

Norm2050: Emission-reduced, climate-resilient building and living in Vienna in 2050

Modern humans spend most of their lives in a built environment. How we shape this environment has a major impact not only on our current health and well-being, but also on future living conditions. As urbanization continues, cities will take on an increasingly important role in addressing urgent climate change mitigation and adaptation issues in the future.

The built environment is subject to numerous regulations, laws, and standards. These are often not adapted to future needs and climate situations, and historical weather observations are the basis for normative specifications for a building. For example, the heating and cooling requirements of buildings are calculated using temperature measurements from the period 1978 to 2007 (ÖNORM B 8110-5) instead of working with future climate scenarios.

Not only new buildings but also existing buildings are affected by climate change. This fact is significantly exacerbated by the long lifespan of real estate and renovation cycles of at least 30 years. The built environment as a living space is on the one hand crucial for the well-being of the users, but on the other hand it also has a great influence on climate change or the mitigation through its energy consumption and emissions.

The goal of the Norm2050 project is to analyze the numerous regulations, laws, standards and procurement guidelines for residential construction in Vienna in accordance with the goal of emission-reduced, climate-sensitive construction and living in Vienna in the year 2050, to identify obstacles and contradictions to achieving the goal, and to make recommendations for action. This is done with special consideration of the five building related goals of the framework strategy "Smart City Wien 2019 to 2050". For this purpose, the three topics "Interior, comfort and energy", "Urban climate and exterior" and "Health and building materials" are analyzed and recommendations are made.

Topic: Interior, comfort, and energy

The updating of the climate data sets used as a normative basis for the calculation of building qualities is identified as particularly relevant. For example, the heating and cooling requirements of buildings are determined based on temperature measurements from 1978 to 2007 (ÖNORM B 8110-5). Only if the climate is realistically represented in the calculations, an emission-optimized and climate-sensitive building can be constructed.

The heat supply of buildings should be fossil-free in the long term, which should already be considered in new buildings and renovations. Current legislation, such as the "*Wiener Bauordnung*", must be adapted accordingly. Support initiatives such as "*Raus aus Gas*" and "*Raus aus Öl*" facilitate the changeover.

Because of climate change, a decreasing demand for heating and an increasing demand for cooling can be expected. Consequently, the cooling of buildings is gaining importance. For this reason, heating and cooling need to be considered and described together. A reasonable room temperature could be based on adaptive comfort models. This is to be ensured in dependence on the outside temperature and without additional active cooling. National laws, standards or guidelines must be adapted accordingly.

Topic: Urban climate and outdoor space

In the outdoor space, it is important to counteract the development of urban heat islands through targeted measures. The urban climate analysis map of Vienna ("*Stadtklimaanalysekarte*") can make a valuable contribution to improving the urban climate by keeping fresh air corridors free and cooling at night. The involvement of such maps would be possible in ÖNORM B 8110, the "*Wiener Bauordnung*" the new OIB Guideline 7. Furthermore, a declaration of landscape protection areas could be created in the context of the urban climate analysis map of Vienna and the "*Wiener Naturschutzgesetz*".

Regarding climate-sensitive zoning, the “*Wiener Bauordnung*” should address the preservation or creation of environmental conditions that ensure a healthy basis for life. The creation of conditions that promote the careful use of land and energy resources should be strived for. The development of open spaces for the construction of new garages should be generally prohibited in the “*Wiener Garagengesetz*”. Likewise, the underbuilding of open spaces for the construction of new garages should be regulated. Alternatively, at least minimum structure thicknesses should be defined.

The preservation and creation of infiltratable areas should also be considered. This could be implemented in the “*Wiener Bauordnung*”, “*Wiener Gehsteigverordnung*”, “*Wiener Kanalanlagen*” and “*Einmündungsgebührengesetz*”. Under certain conditions, the possibility of infiltration on adjacent or public areas should be created. In the future, the recirculation use of precipitation water should be prescribed by law. OIB RL 3 could be used as a basis for this.

Topic: Health and building materials

In the future, the materials used must also be selected and used comprehensively from the perspective of resource conservation. This also includes transport routes. The reuse of demolition or excavation material on site should be strived for. Legal regulations are required, for example based on a new guideline on sustainability issued by the Austrian Institute of Construction Engineering (OIB RL 7 for sustainability). The reusability, recyclability, and disposability of materials, which up to now has mainly been illuminated by the life cycle assessment, should in future be considered in planning processes from the outset.

Specific recommendations for renewable raw materials (linoleum, wood, etc.) or a (at least gradual) exclusion of fossil plastic products (rubber, PVC-free plastics, etc.) are needed in the “*Raumbuch Wien*” and in the “*Ökokauf Wien Kriterien*”. The same applies to insulation materials. It is also proposed to prescribe a minimum content of recycled material (e.g. gypsum from old gypsum plasterboards for new gypsum plasterboards) for the Ökokauf Wien Kriterien catalog for finishing boards (No. 08007) in the sense of the circular economy. This should be implemented in a step-by-step plan that gives a long-term perspective. At present, there is no such requirement. In the criteria catalog for textile floor coverings (No. 08003), on the one hand a take-back guarantee by the manufacturer should be required in the sense of the circular economy, and on the other hand recycling - i.e. clear separation of the different parts of the carpet (wear layer and backing layer) should be possible in a comprehensible manner. For carpets with glued (bitumen) backing this is not comprehensible. Leading carpet manufacturers have been offering such products for several years.

It is recommended that a deconstruction and recycling concept as well as a material building passport be made mandatory in the design planning phase of renovation projects, but especially for new buildings. Guidance can be provided by building assessment systems and certifications, such as “*klimaaktiv*”, the “*Gesellschaft für Nachhaltiges Bauen*” (ÖGNB) or the “*Österreichische Gesellschaft für Nachhaltige Immobilienwirtschaft*” (ÖGNI). In addition, a legal regulation is needed, for example based on a new OIB RL 7 for sustainability.

