowledge of the planners. In Germany, Austria and Switzerland, TAB has been increasingly used for heating and cooling in the commercial sector in combination with locally generated renewable energy. In Austria, the realization of TAB residential projects is also gaining momentum. In the first pilot projects, in addition to the use of locally generated renewable energy, renewable surplus electricity is also drawn from the grid or load peaks from heating grids. The prerequisite for this is corresponding control signals from the grid operators.

To strengthen this impulse for increased use of TAB and to promote pioneering planners in this area, the Climate and Energy Fund (KLIEN) in Austria has been supporting planning services for entire heat supply concepts with TAB in residential buildings since 2021. The program aims to enable the implementation of as many projects as possible by Austrian housing developers based on high-quality planning and to build up know-how with regard to flexibility options.

For a broader implementation of TAB, a strategy must be developed on how its use can also be considered in existing (energy and housing) subsidy systems. In Salzburg, for example, this was anchored in the 2022 Salzburg housing subsidy by awarding bonus points (bonus system).

On the investment side, a subsidy for control and regulation technology could make sense as an impulse. A subsidy for the construction costs is not considered necessary, since compared to other surface systems (such as underfloor heating), no additional costs are actually incurred, but direct benefits are reaped.

What priorities could be set?

In accordance with the possible contributions of TAB to the overarching climate and energy goals, planning and funding submission should be linked to one or more specific field(s) of application:

- optimized use of locally generated renewable energy
- effective utilization of renewable "surplus electricity" from the grid
- an increase in flexibility options in micro, local and district heating networks

How much should be funded?

It is recommended to make the fee for the planning service dependent on the size of the project in question, but to limit it with award-specific upper limits. In the lower range, a base amount could be set to compensate for the effort involved in smaller objects. In addition, surcharges could be set for special innovations or for more extensive monitoring.

In the meantime, subsidy talks have been held in Austria for the project planning of 131,000 m² of living space, for which subsidies of around € 10 per m² have been reserved. This value can be used as a benchmark for possible funding levels and costs.

What preconditions would have to be met for the promotion of projects?

In Austria, the focus of funding was placed on new residential buildings and on innovative renovations of multi-story residential buildings, as this is where implementation requires the strongest incentives. In the countries participating in the project, it will have to be discussed whether a similar focus or a differentiation between residential and commercial buildings should be aimed at.

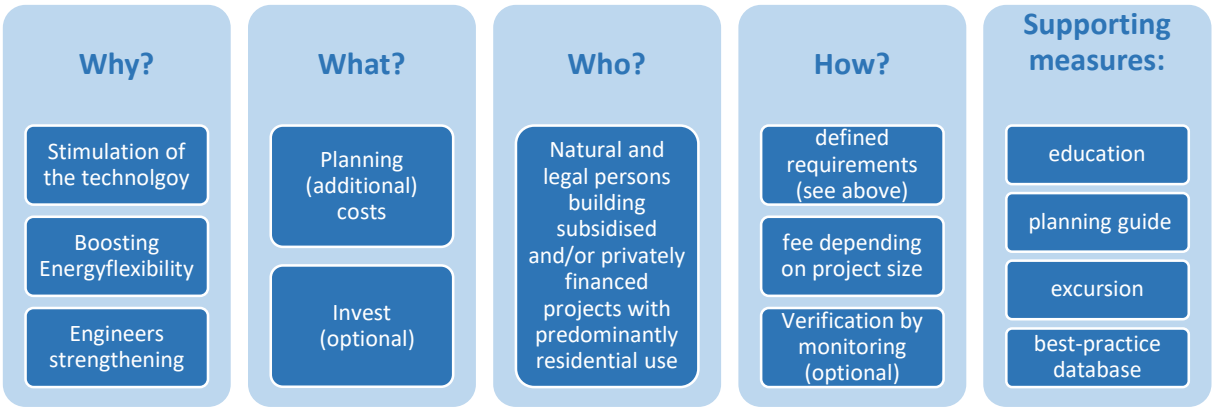
For residential buildings, the following requirements must be fulfilled in the KLIEN funding:

- Useful floor space >50% used for residential purposes
- Buildings with five or more flats
- Building masses are actively used for heat storage and heat dissipation
- Cooling function part of the planning
- Activated masses are the only system for room temperature control
- No fossil systems and electricity-direct heating systems
- The approved submission plan must have a planning date that is at least one month after the consultation meeting.
- Natural and legal persons who build subsidized and/or privately financed projects with predominantly residential use are eligible to submit applications.

How can it be ensured that only innovative projects are funded and how can 'success' be proven?

To guarantee the innovative content of a project, certain minimum criteria could be set. This could be achieved, for example, by specifying the quality of the building envelope and/or by demonstrating the energy flexibility of a building, i.e., the ability of the building to control its energy demand according to climate conditions, user and network requirements.

For all building projects, participation in a one-to-two-year operational monitoring is recommended for quality assurance and optimization of the system during the commissioning phase. This can either be stipulated in the funding conditions or forced through a funding supplement. This can generate experience values in operation and create a knowledge base that serves as a basis for broad implementation of the TAB in future construction projects. It would be important to provide for the use of monitoring data for strategic planning purposes in the funding conditions.



Where can I find more information on the existing subsidies mentioned?

KLIEN funding in Austria: www.klimafonds.gv.at/call/tba2020/

Salzburg Housing Subsidy: www.salzburg.gv.at/bauenwohnen_/Documents/wbf_eigentum.pdf

The idea for this proposal paper was developed in the project group of the EU-funded Interreg Alpine Space project 'Cool*Alps' and is intended to serve as a basis for decision-making on possible TAB funding in the participating countries. Due to the different experiences and energy policy challenges in the individual regions, it will make sense to adapt the funding priorities regionally.

Who can I contact if I have questions?

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