

# **SIA Energy Efficiency Path**

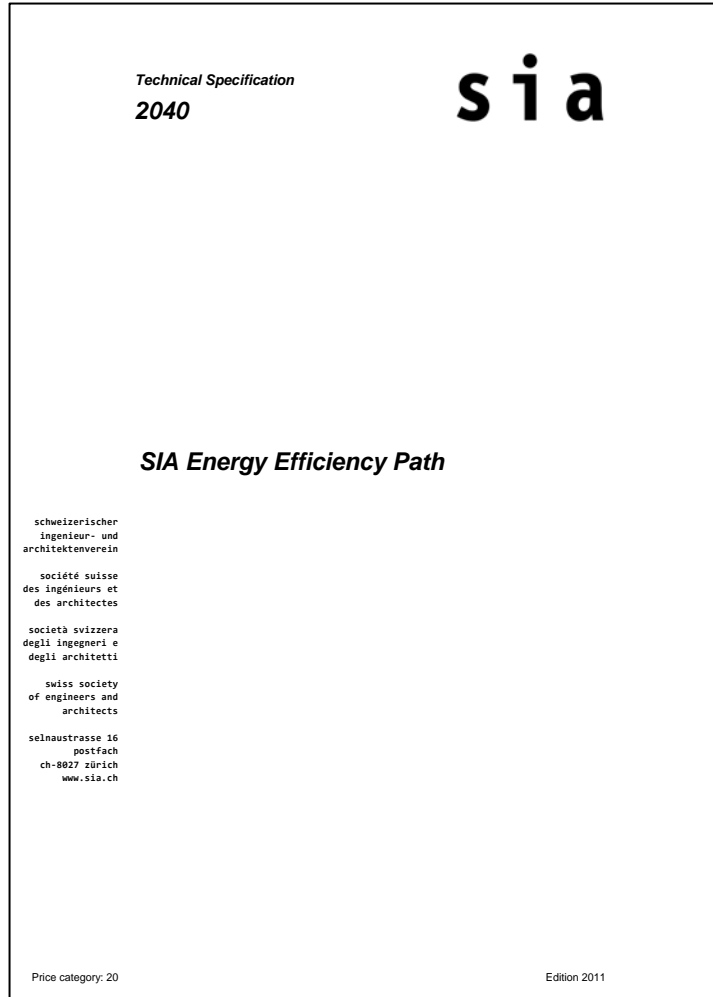
**SIA Swiss Society of Engineers and Architects**

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**member of the SIA committee on the SIA Energy Efficiency Path**

**Bridging the Gap between Policy and Science, Berne, November 14<sup>th</sup> 2012**

# SIA Energy Efficiency Path



First published in 2006 as  
**Technical Report SIA D 0216**

Totally revised and  
published in 2011 as  
**Technical Specification SIA 2040**

in combination with new  
**Technical Report SIA D 0236**

**SIA 2040 now available in English**

# SIA Energy Efficiency Path

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**SIA Energy Efficiency Path  
is the application of the  
2000 Watt Society  
to buildings**

# SIA Energy Efficiency Path

## 2000 Watt Society

Vision of a sustainable and globally equitable energy strategy:

2000 Watt continuous power of total primary energy per person

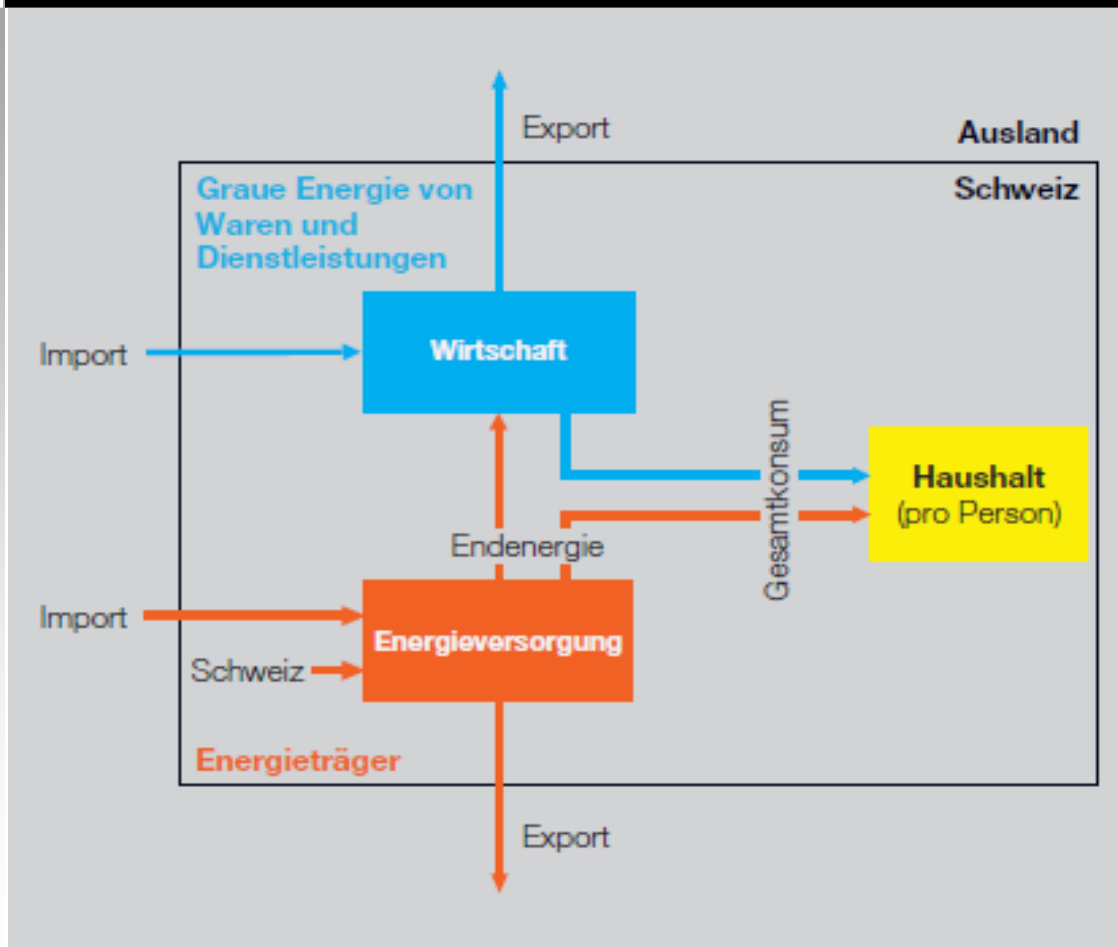
1 ton of CO<sub>2</sub>-equivalent green house gases per person and year



detailed concept by  
EnergieSchweiz für Gemeinden  
Stadt Zürich  
SIA

available: [www.2000watt.ch](http://www.2000watt.ch)

# SIA Energy Efficiency Path



**final energy used by households and economy**

**includes embodied energy of imported energy carriers**

**does not include embodied energy of the import/export balance of goods and services**

# SIA Energy Efficiency Path

2000 Watt Society				
		2005	2050	2100
Average annual power of total primary energy use	W per person	6300	3500	2000
Average annual power of non-renewable primary energy use	W per person	5800	2000	500
Greenhouse gas emissions	t per person	8.6	2.0	1.0
SIA Energy Efficiency Path: intermediate goal				

# SIA Energy Efficiency Path

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## **3 types of buildings:**

**Residential**

**Offices**

**Schools**

## **3 aspects:**

**Construction**

**Operation**

**Mobility**

**New buildings and  
conversion of existing buildings**

# SIA Energy Efficiency Path

## Calculation of Project Values:

### Construction

Calculated according to

**TS SIA 2032 Embodied Energy of Buildings**

Embodied energy of all buildings materials used for construction

Conversion of existing buildings: only material used for conversion is considered

Embodied energy divided by lifetime gives values per year directly comparable to operating energy



# SIA Energy Efficiency Path

## Operation:

All uses of energy are considered:

- space heating,
- hot water,
- ventilation/air conditioning,
- lighting,
- operating equipment

Calculated according to SIA standards based on EPBD standards

Default values are given for the preliminary project phase

# SIA Energy Efficiency Path

## **Mobility:**

**Calculated according to**

**TS SIA 2039 Mobility – Energy Use depending on  
Building Location**

**Average values of primary energy use per person are  
modified by:**

- location in central town / other location**
- quality of accessability by public transportation**
- distance to nearest market**
- number of parking spaces available**
- availability of private car**
- availability of monthly pass for public transportation**

# SIA Energy Efficiency Path

## Target values

for non renewable primary energy and green house emissions

per conditioned floor area

for sum of construction, operation and mobility

Buildings, which meet target values, are considered SIA Energy Efficiency Path compatible

Buildings, which can achieve to meet the target values with technical building systems measures, are considered SIA Energy Efficiency Path capable

# SIA Energy Efficiency Path

## Target and Guide Values determined in 4 steps:

- Determination of actual energy use of buildings separately for residential buildings, offices, schools for construction, operation, mobility
- Reduced by factor of 2.9 for primary energy non ren. 4.3 for green house gases
- Target Values = sum of the reduced values for construction, operation and mobility
- Indicative Guide Values for construction, operation and mobility values are determined according to practability

# SIA Energy Efficiency Path

## Excel-Tool for preliminary planning phase:

Rechenhilfe SIA 2040: Vorstudie / Vorprojekt

Erstellung

Projektinformation

Objekt, Datum...

Gebäudekategorie

Wohnen

Neubau

Objekteingaben

GF

m<sup>2</sup>

0 Geschossfläche

EBF

m<sup>2</sup>

0 Energiebezugsfläche

Legende:

Eingabefelder

Auswahlfelder

übernom. Werte

BTF = Bauteilfläche

						Primärenergie nicht erneuerbar	Treibhausgas- emissionen
						MJ/m <sup>2</sup>	kg/m <sup>2</sup>
						amortisiert auf ein Jahr, bezogen auf EBF	
	Bezeichnung	Bezug	Einheit	Menge	Ausführungsvariante		
Gebäude unter Terrain	Aushub	Volumen	m <sup>3</sup>	0	Aushub	#DIV/0!	#DIV/0!
	Fundament, Bodenplatte	BTF	m <sup>2</sup>	0	Bodenplatte	#DIV/0!	#DIV/0!
	Aussenwand	BTF	m <sup>2</sup>	0	Aussenwand unter Terrain	#DIV/0!	#DIV/0!
	Dach	BTF	m <sup>2</sup>	0	Dach unter Terrain	#DIV/0!	#DIV/0!
Gebäude über Terrain	Aussenwand: Tragwerk	BTF	m <sup>2</sup>	0	Aussenwand Tragwerk	#DIV/0!	#DIV/0!
	(Reserve)	BTF	m <sup>2</sup>	0	Aussenwand Tragwerk	#DIV/0!	#DIV/0!
	Aussenwand: Aufbau	BTF	m <sup>2</sup>	0	Aussenwand Aufbau	#DIV/0!	#DIV/0!
	(Reserve)	BTF	m <sup>2</sup>	0	Aussenwand Aufbau	#DIV/0!	#DIV/0!
	Fenster inkl. Sonnenschutz	BTF	m <sup>2</sup>	0		#DIV/0!	#DIV/0!
	Innenwände	BTF	m <sup>2</sup>	0		#DIV/0!	#DIV/0!
	Decke: Tragwerk	BTF	m <sup>2</sup>	0	Decke Tragwerk	#DIV/0!	#DIV/0!
	(Reserve)	BTF	m <sup>2</sup>	0	Decke Tragwerk	#DIV/0!	#DIV/0!
	Decke: Aufbau	BTF	m <sup>2</sup>	0	Decke Aufbau	#DIV/0!	#DIV/0!
	(Reserve)	BTF	m <sup>2</sup>	0	Decke Aufbau	#DIV/0!	#DIV/0!
	Balkon	BTF	m <sup>2</sup>	0		#DIV/0!	#DIV/0!
	Dach: Tragwerk	BTF	m <sup>2</sup>	0	Dach Tragwerk	#DIV/0!	#DIV/0!
	(Reserve)	BTF	m <sup>2</sup>	0	Dach Tragwerk	#DIV/0!	#DIV/0!
	Dach: Aufbau	BTF	m <sup>2</sup>	0	Dach Aufbau	#DIV/0!	#DIV/0!
	(Reserve)	BTF	m <sup>2</sup>	0	Dach Aufbau	#DIV/0!	#DIV/0!
Gebäudetechnik	Elektroanlage	EBF	m <sup>2</sup>	0		#DIV/0!	#DIV/0!
	Solarstromanlage	max. Leist.	kW	0	(Eingabe im Blatt 'Betrieb')	#DIV/0!	#DIV/0!
	Wärmeanlage	EBF	m <sup>2</sup>	0		#DIV/0!	#DIV/0!
	Thermische Solarkollektoren	BTF	m <sup>2</sup>	0	(Eingabe im Blatt 'Betrieb')	#DIV/0!	#DIV/0!
	Lufttechnische Anlage	EBF	m <sup>2</sup>	0	(Eingabe im Blatt 'Betrieb')	#DIV/0!	#DIV/0!
	Wasseranlage	EBF	m <sup>2</sup>	0		#DIV/0!	#DIV/0!
Projektwert						#DIV/0!	#DIV/0!

Richtwert

110

8.5

# **SIA Energy Efficiency Path**

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**Many buildings have been planned according to the SIA Energy Efficiency Path**

**Often used in Architecture Competitions**

**But:**

**The SIA Energy Efficiency Path is not a label.**

**There is no certification of buildings.**

# SIA Energy Efficiency Path

Hochhäuser in Zürich-Leimbach  
Baugenossenschaft BGZ, ZH  
Arch.: Harder Haas, Eglisau



Geschäftshaus Axpo, Baden  
Arch.: Meier Leder, Baden



Wohnsiedlung Sihlbogen, Zürich  
Baugenossenschaft Zurlinden  
Arch.: Dachtler Partner, Zürich



Schulhaus Eichmatt  
Hünenberg und Cham  
Arch.: Bünzli Courvoisier, ZH



Schulhaus Milchbuck  
Amt für Hochbauten, Stadt Zürich  
Arch.: ARGE B.E.R.G Arch.



Umbau Segantinistrasse, Zürich  
Arch.: kämpfen für architektur, ZH

