

# Supporting sufficiency approaches in the building sector

## Summary for decision-makers

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## Introduction & Status Quo

In order to comply with the ecological limits, Germany has set itself various targets relevant to the building sector. First and foremost, Germany is committed for greenhouse gas neutrality by 2045 as a contribution to meeting the 1.5 degree target. The building sector is highly relevant in this regard, as the production, construction, modernization, use and operation of residential and non-residential buildings account for around 40 % of Germany's GHG emissions. At the same time, overall raw material productivity is to be increased in line with the sustainability strategy. In this context, the building sector is responsible for 90 % of domestic mineral raw material extraction. Ultimately, land use is to be reduced to net zero by 2050; today, 32 hectares are still sealed every day by settlement areas alone.

To achieve these sustainability goals, science distinguishes between three complementary strategies. **Efficiency** addresses the question of how we use resources and, for the building sector, means e. g. the use of thermal insulation and optimal operation of heating, ventilation and air conditioning systems. **Consistency** questions the way in which we use resources. Consistency in the building sector requires the use of renewable energies and renewable or recyclable raw materials. **Sufficiency** attempts to answer the question of how much consumption planetary boundaries and global justice allow us. For the building sector, it can be translated into the following five overarching goals or key topics:

### Development of existing buildings before new construction

A prioritization pyramid is proposed, from the least to the most complex intervention: preservation and renewal should be prioritized wherever possible. Only when this is objectively not possible, extensions come into question. New buildings are the last resort.

### Adaptability

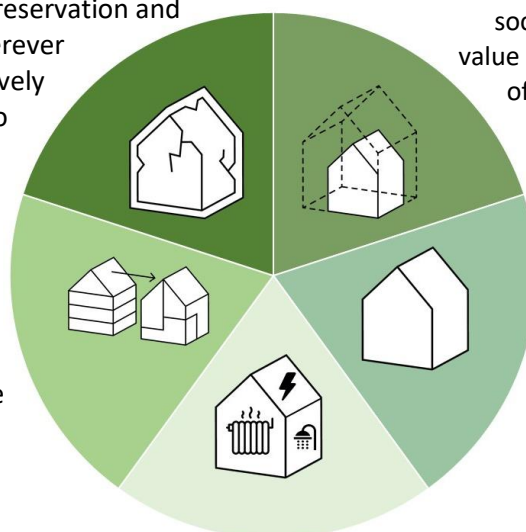
User needs and uses of buildings change and are unpredictable. To make buildings future-proof for changing conditions, they must be adaptive and flexible. This means, for example, that individual rooms can be partitioned off or offices can be converted into apartments.

### Reduction of per capita space requirements

The aim is to reverse the trend of constantly increasing living space per person - to the current average of 47 m<sup>2</sup>. Per capita living space is regionally and socially distributed uneven and a high value is no guarantee for a higher quality of living - on the contrary, it can lead to excessive demands in old age.

### Lowtech

It is aimed for simplicity on material and construction level (e.g. simple wall constructions) as well as building technology (e.g. minimal use of HVAC).



### Frugal usage behavior

Users pay attention, for example, to appropriate temperatures and adequate ventilation behavior depending on the season, type of use and time of use of the respective rooms.

## Potentials

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**Development of existing buildings:** Office conversions (100.000 units p.a.), use of vacancies in rural areas (18.000 units p.a.), adding storeys (114.000 units p.a.) and the division of under-occupied single-family homes (98.000 units p.a.) mean that a total of almost 83 % of the Governments housing construction target (400.000 units p.a.) can be realized in existing buildings.

**GHG emissions:** For an unrenovated detached house occupied by two people, moving in one or two people can reduce per capita GHG emissions by 33 % and 50 % respectively. Conventional refurbishment, on the other hand, can save around 45 %, while ambitious modernization can even save around 88 %. Sufficiency alone can therefore not be a substitute for extensive insulation measures and the use of renewable energies for energy and materials - but it does represent a very relevant additional savings potential. At the national building stock level, it is clear that a reduction in per capita living space in particular can achieve savings. In the best-case scenario, annual Germany-wide GHG emissions from building operation will fall by around 11 million tons and embodied carbon emissions - which arise during the production of building materials and buildings - by around 9 million tons.

**Resource requirements:** Over 400 tons of material are required for the construction of new single-family homes of average size, while only around 280 tons are needed per unit for multi-family houses. When creating living space in existing buildings by adding storeys, renovating or dividing, the material requirement is only less than 50 tons per flat. Space-saving concepts offer additional savings potential. By utilizing the entire potential of existing buildings mentioned above, material savings of around 60 % can be achieved compared to new construction scenarios.

**Land and area sealing:** Assuming that the residential construction target is met with the current proportions of building types and typical areas, it can be seen that 90 % of the land and area sealing target for 2030 (30 hectares per day of land take) has already been taken up. This only concerns areas from residential construction and the associated infrastructure. Non-residential buildings and other transportation areas are not taken into account. Land consumption can be reduced by around half by activating existing buildings or using space-saving construction methods. Compliance with the national "30-hectare target" and subsequently a circular economy of land use can only be achieved by focusing strongly on existing development.

The studies show that only by combining all three sustainability strategies can a 1.5-degree-compatible transformation path be seriously achieved, taking into account further planetary boundaries. While a one-sided focus on efficiency and consistency could make it possible to achieve the climate targets in 2030 and 2045 at enormous expense, reducing emissions in line with the budget approach and meeting the targets for land use and raw material productivity appear impossible or unrealistic. The calculations also show that a sole approach to construction methods and building types is not sufficient. Only by addressing the use phase and the occupancy or use of the residential buildings can the sufficiency potential be leveraged.

## Policy instruments

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Supporting sufficiency approaches in the building sector requires political and legal backing. The study therefore presents the following proposals for the design and implementation of policy instruments that incorporate sufficiency approaches into the further development of the building sector and that expand and supplement the existing range of instruments for the sustainable transformation of the building stock with sufficiency aspects. The sufficiency measures addressed include legal and financial framework conditions and instruments, accompanying information, consulting, training and further education measures as well as the promotion of research and development. To support sufficiency approaches, the creation of new and the amendment of existing legal and financial framework conditions and instruments, as well as the abolition of obstructive ones, should be examined. As a rule, policy measures can only develop their full strategic impact if they are combined into bundles of measures or policy packages that build on each other and complement each other.

<b>Communicating sufficiency: raising awareness, providing information, setting an example</b>	
National Efficiency & Sufficiency Strategy for Buildings	Complementary addition of sufficiency approaches, measures and instruments in national strategies and programs related to buildings and efficiency, e.g. German sustainability strategy, national climate protection strategy, incl. robust monitoring. Specification of the 400.000 units p.a. target, analogous to expansion targets for renewable energies.
Public relations & nationwide campaign	Sufficiency as the third pillar in nationwide communication and public relations work on the energy transition and climate protection. Focus on benefits and emotional level: contribution to increasing the quality of housing and life as well as social and intergenerational justice. Critical questioning of previous narratives, especially with regard to single-family homes.
Sufficiency in federal buildings	Embed sufficiency centrally in the relevant regulations for federal buildings and the BImA. Strengthen the aspects of portfolio development and space economy in the RBBau, the Guideline for Sustainable Building and the BNB system.
<b>Promotion of sufficiency in consulting, integration in planning and implementation of measures</b>	
Integration of sufficiency into municipal planning processes	Process-related and financial support for municipalities in setting up vacancy and redensification potential registers as well as municipal heat planning in combination with inventory recording and activation and housing needs analyses/forecasts linked to socio-demographic data.
Integration of sufficiency-oriented content in advisory services	Mandatory expansion of the training and further education of energy consultants as well as the mandatory content of energy consultations and their documentation to include sufficiency approaches. Integration of sufficiency approaches in existing subsidized advisory services, such as those offered by BAFA, energy agencies, climate protection or neighbourhood managers. Development of housing advice services and agencies.
Sufficiency-weighted funding landscape	In line with the principle of thriftiness and more climate impact as well as affordable living space per subsidized euro, the BEG must be adapted in particular by: Gradual discontinuation of subsidies for new construction, promotion of (conversion) construction in existing buildings, dependence on per capita living space, adaptability as a funding criterion. Promotion of the establishment and operation of housing advice centers. Expand energy-efficient urban renovation, urban development and research funding to include the previously neglected sufficiency strategy.
<b>Impulses for integration into legal frameworks and nationwide standards</b>	
Adjustments to building and planning law	Legally binding anchoring of the net-zero land use goals, including corresponding intermediate steps and distribution to federal states, regions and municipalities. Removal of existing obstacles in the building regulations, e.g. with regard to fire, noise and inventory protection, parking space requirements. Make adaptability mandatory in the approval process and introduce demolition permits.
Further development of the Building Energy Act (GEG)	Consideration of embodied carbon emissions, but production and use phases should be considered separately in order to avoid rebound effects and cross-compensation. (Informative) Disclosure of personal key figures. Sharpening of requirements, e.g. progressive efficiency and consistency targets depending on the building type. Strengthening robust low-tech concepts and passive measures, e.g. through normative adjustments. Identification of further environmental indicators, e.g. abiotic resource consumption.