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# IEE PassREg

## PASSIVE HOUSE REGIONS WITH RENEWABLE ENERGIES

### **Task 2.1.3: Describe the critical factors of existing success models in front-runner regions**

**The Success Model of Tyrol**

Prepared by EnEffect

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# THE SUCCESS MODEL OF TYROL

## Case study

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# THE SUCCESS MODEL OF TYROL

## CASE STUDY

### 1

## ENERGY AND BUILDING POLICIES

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### *Short review*

Austria has got a long standing tradition in low energy and passive buildings construction. The country has the highest density of passive buildings in the world. The number of these buildings per 1 million people is five times higher than in Germany or Switzerland.

Despite the success of Austria in passive buildings construction the province of Tyrol stayed away from this process until the beginning of the new millennium. Only 2% of all newly constructed buildings in the region complied with the passive house standard in 2002. In the following years, this percentage shows a rapid growth. The level of energy efficiency for all new buildings rises extensively: from 37,33 kWh/m<sup>2</sup>a in 2009 (at normative levels at about 54 kWh/m<sup>2</sup>a) to 29,34 kWh/m<sup>2</sup>a in 2011. As concerning renovations, the average level for all buildings in 2011 is 47,81 kWh/m<sup>2</sup>a. The achievement of these impressive results is due to a large extent to the development and implementation of policy instruments and relevant regulations at national and regional levels.

In accordance to the Energy Strategy of Austria, in the National action plans for energy efficiency, adopted in 2007<sup>1</sup> and 2011, Austria plans to achieve energy savings of 9% of its average consumption for the 2001-2005 period by 2016. The measures for saving energy are aimed primarily at buildings and include:

- Increase of the share of newly constructed buildings, which comply with a passive house standard;
- Thermal renovation of all postwar buildings by 2020;
- Increase of the share of energy from renewable energy sources;
- Housing grants more directly linked to energy saving.

The main policy instrument at regional level for the province of Tyrol is "Energy Strategy 2020" with the primary purpose to reduce the dependence of the province on imported

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1 In accordance with EU Directive 2006/32/EC



energy sources, among other measures by increasing energy efficiency and changes in the behaviour of the users. An important element of the strategy is the construction of new buildings, complying with the passive house standard and renovation of existing buildings with use of passive house components with the aim to reduce energy consumption in buildings (mostly for space heating and air conditioning) without reducing the comfort of the occupants. The use of renewable energy sources (RES) is promoted as well. Additionally, with its new 10 - point action programme Tyrol aims to cover all its energy needs in the future with locally produced energy.

## I. Policy Instruments

### **Source:**

*Austria: Laws and regulations related to construction -*  
[http://for2morrow.files.wordpress.com/2012/06/construction\\_laws.pdf](http://for2morrow.files.wordpress.com/2012/06/construction_laws.pdf)

The success of Tyrol was made possible due to the fruitful atmosphere, created by the Austrian policies for climate protection, energy efficiency and sustainable development. Austria ratified the Kyoto Protocol in March 2002, which requires the country to reduce its greenhouse gas (GHG) emissions by 13% below 1990 levels during the period from 2008 to 2012. A climate change strategy was developed during the same year in order to reach the Kyoto targets. It is performed on three levels: national (federal), regional (provincial) and local (municipal) and has been adopted by all provincial governors and the federal government. The strategy was modified in 2007. A new national Climate and Energy Fund with 500 million euro (2007 - 2010) has been established. It is financed by the national tax system and has already been oversubscribed twice.

At the same time the Austrian government encourages production of electricity from renewable energy sources. Laws have been adopted to guarantee the inclusion of energy, obtained from renewable sources, in the national energy grid and the increase of its use.

Most provinces joined in 2008 a nation-wide effort to harmonize the regional construction laws, in particular with regards to technical construction norms and standards.

## IA. National Policy Instruments

### 1.1. Energy Strategy of Austria

In accordance with Directive 2006/32/EC, the Austrian energy efficiency needs to be improved by 9% by 2016 and should therefore achieve savings of end energy consumption of 80,4 PJ.

In order to implement of the package "Energy and Climate" of the EU and to achieve the "20-20-20" EU goals, in April 2009 the Austrian government started the elaboration of the



Energy Strategy of Austria, which was completed in March 2010 ([www.energiestrategie.at](http://www.energiestrategie.at)).

The national goals of Austria for 2020 under the EU's climate and energy policy 20/20/20 are as follows:

- 34% share of renewable energy
- 16% reduction of GHG emissions in sectors outside the emissions trading scheme (ETS)

To achieve these objectives the Strategy requires final energy consumption in 2020 to remain at 2005 levels, i.e. not exceed 1 100 PJ.

The three pillars of the strategy are:

- Energy efficiency: improving energy efficiency at all stages of the supply and use of energy (e.g., new and renovated buildings, sustainable mobility, the implementation of systems for energy management, etc.).
- Renewable energy: focusing on hydropower, wind power, biomass and photovoltaic
- Security of energy supply

The proposed measures are divided into the following categories: buildings, manufacturing and services, as well as trade and small users, mobility, energy supply, energy security and general measures. With regard to buildings, it is planned to reduce the final consumption of energy for heating and cooling by 10% until 2020 compared to 2005: from 337 PJ to 303 PJ.

The stabilization of the final energy consumption at 1,100 PJ by applying the energy strategy corresponds to an increase in energy efficiency by approx. 200 PJ.

The target of 34% renewable energy can be achieved in 2020 if the energy strategy is fully implemented. This share will correspond to the final energy consumption from renewable energy sources of 390 PJ by 2020, so it will require an increase in renewable energy with approximately 70 PJ.

According to the assessment of the Energy Strategy of Austria by the Austrian Energy Agency, the Environment Agency, Energie-Control GmbH and a consortium of the Austrian Institute of Economic Research (WIFO-CEPS), the proposed measures will make it possible to achieve the objectives of energy strategies within 2020.

### **Summary of targets for energy saving in Austria**

The indicative target for saving 80.4 PJ in 2016 under Directive 2006/32/EC: in its first NEEAP Austria calculated indicative savings target of 80.4 PJ in 2016 and thus 17.9 PJ in





2010. Therefore at least 80.4 PJ of final consumption of energy has to be saved by measures to increase energy efficiency by 2016.

### Review of the "bottom-up" measures for energy efficiency in the building sector

Savings in the building sector, as defined by the "bottom-up" approach, are the result mainly of measures to improve the thermal quality of the building structure, the efficiency of heating systems, including promoting the use of alternative energy systems and tightening the requirements of building regulations . Some of the measures and the savings are:

Energy efficiency measure	Objects	Energy savings (TJ)	
		2010 r.	2016 r.
Housing subsidy Building envelope	new buildings/renovations	13 905	22 705
Housing subsidy Efficient heating	new buildings/renovations	10 292	18 821
Stricter legal requirements	new buildings/renovations	14 805	18 676
Energy advice	private households	145	145
<b>TOTAL savings</b>		<b>39 147</b>	<b>60 347</b>

## 1.2 National Energy Efficiency Action Plans

Source:

[http://en.energyagency.at/fileadmin/dam\\_en/pdf/publikationen/annual\\_reports/Jahresbericht2011.pdf](http://en.energyagency.at/fileadmin/dam_en/pdf/publikationen/annual_reports/Jahresbericht2011.pdf)

<http://www.buildup.eu/sites/default/files/content/AT%20-%20Energy%20Efficiency%20Action%20Plan%20EN.pdf>

[http://for2morrow.files.wordpress.com/2012/06/construction\\_laws.pdf](http://for2morrow.files.wordpress.com/2012/06/construction_laws.pdf)

[http://www.bmwfj.gv.at/EnergieUndBergbau/Energiebericht/Documents/Energie%20Strategie%20Austria%20\(engl%20Kurzfassung\)%20\(2\).pdf](http://www.bmwfj.gv.at/EnergieUndBergbau/Energiebericht/Documents/Energie%20Strategie%20Austria%20(engl%20Kurzfassung)%20(2).pdf)

The first Austrian national action plan for energy efficiency from 2007 aims at energy savings of 80.4 PJ for 2016 and outlines two important objectives:

- 50% of the new buildings to meet the klima:aktiv haus standard;
- from 2015 housing grants to be given mainly to new buildings, complying with passive house standards.



The National energy efficiency action plan draws attention also to the thermal renovation of all postwar buildings by 2020, the use of more climate protection construction materials (wood), space heating and hot water systems using solar energy, biomass heating, heat pumps, housing grants more directly linked to energy saving and other environmentally friendly measures (heating, noise protection, humidity protection).

It also provides an assessment of the share of renewable energy sources in the construction sector in 2005 and 2020:

- All buildings: 2005: 33 %; 2020: 38 %;
- Residential buildings: 2005: 24 %; 2020: 26 %;
- Public buildings: 2005: 1 %; 2020: 2 %;
- Commercial buildings: 2005: 8 %; 2020: 10 %;
- Industrial buildings: 2005: 1 %; 2020: 2%.

The second NEEAP - with the same goal of saving energy by 2016 from 80,4 PJ - was adopted in June 2011.

The plan states that since 1995 the final energy consumption and energy intensity in Austria, as measured by final energy consumption per capita, tends to rise. However, as of 2005, this trend is changing and indicator values decrease.

However, despite this positive trend, the energy scenarios prepared under "business as usual" conditions lead to anticipation of further increase in final energy consumption in the medium term. Therefore, the government's programme and the Energy Strategy developed by the Federal Ministry of Economy, Family and Youth of Austria give the highest priority to energy efficiency and formulate far-reaching measures to improve energy efficiency and set the ambitious goal to stabilize the final consumption energy by 2020 at the level of 2005, i.e. the final energy consumption in 2020 should not exceed 1 100 PJ.

The intermediate target of 17,9 PJ of 2011 was exceeded as final energy savings in 2010 amounted to 49,4 PJ. The savings are largely achieved by measures of thermal insulation and heating systems in buildings as more than 80% of the savings in 2010 were achieved in these two areas. The majority of the savings are achieved by the measures implemented by the federal provinces (Länder).

In Austria, the public sector plays its role to lead by example by:

- Major renovations of public buildings;
- Energy efficiency criteria set by the law for federal contracts and procurement practices of the federal government and the federal provinces;
- Focusing of the central federal procurement agency on energy efficiency criteria;
- Specific criteria for public procurement as part of the action plan for sustainable public procurement;



- Information and advice provided by various federal and widespread information campaigns, in particular "klima: aktiv".

In addition, trained energy consultants of the Austrian Government, the provinces, and energy companies provide energy advice and audits. In October 2008 an agreement on reduction of greenhouse gas emissions in the buildings sector was signed<sup>2</sup>. It was decided that public housing grants will be given only to new residential houses with a maximum annual heating demand less than 45 kWh/m<sup>2</sup> from 2010 and less than 36 kWh/m<sup>2</sup> from 2012.

In March 2010 the federal ministers of environment and of economics presented the new comprehensive Austrian Energy Strategy. It stated Austria's 2020 targets:

- 34% share of renewable energy;
- 16% reduction of GHG emissions in non-EU emissions trading scheme (ETS) sectors.

In 2011 the Austrian parliament adopted three major energy-related laws: the 2012 Green Electricity Act, the Gas Economy Law and the Climate Protection Law, all of them supporting Austria's efforts to meet the EU 2020 goals.

### 1.3 e5: Austrian Programme on Technologies for Sustainable Development

Sources:

<http://www.e5-gemeinden.at/index.php?id=26>

[http://www.bmwf.gv.at/fileadmin/.../Ellinger\\_Panzenboeck\\_en.pdf](http://www.bmwf.gv.at/fileadmin/.../Ellinger_Panzenboeck_en.pdf)  
[www.bmwf.gv.at/fileadmin/user\\_upload/RIO\\_20/Ellinger\\_Panzenboeck\\_en.pdf](http://www.bmwf.gv.at/fileadmin/user_upload/RIO_20/Ellinger_Panzenboeck_en.pdf)

The e5 energy label programme for energy conscious communities was developed in 1998 and successfully introduced in 7 Austrian provinces (Bundesländer), including Tyrol, on the basis of the Swiss "Label Energiestadt" programme. Since then about 104 communities and towns have joined the programme (13 in Tyrol).

The main features of the programme are:

- a catalogue of possible activities;
- an auditing and labelling scheme;
- structures for professional energy efficiency activities;
- a network for exchange of experience and external assistance.

The e5 programme is an integrated approach to raise energy efficiency and the use of renewable energy sources in municipalities. The auditing and labelling scheme offers orientation and reward for success already achieved and identifies further requirements.

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<sup>2</sup> [http://for2morrow.files.wordpress.com/2012/06/construction\\_laws.pdf](http://for2morrow.files.wordpress.com/2012/06/construction_laws.pdf)



Progress is monitored by inspections, the so-called "audits", and is rewarded with one to five possible "e".

In Tyrol, the Energie Tirol agency acts as a consultant. Interested communities form the e5 teams. They are responsible for the implementation of the project. The main function of an e5 team is to plan projects and to ensure the approval of the programmes at the political level.

The main benefits of the e5 programme, compared to other measures, are:

- an integrated approach, that includes all energy related fields of action within a community;
- building of structures and networks for professional energy efficiency activities;
- continuous and regularly evaluated energy efficiency activities;
- the cost of participation in the programme depends on the region, but is rather low.

The e5 Programme is a very ambitious approach to increase energy efficiency and the use of renewable energy at local level and within the responsibility of municipalities.

## 1.4 „Smart Energy Demo – FIT for SET" Smart City Programme

Sources:

<http://www.smartcities.at/founding/>

[http://www.klimafonds.gv.at/assets/Uploads/Broschren/ePaper\\_smartcities/index.html](http://www.klimafonds.gv.at/assets/Uploads/Broschren/ePaper_smartcities/index.html)

The "Smart Energy Demo - Fit for SET" programme of the Austrian Climate and Energy fund aims to initiate large demonstration and pilot projects of "smart" cities or "smart" urban areas, in other words, districts, residential areas, or towns in Austria to become cities or areas with zero GHG emissions and with an exceptional quality of life thanks to the use of smart green technologies. The fund supports Austrian companies, so that they can achieve a high level of compatibility with projects, funded under the European SET plan<sup>3</sup>.

The main strategic goals are improving the energy efficiency, increasing the share of renewable energy sources and reducing emissions of greenhouse gases. In medium to long term intelligent smart city concepts should bring about increased development and dissemination of Austrian environmental and energy technologies and help secure and expand the Austria's position as a leader in the field of technology.

### 1.4.1. Smart City Wörgl

One of the participants in the programme is the town of Wörgl, Tyrol. With the initiative "Wörgl unsere Energie" ("Wörgl our energy") the city of Wörgl belongs to the most

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<sup>3</sup> The European SET Plan (Strategic Energy Technology Plan for Europe) allocates 11 billion euro of research funds to be used in the next ten years for new energy supply in Europe.



dynamic cities in Tyrol. To achieve energy self-sufficiency of the city, urban services place emphasis on the use of its own resources.

One of the elements of the initiative are measures for buildings. The road map for buildings plans renovation of 50% of the existing buildings to a passive house standard by 2050; total energy savings of 20%, construction of new buildings, complying with the passive house standard.

The action plan, developed on the basis of the roadmap, includes the following measures for buildings:

- increased funding for thermal renovation measures;
- training for facility managers via Energie Tyrol;
- establishing an energy management system;
- a demonstration project "South Tyrolean village".

#### **1.4.2 Smart City Innsbruck**

Over the past few years the capital of the province of Tyrol Innsbruck (120,000 inhabitants) is increasingly developing initiatives for sustainable development and climate protection with research plans for the environment and urban planning.

##### Purpose

As a part of the wider process of interrelations with all stakeholders, Innsbruck develops the following programs:

- "Intelligent Energy Vision 2050": long-term program
- "Roadmap for 2020 and Beyond": a medium-term program
- Action Plan 2012 -2015

##### Approach

Comprehensive data from existing research and development plans for the city are completed in preparatory work package. Based on these data, three forums are organized, formulating short-term (up to 2015), medium term (2020 and beyond) and long-term goals and measures.

##### Focus: Renovation of buildings

The project examines the technical and architectural concepts to increase energy efficiency in buildings. There is also a demand for "smart" connections between buildings and power lines; possible ways of using renewable energy in buildings and facades are also considered.

##### **Facts and figures**

Consortium leader

City of Innsbruck, Department "Traffic



	Planning and Environment"
Inhabitants	120 497
Length of transport network	Highways: 27,4 km Federal and provincial roads: 54,4 km City road network: 416,9 km Other roads: 151,5 km <b>Total: 650,2 km</b>
Types of transport	Motorized individual transport: 42,2 % Pedestrians: 27,1 % Public transport: 17% Bicycles: 13,2 % Others (taxis, etc ): 0,5%
Number of buildings	12 284
Total number of companies	3 281
Total energy consumption (2012), TJ/a	Electricity: 2 725 Thermal energy: 9 907 (2009)
CO <sub>2</sub> emissions in t/a	Production of thermal energy: 405 485 Motor vehicles: 114 300 Public Transport: 10 000 <b>Total: 529 785 (2009)</b>
Membership / awards	Partnership with Klima:aktiv

## IB. Regional Policy Instruments

### 1.5 Energy Strategy Tyrol 2020

Sources:

<https://www.tirol.gv.at/fileadmin/presse/downloads/Tiroler-Energiestrategie-2020.pdf>

The dependence of Tyrol on imported energy sources should in the long term perspective be kept to a minimum and the necessary energy supply infrastructure should be ensured. To this end it is necessary to increase energy efficiency through innovative energy generation technologies and changes in energy end-user behaviour, but also through construction of local energy generation facilities.

Energy Strategy 2020 is based on a package of measures for energy efficiency improvement, promotion of energy production from RES and guaranteeing of energy supply for the purposes of implementing the requirements of the EU Directive concerning energy efficiency improvement and increase by more than 50% of the share of energy from RES. With regards to measures for buildings Energy Strategy Tyrol 2020 is mainly focused on the following areas:



- space heating and air-conditioning of buildings (residential and intended for services);
- electricity;
- RES;
- training.

### **1.5.1 Space Heating, Cooling, Ventilation (Air Conditioning)**

#### 1.5.1.1 Private Households

Consumption for space heating predominates in energy end-use by households and at the same time the highest potential for energy efficiency improvement exists here. Through implementation of low-energy buildings and passive house standards in new buildings or buildings renovation savings of up to 80% of energy consumption for space heating can be achieved.

It is particularly important that the annual number of residential buildings being renovated, which currently amounts to less than 1%, be increased to at least 3% in order to achieve the 5% share laid down in the action plan in parallel with the improvement of the quality of renovation in the direction of low-energy or passive building. This should be achieved mainly through such tools like promotion of low-energy or passive buildings construction, building regulations, consultancy services, education and skills upgrading, as well as work among the broad public.

#### ***Space heating objectives for households***

- New buildings: minimum energy standard: category A energy passport: maximum heating demand 25 kWh/m<sup>2</sup> per year;
- Acceleration of the activities for renovation of buildings with a special focus on good-quality comprehensive renovation for attainment on the average of energy performance standard for issue of category B energy passport (maximum useful heating demand 50 kWh/m<sup>2</sup> per year).

#### 1.5.1.2 Private and public services

In the field of services energy consumption for space heating predominates, although on a smaller scale than in the households sector – 50% of the total, followed by electricity consumption about 45% of the total (less transport). The highest potential for savings exists in the field of space heating (up to 80 %) and ventilation/air conditioning (up to 60%).

The Energy Strategy aims at combination of economic growth with reduction of energy consumption through measures for energy efficiency improvement in the field of services. To achieve this objective it is necessary to reduce the energy consumption for space



heating through application of low-energy buildings and passive house standards in both construction of new buildings and building renovations. Special emphasis is laid on avoidance of the need for air-conditioning (integrated planning).

The use of energy from RES is promoted with priority depending on demand, for example solar systems for domestic hot water.

### ***Space heating objectives for services***

- New buildings: minimum energy standard: category A energy passport (maximum 25 kWh/m<sup>2</sup>.year heating demand), as well as mandatory requirement for use of passive house components;
- Renovation: good quality and comprehensiveness of renovation works for the achievement on the average of energy performance of category B energy passport (maximum 50 kWh/m<sup>2</sup>.year heating demand);
- Optimisation of in-house systems (space heating, ventilation, air-conditioning).

Due to the economic role of tourism and the high space heating demand in this sector stricter efforts for energy efficiency are of particular significance. Accommodation facilities possess large potential for improvement in space heating during renovation works, as well as in the case of new construction. The use of RES like biomass and thermal solar installations, such as installations for domestic hot water, are particularly suitable for this services sector with its high demand of hot water with low temperature.

Tyrol Energy Strategy 2020 envisages for the public services sector the function to act as a model, for instance through construction of new buildings complying with a passive house standard or through renovation using passive house components.

## **1.5.2 Electricity**

Regardless of the energy efficiency improvements the rate of growth of electricity consumption is 2% per year. The Energy Strategy aims at breaking this trend and achieving a reduction of the average specific electricity consumption per household.

By expert assessment the potential for electrical energy efficiency improvement in households is about 30% through wider use of energy efficient household appliances and lighting, as well as by changes of consumer behaviour.

## **1.5.3 Renewable Energy Sources (RES)**

The major ways of use of RES energy in households are diverse and include biomass, solar energy and geothermal energy. In view of its lower heating demand the innovative types of buildings, such as low energy buildings and passive houses, which use solar energy and geothermal energy, are becoming increasingly important.





The Energy Strategy aims at promoting the share of energy from RES to a maximum. The major instruments for this purpose are promotional measures, consultancy services and work with the general public.

In future new technologies will be used on a broader scale in the services sector, for instance in administrative buildings and commercial sites. Thus the innovative and efficient use of geothermal energy for heating and cooling in commercial buildings will be ever more frequently taken into consideration. The significance of photovoltaic plants will also increase.

#### 1.5.4 Training and education

The Tyrolean Energy Strategy 2020 covers the topics training for designers and workers in the construction sector to ensure a high quality of design and workmanship. The fields of training “refurbishments using Passive House components” and “comfort ventilation” are mentioned in the text as examples.

Focus is also placed on the information and training provided to municipalities and municipal staff in the field of energetic requirements and energy certificates.

In addition, it aims at implementing a “Chair of energy efficient construction” at the University of Innsbruck.

### 1.6 Energy Autonomous Tyrol Project: A New 10-point Programme of the Province

Source:

[http://www.waengle.at/pdf/energie\\_tirol/generationenprojekt\\_energieautonomes\\_tirol.pdf](http://www.waengle.at/pdf/energie_tirol/generationenprojekt_energieautonomes_tirol.pdf)

With its new 10 - point action programme Tyrol aims to cover its energy needs in the future with locally produced energy and to become energy autonomous through the locally produced energy from sun, wood and water within one generation. Drastic reduction of energy consumption and increasing the share of renewable energy are its two main pillars. The energy consumption in buildings is 40 % of the total consumption and one of the main measures of the programme is to improve the energy efficiency of existing buildings. It is estimated that through quality renovation of buildings more than two thirds of their energy consumption can be saved permanently.

The ten points of the programme are:

1. Raising the buildings renovation rate from 2 to at least 3 percent per year thus halving their energy demand.
2. Energy efficient renovation of public buildings in order to serve as models.
3. A new funding programme for energy-efficient and innovative tourism projects.



4. Waste heat recovery in industrial and commercial sites.
5. Hydropower expansion and improvement.
6. Development of new mobility concepts.
7. Energy and climate projects at community and district levels.
8. A support programme for new photovoltaic power plants.
9. Strengthening of research and development on energy innovation in Tyrol.
10. Public awareness through broad information, guidance and training.

## II. Legal Framework

Source:

[http://for2morrow.files.wordpress.com/2012/06/construction\\_laws.pdf](http://for2morrow.files.wordpress.com/2012/06/construction_laws.pdf)

Austria is a federal republic, which consists of nine provinces (Länder). Due to the division of responsibilities according to the 1929 constitutional law there has never been one single building law in Austria, but nine different systems, each consisting of a building law (covering the procedures and functional requirements for building works) and related ordinances (covering the technical requirements).

Most provinces joined in 2008 a nation-wide effort to harmonize the regional construction laws, in particular in the field of technical construction norms and standards. They changed their building regulatory system on the basis of the so-called guidelines, developed by the Austrian Institute for Construction Engineering (OIB).

With regards to low-energy and passive buildings major roles are played by Guideline no.6 of the Austrian Institute for Construction Engineering for the minimum requirements for heating demand of buildings and by the klima:aktiv haus standard for support of sustainable development and reduction of energy consumption and emissions of CO<sub>2</sub>, including criteria for energy efficiency, environmental protection, quality of planning, materials and construction, as well as comfort and quality of ventilation. This standard is similar to the well-established passive house standard of the German Passive House Institute (PHI), Darmstadt. But there are some differences:

### Passivhaus calculated with PHPP

15 kWh/(m<sup>2</sup>TFA a) (TFA = treated floor area = heated/cooled net floor area)

Internal heat sources = 2.1 W/m<sup>2</sup>

Detailed thermal bridge calculation, detailed consideration of shading, climate data set of the location of the building

### A++ building according to energy certificate (OIB)

10 kWh/(m<sup>2</sup>BGF a) (BGF= Bruttogeschoßflaeche = gross building area)

Internal heat sources = 3.75 W/m<sup>2</sup>

Detailed thermal bridge calculation required, but in practice frequently set as default...

Detailed consideration of shading required, but in practice frequently set as default...



Set of reference climate data used (used for building codes and subsidies, for the energy certificate the climate data of the specific location of the building are used and provide additional information)

## IIA. National regulations

### 1.7 Guideline No 6 of the Austrian Institute for Construction Engineering (OIB Nr. 6): Energy Economy and Heat Retention

Source:

[http://for2morrow.files.wordpress.com/2012/06/construction\\_laws.pdf](http://for2morrow.files.wordpress.com/2012/06/construction_laws.pdf)

*080313 SBI Survey - European national strategies to move towards very low energy buildings - March 2008 .pdf*

OIB Guideline no. 6 for minimum requirements for space heating energy demand (calculated values based on building performance, [www.OIB.or.at](http://www.OIB.or.at)) is implemented in the building regulations of the Austrian provinces. It establishes an energy performance certificate in accordance with the EU directive on EPBD (Energy performance of Buildings 2002/91/EC), supplemented and revised in 2010. ( 2010/31/EU). Under OIB Guideline no. 6 'Energy economy and heat retention' there is also a manual for calculation of the energy performance of buildings, which has been published as a separate document. This manual contains the methodology for the assessment of the energy efficiency of buildings as required by the EPBD.

The main criteria of OIB directive 6 (Recast 2011) are:

- annual heating demand for new residential buildings: max. 54.4 kWh/(m<sup>2</sup>a);
- annual heating demand for non-residential buildings with an area of more than 400 m<sup>2</sup>: HWB\* = max. 18,7 kWh/(m<sup>3</sup> a); related to the gross **volume**
- annual heating demand for renovation of residential buildings: max. 87.5 kWh/(m<sup>2</sup> a);
- specific minimum requirements for insulation of walls, windows, doors, ceilings, floors;
- minimum insulation requirements for pipes and fittings;
- avoidance of thermal bridges;
- an energy performance certificate.

### 1.8 klima:aktiv haus Passive House Standard

Sources:

[http://ec.europa.eu/energy/efficiency/doc/buildings/info\\_note.pdf](http://ec.europa.eu/energy/efficiency/doc/buildings/info_note.pdf)

*080313 later named SBI when it became Survey - European national strategies , presentation to move toward very low energy - March 2008.pdf The impact of energy performance regulations on*



*systems of building control' by H. Visscher/E. , Mlecnik/F. Meijer (RICS Cobra Research  
Conference, University of Cape Town, 10- 11th September 2009*

<http://vbn.aau.dk/files/14019804/sbi-2008-07.pdf>

[http://www.sci-network.eu/fileadmin/templates/sci-network/files/Resource\\_Centre/Tools/klimaaktiv.pdf](http://www.sci-network.eu/fileadmin/templates/sci-network/files/Resource_Centre/Tools/klimaaktiv.pdf)

Since 2005 the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management supports the dissemination and implementation of minimum criteria concerning the energy performance and the ecological quality of newly built residential buildings within its klima:aktiv haus programme.

klima:aktiv haus is one of the thematic sub-programmes of klima:aktiv, the national programme for climate protection. The klima:aktiv haus standard has been developed with the aim to support sustainable development and to reduce the total energy demand and the CO<sub>2</sub> emissions.

The standard includes criteria for energy efficiency, ecology, quality of planning, materials and construction, as well as comfort and quality of ventilation.

The assessment is carried out on the basis of a credit scheme with a maximum value of 1000. In case the number of credits is above 700, then, once the builders, planners or house sellers have filled-in the building declaration, the house counts as a klima:aktiv house; with more than 900 points it can be referred to as a klima:aktiv passive house. The declaration is then lodged with the managers of the klima:aktiv house programme for quality assurance purposes.

The main requirement is that the energy consumption does not exceed 15 kWh/m<sup>2</sup> per year (with small variations in the definition of area in the different provinces and the some differences as mentioned under II). Buildings must be without thermal bridges and airtight, they must be equipped with energy efficient ventilation systems with heat recovery and with water saving fittings. Furthermore they must not be built of HFCH or PVC containing building materials and they must satisfy the requirements for summer suitability.

The criteria of klima:aktiv for passive houses are similar to the well-established passive house standard of the German Passive House Institute (PHI), Darmstadt. Additional rating points are gained if their certification is performed by the Passive House Planning Package (PHPP) – a software developed by the Passive House Institute. An essential difference is that the klima:aktiv haus standard, in addition to the energy consumption criterion contains additional criteria for quality of the building.

## 1.9 List of National Regulatory and Legal Documents

Source:

<https://www.tirol.gv.at/fileadmin/presse/downloads/Tiroler-Energiestrategie-2020.pdf>



- Law on electricity and electricity sector organization, (ElWOG) BGBl. I Nr. 143/1998, IDF BGBl. I Nr. 106/2006
- Law for eco-power BGBl. I Nr. 149/2002 IDF BGBl. I Nr. 10/2007
- Energy supply deviations Act 1982 BGBl. Nr. 545/1982 IDF BGBl. I Nr. 106/2006
- Law on preliminary advice and registration for natural gas 1982 BGBl. 546/1982 IDF BGBl. I Nr. 106/2006
- National law concerning a GHG emissions trading system with certificates (Law on emissions certificates – EZG), BGBl. I Nr. 46/2004 IDF BGBl. I Nr.171/2006
- Harmonizing of the Austrian Climate Strategy for achievement of the Kyoto objectives 2008-2012, Decision of the Council and Ministers of 21.03.2007
- Ordinance on eoc-design 2007 BGBl. II nr. 126/2007

## IIB. Regional Regulations

### 1.10 Regional Standards

Source:

<https://www.tirol.gv.at/fileadmin/presse/downloads/Tiroler-Energiestrategie-2020.pdf>

One of the central tools for promotion of construction and renovation leading to energy conservation is the Regulation on Housing Construction. The focus is laid above all on promotion of comprehensive building renovation and use of passive house components in building renovation. The system for promotion of housing construction (new buildings and renovation) is consolidated in particular in the direction of promotion of low energy consumption, use of environmentally friendly household appliances and environmentally sound building materials. The Regulation on Housing Construction (new buildings) envisages calculation of an energy demand indicator (useful heating demand in kWh/m<sup>2</sup>.year). The Law on Energy Passports envisages mandatory introduction of energy passports by 1 January 2008. A significant effect from the introduction of energy passports is the promotion of integrated planning for new and renovated buildings. This means that isolated measures will no more be the first choice, but rather the joint impact of building technologies and in-house systems. Through the introduction of the new indicator for final energy consumption in future it will be possible to take into account also the efficiency of in-house systems. In this respect the involvement of the communities will play an important role in requiring a presentation of an energy passport in the event of requests for building/renovation permit. For certifying the transfer of knowledge concerning the requirements for issue of an energy passport it will be necessary to set up an information office in support of municipalities. At the same time in order to guarantee the quality of a building in the event of sale/purchase a presentation of energy passports will be required.



Co-funded by the Intelligent Energy Europe  
Programme of the European Union

The use of RES energy in housing construction is an object of an intensive promotional policy.

## 1.11 List of Regulatory and Legal Documents of the Province of Tyrol

Source:

<https://www.tirol.gv.at/fileadmin/presse/downloads/Tiroler-Energiestrategie-2020.pdf>

- Tyrol law on promotion of housing construction 1991, LGBl. Nr. 55/1991 IDF LGBl. 108/2001
- Tyrol building regulation 1998, LGBl. Nr. 94/2001 IDF LGBl. Nr. 60/2005
- Tyrol law on space heating in-house systems 2000, LGBl. Nr. 34/2000 34/2000 34/2000 IDF LGBl. Nr. 89/2002
- Tyrol law on natural gas 2000, LGBl. Nr. 78/2000
- Tyrol law on electricity 2003, LGBl. Nr. 88/2003 IDF LGBl. Nr. 17/2007
- Tyrol law on spatial planning 2006, LGBl. Nr. 27/2006



## 2

# ECONOMY AND FINANCING

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### Short review

Sources:

<http://www.iibw.at/EN/>

[http://www.iibw.at/EN/index.php?option=com\\_content&view=article&id=22&Itemid=26](http://www.iibw.at/EN/index.php?option=com_content&view=article&id=22&Itemid=26)

The housing policy in Austria is in the authority of the Federal State (Civil Law, i.e. Rent Law, Condominium Law, Limited Profit Housing Law, etc.; tax collection) and the provinces (housing subsidy schemes, regional planning, building regulations, etc.). Housing markets are strongly influenced by policy action.

The klima:aktiv national programme is a part of the Austrian strategy for climate protection and consists of more than 20 sub-programmes with measures for buildings, electrical appliances, products from renewable materials, etc. One of the objectives of the programme is attracting additional investments in energy efficiency and renewable energy. Another national programme is the Austrian programme on Technologies for Sustainable Development. It aims to promote effective restructuring of the economy towards sustainability. The sub-programme "Building of Tomorrow" is a part of it with respect to buildings.

The action programme "Economy of Tyrol" supports optimisation of energy use by operational energy consulting for implementation of new technologies.

The financing of measures in the area of construction of new low energy and passive buildings and of thermal renovation of existing buildings, as well as of use of RES energy, is carried out mainly by means of subsidies at national and regional levels. Housing subsidies are very important, as the structure of housing tenure shows relatively high sector of subsidised social housing - 23 % (approximately 10 percentage points above the EU-15 average). Other incentive programmes, oriented to the sector of private services are "Promotion of domestic environmental protection" and "Promotion of energy conservation measures in Tirol".

## I. NATIONAL PROGRAMMES

### 2.1 klima:aktiv - Austrian Climate Protection Programme

Sources:

<http://www.klimaaktiv.at/publikationen/klimaaktiv/annualreport2011.html>

<http://www.klimaaktiv.at/publikationen/klimaaktiv/fitfor2020.html>



klima:aktiv is a climate protection programme launched in 2004 by the Federal Ministry of Agriculture, Forestry, Environment and Water Management and managed by the Austrian Energy Agency. It plays an important role in the Austrian federal climate strategy, which consists of a bundle of measures of regulation, taxes, and subsidies.

The main purpose of klima:aktiv is to introduce and promote environmentally sound technologies and services.

klima:aktiv focuses its activities in several key areas with initiatives for training, clear and transparent quality assurance standards and measures, consultation and information activities, as well as activation and integration of all the important stakeholders.

klima:aktiv follows the idea of market transformation. The main characteristic of this approach is an active and comprehensive inclusion of all relevant market participants and stakeholders. The main advantages of a market transformation approach are comparatively low costs and high sustainable effects. In this case market transformation aims to raise the share of energy efficient products and services.

The advantage of combining all these various strands under one umbrella brand mainly results from the fact that the instruments used (training, consulting, quality management, networking and awareness campaigns) might differ in content and importance in different market segments but not so much in form. Thus the individual thematic programmes can profit from each other – not only can they learn from their own but also from others' mistakes. Vice versa, success stories will quickly work a circuit and all other programmes can profit.

## 2.2 Austrian Programme on Technologies for Sustainable Development "Nachhaltig Wirtschaften"

Source:

<http://www.nachhaltigwirtschaften.at/english/>

In 1999 the Austrian Federal Ministry of Transport, Innovation and Technology (BMVIT) launched a research and technology programme "Nachhaltig Wirtschaften", which aimed to effectively stimulate the restructuring of the economy towards sustainability. It initiates and supports advanced research and development projects and the implementation of exemplary pilot projects and includes several sub-programmes, one of which is "Building of Tomorrow" (Haus der Zukunft). The program could finance with a grant up to 35% of the "innovative costs" of the project. Starting from the low-energy solar building approach and the passive building concept and incorporating ways of using environmentally friendly and renewable materials in construction, new designs with great promise for the future have been developed and implemented both for new construction and for renovating existing buildings.

In "Building of Tomorrow Plus" the overriding goal is to achieve technological preconditions for constructing buildings that do not consume energy, but generate it.





Co-funded by the Intelligent Energy Europe  
Programme of the European Union

The long term vision for “Building of Tomorrow” is to increase energy efficiency in construction and use to a point where, over buildings’ entire life cycle, the emissions of greenhouse gases are reduced to zero in total.

By 2010 of over 700 projects submitted around 300 have received funding and the Ministry has provided more than 35 million euro in grants.

The Ministry commits program management to the Austrian Research Promotion Agency (FFG) – the national financial institution for applied research in Austria (<http://www.ffg.at/en>) as financial manager and to the Austrian Society for Environment and Technology (OGUT) as Manager of Public Relations (<http://www.oegut.at/en/>).

## II. REGIONAL PROGRAMMES

### 2.3 Action Programme "Tyrol Economy": Energy Consulting

Source:

[http://www.energieinstitut.net/portal/page/portal/EIW\\_HOME/DOWNLOADS/eiw\\_studie\\_beratung\\_foerderung.pdf](http://www.energieinstitut.net/portal/page/portal/EIW_HOME/DOWNLOADS/eiw_studie_beratung_foerderung.pdf)

The province programme for operational energy consulting in Tyrol is conducted primarily by the Chamber of Commerce (together with Energie Tirol and klima:aktiv). The focus is on optimisation of energy use by means of new technologies. In addition, the Tyrol Chamber of Commerce in cooperation with the regional energy agency Energie Tirol carries out audits of the tourist industry, preliminary assessments of potential energy savings and advice on possible measures for their implementation.

The hourly rate for the consultations is €67 with possible discounts from 25 to 50 %. The energy audit of hotels, restaurants and other tourist businesses is free of charge.

The regional energy agency of the province, Energie Tirol, focuses on consulting households and communities, and as a part of the action programme it serves as the organization for initial information on energy issues.

## III. FINANCING

Austria and its provinces have a comprehensive system of subsidies for energy efficiency and for use of renewable energy sources, including grants for research and development. The amount of subsidy is directly dependent on the rate of energy efficiency achieved.

Subsidies on national level are mainly investment subsidies, provided by the by the Ministry of Agriculture and Forestry, Environment and Water Resources Management and the “Klima- und Energiefonds” (National Climate and Energy Fund; <http://www.klimafonds.gv.at>), which provides 100 M€ per year until 2014 for thermal renovation of residential and non-residential buildings.



Various subsidies exist on provincial level, most being linked to the housing support (Wohnbauförderung). All subsidies are based on the national and provincial tax systems.

## 2.4 National Incentives and Subsidies

### Sources:

<http://www.energie-gemeinde.at/>

<http://www.umweltfoerderung.at/>

Projects for energy from RES and for energy saving by buildings renovation, airconditioning systems, that use only RES, etc. are supported within the framework of the "Climate Protection in the Municipalities" programme. Subsidies are granted to commercial companies and non-profit organisations, municipalities and private persons mainly by the Ministry of Agriculture and Forestry, Environment and Water Resources Management, the Climate and Energy fund and the Ministry of Economy.

The "Climate and Energy" Fund for the period 2007 - 2010 is created by the Council of Ministers on May 2, 2007. The objective of the fund, with an allocation of 500 million, is to improve energy efficiency and increase the share of renewables in energy production. The Fund is designed to be an important step to reduce greenhouse gas emissions and to allow the implementation of the national climate strategy. The Fund finances projects and research related to climate and energy, and in 2007 provided a total of € 50 million, and since 2008 - € 150 million annually.

The main focus of the fund is to provide financial assistance and procurement support initiatives in climate protection and sustainable energy supply. The program provides measures in three areas:

- Research and development of sustainable energy technologies;
- Promotion of projects in the local public transport and eco-friendly freight, and project management in mobility;
- Projects supporting the market penetration of sustainable energy technologies that are related to climate protection.

The "Climate and Energy" Fund was established as a legal entity with Presidential Committee, an Advisory Council of Experts and a Managing Council. The Conference Committee includes the Federal Chancellor, Federal Minister of Agriculture, Forestry, Environment and Water Management, Federal Ministry of Transport, Innovation and Technology and the Federal Ministry of Commerce, Industry and Labour. The Advisory Council of Experts is composed of four members and makes recommendations on financial aid; the companies Österreichische Forschungsförderungsgesellschaft mbH and Kommunalkredit PublicConsulting GmbH act as implementing agencies.

The fund is intended, first, to further strengthen the position of Austria as a leading industrial country in the field of energy and technologies for environmental protection



and, on the other hand, to ensure sustainable and environmentally friendly energy supply for Austria.

At the moment, subsidies amounting up to 35% of the eligible costs (innovative components) for materials, installation and planning and are provided for:

- energy sources: for heating systems, working with wood or with solar energy, heat pumps and (until 2012) for photovoltaic systems;
- energy savings: for energy efficient buildings renovation and construction of new low energy agricultural buildings, as well as for transition to a space heating system with RES energy.

## 2.5 Residential Subsidies at Regional level

Sources:

[http://www.iibw.at/EN/index.php?option=com\\_content&view=article&id=19&Itemid=23](http://www.iibw.at/EN/index.php?option=com_content&view=article&id=19&Itemid=23)

[http://www.iibw.at/EN/index.php?option=com\\_content&view=article&id=22&Itemid=26](http://www.iibw.at/EN/index.php?option=com_content&view=article&id=22&Itemid=26)

Various subsidies exist at provincial level, most being linked to housing support (Wohnbauförderung), especially concerning thermal insulation, use of biomass for heating and solar energy for space heating and domestic hot water preparation, but also for energy consulting and issue of EPCs.

The provinces provided € 1,950 million in 2010 for subsidised new construction. Roughly 1/3 went to companies, constructing affordable houses (LPHA), 1/6 to commercial housing developers and the remaining more than 1/2 to individual households and municipalities. In 2010 as many as 28,000 houses were subsidised. This is roughly 60% of all new construction. The provision of subsidies is usually linked with limitations of purchase prices and rents.

The subsidies for renovation of buildings are put into effect either as investment grants (usually between 10 and 25%) or loans (with 1% to 4% interest for a period of 10 to 20 years, depending on the regional system and the quality of supported measures).

Almost half of the housing subsidies by the provinces are granted for new construction in the multi-apartment sector, another 11% are spent for the sector of detached houses. The expenditures for housing renovation are quickly increasing (28 %).

## 2.6 Residential Subsidies in Tyrol (Wohnbauförderungsrichtlinie)

Sources:

[https://www.tirol.gv.at/fileadmin/themen/bauen-wohnen/wohnbaufoerderung/downloads/wbf-richtlinie\\_01-10-2013.pdf](https://www.tirol.gv.at/fileadmin/themen/bauen-wohnen/wohnbaufoerderung/downloads/wbf-richtlinie_01-10-2013.pdf)



New guidelines for housing subsidies in Tyrol came into force on October 1, 2013. Particularly attractive subsidies are provided for renovation of residential buildings. With extensive renovations up to two-thirds of the heating costs can be saved.

To obtain the subsidies for new housing applicants must have a family income between EUR 1,310 and EUR 2,660 per month, depending on the number of family members and the exact amount of the monthly income. In obtaining subsidies for social housing, there are restrictions on the sale cost of housing and the amount of the rent. There are no economic restrictions for subsidizing of retrofitting of existing buildings.

The first level of subsidizing is a credit low rate (from 1 to 4%) for up to 39 years. Compliance with certain minimum requirements for space heating is a precondition to receive subsidies; from 1.1.2012 the maximum annual heating demand shall not exceed 20 to 36 kWh / m<sup>2</sup>.a depending on the characteristic length of the building (approximately 33% lower than the rate of OIB directive). The loan may not exceed EUR 980 / m<sup>2</sup>.

The second level is a grant subsidy to be obtained in order to cover increased criteria for energy consumption of the building. The subsidy amount is calculated as the total number of points multiplied by the eligible area and multiplied by the point value of EUR 8. Some of the more important measures and corresponding points are the following:

<b>Improving heating</b>	$\geq 33\%$	3 points
	$\geq 60\%$	6 points
Improve the heating to	$\leq 10 \text{ kWh/m}^2.\text{a}$	11 points
<b>Biomass heating as the sole heating system</b>		
Building up to 300 m <sup>2</sup> of floor area		2 points
Buildings over 300 m <sup>2</sup> of floor area		1 point
Connection to an existing biomass heating system		0.5 points
<b>Installing a heat pump for heating purposes (space heating)</b>		
Building up to 300 m <sup>2</sup> of floor area		2 points
Building over 300 m <sup>2</sup> of floor area		1 point
<b>Installation of comfort ventilation with heat recovery</b>		
Building up to 300 m <sup>2</sup> of floor area		3 points
Building over 300 m <sup>2</sup> of floor area		2 points
<b>Execution of the project with high quality planning, execution, as well as high energy and environmental quality, provided that they meet the requirements of the "klima:aktiv house" or similar building certification system (eg. Passive house from PHI, Total Quality Building - ÖGNB)</b>		
Building up to 300 m <sup>2</sup> of floor area		2 points
Building over 300 m <sup>2</sup> of floor area		1 point



A certificate from an independent, authorized institution must be provided as a proof.

### **Execution of the building with environmentally friendly, sustainable materials (Ecological index 3)**

Building up to 300 m <sup>2</sup> of floor area and OI3TGH-BGF≤140	2 points
Building over 300 m <sup>2</sup> of floor area and OI3TGH-BGF≤140	1 point
Building up to 300 m <sup>2</sup> of floor area and OI3TGH-BGF≤70	3 points
Building over 300 m <sup>2</sup> of floor area and OI3TGH-BGF≤70	2 points

The sustainability of the materials is also evaluated, including how environmentally friendly is their production. This is done by the means of Ecological index 3 per m<sup>2</sup> gross floor area. All this is evaluated during the preparation for the energy certificate. The data is managed in the building-book-platform (<http://www.baubook.at/>). The evaluation procedure is described in OI3 guide from the Institute for Healthy and Ecological Building in Vienna (IBO).

### Solar Panels for hot water and heating

The grant amounts to € 210 per square meter of solar collectors area in a solar system for hot water to a maximum of € 2,100 per apartment. If the solar system is used to support space heating, the maximum funding amount is increased to € 4,200.

### **Renovations eligible for subsidy:**

#### **Regardless of the building's age:**

- adding rooms to a dwelling; division of a dwelling; enlargement of a dwelling
- turning other rooms into dwelling
- adapting a dwelling for an elderly or disabled people
- connection to district heating

#### **Building permit older than 10 years:**

- thermal protection
- measures to reduce the energy loss, the energy consumption and pollution emissions from heating and hot water treatment systems
- installation of energy saving heating systems
- erection or renovation of fireplaces/chimneys
- further environmentally-friendly measures
- noise and moisture protection

#### **Building permit older than 20 years:**

- roof renovation
- installation of sanitary facilities and electrical systems, when such are not present

### Requirements in connection to the building

#### **Building's size**



The structural seclusion of the dwelling(s) must be sought. In case of division the area must be at least (minimum) 30 m<sup>2</sup>. In case of extension the maximum area of 150 m<sup>2</sup> must not be exceeded.

### Thermal protection

A prerequisite for the subsidy in connection to the thermal protection measures and the extension of a building is the achievement of the following U-values.

Renovation of a building component – the following U-Values have to be achieved:

Building component	U-Value [W/m <sup>2</sup> K]
Roof or ceiling (to outside and roof attics)	$U < 0.18 \text{ W/m}^2\text{K}$
External Walls (to outside and roof attics)	$U < 0.25 \text{ W/m}^2\text{K}$
Floors, Walls (to basements or soil)	$U < 0.35 \text{ W/m}^2\text{K}$
Windows (changing the glass and the frame)	$U_w < 1.35 \text{ W/m}^2\text{K}$
Windows (changing the glass only)	$U_g \leq 1.10 \text{ W/m}^2\text{K}$

Table 1

At the request of the state/country a corresponding certificate must be submitted.

The above mentioned U-Values will usually be achieved when the external walls have 14 cm of insulation, the roof has 22 cm of insulation and the ground floor (or respectively basement floor) has 10 cm of insulation.

In special cases, when a building is historical or listed, an exception from the abovementioned

U-Values could be made. The reasons behind this decision must be justified. These minimum requirements for the thermal protection cannot be achieved because they are for example technologically, functionally or economically not feasible.

### Building services – energy supply

When renovating the heating system or heating supply system it is a subsidy requirement to install innovative climate-relevant systems. These include for example:

- Biomass heating system
- Heating pump for heating purposes with ground or ground water as a heating source
- Heating pump for heating purposes with air as a heating source
- District heating (from RES, waste heat)



- Partly natural gas-fired boilers in combination with thermal solar installation (first installation, replacement)

The installation of a biomass heating system is also eligible for subsidy. For small heating boiler (with heating capacity  $\leq 400$  kW) the following parameter criteria (by nominal load) must be met:

Energy conversion efficiency: minimum 85%

Emissions limit values in mg/MJ:

Boiler, Space heating	CO	NOx	OGC	Dust
with automatic loading				
• Boiler, Pellets	60	100	3	15
• Boiler, Wood chips	150	120	5	30
• Space heating	120	100	6	20
with manual loading				
• Boiler	250	120	30	30
• Space heating	700	120	50	30

Table 2

Note: Dust and NOx should be measured according to ÖNORM EN 303-5.

For fixed masonry-heaters or storage heaters in form of single stoves or central heating the abovementioned emission limit values are not decisive (essential). Energy conversion efficiency of 85% has to be provided.

An electrical heat pump for heating purposes with ground or groundwater as a heat source (main heating distribution with low temperature under 45°C) is considered innovative climate-relevant system if the Seasonal Performance Factor (SPF) is  $\leq 4$ . The proof of the Heating Seasonal Performance Factor is to be delivered via the programme "JAZcalc". The programme is available on <http://www.tirol.gv.at/wohnbau>. The heat pump has to be equipped with heat and electricity meters, whose proper performance has to be confirmed with acceptance form (F 87).

A heat pump for heating with air as a heat source (main heating distribution with low temperature under 35°C) is considered innovative climate-relevant system if the building it is used in has an area of max. 300 m<sup>2</sup> and the heating demand is max. 25 kWh/m<sup>2</sup>a. The heat pump has to be equipped with heat and electricity meters, whose proper performance has to be confirmed with acceptance form (F 87).



The installation (first installation, replacement) of a gas-fired boiler or (derogation from the principle of the use of the innovative climate-relevant system) or the replacement (not first installation) of old heating systems or boilers (using liquid fossil fuels) with oil-fired boiler could be subsidized if:

- is combined with solar panels
- for buildings which still have not been thermally renovated, an energy performance certificate with appropriate recommendations is submitted
- there is no possibility of connection to district heating and
- due to air-pollution control and lack of supply possibilities and/or storage facilities the use of biogenic fuels is not possible or not economically reasonable.

In case there is not enough solar radiation and the installation of solar panels is not possible or economically-disadvantageous, it is not necessary for this condition to be fulfilled.

With these measures the subsidy is increased by 3 pp (percentage points), if a heating demand according to the Eco bonus, Eco level 1 is proven. The fulfillment of the subsidy requirements have to be proven by the applicant.

#### **Comfort ventilation with heat recovery**

A comfort ventilation with heat recovery is eligible if there is a present supply and exhaust air system with centralized, decentralized or there is an individual ventilation unit in each dwelling (and not a single fan), there is a heat recovery and the following requirements are fulfilled:

##### Efficiency criteria

- air electrical power consumption  $\leq 0,45 \text{ W/m}^3\text{h}$
- heat recovery rate  $> 75\%$  according to PHI measuring methods (PHI=Passive House Institute) or  $> 70\%$  according to EN 13141-7, or  $> 84\%$  according to DIBt method (DIBt=The Center of Competence in Civil Engineering)

##### Comfort criteria

- air volume adapted to the requirements according to ÖNORM H 6038 (Ventilation Systems – Controlled Mechanical Ventilation with Heat Recovery for Apartments – Design, Installation, Testing, Operation and Maintenance)
- Sound level  $< 25\text{dB (A)}$
- Outside air filter minimum F7, exhaust air filter minimum G4 acc. DIN EN 779
- Inlet air temperature  $> 17^\circ\text{C}$

The professional implementation and performance of the system has to be confirmed by Acceptance form (F88). A list of the eligible for subsidy comfort ventilation systems is available at <http://www.komfortlüftung.at>.





### **Other building requirements**

- The subsidized measures must be carried out using standard equipment. In cases when there is a possible economical use of public funds, the costs of certain measures (e.g. for a window replacement, dwelling extension, lack of bathroom, shutters, blinds etc.) is taken into account when determining the subsidy only in the sense of the standard equipment acknowledged as reasonable. Subsidies for other points (e.g. for sound protection measures on or for dwellings next to highways) are reducing the funding in the calculation for the eligible for subsidy costs, unless these measures have met the requirements in the points, eligible for additional subsidies. Soundproof windows will only be funded if they have a sound reduction of at least 38 dB. Insurance benefits are deducted.
- The used building materials must not release during the life-cycle of the building any climate-damaging halogenated gases in the atmosphere (Haloalkane, Chlorofluorocarbon, Chlorodifluoromethane or Sulfur hexafluoride).
- During the renovation project the condition of the whole building must be taken into account. The probable useful economic life of the building should be economically reasonable. The expected increase of the rent must also be justifiable and reasonable for the local market.
- In case of establishment or readjustment of central heating system, to which are connected at least 2 dwellings, they must be equipped with devices that at least approximately record/register the heating demand per dwelling.
- An electrical heating will be subsidized only in exceptional cases (e.g. in inversions when adapting a dwelling for an elderly or disabled people) and no alternative heating opportunity is available.
- Dwellings or residential homes, whose renovation requires considerable expenditures, must have after the completion of the refurbishment contemporary equipment and facilities, especially with connection to the energy supply, water supply and sewage disposal.
- The financing of the renovation measures expenses must be ensured.
- A subsidy for the expansion of a dwelling will only be paid without simultaneous renovation (in advance?) when the eligible for funding area of the extension is at least 10 m<sup>2</sup>.

### **Requirements in connection to the residents**

#### **General requirements**

- Applicants must announce the residents of the dwellings to be rehabilitated (stating the names, professions and addresses).
- The dwelling should be main residence for the inhabitants (all-year-long regular use)
- The granting of renovation subsidy is for a limited period of time irrespective of the applicants' income, specifically for application submitted by 31.12.2014.

### **Applicants**



A subsidy is granted to the owner or to the one who is entitled to issue permits for construction on the property. When renovating one dwelling a subsidy is granted to the tenant, who lives in the dwelling and the apartment owner or co-owner. For a provision of guarantee from the state (Land) for a capital marker credit, necessary for financing can apply exclusively tenants. They must have Austrian citizenship or acc. to § 17a TWFG 1991 should be equally treated.

### **Types of support and eligible costs**

The subsidy consists of:

- Granting of annuity subsidy or
- Granting of one time subsidy, as well as
- Provision of guarantee

The amount of funding is determined by the dwelling area and the household size, where the higher the number of people living in the future household (the applicant and their family), the more eligible for funding floor space. Subsidy will be provided depending on the nature of the project, on the basis of the proven costs or as a fixed amount per m<sup>2</sup> floor space eligible for funding. For farmers can be paid off in the form of lump-sum payment.

The subsidy depends on the type of financing of the project:

### **With bank credit – annuity subsidy**

The state grants for the implementation of eligible for funding renovation measures to:

- Owner
- Tenant

### **Annuity subsidy to a credit**

The basic subsidy is 25% from the initial cost burden (credit's annuity) of the credit (minimum duration 10 years). This is in case no higher subsidy is provided from *Table 3*. The amount of the credit can be at most equal to the amount of the total costs eligible for subsidy (förderbaren Gesamtbaukosten). The annuity subsidy is calculated on the basis of the interest rate at the moment of the application, paid off twice a year for a maximum of 12 years. If the credit's duration is more than 12 years, then the annuity subsidy is calculated on the basis of fictive duration of 12 years.

For the calculation of the original annuity is used the borrowing rate at the time of the adjustment (January 1, April 1, July 1 or October 1), preceding the date of the application. If the application is made at the date of the adjustment (January 1, April 1, July 1 or October 1), the interest rate at this moment is decisive.

Annuity subsidy will only be granted if the financing of the project is through credit from a Building society or other credit with duration of at least 10 years. The interest rate of this other credit must be maximum 1.75 percent points more than the 3-months-Euribor



rounded to the second decimal place. It must be agreed that adjustments to the interest rate is done every year on January 1, April 1, July 1 and October 1.

**With own funds – one time subsidy**

The state grants for the implementation of eligible for funding renovation measures to:

- Owner
- Tenant

One-time subsidy for financing with own funds

The basic subsidy is 15% of the eligible for subsidy total construction cost, if the financing of the renovation measures is done with own funds. This is in case no higher subsidy is provided from *Table 3*.

Increased subsidy for energy saving and environmentally-friendly measures

Renovation measure	Annuity subsidy in %	One time subsidy in %
<b>Sound and thermal protection</b>		
-e.g. insulation, windows	35	25
-insulation from renewable resources (cork, hemp)	40	30
<b>Heating systems – Building services</b>		
-biomass heating	35	25
-connection to biomass district heating, district heating from waste heat	40	30
-gas-fired boilers	35	25
-geothermal heat pump	35	25
-controlled ventilation system with heat recovery	35	25
	40	30
-comfort ventilation system	40	30
-solar panels		



Table 3

### Solar panels

The subsidy depends on the size of the collectors and boilers (buffer volume, hot water storage tank). Existing solar systems (collectors, buffer) are taken into account in the calculation of funding. The subsidy of solar systems for hot water (and heating) is made on the basis of the documented with receipts costs. The collectors eligible for funding must have a product certification with a seal of approval from a recognized testing laboratory acc. to “Solar-Keymark” guidelines or acc. to “Austria-Solar”. A list of approved collector types is available at <http://www.solarkeymark.org>.

#### Annuity subsidy

The subsidy consists (for every subsidized dwelling) of maximum 700 €/m<sup>2</sup> collector aperture area and 50 l capacity, a total of maximum 7000 € of the eligible for subsidy total construction cost (supported credit amount). If the solar panels serve for space heating (support the space heating system), the amount is increased to 14,000 € from the eligible for subsidy total construction cost. The solar panels must be equipped with a heat meter, whose proper execution have to be confirmed by acceptance form (F 89).

#### One-time subsidy

Solar panels for hot water will be subsidized with maximum 2,100 Euro per dwelling/apartment, for solar panels that also support the space heating the subsidy is increased to 4,200 Euro per dwelling/apartment.

#### **Subsidy Eco Bonus for complete (deep) thermal energy renovation**

The renovation must include if possible the entire building envelope and minimum three of the following: facade, windows, insulating the ground (basement) floor, insulating the roof (uppermost floor deck), installation of climate-relevant system).

The subsidy is in the form of one time subsidy on the basis of the improvement of the heating demand (comparison of the heating demands before and after the renovation)

#### **Requirements**

-Maximum annual heating demand per m<sup>2</sup> of conditioned gross floor area (HD<sub>GFA</sub>), depending on the geometry (the value of  $l_c=1/(A/V)$ , where A is the area of the thermal envelope and V is the conditioned volume – and based on the reference climate according to OIB-Guideline (heating degree day : 3,400 Kd/a).

The heating demand depends on  $l_c$  should be interpolated linearly between the given values. In buildings with ventilation system with heat recovery the maximum allowed HD<sub>GFA</sub> is reduced (only) in the Eco level 1, by 8 kWh/m<sup>2</sup>a.

	HD <sub>GFA</sub> in kWh/m <sup>2</sup> a	HD <sub>GFA</sub> in kWh/m <sup>2</sup> .a
<b>Eco level</b>	$A/V \geq 0,8$	$A/V \leq 0,2$



1	75	35
2	54.4	25.6
3	25	15

Table 4

The calculation of the heating requirement has to be done under the provisions of the Tyrolean Building Regulations 2011. The aforementioned U-Values are not decisive.

-Submission of heating requirement calculations (incl. plans and calculation basis).

-The application for the Eco bonus is done simultaneously with the application for the residential building renovation, no later than the time of final settlement.

#### Amount

The amount of the subsidy depends on the Eco level, the floor space with and the level of improvement of the heating demand ( $HD_{GFA}$  before the renovation and  $HD_{GFA}$  after the renovation).

	Eco level 1		Eco level 2		Eco level 3	
	Improvement level		Improvement level		Improvement level	
	≥ 50%	≥ 65%	≥ 50%	≥ 65%	≥ 50%	≥ 65%
<b>Floor area ≤ 300 m<sup>2</sup></b>	€ 3,300	€ 4.400	€ 4.950	€ 6.600	€ 6.600	€ 8.800
<b>Floor area &gt; 300 ≤ 1000 m<sup>2</sup></b>	€ 5,500	€ 7.700	€ 8.250	€ 11.000	€ 11.000	€ 15.400
<b>Floor area &gt; 1000 m<sup>2</sup></b>	€ 8,250	€ 11.000	€ 12.100	€ 15.950	€ 16.500	€ 22.000

Table 5

#### Subsidy for quality renovation

Building renovations with particularly high level of planning, execution, and energy and environmental quality will have an additional subsidy, if they have they reach the Eco level 3 and the requirements of the klima:aktiv house or corresponding building certification systems (e.g. Passive House (PHI), Total Quality Building, Austrian Society for Sustainable Building). The proof must be provided via certificate by an independent, authorized institution. The funding will be provided in the form of a one-time subsidy in the following amount:

<b>Floor area ≤ 300 m<sup>2</sup></b>	€ 1,000
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Floor area > 300 ≤ 1000 m <sup>2</sup>	€ 1,500
Floor area > 1000 m <sup>2</sup>	€ 2,000

Table 6

### **Subsidized cost for the renovation**

Upper limits

Owner – maximum 700 Euro/m<sup>2</sup> subsidized area

Tenant – maximum 21,000 Euro

Lower limit 1,000 Euro

### **The process**

#### **Application**

Max. 18 months after the invoice date (receipt's date) for the renovation measures

#### **Subsidy guarantee**

Issue after State's positive answer to the application

#### **Payment**

##### Annuity subsidy

-with the beginning of the bank's loan repayment, no earlier than the submission of the loan guarantee

##### One time subsidy

-right after the submission of the loan guarantee

## **2.7 „Promotion of Domestic Environmental Protection” and “Promotion of Energy Conservation Measures in Tyrol” Programmes**

*Sources:*

*Umweltförderung im Inland, Bundesministerium für Land- und Forstwirtschaft, Umwelt- und Wasserwirtschaft.*

*Wirtschaftsförderungsprogramm des Landes Tirol, Tiroler competitive benefits  
Energiesparmaßnahmen.*

There are two promotional programmes for the private services sector at national and provincial levels – „Promotion of domestic environmental protection” and “Promotion of energy conservation measures in Tyrol”. Under these programmes energy efficiency measures and use of RES are supported.



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Under “Promotion of energy conservation measures in Tirol” the use of renewable energy sources is promoted as a priority in parallel with measures for energy efficiency improvement.

In the area of tourism special consulting services within the framework of programmes for the promotion of solar energy installations are already provided.

In the area of advisory services further consultations for the individual economic sectors in the framework of the “Action Programme Tirol Economy” need to be developed. In addition to consulting activities it is necessary to promote the use of RES in the services sector through its own technologies programme. Besides the information and communication activities R&D projects in the area of RES are in the focus as well.



## 3

### KEY STAKEHOLDERS INVOLVED

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#### *Short review*

The achievement of the objectives of the Tyrol province in terms of low energy and passive buildings with use of renewable energy sources is made possible by pooling the efforts of all stakeholders and the efficient use of their potential.

Key partners at national level are the Federal Ministry of Transport, Innovation and Technology with its five-year research and technology programme on technologies for sustainable development; the Austrian Energy Agency, which brings together policy, economy, scientific institutions and other interested organizations to prepare the soil for decisions in politics, public administration and industry; the Austrian Society for Sustainable Real Estate Management, which aims to achieve a transparent system for integrated assessment of all sustainability criteria for buildings; the Limited Profit Housing Associations (LPHA), which carry out 1/3 of subsidised new construction in Austria; the Austrian Institute for Construction Engineering, founded by the nine provinces for coordination of the activities of the provincial administrations in the field of construction, particularly with respect to legislation, standardisation and certificates.

At regional level important players are the energy agency of Tyrol Energie Tirol, founded in order to improve energy efficiency in the private and public sectors, taking into account local renewable energy sources, and Low Energy Building Cluster Tirol, which is a public-private initiative of the Austrian Federation of Industry in Tyrol and private companies with a mission to accelerate the market diffusion of low energy buildings and to increase the construction quality of new buildings, as well as of the renovation of existing ones. Other organizations at the regional level are the agency Standortagentur Tirol, including the cluster "Renewable Energy Sources Tyrol", the "alps" Technology Center for Adaptation to Climate Change, the association IG Passivhaus Tirol and the leading developer in Tyrol Neue Heimat Tirol – a limited profit housing association.

#### I. NATIONAL LEVEL

##### 3.1 Austrian Federal Minister of Transport, Innovation and Technology (BMVIT)

Source:

<http://www.bmvit.gv.at>

<http://www.nachhaltigwirtschaften.at/english/index.html>

The Austrian Federal Ministry of Transport, Innovation and Technology (BMVIT) has developed a five-year R&D programme on technologies for sustainable development. It





initiates and supports advanced research and projects for development and implementation of exemplary pilot projects in several areas of activity.

One of subprogrammes, "Building of Tomorrow", aims to support innovative sustainable buildings in Austria. "Building of Tomorrow" refers to residential and office buildings with the following improvements in comparison to existing practices in Austria:

- improved energy efficiency during the entire life cycle;
- emphasis on use of renewable energy sources, in particular solar energy;
- costs, comparable to those of conventionally designed buildings.

### 3.2 Austrian Energy Agency (AEA)

Source:

<http://en.energyagency.at>

The Austrian Energy Agency is an energy research and policy institution, established in 1977, in which the federal and the provincial administrations, as well as a number of important institutions and corporations from different economic sectors cooperate.

The AEA prepares the ground for decisions in politics, public administration and industry by means of detailed research and by highlighting important dependencies and relations among topics. It also provides information to all target groups in the society on the background and the developments in the field of energy production and consumption.

It brings together politics (the federal and provincial governments, the Association of Austrian cities and towns), economy (OMV, EVN, Wiener Stadtwerke Holding, TIWAG, etc.), stakeholders and organisations involved (WKÖ, IV, Fachverbände, AEE, Austropapier, Biomasseverband etc.) and scientific institutions (WIFO-CEPS, EIV, LEV).

The main areas of activity are innovative energy technologies, energy efficient systems and renewable energy sources.

### 3.3 Austrian Society for Sustainable Real Estate Management (ÖGNI)

Source:

[www.ogni.at](http://www.ogni.at)

The Austrian Society for Sustainable Real Estate Management is a partner organization of the German Green Building Council (DGNB).

The goal of ÖGNI is to achieve a transparent system for integrated assessment of all sustainability criteria for buildings for the Austrian real estate sector. The organization is funded on the base of the projects it develops, i.e. it does not have a certain fixed budget. Its main areas of work are the promotion of "sustainability" as a concept to the general public, the organization of exhibitions and awards for already constructed buildings. Its main task is to maintain a good network of contacts among all participants in its initiatives

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by regularly conducting specialized workshops and conferences. The organization is still in an early stage of development.

### 3.4 Limited Profit Housing Associations (LPHA)

*Source:*

[http://www.iibw.at/EN/index.php?option=com\\_content&view=article&id=17&Itemid=20](http://www.iibw.at/EN/index.php?option=com_content&view=article&id=17&Itemid=20)

The LPHA in Austria comprise 190 housing co-operatives, private-limited and public-limited companies with a total housing stock of 865,000 units, which represents 23% of the country's total. Roughly 1/3 of the subsidised new construction is carried out by LPHA. LPHA are entrepreneurs who build at fixed by local governments price and have limits on the value of the property at the sale and the amount of rent. They are also responsible for the maintenance and management of buildings after construction is complete.

All Limited Profit Housing Associations together have a stable housing output of 14,000 to 16,000 units per year. This is more than half of all multi-apartment housing construction in Austria. With this very high market share, the LPHA have not only outperform municipal housing, but also private multi-apartment housing construction.

### 3.5 Austrian Institute for Construction Engineering (Österreichisches Institut für Bautechnik - OIB)

*Source:*

<http://www.oib.or.at/>

The Austrian Institute for Construction Engineering (OIB) is a private association, founded by the nine Austrian provinces. It is responsible for coordination of the activities of the provincial administrations in the field of construction, particularly with respect to legislation, standardisation and certificates. The OIB represents the provinces in the Standing Committee on Construction and in the Preparatory Group within the European Commission. In addition, the OIB is the Austrian European Technical Approval Body and a member of the European Organisation for Technical Approvals (EOTA).

### 3.6 Austrian Research Promotion Agency (FFG)

*Источник:*

<http://www.ffg.at/en>

The Austrian Research Promotion Agency (FFG) is the national funding agency for industrial research and development in Austria. As a "one-stop shop" offering a diversified and targeted programme portfolio, the FFG gives Austrian businesses and research facilities quick and uncomplicated access to research funding.

The FFG was founded on 1 September 2004 (pursuant to the FFG Act on establishing a *The Success Model of Tyrol*



research promotion agency, Federal Law Gazette I No. 73/2004). The FFG is wholly owned by the Republic of Austria, represented by the Federal Ministry for Transport, Innovation and Technology (BMVIT) and the Federal Ministry of Economy, Family and Youth (BMWFJ). As a provider of funding services, however, the FFG also works for other national and international institutions.

One of the areas of funding of FFG is to promote energy efficiency and better environmental protection. Energy resources are limited and must therefore be used more carefully in the future. And this is precisely where the FFG has an important role to play: it promotes technologies that enable more efficient use of energy. The Agency supports the creation and development of new smart energy infrastructures and facilitates the development and optimisation of renewable energy sources.

### 3.7 Austrian Society for Environment and Technology (ÖGUT)

Source:

<http://www.oegut.at/en/>

The Austrian Society for Environment and Technology (OGUT) is a non-profit organization, formed as a scientific platform for environment, economy and administration. It was founded in 1985 with the goal to overcome the communicational barriers in the conflict areas of economy and ecology.

Due to the membership of around 80 organizations from ministries (e.g. Ministry of Economics and Labour, Ministry of Agriculture, Forestry, Environment and Water Management), public authorities (e.g. Municipality of Vienna, Province of Lower Austria), private industry and enterprises (e.g. Siemens Austria), interest groups (e.g. Chamber of Commerce, IG Passivhaus), environmental organizations (e.g. Greenpeace, WWF, Global 2000) and professional individuals, OGUT has the best preconditions for networking, preparation and providing of competent information and innovative solutions in order to meet and initiate challenges in the environmental field.

The main focus at OGUT lies on "networking, scientific competence and innovation" and the topics that are dealt with lie in the fields of "Environment and Technology". An important pillar of OGUT's activities is to develop strategies for environmentally sound policies and measures as a think-tank, together with its members.

Besides scientific expertise, OGUT has an accounted expertise in project and programme management. In that role OGUT is commissioned by the Austrian Federal Ministry for Transport, Innovation and Technology to manage the Austrian building RTD programme "Building of Tomorrow".

### 3.8 Passivhaus Austria

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Links: <http://www.passivhaus-austria.org/>

With its streamlined operating structure, Passivhaus Austria is actively engaged in sustainable advancement and establishment of the Passive House Standard and of the EnerPHit Standard for renovation. For Dr. Wolfgang Feist, President of Passivhaus Austria, ongoing work relating to publicity, further training and quality assurance in Austria is of central importance for establishing the Passive House as the acknowledged high quality standard. The Passivhaus Austria was founded in October 2013 and has now 65 members.

The aim is to promote Passive House as THE standard which meets best the requirements regarding NZEB, climate protection objectives, living comfort, health requirements, cost optimality, reduction of dependence on imported energy from abroad etc.. It is the standard which will be applied by law in the City Brussels from 2015, and in Luxemburg from 2017 onwards in all new buildings.

The Passivhaus Austria has committed itself to maximum efficiency and therefore to the Passive House Standard, in order to accomplish the energy revolution with 100 percent renewable energy. It offers information exchange with network partners, designers and property developers, real estate sector, construction materials industry and the building trade

### 3.9 Passive House Institute Innsbruck

Links:

<http://www.phi-ibk.at/>

The Passive House Institute Innsbruck was founded in 2010 and covers similar areas of activities as its sister organisation the Passive House Institute in Darmstadt. These include consultations during all stages of a construction project, quality assurance, certification of entire buildings and construction components, e.g. windows, ventilation systems, wall systems, etc. In addition, it offers consultations for product development, energy performance simulations, presentations on the Passive House Standard. The PHI Innsbruck is also a partner in the EU cofounded SINFONIA project.

## II. REGIONAL LEVEL



### 3.10 Energy Agency of Tyrol (Energie Tirol)

Source:

<http://www.energie-tirol.at/>

Energie Tirol is a regional energy agency in Tyrol, founded in 1992 by the province as a non-profit association. Its objective is to improve energy efficiency in the private and public sectors, taking into account local renewable energy sources. It is financed partly by the provincial government, by the major energy supplier in Tyrol and by participation in projects (about 60% of the financing). Its aim is to improve energy efficiency in the public and private sectors, taking into account local renewable energy sources by:

- consulting the end user;
- advise the Government on how to develop a system of subsidies.

Energie Tirol participate in the dissemination of information, advice on specific energy issues, energy audits, promote new technologies, energy efficiency in buildings, solar thermal and change the behavior of individuals in terms of energy use.

The Agency provides consulting services to households, businesses and municipalities and puts a strong emphasis on energy efficient buildings and passive houses in particular. It is a partner in the e5 programme for energy efficient communities.

### 3.11 Low Energy Building Cluster Tyrol (Niedrigenergiehauscluster Tirol)

Source:

<http://ec.europa.eu/DocsRoom/documents/5084/attachments/1/translations/en/renditions/pdf>

Low Energy Building Cluster Tyrol is a public-private initiative of the Austrian Federation of Industry in Tyrol and private companies, mainly from the construction industry, established in 1999. Its mission is to accelerate the market penetration of low energy buildings and to increase the construction quality of new buildings, as well as of the renovation of existing ones. This mission is achieved by networking, professional training and definition of common quality standards.

To ensure construction of low energy buildings (including complying with a passive house standard) at high quality standards the cluster is active in the following areas:

- standardisation of the products (e.g. passive houses ) of different companies;
- development of innovative products and services;
- motivating and improving the qualifications of employees (and companies);
- change of public regulations and general market conditions in favour of low energy buildings;
- “clustering” of independent companies.



### 3.12 Standortagentur Tirol

Source:

<http://www.standort-tirol.at/page.cfm?vpath=index>

Standortagentur Tirol is an agency of the Province of Tyrol, established in 1997 with an annual budget of about € 7 million and a targeted mission to assist the region in terms of science, economy and employment. The Agency is funded by grants, participation in projects and membership fees.

Through its program for establishing clusters it has created a network of more than 68 companies and partners, thus helping the participants in the network to identify potential partners and projects in the province of Tyrol.

One of the members of Standortagentur Tirol is the cluster “Renewable Energies Tyrol”.

#### **Cluster “Renewable Energies Tyrol” (Erneuerbare Energien Tirol (EET))**

Tyrol is traditionally active in the production of energy from renewable sources. Tyrolean companies and research institutes have been particularly successful in developing new technologies for efficient use of wind energy.

The cluster includes 86 innovative companies, institutions and universities with over 8000 employees. The companies and research institutions in the cluster cover in particular the following technology areas:

- Solar heat
- Photovoltaic energy
- Heat pumps
- Energy from biomass and biogas, CHP
- Electric Mobility
- (Small) HPP
- Energy efficiency and energy-efficient buildings

Its daily activities include:

- Establishing contacts between companies and researchers;
- Motivate and encourage strategic research and innovation activities;
- Initiating and coordinating collaborative projects between its members;
- Initiating and supporting innovative projects and activities in the field of renewable energy sources;
- Informing members of developments in the field of renewable energy.



### 3.13 alpS - Technology Center for Adaptation to Climate Change

Source:

<http://www.alp-s.at>

AlpS GmbH is a private non-profit organization in Tyrol. The organization investigates how global climate change affects regional and local human-environment systems. Climate and socio-economic scenarios provide the basis for assessment and evaluation of possible future developments in mountain regions.

AlpS focuses on innovative, marketable technologies and strategies for a sustainable adaptation to climate change. These include innovations for early warning and monitoring systems for the prevention of natural disasters, tools for modern risk management as well as concepts for adapted land-use, water resource and forestry management.

The organization also supports decision makers, institutions and businesses on the basis of its scientific expertise. Risk management for municipalities and businesses or regional energy development strategies serve as two successful examples.

### 3.14 IG Passivhaus Tirol

Source:

<http://www.tiroler-passivhaus.at/>

IG Passivhaus Tirol began its operation as a private initiative of the 8 small / medium companies in 2003 and it was officially established as an association in 2005 and over time has grown to a network of nearly 80 members in 2012. It is an association of experts in technology for passive buildings whose purpose is to accelerate the deployment of passive houses in Tyrol.

The association's position as a center of expertise in Tyrol on all issues related to sustainable and most of all passive buildings is provided by a continuous exchange of information, the provision of quality, comprehensive training and careful cooperation.

The Association is a member of the IG Passivhaus Österreich and the Passivhaus Austria and is a partner in the EU cofunded project PassREg.

### 3.15 Neue Heimat Tirol

Sources:

<http://www.neueheimattirol.at>

<http://www.tiroler-passivhaus.at/ueber-uns/mitgliedsbetriebe/neue-heimat-tirol.html>

The Company Neue Heimat Tirol, founded in 1939, is one of the leading developers and one of the leading property management companies in western Austria. It is owned by the province of Tyrol and Innsbruck (by 50% each). Its features are accessible cost of ownership and management of rented housing and optimized



energy costs. As a consultant in the residential sector, Neue Heimat Tirol offers its services to all communities and institutions. The main emphasis is placed on the cost saving architecture, quality of life and environmental awareness. Neue Heimat Tirol is a leader in the renovation and maintenance of buildings, and in improving of the quality of life.

One of the long standing efforts of the Neue Heimat Tirol is to keep heating costs to the lowest possible level. This, therefore, requires a suitable building envelope. To minimize the consumption of oil and gas, solar panels on the newly built housing are almost always installed. Neue Heimat Tirol reduces the energy load on buildings with full energy renovations, improved thermal insulation of the facade and roof, and replacement of doors and windows.

The competence of Neue Heimat Tirol on energy issues provides relatively stable heating costs for housing over the past two decades despite the sharp increase in energy prices.

The greatest achievement of the company is the construction of "Lodenareal", which demonstrates the construction of buildings in the passive house standard in large scale. The project consists of 354 living units (PH database ID: 1225)

(ref.5.1)

### **3.16 University of Innsbruck – Department “energy efficient construction”**

Source: <http://www.uibk.ac.at/bauphysik/>

In the Tyrolean energy strategy 2020 it was laid down that the Federal state of Tyrol should finance an additional chair in the area of energy efficient construction in order to ensure that sufficient young professionals are educated and required research work can be carried out. The energy efficient construction department was created in 2008/9 and covers the topics of active and passive usage of solar energy, energy efficient domestic water, research in the field of renovation and development of innovative components, energy efficient buildings, energy efficient heating with renewable energy carriers, energy efficient building services, ventilation and heat recovery.

A large laboratory infrastructure supports its involvement in different research projects in the field of building physics, building services, solar thermal technology etc.

The chair covers the energy efficient construction department of Prof. Dr. Wolfgang Streicher and the building physics department of Prof. Dr. Wolfgang Feist.





## 4

# PLANNING AND DESIGN CAPACITY

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One of the necessary conditions for achievement of the objectives of the energy strategy of Tyrol is acquisition of appropriate knowledge and skills by all stakeholders. This is achieved through professional orientation, basic vocational training and/or upgrading of skills, professional advice, creation of clusters, as well as national and international networks and other forms of exchange of experience.

At national level the most important programmes are klima:aktiv - training of professionals, the Austrian programme on Technologies for Sustainable Development "Nachhaltig Wirtschaften" and the BUILD UP Skills programme.

At regional level in Tyrol the local energy agency Energie Tirol has implemented decentralised energy consultancy services, while Energy Academy Tyrol offers practical training in relevant key thematic areas, and Energy Academy Tyrol and IG Passivhaus Tirol offer practical training in relevant key thematic areas.

## I. FEDERAL PROGRAMMES

### 4.1 klima:aktiv - Training of Professionals

*Source:*

<http://www.uncsd2012.org/content/documents/519austria%20klima%20aktiv.pdf>

One of the key activities of the klima:aktiv programme is training of professionals. klima:aktiv provides the qualifications needed in the thematic programmes and coordinates training and education in various relevant fields. The main focus is on advanced vocational training. Pilot training and seminars are initiated and introduced in the training market, in cooperation with universities, technical colleges, educational service of the Chamber of Commerce etc. klima:aktiv is therefore not in competition with the educational market players but acts as a partner and an innovation manager.

The competence partners and the klima:aktiv professionals, who profit from trainings are plumbers, owners of biomass plants, planners, chimney sweepers, architects, master builders, energy advisers, ecology trainers and mobility managers.

### 4.2 Austrian Programme on Technologies for Sustainable Development "Nachhaltig Wirtschaften"

*Source:*

<http://www.nachhaltigwirtschaften.at/english/>



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This programme has been developed by the Austrian Federal Ministry of Transport, Innovation and Technology (BMVIT). It initiates and supports advanced research and development projects and implementation of exemplary pilot projects.

The objectives of the programme are:

- new opportunities for the economy;
- economical use of natural resources;
- consolidation of Austria's position in the field of technology;
- a positive effect on the economy and employment, achieved through:
  - strengthening of R&D competence;
  - interdisciplinarity and networking;
  - dissemination and application of R&D results.

### 4.3 BUILD UP Skills – Top Qualification for Energy Efficiency in the Building Industry

Source:

<http://en.energyagency.at/projects-research/buildings-household/detail/artikel/build-up-skills-top-qualification-for-energy-effi>

The guideline for overall energy efficiency of buildings creates a new challenge for designers and experts in the field of construction industry in respect of the category of buildings with almost zero energy.

The "BUILD UP Skills" initiative of European Union – Intelligent Energy Europe (IEE) aims to improve the relevant know-how of craftsmen, construction workers and installation personnel by means of specific training and further training concepts.

In the first stage the "BUILD UP Skills" project in Austria initiates a national strategy process, bringing together all relevant national participants in the areas of qualification, training and education. In the second stage the relevant working groups prepare a national road map for improving the qualifications of craftsmen in the construction sector.

The project consortium consists of three partners: Austrian Energy Agency as a coordinator, Regional Association Steiermark and Organisationsberatung GmbH (responsible for the klima:aktiv education coordination). The total project includes representatives from ministries, numerous public authorities, social partners, representatives from interested lobbies and educational institutes in several working groups. The project started in Austria in November 2011, the national roadmap is envisaged to be completed by May 2013. In the second phase of the initiative, the newly gained knowledge will be applied to new training and further training measures.



## II. REGIONAL PROGRAMMES

### 4.4 Energie Tirol Consultations

Source:

<https://www.energie-Tirol.at/index.php?id=2238>

The establishment of decentralised energy consultancy services in Tyrol is important for achieving the objectives related to space heating. The provincial office for energy consultancy Energie Tirol is represented in all districts and offers advice and consultations. It conducts meetings on fixed dates in individual districts and on-the-spot consultations upon request. With the opening of energy services desks in 2009 the decentralised provision of consultations by Energie Tirol developed further and now intensively networks with regional actors. Thus a dense system for energy consultancy services is being built jointly with the municipalities, close to the citizens' concerns.

The consultations, provided by Energie Tirol, represent a service in the areas of energy saving, environment and efficient use of resources for promotion of energy conservation. A specific emphasis is put on the quality of construction works, which should ensure optimal results from design phase to construction from energy performance point of view.

Experts not only advise on all major issues of low energy and passive houses, but also provide important advice and information for new insulation systems, window frames and glazing, environmental heating systems, use of solar energy by means of collectors and heat pumps for the promotion of energy conservation in the country.

### 4.5 Energy Academy Tyrol

Source:

<http://www.energie-tirol.at/energie-akademie-tirol/>

Promotion of energy efficient buildings, environmentally friendly heating systems and diffusion of innovative energy technology are the main activities of Energy Academy Tyrol. The academy has been founded by Energie Tirol and the province of Tyrol in collaboration with various partner organisations.

The energy academy offers an interesting range of information sessions for private clients. Topics include renovation of buildings, comfortable ventilation systems, environmentally friendly heating systems, etc.

The academy offers practical training in key thematic areas for representatives of communities and for employees of municipalities.

In-house training for companies will be offered tailored to the requirements of the particular company for training courses for its employees.



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#### **4.6 IG Passivhaus Tirol – training courses**

Source:

<http://www.tiroler-passivhaus.at/home/passivhaus-handwerker/-praktiker-kurs.html>

Through its training center, IG Passivhaus Tirol offers training courses for certified designers and construction specialists in the field of passive houses in collaboration with Energie Tirol and other institutions. This practical training aims to prepare specialists in the application of EU regulations and deliver deep knowledge required for the construction of passive houses.



## 5

# CONSTRUCTION AND TECHNOLOGIES

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Sources:

[ec.europa.eu/energy/efficiency/doc/il/info\\_note.pdf](http://ec.europa.eu/energy/efficiency/doc/il/info_note.pdf)

<http://www.langconsulting.at/index.php/en/lang-consulting-en>

In Austria there are two definitions of low energy buildings:

- Low energy building: annual heating energy consumption below 60-40 kWh/m<sup>2</sup> gross area, 30% above standard performance;
- Passive building: equal to Feist passive house standard: annual heating energy consumption below 15 kWh/m<sup>2</sup> (heated area in Tyrol)

### 5.1 Project Lodenareal

Sources:

[http://www.passivhausprojekte.de/#d\\_1225](http://www.passivhausprojekte.de/#d_1225)



The largest residential complex in Europe, designed and built up to the passive house standard was opened in October 2009 in Innsbruck, the capital of Tyrol. Around 35.000 m<sup>2</sup> (gross) for 354 flats (26.000 m<sup>2</sup> usable area) have been built by the building owner Neue Heimat Tirol ([www.neueheimattiro.at](http://www.neueheimattiro.at)), a social housing company providing affordable flats to citizens. The heat energy demand is to be 15 kWh/m<sup>2</sup> per year, as calculated by the PHPP software. Solar collectors (1.050 m<sup>2</sup>), groundwater pre-heating (or cooling) of ventilation air, a wood pellets boiler (300 kW) and a condensation gas boiler (326 kW) cover the energy demand for space heating and hot water. The compliance with the passive house standard has been certified by the Passivhaus Institute (PHI), Darmstadt.

Overall annual energy consumption per square meter does not exceed the 15 kWh/m<sup>2</sup> passive house standard. Up to 80% of the heating consumption will be covered by a combination of a wood pellets and a gas boiler and up to 20% by 1050 m<sup>2</sup> of solar panels,



which produce annually 350 kWh/m<sup>2</sup>. The insulation and ventilation technologies also comply with the passive house standard.

Main features:

- Treated floor area: 26000 m<sup>2</sup>
- Annual heat demand: 14.5 kWh/ (m<sup>2</sup>.a)
- Heat-load: 9.1 W/m<sup>2</sup>

## 5.2 Olympic Village, Innsbruck, Tyrol, Austria

Sources

<http://www.phnw.org/files/11.pdf>

[http://www.innsbruck2012.com/en/venues/olympisches\\_jugenddorf](http://www.innsbruck2012.com/en/venues/olympisches_jugenddorf)

The new apartment complex for the 2012 Youth Winter Olympic Games demonstrates the potential for a large scale building project, complying with the passive house standard. The development consists of 13 apartment blocks, comprising a total of 444 apartments for accommodation of the participants in the Olympiad, which after April 2012 were made available to local residents.

Main features:

- Very low energy new building ( <= 25 kWh/m<sup>2</sup> annual heat demand)
- Treated floor area: 32229 m<sup>2</sup>
- Annual heat demand: 18.2 kWh/ (m<sup>2</sup>.a)
- Total primary energy demand (domestic hot water, heating, cooling, household electricity): 108 kWh/ (m<sup>2</sup>.a)
- Primary energy demand: (hot water, heating and auxiliary electricity) 33 kWh/ (m<sup>2</sup>.a)
- Heat load: 13.3 W/m<sup>2</sup>

## 5.3 Residential Building Mitterweg



As clearly described in the website of "[Baumschlager-eberle](http://www.baumschlager-eberle.com)" design studio, authors of the project, the realization of "Residential Building Mitterweg" was strongly motivated by economic and social factors and this is why it rightly perceived as one of the milestones for the introduction of PH standard in the regular construction practice:

"In order to lower the rent for the average income, architects as well as developers in Europe are under the pressure of lowering the cost of social housing, in terms of construction as well as operation. On the other hand, cheap „poor man's houses“ should be avoided. How to combine these opposing demands, is demonstrated by this project on the outskirts of the city of Innsbruck, capital of the federal state of Tyrol. It does not only conserve energy and is inexpensive, but also uses high standards of residential design and a special quality of form.

The secret of its success is that the architects thought of saving costs already during the design phase. Compact building volumes with relatively small exterior surfaces and highly insulated exterior walls are associated with a not effortless but very efficient environmental control system, combining the following factors: controlled ventilation of the apartments with thermal recovery, hot water provided by solar collectors, using rainwater for flushing toilets. Both units consume about 70% less energy than one conventional residential building.

Cost were also lowered by accessing eight apartments each per story from a central stairwell. This central node, illuminated from above, with an elliptical spiral staircase has a specific quality: The surrounding walls do not form a rectangle, but swing in a convex manner to the niches in the corners, where the entrances to the apartments are grouped in pairs. Similarly striking is the design of the multilayered facades. The wood lattice fronting the peripheral balconies softens not only edges, but also offers privacy for the inhabitants."

- Site Area - 4.905 m<sup>2</sup>
- Area of Building - 670 m<sup>2</sup>
- Net Floor Area - 4.040 m<sup>2</sup>
- Building Volume - 19.600 m<sup>3</sup>
- Commencement Of Planning - 1996
- Commencement Of Work – 1997
- Completion - 1997
- Energy Demand - 21 kWh/(m<sup>2</sup>.a)

Source: <http://www.baumschlager-eberle.com>

## 5.4 Lohbach, Innsbruck, Tyrol, Austria

Back in 2000, when the project Lohbach was completed, it was the first low-energy housing project of this scale in Tyrol. It had the largest solar energy panels` area – 1.180,00 m<sup>2</sup>. This sustainable project also takes advantage of reusing rain water. Lohbach consists of 298 residences, from which 101 are rented. Additionally, there are 16 housing units for senior citizens that Neue Heimat Tirol (NHT) has built for Innsbruck Social Services.



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- Site Area - 14.897 m<sup>2</sup>
- Area of Building - 4.850 m<sup>2</sup>
- Gross Floor Area - 28.200 m<sup>2</sup>
- Net Floor Area - 22.150 m<sup>2</sup>
- Commencement Of Planning - 1997
- Commencement Of Work - 1998
- Completion - 2000
- Energy Demand - 20 kWh/ (m<sup>2</sup>.a)



Source: [Neue Heimat Tyrol](#)

In 2008 new 128 rooms (residential apartments and nursing home) were built with an area of 7.791 m<sup>2</sup>.

Lohbach is one of the first NHT's low-energy projects. Since it has proven to be successful, nowadays all new NHT projects are passive buildings. Lohbach is also considered as one of the milestones in low-energy construction's development in Tyrol.





## 6:

# CERTIFICATION AND QUALITY ASSURANCE

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A necessary condition for the completion of programmes and plans for energy efficiency in the field of construction of low energy and passive buildings and thermal renovation of existing ones is the creation of a system of certification and quality control. Certification of passive buildings is of particular importance for provision of subsidies and for monitoring of achieved energy savings results.

Construction quality control is performed by the building authorities and usually only the design documentation is assessed. In cases of larger and complex projects on-site inspections are carried out as well.

Certificates for energy performance of buildings in Austria are issued by qualified experts and quality control is performed by the regional authorities.

Sources:

<http://www.buildup.eu/sites/default/files/content/AT%20-%20Energy%20Efficiency%20Action%20Plan%20EN.pdf>

[http://ec.europa.eu/enterprise/sectors/construction/files/compet/national-building-regulations/prc-at\\_en.pdf](http://ec.europa.eu/enterprise/sectors/construction/files/compet/national-building-regulations/prc-at_en.pdf)

## 6.1 Certification of Passive Buildings

Sources:

*"The impact of energy performance regulations on systems of building control" by H. Visscher/E. Mlecnik/F. Meijer (RICS Cobra Research Conference, University of Cape Town, 10- 11th September 2009)*

[http://www.passiv.de/en/03\\_certification/02\\_certification\\_buildings/02\\_certification\\_buildings.htm](http://www.passiv.de/en/03_certification/02_certification_buildings/02_certification_buildings.htm)

[http://passiv.de/downloads/03\\_certification\\_criteria\\_residential\\_en.pdf](http://passiv.de/downloads/03_certification_criteria_residential_en.pdf)

[http://passiv.de/downloads/03\\_certification\\_criteria\\_nonresidential\\_en.pdf](http://passiv.de/downloads/03_certification_criteria_nonresidential_en.pdf)

[http://passiv.de/downloads/03\\_certification\\_criteria\\_enerphit\\_en.pdf](http://passiv.de/downloads/03_certification_criteria_enerphit_en.pdf)

[http://www.passipedia.org/passipedia\\_en/planning/other\\_attributs\\_for\\_passive\\_houses](http://www.passipedia.org/passipedia_en/planning/other_attributs_for_passive_houses)

<http://www.lanqconsulting.at/index.php/en/the-passive-house/passive-house-guide>  
[http://erq.ucd.ie/pep/pdf/European\\_Embedding\\_of\\_Passive\\_Houses.pdf](http://erq.ucd.ie/pep/pdf/European_Embedding_of_Passive_Houses.pdf)

Passive House buildings maintain pleasant indoor temperatures year round with extremely low energy demands. Such buildings require careful design, thorough planning and meticulous execution. The certification of a Passive House through the [Passive House Institute](#) or any of its [accredited Building Certifiers](#) offers enhanced quality assurance. The vast experience of these certifiers benefits designers throughout the planning process whereas the certification itself provides evidence of the building's quality.

The bodies which certify buildings according to the standard of the Passive House Institute are listed below:



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### **Passivhouse Institute - Innsbruck**

Austria

<http://www.phi-ibk.at/>

### **Energieinstitut Vorarlberg**

Austria

[www.energieinstitut.at](http://www.energieinstitut.at)

### **Herz & Lang - Die Fachplaner für energieeffizientes Bauen**

Dependence Austria

[www.herz-lang.de](http://www.herz-lang.de)

### **Österreichisches Institut für Bauen und Ökologie GmbH (IBO)**

Austria

[www.ibo.at](http://www.ibo.at)

Austrian Institute for Construction Engineering (OIB) has developed under OIB guideline No6 in addition to the PHPP from the Passive House institute an Austrian methodology to apply housing subsidies for Passive Houses. The main differences between the PHPP and the Austrian OIB methodology are described under II (legal framework)

A note from a presentation by Schöberl&Pöll, Wien:

"Difference between ÖNORM B 8110-6 [noted by the author: Basis for energy certificate] and PHPP:

A Passivhaus correctly calculated with the PHPP has a heating demand of approximately 15 kWh/(m<sup>2</sup>TFA a) (TFA = treated floor area = heated or cooled net occupied area). As per experience the same building shows a heating demand of approximately 5-7 kWh/(m<sup>2</sup>BGF a) on the energy certificate according to ÖNORM. (BGF = Bruttogeschossflaeche = gross building area)

One may criticize in the OIB methodology the very optimistic default values for internal heat gains and shading and the not sufficient consideration of the thermal bridges of the building while the PHPP is validated in many real applications.

Sometimes these differences lead to confusion regarding the quality which the building owner can expect from his building.

## **6.2 Construction Control**

Source:

<http://ec.europa.eu/DocsRoom/documents/5084/attachments/1/translations/en/renditions/pdf>

Construction quality control is performed by the building authorities. Private experts or private institutions are only involved in certain cases either on behalf of the building authority or contracted by the builder (building owner) as provided for in the procedural regulations of the province. Verification is done in most cases through an assessment of the design and only in a few ones (e.g. for larger or more complicated projects) by



additional inspections on site. Only registered designers, contractors and specialists are allowed to participate. The professional requirements for those registered designers, contractors and specialists are relatively high in Austria (professional education at secondary or university level plus several years of professional experience plus additional examination).

The assessment is done before the construction work starts, hence building permits can be seen as design permits. After the completion of 'Y0602.01.01 Screening nat. building regulations-Austria- 4-14 Febr. 2011' in most provinces a confirmation by the builder is required that all legal requirements as well as conditions and orders of the building permit have been duly respected. Site inspections are normally only carried out for larger and/or more complicated projects. In order to make inspections at the right time the building authority can oblige the builder to notify the building authority when certain stages of the construction process have been achieved (e.g. completion of the foundation, placement of the reinforcement, etc.).

Building plans are monitored on all aspects of sustainability, except for those related to economic and social quality. The inspections are performed by the municipal authorities for functional and technical quality. Other aspects of sustainability are checked either by the architect, a technical advisor on behalf of the authorities or the owner, or by other public authorities. The monitoring process is regulated in the building law of the province.

Construction works are inspected on some aspects of ecological quality, like waste reduction, and on functional and technical quality. This monitoring is performed by the municipal authorities, by the technical advisor on behalf of the municipality or by other public authorities. Prior to occupation the finished building is checked on most aspects of sustainability, except on economic quality and technical execution/quality of the construction process. This is done by the municipality, by other public authorities, or by a technical advisor.

Existing buildings are only checked on aspects of functional and technical quality by other public authorities.

### 6.3 Quality Control of Energy Performance

Source:

<http://www.buildup.eu/sites/default/files/content/AT%20-%20Energy%20Efficiency%20Action%20Plan%20EN.pdf>

There is no mandatory national quality assurance scheme for energy performance certificates (EPC) of buildings in Austria. Qualified experts usually have had a certain amount of information and training during their specialisation, although widely differing and, with some exceptions, not covering all fields of knowledge necessary to issue an EPC. Therefore, most of them undergo additional training, which is organised and offered by the governments and the responsible institutions of the provinces. The training of experts, managed mainly by the provincial authorities, universities, the Chambers of Commerce



and Civil Engineers as well as by some private organisations, evaluates the knowledge of the experts about the technical requirements of buildings, the diverse regulations and the details of the certification system itself.

Depending on the regulations of the specific province either all energy performance certificates (EPC) or most of them are checked if they are linked with residential or other subsidies. Random checks are carried out of EPCs, that recorded in an official database of the provinces (e.g. ZEUS). Checks always include a full data review of calculations in order to verify compliance with the correct methodologies. Further checks may include input data if they do not seem plausible. Other EPCs are not checked regularly, but will be in the future, after independent controlling institutions are set up in the provinces.

After a number of checks have been performed many experts have had to revise the EPCs at their own expense and, in some few cases, legal actions have been taken due to incorrect application of thermal regulations or certification methodologies, which have finally led to compensation payments or to annulment of contracts.

## 6.4 Quality Assurance in IG Passivhaus

Customer satisfaction and high quality of the services and products of IG Passivhaus members are of crucial importance for the network. In order to achieve this high quality and to continue to develop its network in this direction, IG Passivhaus came up with QA concept that guarantees results close to perfection.

### Excellence through stars for quality

The members of IG Passivhaus can earn up to 5 stars in this inner QA system. The following categories are included in the rating system: Customer satisfaction, Development, Planning and Product quality. Each star is 200 points, as up to 1000 points can be collected in the process. This allows the potential customers to objectively evaluate the members of IG Passivhaus.

### New members

During the first year of their membership the new members must collect at least 200 points, before their full acceptance can be approved. Additionally, they have to take part in the course for "[Certified passive house designer](#)" or "[Certified Passive House Tradesman](#)". This should happen in the first 12-24 months of their membership. The full acceptance applies only for members of the regional interest groups.



## 7

# VISIBILITY AND PUBLIC SUPPORT

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A very important step in every success model is working with the community and presenting the information in a way appropriate for the final customer/consumer. Drawing attention on topics such as environmental care and reasons why one should/must change the way s/he leads her/his everyday life and raising the overall awareness of the future of habitation and its comfort is as important as building the right policy and financial plans.

To this end a number of information campaigns are being carried out at national level, such as information and communication campaigns for energy performance certificates as well as providing information and raising of public awareness within the framework of the klima:aktiv programme.

At regional level the energy agency Energie Tirol participates in the processes of dissemination of information and consultations through various information campaigns, such as "Yes to Solar", "Heat Pumps – Let Us Make Best Use of Geothermal Energy", "Tirol A++ - Saving Heating Costs!", targeted at the general public; by organizing competitions with awards such as an award for renovation of homes and an energy award for communities; by conducting on-site information sessions in municipalities and by publishing the "Energy prospects of Tyrol" newspaper.

## 7.1 National Information and Communication Campaigns for Energy Performance Certificates (EPC)

Austria started the implementation of EPBD certificates in 2008 and the provincial governments performed many actions to promote EPCs on regional level, mainly using brochures, folders and information campaigns linked to the training of experts. No extensive advertising campaign was developed to launch the EPCs, like in some other EC member states, but information was well distributed by numerous energy agencies as well as by experts, the provincial governments and independent energy consultants.

During the preparations for the introduction of the EPBD energy performance certificates comprehensive measures to inform the population and affected professional groups (such as planners, real estate agents, residential constructors, etc.) were taken in all federal provinces also with the help of several joint projects co-financed by the European Commission.

During 2008-2010 representatives and experts of the provincial governments, universities, energy agencies and Chambers of Commerce have participated in more than 3000 events, fairs, seminars and workshops disseminating the certification process and the EPCs, promoting awareness among citizens regarding information on thermal quality



performance of buildings. A number of websites provide detailed information about the building energy performance certificates as well.

## 7.2 klima:aktiv - Providing Information and Raising Awareness

Source:

<http://www.uncsd2012.org/content/documents/519austria%20klima%20aktiv.pdf>

One of the main activities of the klima:aktiv programme is providing online and printed information and thus raising the awareness of consumers, businesses and professionals.

klima:aktiv uses modern language, avoiding moralising and "teaching", but shows the direct benefits of climate protection actions and products instead. The klima:aktiv awareness and information campaigns inform the media and the citizens about the benefits of climate friendly activities. Advertisements, articles in newspapers and specialised magazines, give-aways etc. are part of the klima:aktiv initiative to make the "klima:aktiv" brand well-known. In June 2008 already 26% of the Austrians recognised the brand with a very positive image attributed to it: economic, positive, modern, dynamic and ecological. klima:aktiv provides on-line information platforms to empower consumers, companies and professionals to act instantly. klima:aktiv is present at about 1500 events each year.

## 7.3 Energy Agency of Tyrol (Energie Tirol)

Source:

<http://www.energie-tirol.at/>

Energie Tirol participates in dissemination of information, consultations on specific energy issues, energy audits, promotion of new technologies, energy efficiency of buildings, solar energy, thermal insulation and changing citizens' behaviour with respect to energy use.

### 7.3.1 Information Campaign "Yes to the solar energy!" ("Ja zu solar")

Sources:

<https://www.tirol.gv.at/fileadmin/presse/downloads/Tiroler-Energiestrategie-2020.pdf>

[http://www.energie-tirol.at/fileadmin/static/folder/ET\\_Folder\\_Ja\\_zu\\_Solar\\_mod.pdf](http://www.energie-tirol.at/fileadmin/static/folder/ET_Folder_Ja_zu_Solar_mod.pdf)

The promotion of decentralised energy consulting service centres is essential for further increase of the share of renewable energy sources.

The local regional energy agency in Tirol (Energie Tirol, Austria) started the "Ja zu Solar" information campaign in 2004. Since a lack of information on the consumer side was identified as one of the main barriers to increased uptake of solar thermal technologies, the implementation of a broad information campaign was seen as an appropriate tool to reach this goal. The programme primary criterion for success was the initiation of additional uptake of solar thermal technologies measured in additional area of solar



collectors installed. The target was to increase the installed collector area from 160 000 m<sup>2</sup> (2005) to 300 000 m<sup>2</sup> within five years.

### 7.3.2 Energy Programme Tirol A++

Sources:

<https://projekte.izt.de/bewaree/services/exhibitions-and-events/>

<https://www.tirol.gv.at/fileadmin/presse/downloads/Tiroler-Energiestrategie-2020.pdf>

In the field of work with the general public the Energy Strategy relies on the “Tirol A++” programme for energy efficiency improvement . This promotional programme is considered to be the central focus of comprehensive information activities aimed at improvement of energy efficiency in households. The information activities comprise themes, related to building construction and renovation methods, leading to energy conservation, as well as such related to energy efficiency oriented change in the behaviour of building users. As with the already successful "Yes to the solar energy!" promotional programme the work is implemented in close cooperation with Tyrol municipalities. The information palette extends from special events through dissemination of information materials to special offers for consultations and advisory services.

The achievement of the efficiency objectives obviously depends also on the commitment and involvement of construction and construction-related companies in Tyrol. In this respect training for skills upgrading, networking and activities going beyond the framework of the construction sector are of utmost significance.

#### “Heat Pumps – Let Us Make Best Use of Geothermal Energy” Campaign

On the basis of the experience, accumulated from the initiative for utilization of solar energy the “Heat Pumps – Let Us Make Best Use of Geothermal Energy” information campaign was launched in 2007 within the framework of “Tirol A++”. In the centre of attention was the efficient use of heat pumps. Evidence about the benefits from that technology is observed above all in low-energy buildings, respectively passive ones.

#### “Tirol A++ - Saving Heating Costs!” Campaign

The “Tirol A++ - Saving heating costs!” energy initiative is a joint project of the province of Tyrol and Energie Tirol to improve the energy efficiency in the region. Within the framework of this project Energie Tirol performs information events in cooperation with municipalities in Tyrol. The one to two hour events include presentations on different topics and the participants have the possibility to consult experts afterwards. The variety of topics ranges from information about saving heating costs by behavioural changes, use of solar energy, simple structural measures to reduce the consumption of energy for space



heating, renovation of buildings for considerable reduction of energy consumption, information about energy passports to information about municipal subsidies for energy saving measures. Energie Tirol estimates that only by economical behaviour and implementation of simple measures in private households up to 20% of the energy consumed could be saved. In an average one family house the savings would be about 400 Euros per year (2007).

### **Tyrol Renovation Award**

*Source:*

<http://www.architekturwettbewerb.at/competition.php?ID=937> The purpose of the award is to pay tribute to outstanding building renovation services, which combine technical and architectural quality, as well as to promote the knowledge of new construction services. The success models are intended to present the achievements of Tyrol and to promote high quality renovation of old buildings.

### **Tyrol Energy Award for Communities**

*Source:*

<http://www.energie-gemeinde.at/aktuelles/news-single/artikel/tiroler-energiepreis-fuer-gemeinden-jetzt-einreichen/>

The Tyrol energy award for communities is awarded for outstanding achievement in energy efficiency projects by one of the Tyrol e5 communities. The choice for the award is made by a jury of experts in the areas of energy, environment, transport and land use planning.

The aim of the award is to demonstrate the enormous potential of energy efficiency communities and particularly of innovative, sustainable community projects and highlight their role model.

### **7.3.3 "Energy Prospects of Tyrol" Newspaper**

*Source:*

<http://www.energie-tirol.at/publikationen/uebersicht-aller-publikationen/>

"Energy prospects Tyrol" (Energie Perspektiven Tirol), the newspaper of Energie Tirol, presents an overview of the most important innovations in the Tyrol energy sector. One of the recent issues, for example, focuses on a broad range of advice by Energie Tirol, which extends from consulting for clients in the energy services centres in Tyrol to individual consulting services for renovation of multi-family houses to construction supervision with respect to energy.