



**Fraunhofer** Institut  
Systemtechnik und  
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**I N T E R F A C E**  
Institut für Politikstudien

**Research Programme „Energy Economics“ of the Swiss Office of Energy:**

**„Comparing Energy-Standards for Buildings in five European Countries“**

**Polycity Workshop, February 2/3 2006, Basel**  
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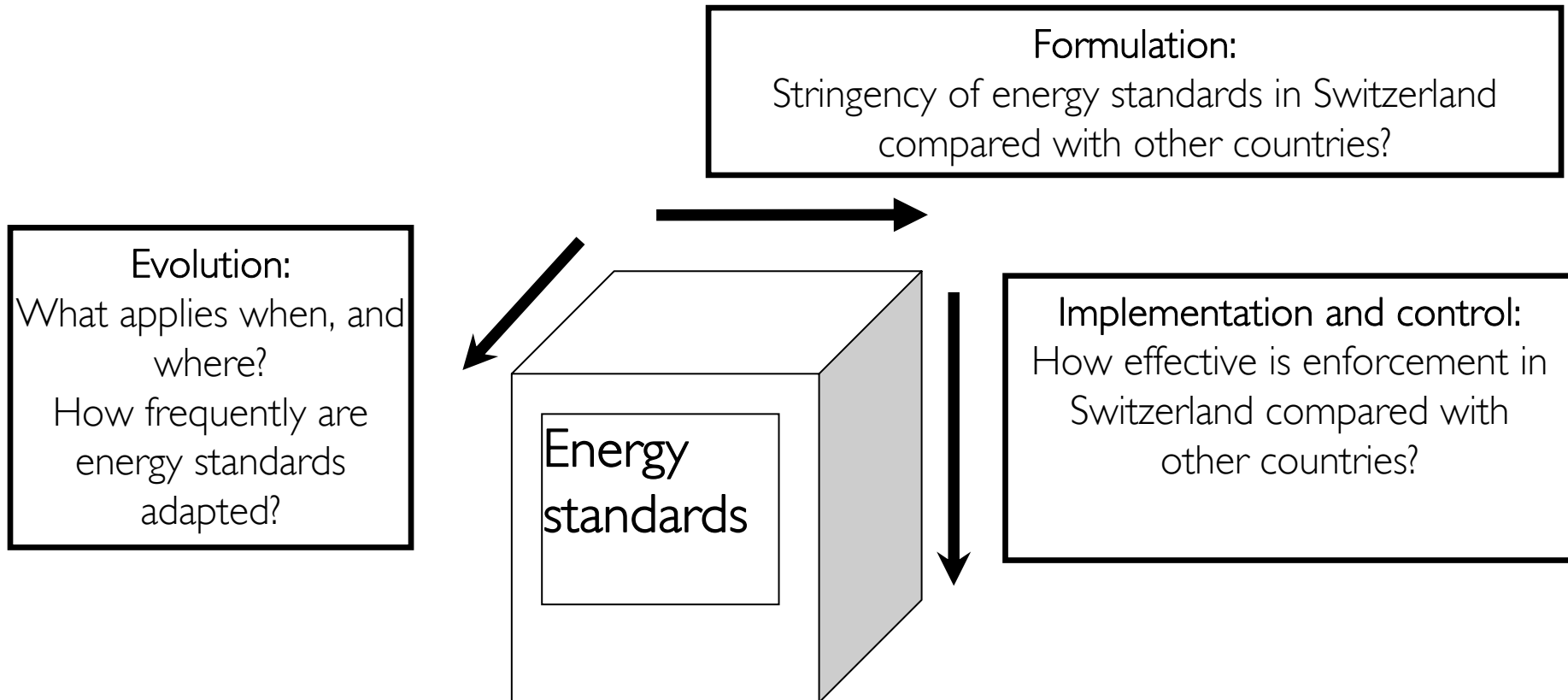
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# 1 Research Questions

**Energy standards = legally anchored provisions governing energy consumption (room heating, hot water, electricity) that must be observed when a building is to be constructed.**



# 1 Procedure

- Compilation of an overview of energy standards in Europe
- Selection of four countries for comparison with Switzerland: Austria, Denmark, Germany, the Netherlands
- Description of evolution and enforcement of standards in the five countries by evaluating documents and conducting interviews
- Calculation of heating requirements of 3 types of houses in the five countries, and comparison of findings in order to assess the stringency of Switzerland's standards
- Discussion on findings with members of a support group (cantons, Swiss Federal Office of Energy, Swiss Association of Architects and Engineers, experts)
- Conclusions and recommendations

## 2 Selected findings relating to the evolution of energy standards

	<b>Switzer-land</b>	<b>Austria</b>	<b>Germany</b>	<b>Nether-lands</b>	<b>Denmark</b>
<b>First standards</b>	1977	1980	1978	1978	1972
<b>Legislative competency</b>	Cantons	Provinces	Govern-ment	Ministry	Ministry
<b>Method of development</b>	Incremental	Incremental	Hierarchi-cally	Hierarchi-cally	Hierarchi-cally
<b>Frequency of adaptation</b>	1980 1990 2001	1980 1995 2003	1984 1995 2002	1985 1995 1998 2001	1977 (1985) 1995/1998
<b>Involvement of private-sector organisations</b>	High (SIA)	Low	Medium	Low (calculation method)	Low (calculation method)

## 2 Conclusions from comparison of evolution of standards

- Evolution in Switzerland is relatively homogeneous despite difficult background conditions (fragmentation of legal competencies with 26 cantons)
- Standards are more homogeneous in unitarian countries with central government structure and strong authorities (hierarchical evolution)
- Chronological development of standards in Switzerland is similar to that of other countries - centrally co-ordinated development does not indicate a higher frequency of adaptation
- Comparatively high importance of standards organisation (SIA) in Switzerland

### 3 Current status: selected elements

	<b>Switzer-land</b>	<b>Austria</b>	<b>Ger-many</b>	<b>Nether-lands</b>	<b>Denmark</b>	<b>EU (EPBD)</b>
<b>Energy index (heating)</b>	Heating requirement	U-values, heating requirement	Annual primary energy consumption	Value between 0 and 2	U-values/ transmission losses/ heating requirement	Primary energy consumption
<b>Energy label part of energy standards</b>	No	In two provinces	Since 1996, revision in prep.	No	Since 1981 (audit) and 1997 (energy label)	Yes
<b>Incorporated elements appendices EPBD</b>	5-7	4	11 (2 in prep.)	13	6	14

### 3 Current situation: conclusions

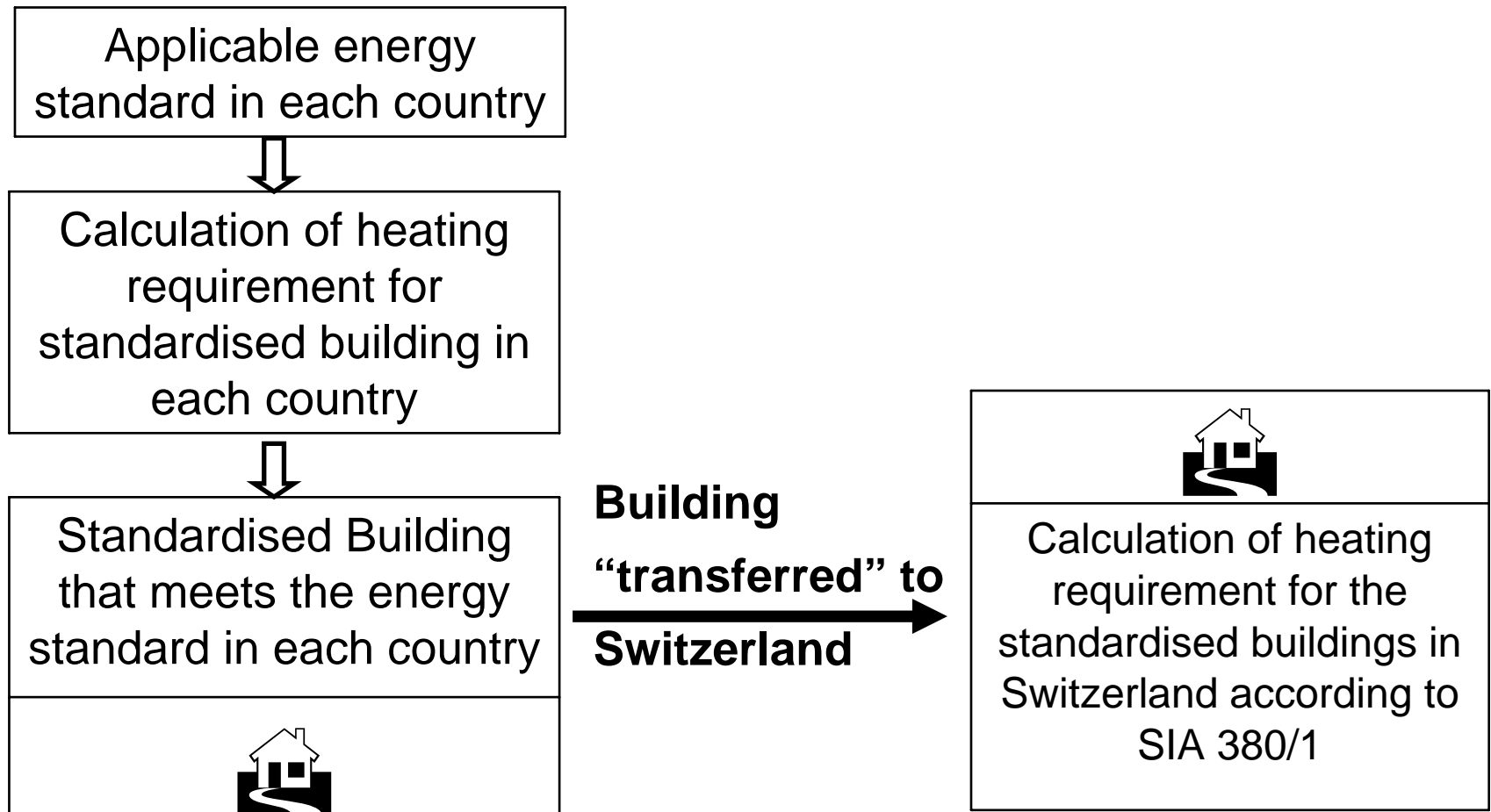
- There is currently no common homogeneous basis for energy standards in the countries included in the study
- However, there are signs of a trend towards standards on the basis of primary energy consumption
- To date, EU directives have not given rise to a tightening of standards within member states – in the countries concerned, the reasons for this were of an internal nature
- In the EU member states included in the study, EU directives generated a high level of activity relating to the creation of labels within the scope of standards – a similar level of activity has not been observed in Switzerland

## 4 Comparison of consumption for buildings: procedure

Three different types of standardised buildings

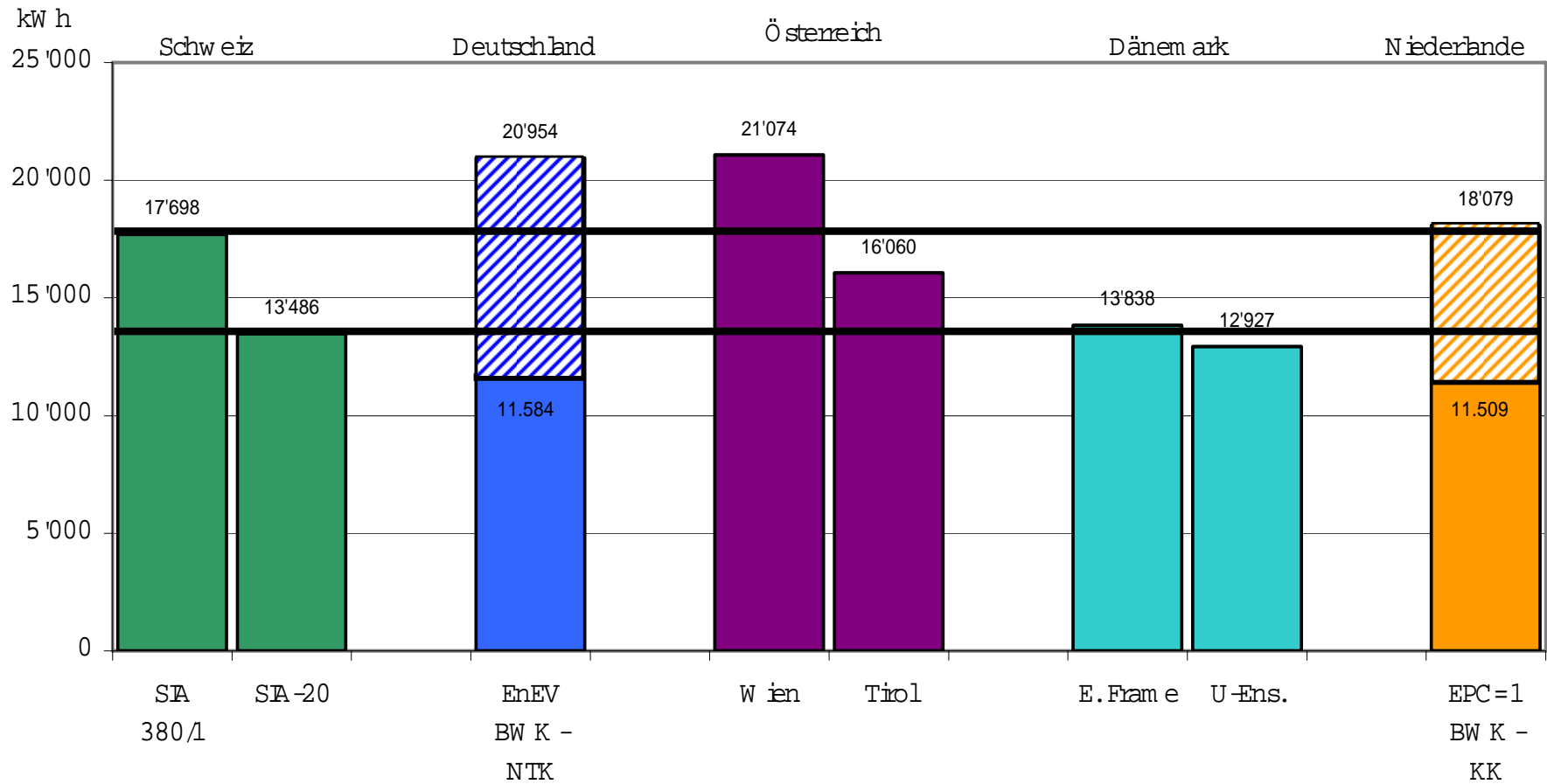
A, D, NL, DK

Switzerland



# 4 Selected findings : single family dwelling

EFH - Vergleich B - Ausländische Standards am Standort Schweiz



## Conclusions relating to stringency of energy standards in Switzerland

- In the countries concerned there are major differences in calculation methods that are difficult to explain
- In cantons which use MuKE n module 1 (MuKE n = model provisions of the cantons in the area of energy) as their basis, standards do not compare favourably with those in the other four countries
- In cantons which use MUKEn module II as their basis, standards compare favourably with those in the other countries
- Frequency of adaptation does not necessarily translate into a more stringent standard

## 5 Selected findings relating to the implementation of standards

	<b>Switzer- land</b>	<b>Austria</b>	<b>Germany</b>	<b>Nether- lands</b>	<b>Denmark</b>
<b>Implementati on model at regional level</b>	3 (mixed – central / decent- ralised)	2 (Bldg regs decentralised WBF central by province)	1 (Imple- mentation by munici- palities)	1 (Imple- mentation by munici- palities)	1 (Imple- mentation by munici- palities)
<b>Concept of Implementati on concept</b>	Information / control by public authorities	Bldg. regs private sector/heatin g req. public sector	Private sector	Public and private sectors	Private sector
<b>Municipalities</b>	2,880	2,359	14,368	506	275
<b>Average size (population)</b>	2,544 (Median 850)	3,414	5,744	31,300	19,300

## 5 Conclusions concerning the implementation of standards

- No pronounced differences between implementation models, intensity of implementation, and quality of planning and realisation
- Therefore it cannot be stated that a given implementation model (decentralised or central) yields better or worse results
- The problems associated with implementation are similar in each country, and motivation of the relevant authorities is a crucial factor: the greater the awareness of the related problems, the higher the quality of implementation
- Despite the difficult background conditions (large no. of municipalities, size of municipalities, different models), the quality of implementation in Switzerland is not lower
- Where implementation is strict in Switzerland, the level of implementation may be better than in the other countries

## 6 Recommendations

1. “Laboratory” for use by the cantons should be supported in order to prevent lowering of the level of existing standards
2. Adaptation of standards in the direction of overall energy efficiency in the area of complex buildings; support measures:
  - Training and further education of specialised personnel
  - Optimisation of user behaviour
3. A higher frequency of adaptation of standards (2 to 4 years) is not possible in Switzerland at present; recommended alternative is a 10-year cycle with more pronounced adjustments
4. The implementation concept at the public-sector level calls for the corresponding resources, especially in the municipalities
5. If an energy label for buildings is to be introduced in Switzerland:
  - The interface with Minergie will have to be clarified
  - An evaluation of findings from neighbouring countries will have to be made