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Confederazione Svizzera
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Federal Department of the Environment, Transport, Energy and
Communications DETEC

Federal Office for the Environment FOEN
Forest Division
Timber Industry & Forest Management Section

Challenging the Conventional Thinking of Cascading Use of Timber

*Research results and Realisation in
Switzerland*

ICF Conference, 27th/28th of April 2016, Newcastle/UK

Alfred W. Kammerhofer

Head of Section Timber Industry and Forest Management FOEN, Berne/Switzerland



‘Wood Resource Policy’ of Switzerland

“*Cascading Use of Timber*”

“Cascade and multiple use means that use starts with the exploitation type that offers the highest added value, generates the greatest ecological benefit and enables multiple use. The material use of assortments that can be exploited for both material and energetic purposes in accordance with the specified “cascade criteria” represent a more optimal valuation.”

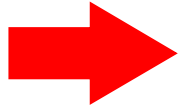
(see page 11)

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<http://www.bafu.admin.ch/publikationen/publikation/01002/index.html?lang=en>



Contents



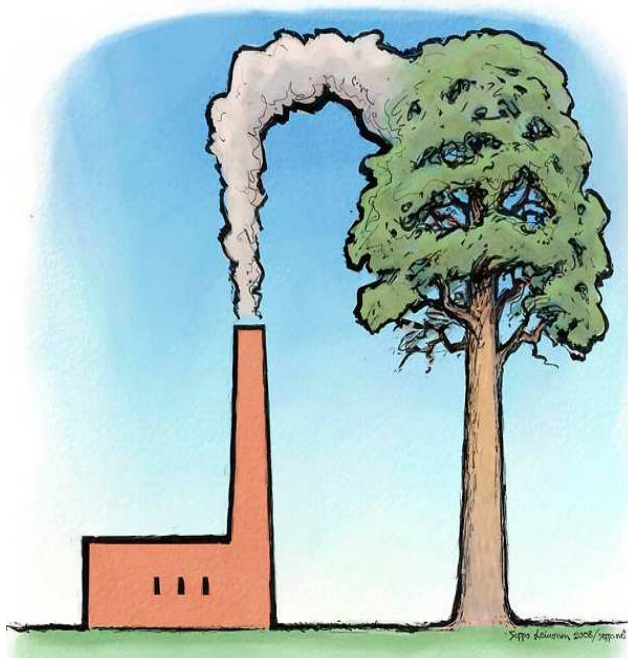
1. Value of Cascading Use
2. Demand
3. Potential capability
4. Contribution to Policy
5. Capital Investment in the Timber Industry
6. Examples in the Construction Industry in Switzerland



Contribution of Forest and Timber

Climate Change

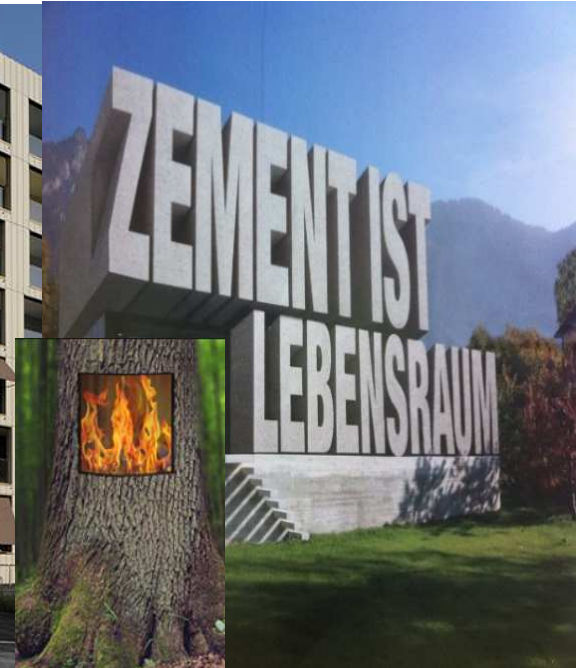
1. CO₂-Storage in Forests



2. CO₂-Storage in Timber (HWP harvested wood products)



3. Substitution of CO₂ intensive materials



Adaptation on Climate Change



Resource efficiency building

Timber

- The timber in the **Swiss Building Park** stores ca. **85 Mio. t CO₂** equivalence.
- This equates to the Swiss CO₂ emission for **2 years!**





Comparison of Added Value

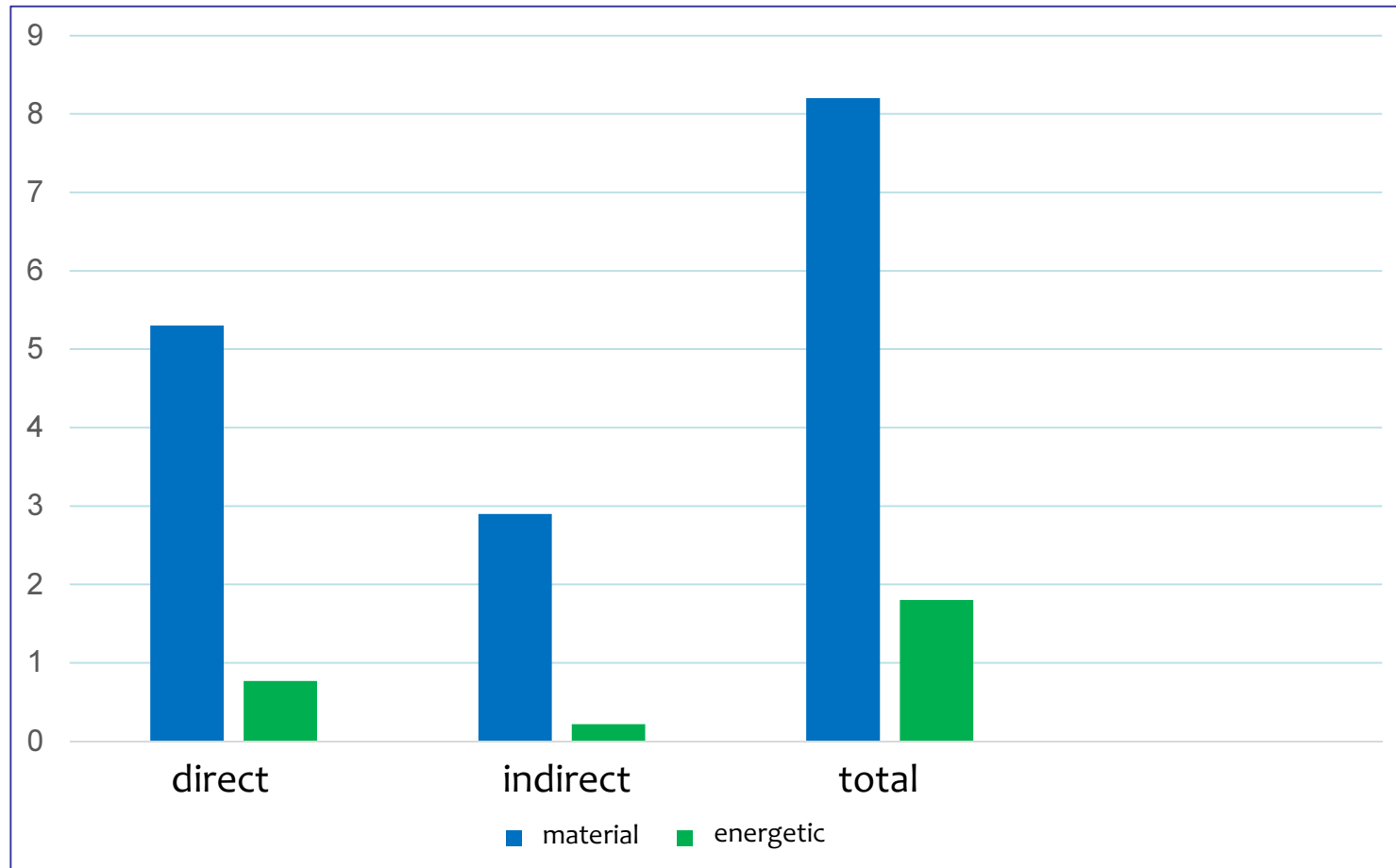
Source: Ernst Basler & Partner, Interface (2013): Inländische Wertschöpfung bei der stofflichen und energetischen Verwendung von Holz. On behalf of FOEN Berne.

Direct and indirect added value of material and energy utilisation of Timber in bn. CHF (base year 2010, Fig. 10/11, p 32):

	material direct	material indirect	energy direct	energy indirect	rate direct	rate indirect
Total	5.3	2.9	0.77	0.22	7 : 1	13 : 1
Total	8.2		0.99		8 : 1	
Total	9.19					



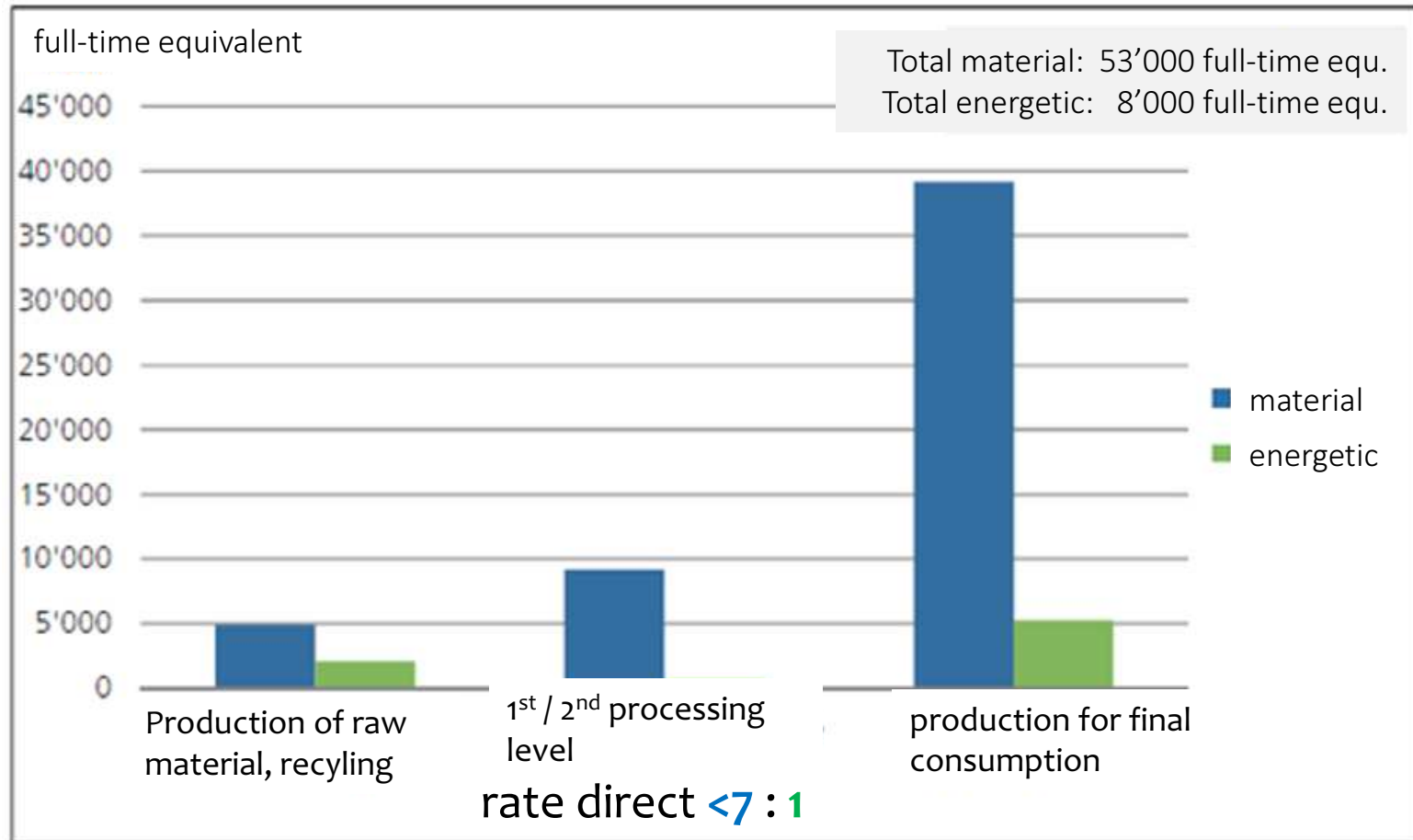
Direct and indirect added value of material and energy utilisation of Timber in billions of Swiss franc (bn. CHF)



Source: Ernst Basler & Partner, Interface (2013): Inländische Wertschöpfung bei der stofflichen und energetischen Verwendung von Holz. On behalf of FOEN Berne.



Employees in full time equivalent (FTE) to added value stage (base year 2010)



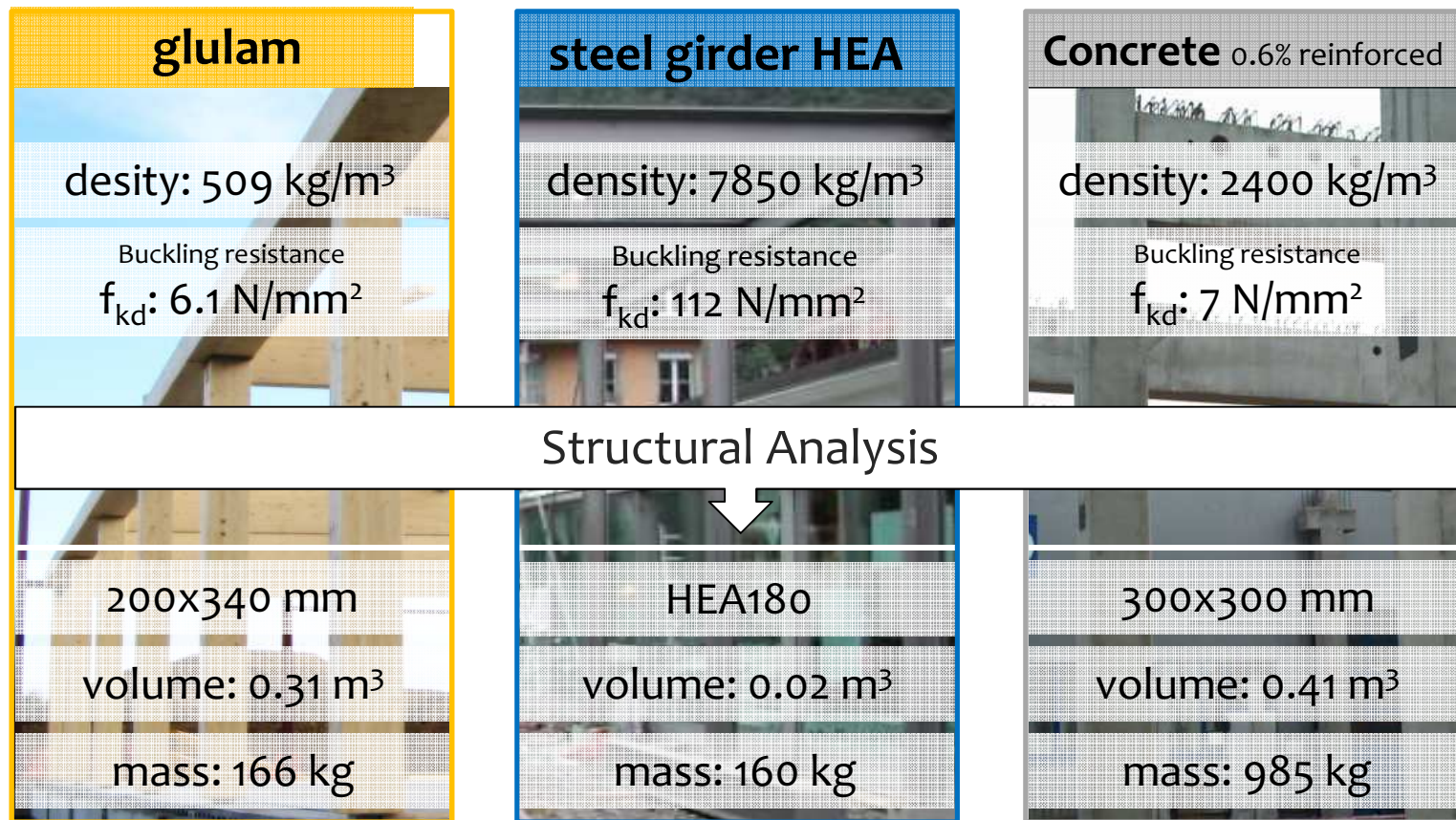
Source: Ernst Basler & Partner, Interface (2013): Inländische Wertschöpfung bei der stofflichen und energetischen Verwendung von Holz. On behalf of FOEN Berne.



Challenging the assessment of resource efficiency from building materials

Arbitrary construction example, critical load on an column, pillar with height 4.5 m, carrying capacity 406 kN

Figure: Wiehag Timber Construction (BSH), Fritz Boss AG (HEA)
Statik: g.bettschen, «Das zentrische Knicken»





Assessment of resource efficiency: Example «Global Warming Potential» (GWP) of a pillar

material	glulam	steel girder HEA	Concrete 0.6% reinforced
layout	dimension 200x340 mm volume 0.31 m ³ mass 166 kg	dimension HEA180 volume 0.02 m ³ mass 160 kg	dimension 300x300 mm volume 0.41 m ³ mass 985 kg
production	-96 kg CO ₂ -eq. Binding of CO ₂	+278 kg CO ₂ -eq. reduction of iron ore	+128 kg CO ₂ -eq. cement, neutralising of chalk
waste disposal (in 100 y)	+251 kg CO ₂ -eq. thermic unitisation		+2 kg CO ₂ -eq. demolition
Subtotal	+155 kg CO ₂ -eq	+278 kg CO ₂ -eq	+130 kg CO ₂ -eq
beyond product- system (in ca. 80 y)	-114 kg CO ₂ -eq. substitution fossil fuel	-153 kg CO ₂ -eq. recycling of scrap metal	-28 kg CO ₂ -eq. substitution of gravel by concrete granulate, recycling of scrap metal
total	+41 kg CO ₂ -eq	+124 kg CO ₂ -eq	+103 kg CO ₂ -eq
Recycling		55% recuperation	22% recuperation (10% by concrete without steel)



Resource efficient construction

Weight of material

Timber is light and therefore ideal to reorganise, extend or add another floor

The net weight by comparison:

steel > concrete > timber

17

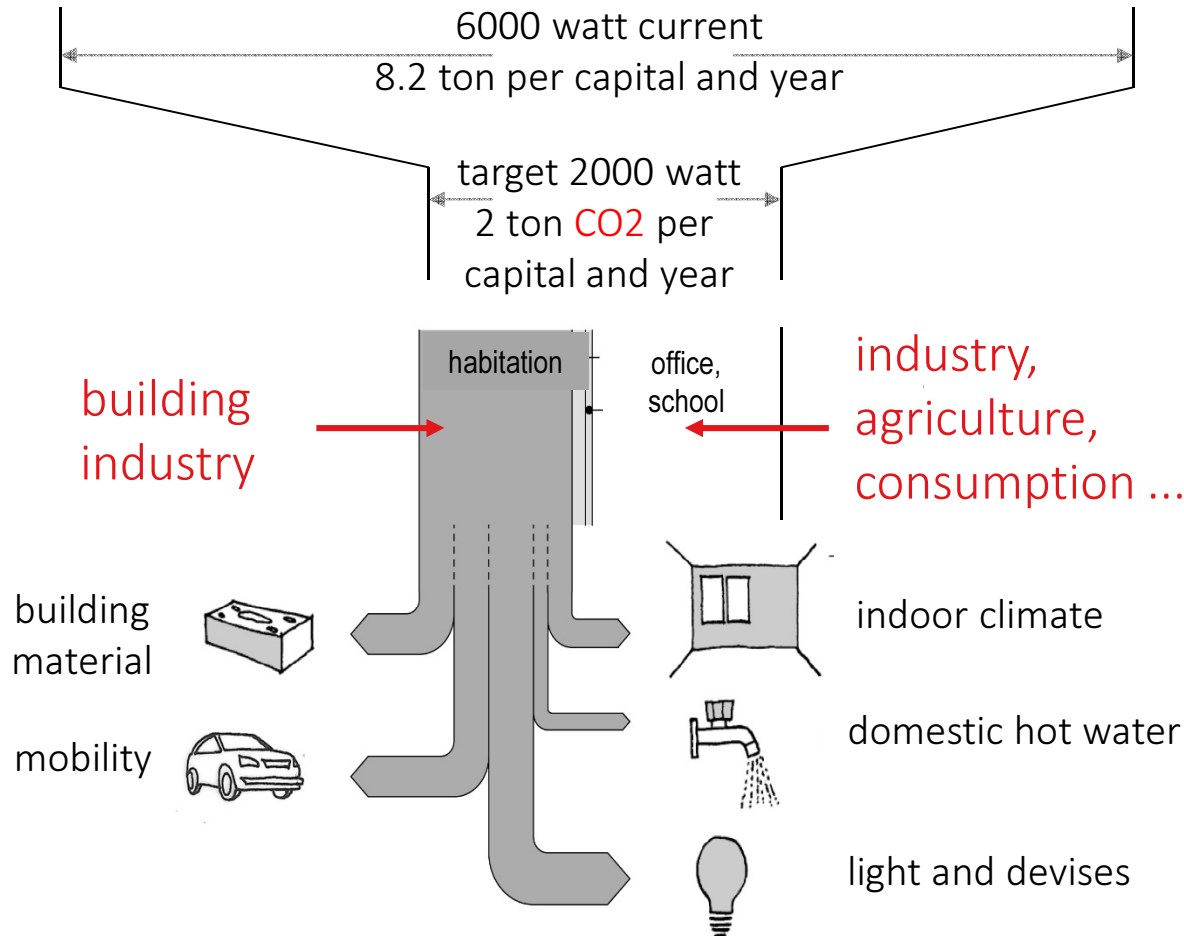
5

1





The building sector is applicable



In Switzerland, **nearly half** of our **total energy** and **greenhouse gas emissions** is created by construction process and maintenance of buildings.

Source: Preisig Pfäffli, Architekturbüro H.R. Preisig, 8006 Zürich



‘SIA path of Energy Efficiency’ Booklet SIA 2040

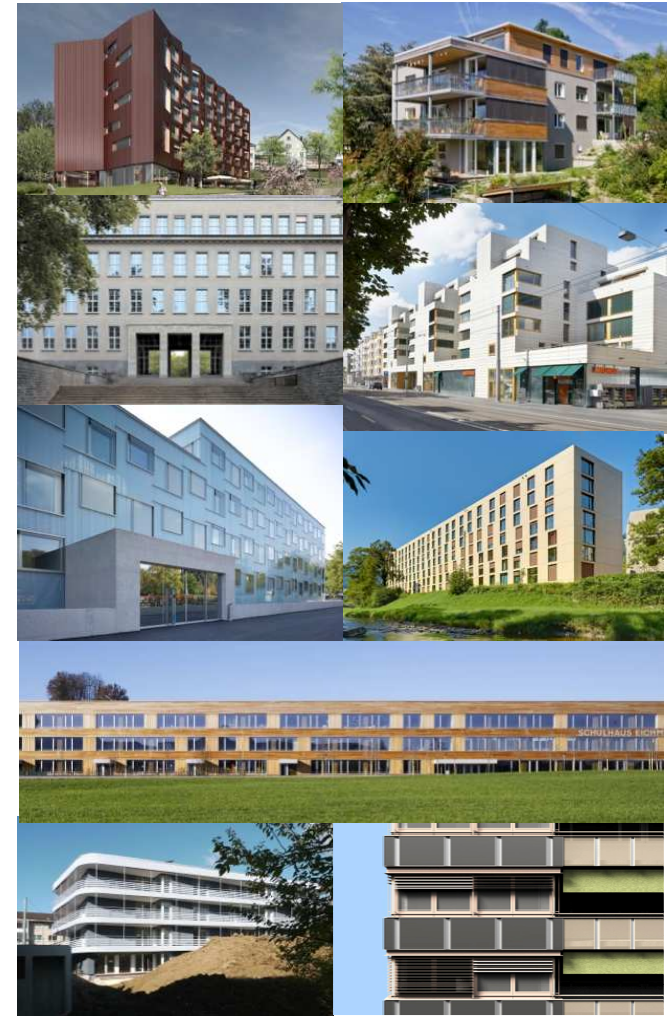
www.sia.ch – Swiss Society of Engineers and Architects SIA

- + accepted, ambitious standard
- + exclusive standard, which puts **climate-projection** at the forefront.
- + **more space in the planning process** – less rules and regulations bring flexibility for project-related solutions.

- **no recipe, no label**

In order to encourage designers and planners without limiting them this bulletin is a useful help and provides guidelines for them; subsidies are awarded for reaching the targets and so the public authorities need a system of proof.

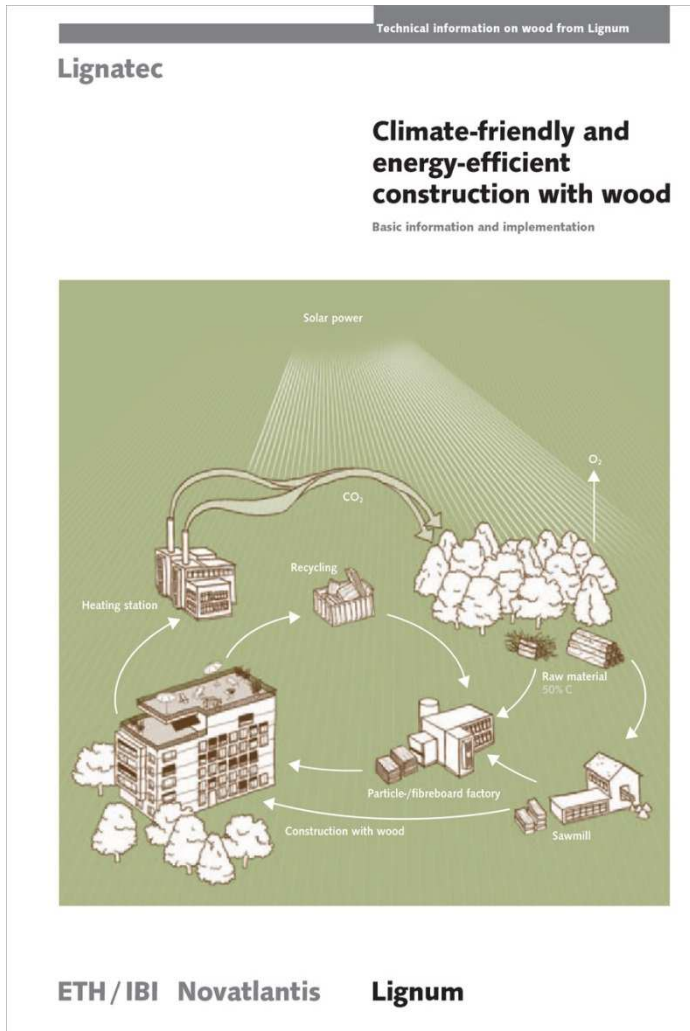
Source: Preisig Pfäffli, Architekturbüro H.R. Preisig, 8006 Zürich





Basic Information & Implementation

for Climate-friendly and energy-efficient construction with wood



Part I

The results of the study carried out within the framework of this 2012 publication add other powerful arguments to the following non-exhaustive list:

- Heating demand is lowest in timber frame construction.
- Studies show that buildings must be planned, built and evaluated to ensure optimisation of energy resources.
- etc.

Part II

Background information and conceptual design of climate-friendly and energy-efficient buildings (2000-Watt-Society, SIA booklet 2040 «SIA path to energy efficiency»)

- Energy production and intelligent building technology
- Energy figures as a measure of energy reduction
- etc.

>> English version available by www.lignum.ch

96 pages, A4, Art.-Nr. 1202526, CHF 35.00



Housing Association «Zurlinden» Zürich



Example: Flat 'Sihlbogen in Zurich' planned by using
'SIA path of Energy Efficiency', Booklet SIA 2040
Building costs 2'561 CHF/m² effective area (German: Hauptnutzfläche HNF)





Buildings Association «Zurlinden»

Zürich



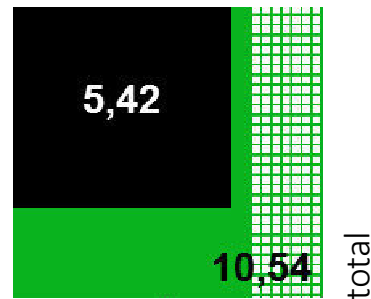
		m ²	m ²			kWh	kg	kWh	kWh	kWh	kWh	m ³	%	kWh	p/Wohn.	kWh	kWh	kWh	kWh	
																pro m ² .a			pro m ² .a	
1	Wiedikon	53	4923	3748	1924	0.08	715189				56873	2776	35.02	194'497	3670	133.72	360'873	73.30		
3	Höngg alt	12	926	648	1947	0.08	130881					487	27.05	35'401	2950	141.34		103.11		
4	Girhalde	82	6428	4773	1949	0.08	1348339						18.24	246'000	3000	209.76		171.49		
5	Albisrieden	127	10766	7382	1952	0.08	2001084						19.04	381'000	3000	185.87		156.48		
6	Rautihalde	47	3549	2356	1960	0.08	597940				1504	18.28	109'327	2326	168.48	488'613	137.68			
7	Tobelegg	12	1038	552	1971			9940	117292				28.65	33'600	2800	113.00		80.63		
8	Langnau 1	96	10436	8148	1973	0.06	1165911	3380	39884		4567	29.37	354'112	3689	115.54	851'683	81.61			
9	Langnau 2	32	3424	2702	1974	0.07	461826				1538	25.82	119'252	3727	134.88		100.05			
10	Bachwiesen	58	7155	5379	1985	0.08	867510						21.39	185'600	3200	121.25		95.31		
11	Rötel	76	7615	5348	1977	0.07	1964804	10280	121304		800447	2592	26.20	229'450	3019	168.83	646'346	84.88		
13	Bockhorn	36	3786	3054	2000	0.09	325533			44949	54046	1323	39.22	102'582	2849	83.58	159'003	42.00		
14	Breitwies	40	4750	3960	1999	0.07	511534					1781	37.05	132'774	3319	107.69	225'635	47.50		
15	Albisdürfli	86	10115	7824	1983	0.08	1363028						20.19	275'200	3200	134.75		107.55		
16	Limmat	32	5071	4592	2002	0.08	407204					1785	33.32	138'404	4325	89.23	276'985	54.62		
17	Hardegg	20	4440	3081	2003	0.09	286915						29035	783	25.37	68'095	3405	71.16	200'353	45.12
18	Leimbach	58	9450	7253	2005	0.1	547481						59136	3281	43.23	238'499	4112	57.93	313'228	33.15
19	A-Park	68	11438	7735	2008	0.12	204413		445589	36149	37851	2285	35.64	219'260	3224	56.68	396'006	34.62		
21	Lienihof	33	4105	3586	2007	0.08	139014		317350		128525	1415	38.84	125'645	3807	79.86	197'866	48.20		
22	Sihlweid	167	20108	14496	1980	0.09	2496947	1550	18290		627520	4445	46.54	647'349	3876	93.88	743'571	36.98		
23	Suteracher	14	1672	1624	1997	0.11	209550				38610	444	26.08	38'313	2737	102.24	108'607	64.96		
24	Sihlbogen B	140	17522	12915	2013	0.18	185720					5644	50.09	307'248	2195	36.27	306'109	17.47		
24	Sihlbogen A	81	9590	6338	2015	0.18														
26	Badener 380	54	6657	4320	2009	0.13	59088		155257		185	1953	50.30	151'430	2804	46.04	149'598	22.47		
29	Neeserweg	15	1117	942	1953			10400	122720				34.22	42'000	2800	109.87		72.26		
30	Albisriederstr.	27	2072		1956	0.09	167247		125976				25.78	75'600	2800	141.52		105.03		
31	Bachwiesen	16	1960	1716	1983	0.09	245295						20.87	51'200	3200	125.15		99.83		
32	Meilen	25	3107	2143	2014	0.09	27148		144930			662	26.59	38'530	1541	46.65	106'400	34.25		
35	Waldegg	26	2908	2394	1984	0.09	582020						14.30	83'200	3200	200.14		171.53		
36	Hardau	10	1232	979		0.09	192427						15.59	30'000	3000	156.19		131.84		
37	Gen.-Wille-Str.	27	2279	1683	1952	0.1	348276						23.26	81'000	3000	152.82		117.28		
Total		1570	179'639	131'671			17'552'324		2'058'374	81'098	133'458	1744'057		26.97	4734'566	3'016	100.65		74.30	



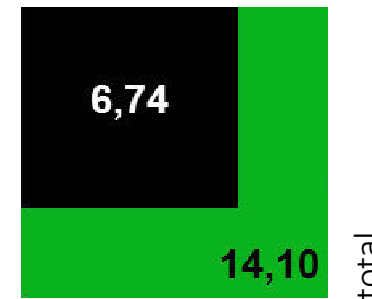
Wood consumption (demand) in Switzerland

Demand and added value of Timber in Switzerland, 2011 (Source: 'Branchen-analyse Wertschöpfungskette Wald & Holz 2014' by .bwc consulting AG on behalf of FOEN)

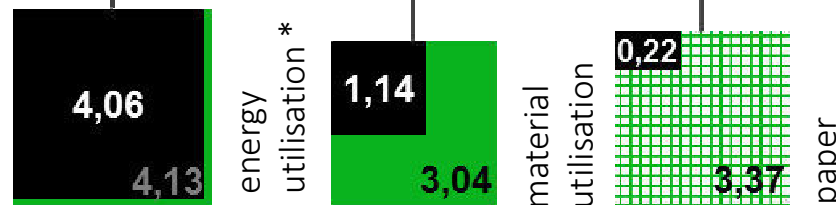
Timber consumption,
in million m³



Gross production
value, in billion CHF



Gross value added,
in billion CHF



■ Swiss timber

■ Swiss total

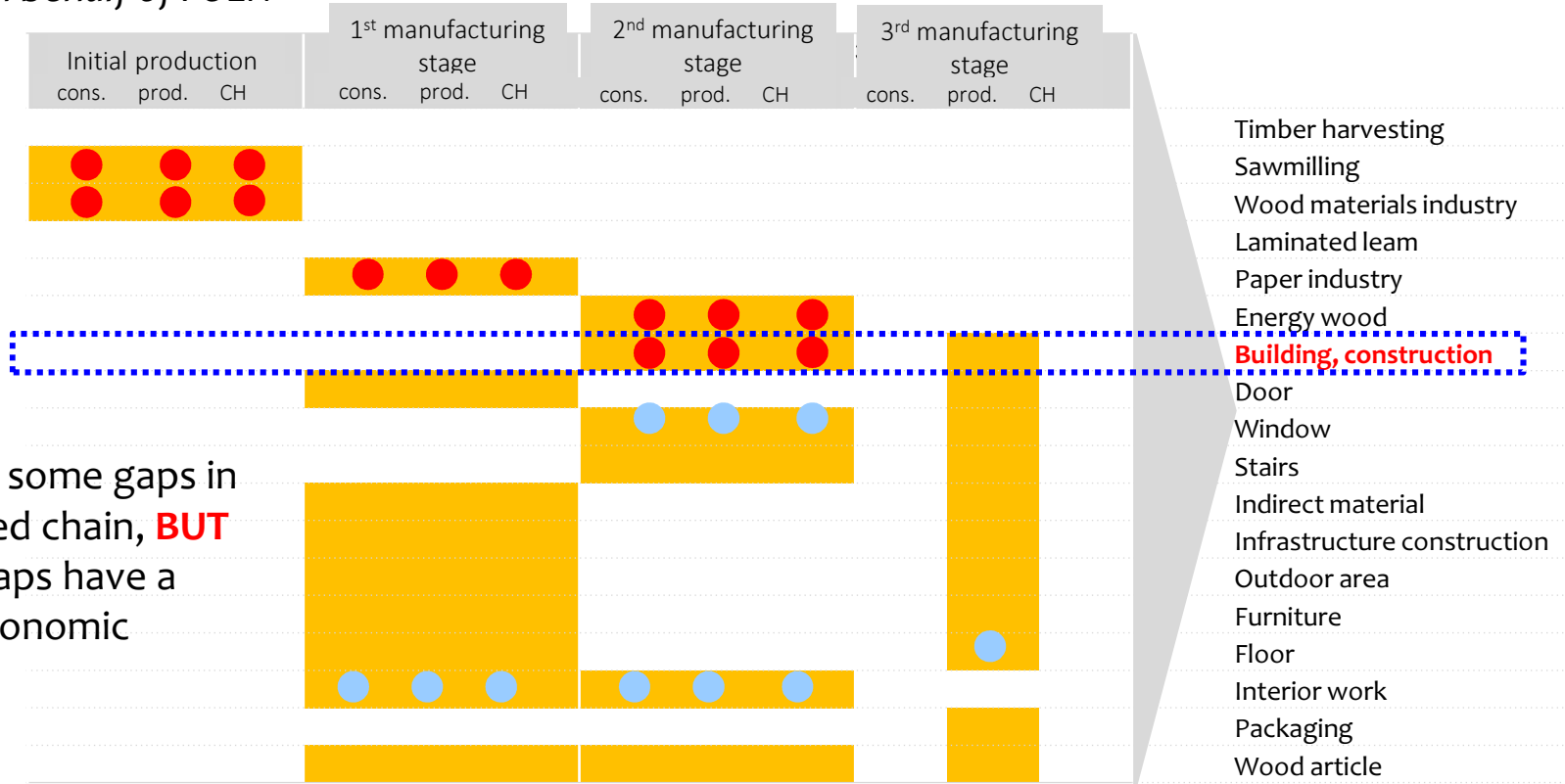
▤ Use of fibre in paper production (calculated in m³ wood equivalent for waste-paper, pulp and mechanical pulp)

* The energy utilisation is based on Wood out of forests, waste-wood, corridor-wood, wood-residues, wood-pellet



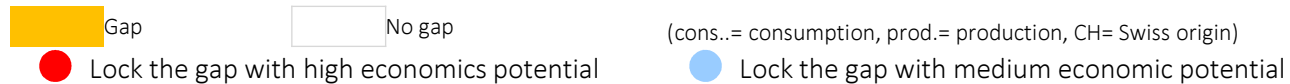
Results of the Gap Analysis

Source: 'Branchen-analyse Wertschöpfungskette Wald & Holz 2014' by .bwc consulting AG on behalf of FOEN



YES, there are some gaps in the value added chain, **BUT** none of this gaps have a meaningful economic potential.

see page 264 in the final report:



Lesehilfe: Die gelb gekennzeichneten Felder zeigen die rechnerisch identifizierten Lücken in den vorgelagerten Gliedern der jeweiligen Wertschöpfungskette an.
Beispiel: Für die Wertschöpfungskette Gebäude wurde eine rechnerische Lücke in der 2. Absatzstufe (Ungleichgewicht zwischen Holzeinsatz CH Produktion und Holzeinsatz CH Herkunft) und eine rechnerische Lücke in der 3. Absatzstufe (Ungleichgewicht zwischen Holzeinsatz CH Verbrauch und CH Produktion) identifiziert.
Hinweis: Angaben zum Ausmass der Höhe der jeweiligen Potenziale sind in Abbildung 217 dargestellt.



Selected Results

Source: 'Branchen-analyse Wertschöpfungskette Wald & Holz 2014' by .bwc consulting AG on behalf of FOEN


m ... million

Annual net-wood-growth in Swiss forests, trend increasing, ca.	8.2 m m ³ /y
Annual wood harvesting (2012) +20% matching coefficient, trend declining	5.6 m m ³ /y
Target of Swiss National Forest Programme for annual timber harvesting	8.2 m m ³ /y
=> Additional annual Wood utilization potential in Swiss Forests	2.5-3.0 m m³/y
Annual Wood demand in timber work, trend strong increasing, ca.	1.00 m m ³ /y
Annual Swiss production of glued-laminated timber out of Swiss forests (2011), rd.	0.18 m m ³ /y
=> Additional annual potential for Swiss Wood for glued-laminated products*	0.57 m m³/y

*) Difference on demand of timber work are in large part products out of non-glued-laminated products for the timber work.

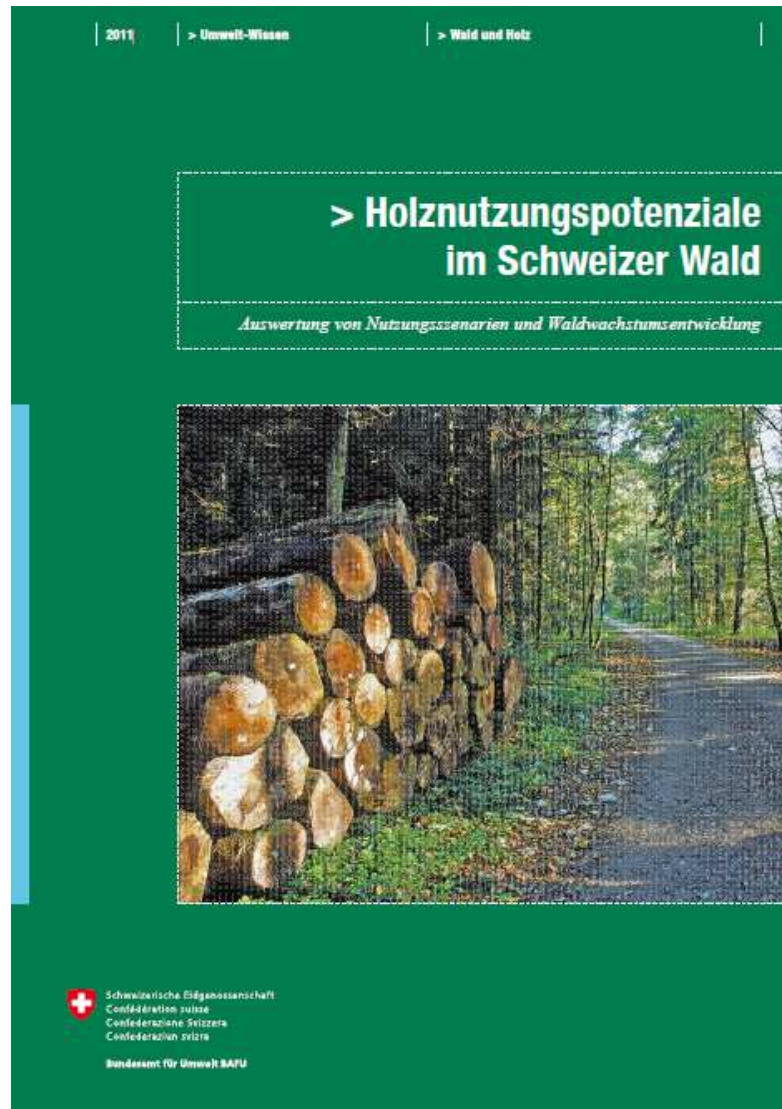


Contents

1. Value of Cascading Use
2. Demand
-  3. Potential capability
4. Contribution to Policy
5. Capital Investment in the Timber Industry
6. Examples in the Construction Industry in Switzerland



Potential of Wood utilisation in Swiss Forests

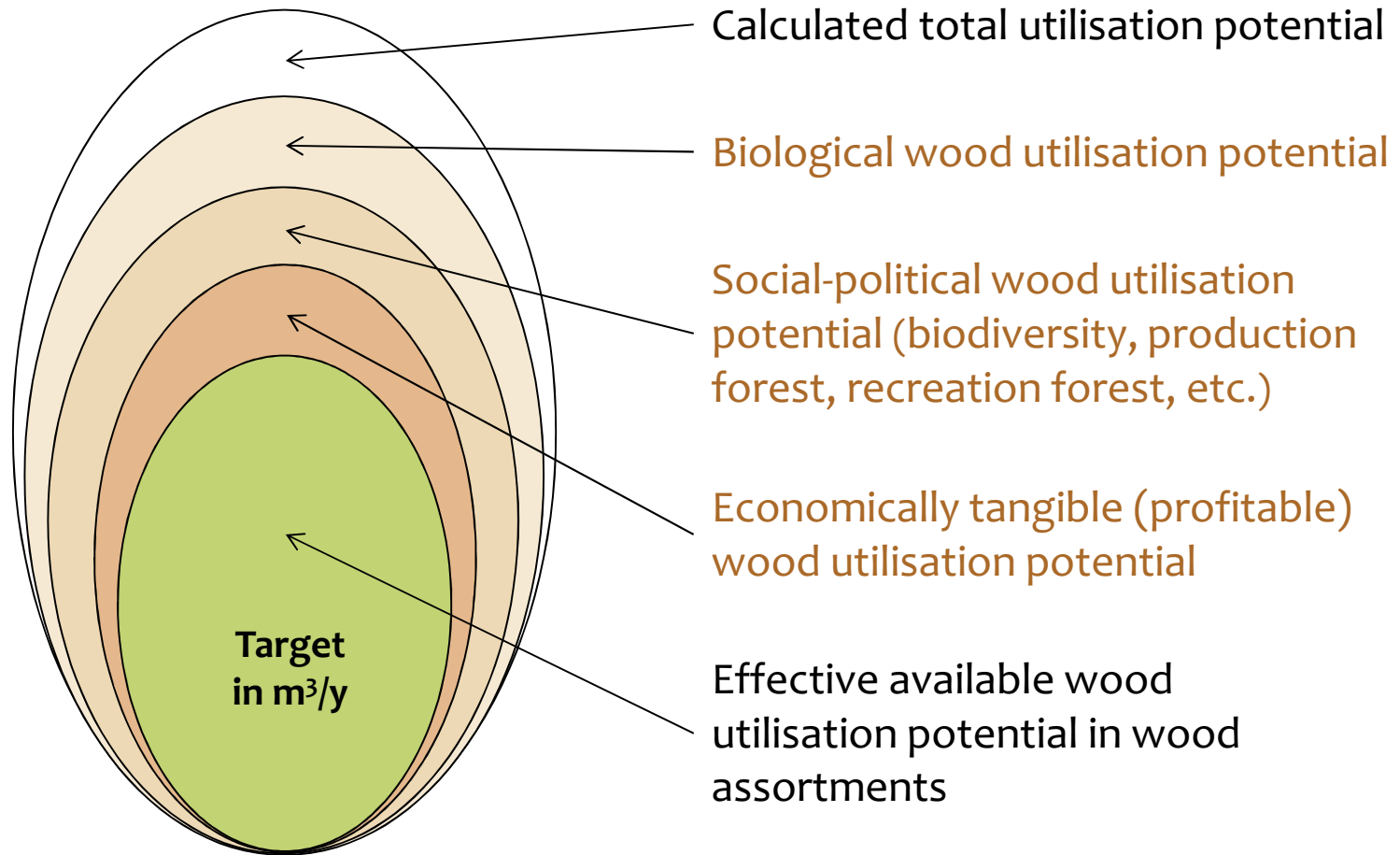


- The potential of wood utilisation in Swiss forest is modelled till the year 2046 and the forest development is modelled till the year 2106
- 5 utilisation scenarios
- Results requested for tree species, wood assortments, 14 economic regions.




Sustainable potential of Wood in a Forest

'Onion Skin Model'





Contents

1. Value of Cascading Use
2. Demand
3. Potential capability
-  4. Contribution to Policy
5. Capital Investment in the Timber Industry
6. Examples in the Construction Industry in Switzerland



Policy of the Swiss Federation

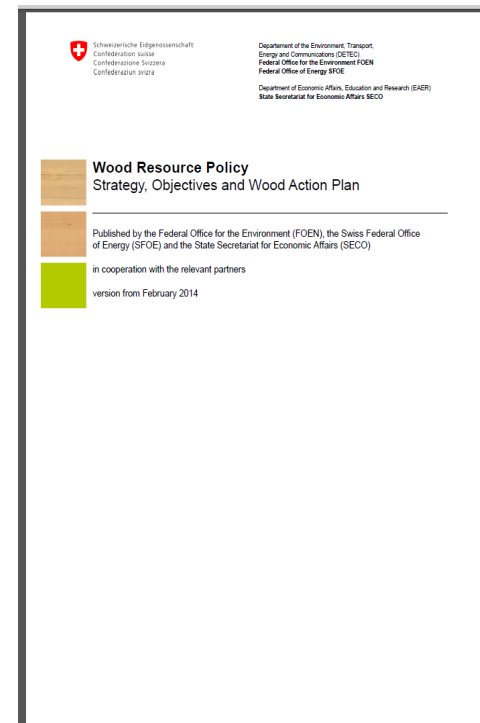
Forest Policy 2020

Visions, Objectives and Measures for the Sustainable Management of Forests in Switzerland



Wood Resource Policy

Strategy, Objectives and Wood Action Plan in Switzerland

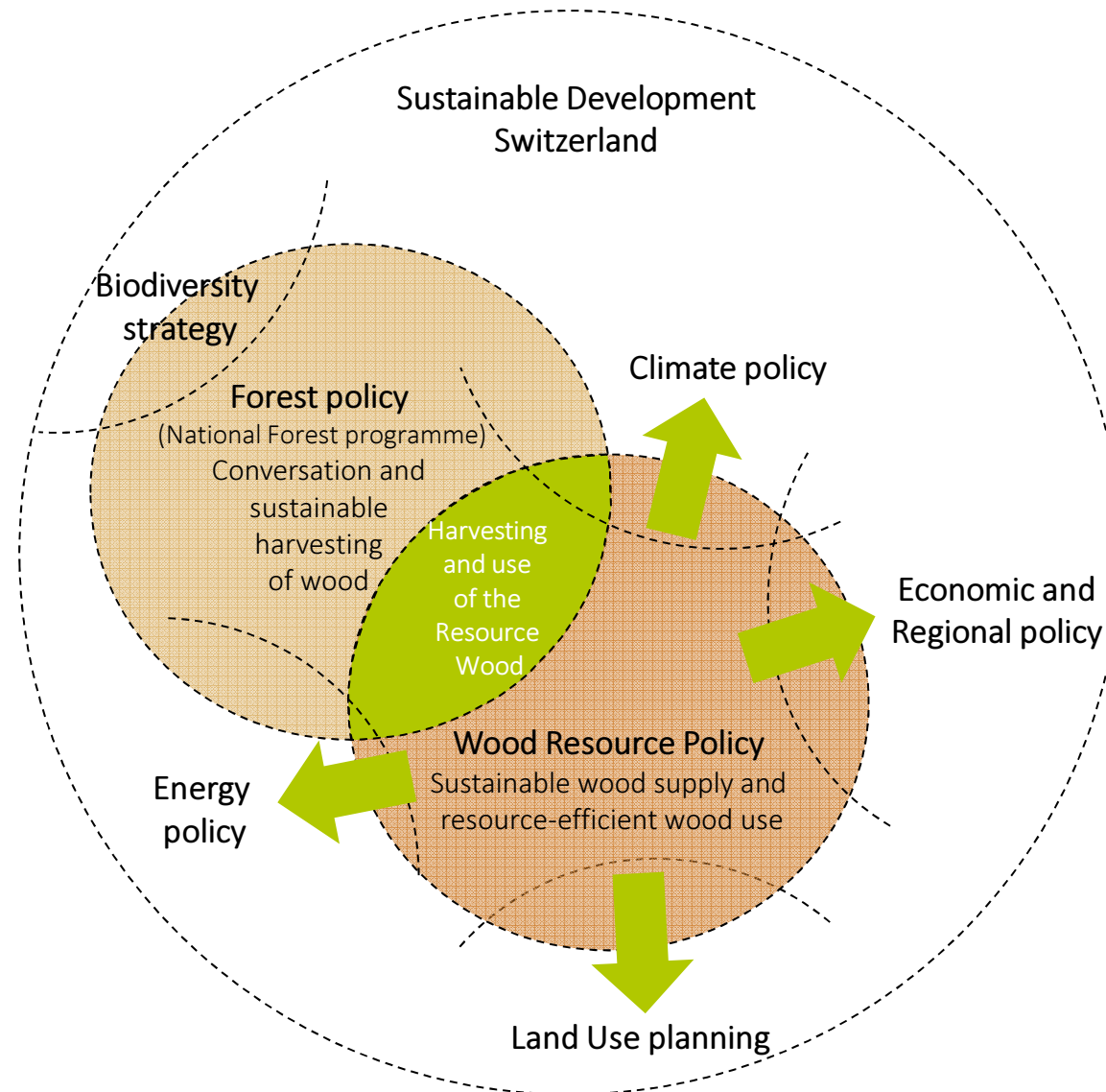


>> The supply of wood from Swiss forests shall be sustainable and its use shall be resource-efficient in accordance with optimised **cascade use**.



Wood Resource Policy in Switzerland

Setting





Wood Resource Policy

5 Objectives

1. The sustainably harvestable wood production potential of the Swiss forest shall be exploited to the full by an efficient Swiss forestry sector.
2. Demand for material wood products in Switzerland shall increase, with particular emphasis on wood from Swiss forests.
3. The use of fuelwood shall increase while taking the principles of sustainable use and efficient and clean exploitation into account.
4. The innovation capacity of the wood value-added chain shall increase.
5. The Wood Resource Policy shall make an important contribution to the fulfilment of the objectives of other sectoral policies through optimum coordination.



Wood Action Plan

Priority measures 2013-2016

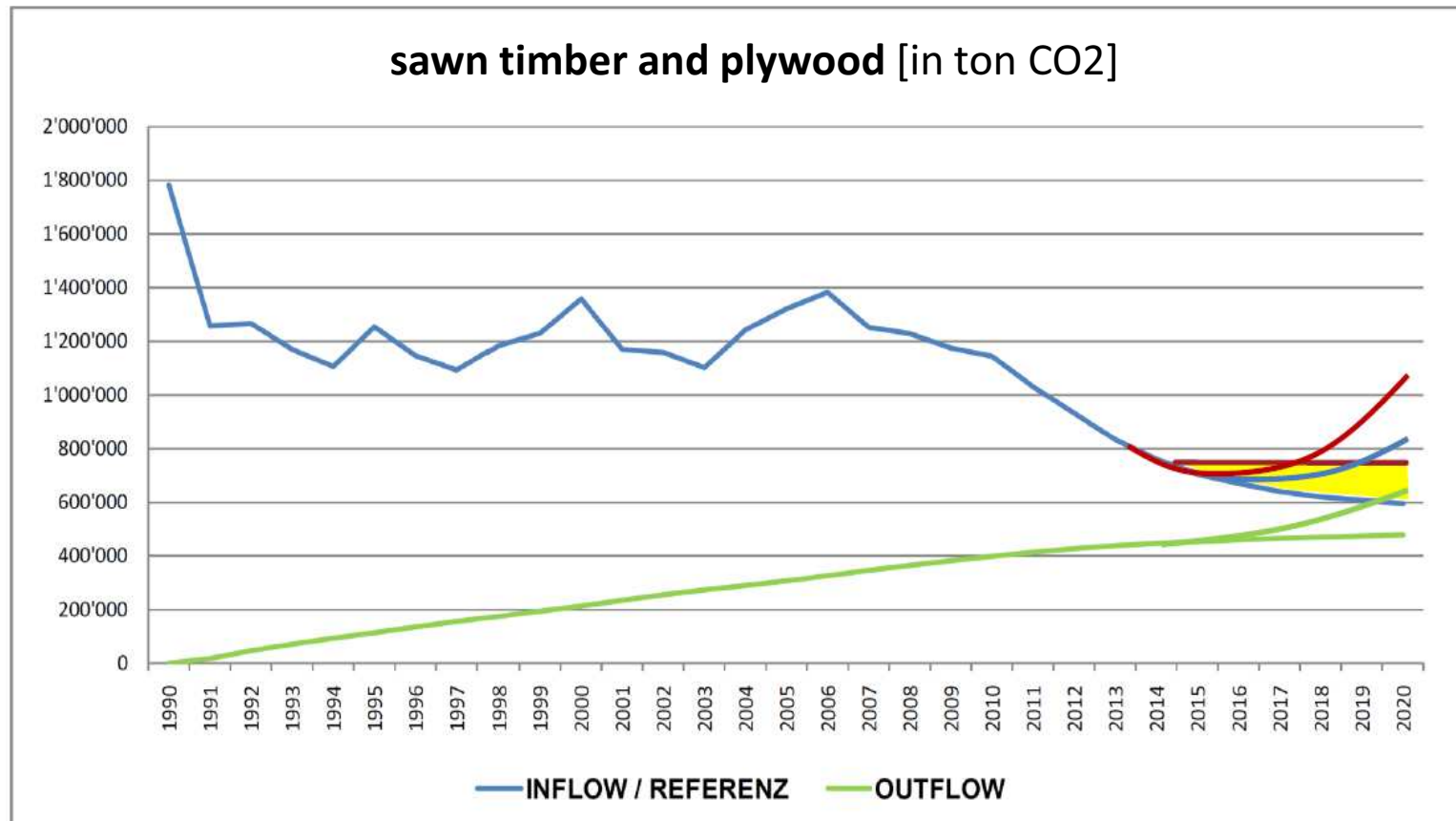
1. Base data including knowledge transfer
2. Mobilisation Wood form Swiss Forest
3. Raising awareness among the population and institutional building
4. Use of Hardwood (particular beech)
5. High-volume timber construction systems in specific areas
6. Framework conditions, coordination with partners





Adapting the frame conditions for CO₂ compensation by HWP gives an stimulus to the Timber Industry

– written confirmation only for additional quantity above business as usual (reference trend)



Source: Holzindustrie Schweiz / industrie du bois suisse



Selling CO₂ compensation certificates via HWP gives a stimulus to the Timber Industry



Operative Arrangements

Principle: Entrepreneurs have to decide, what arrangements are meaningful and possible in there factories

- Capital investment in optimising production (improving performance, increase the yield, gradation),
- Capital investments in optimising process and logistic (reduction of time of non-use, reduction of the reversal time, optimising flow of materials)
- Capital investments in further processing (new products with high market demand, e.g. construction solid wood, glued-laminated timber out of softwood and hardwood, board plywood)
- Capital investment in services (organise general partnership major costumers: storage, pre-cut part, consignment, etc.; kiln drying, planing down, etc.)
- Capital investments in additional employees (growing in output, additional purchasing and selling)



Selling CO₂ compensation certificates via HWP gives a stimulus to the Timber Industry


Strategical Arrangements

- Action to improve the disposability of wood (mobilisation)
- Action to increase the selling of Swiss wood (Origin-Swiss-Wood-Sign 'HSH')
- Action to improve frame conditions
- Action which requires coordinative approach





Contents

1. Value of Cascading Use
2. Demand
3. Potential capability
4. Contribution to Policy
-  5. Capital Investment in the Timber Industry
6. Examples in the Construction Industry in Switzerland



Capital Investment in Swiss Timber Industry

samples

Blumer Lehmann
The fascinating world of wood

Engineering Free forms
An interplay of disciplines

FAGUS JURA

Fagus Jura SA invests in a hardwood glued-laminated timber factory, especially for beech-wood

BATIR EN HETRE
100 pour cent

Implenia

Implenia AG invested in timber work

NECKER HOLZ AG
WOLZ AUS DEM NECKERTAL
SÄGE- UND LEIMWERK

Vision Necker Holz

- 8000 m³ 1 Jahr
- Team A Team B
- Flexibelste Produktion in Europa

SWISS KRONO INVESTIERT CHF 80 MILLIONEN IN DEN STANDORT MENZNAU

SWISS KRONO

Menznau, 20. August 2015 – die Kronospan Schweiz AG richtet den Produktionsstandort im luzernerischen Menznau auf die Zukunft aus: Für CHF 80 Mio. wird eine komplett neue Fabrikationsanlage und ein neues Verwaltungsgebäude mit einem modernen Ausstellungsraum errichtet. Zudem werden künftig Forschung und Entwicklung der Swiss Krono Group in Menznau konzentriert. Für Ines Kaindl, Tochter des Firmengründers und Verwaltungsratspräsidentin, ist diese Investition ein klares Zeichen für den Standort im Luzerner Hinterland: «Menznau mit seinen 440 Mitarbeitenden wird auch künftig eine wichtige Rolle in unserem Unternehmen wahrnehmen.»

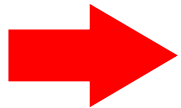
SCHILLIGER HOLZ
Gegründet 1861

Schilliger AG invests in a new softwood glued-laminated timber factory, and multiply the production



Contents

1. Value of Cascading Use
2. Demand
3. Potential capability
4. Contribution to Policy
5. Capital investment in the Timber Industry
6. Examples in the Construction Industry in Switzerland





CO2 Institute – visualising Good Practice



Home

Über holz-objekte.org

Objekt erfassen

Kontakt

Suche...

KATEGORIEN

Bauten

- Einfamilienhäuser
- Mehrfamilienhäuser
- Hotels/Restaurants
- Alters-/Pflegeheim
- Bürobauten
- Gewerbe-/Industriebauten
- Landwirtschaftsbauten
- Schulgebäude
- Sportanlagen
- Öffentliche Bauten
- Brücken/Stege
- Türme
- Infrastrukturbauten
- Kleinbauten
- Bauteile

Möbel

Produkte



◀ Zurück



Weiter ▶



Objekt: Überbauung Hegianwandweg / 5 MFH / 76 Wohnungen
([Website](#))

Bauherrschaft: Familiengenossenschaft Zürich

Standort: 8045 Zürich

Baujahr: 2003

Holzbau: ARGE Zschokke-Hatt Haller und Brunners Erben, Ort

Holzbauingenieur: [PIRMIN JUNG Ingenieure für Holzbau AG](#),
[Rain](#)

Architektur: [EM2N Architekten AG, Zürich](#)

CO₂-Reduzierung: 1193 t

Holzarten: Fichte



CO2 Institute – categories of good practice



Home Über holz-objekte.org Objekt erfassen Kontakt Suche...

KATEGORIEN

Bauten

- Einfamilienhäuser
- Mehrfamilienhäuser
- Hotels/Restaurants
- Alters-/Pflegeheim
- Bürobauten
- Gewerbe-/Industriebauten
- Landwirtschaftsbauten
- Schulgebäude
- Sportanlagen
- Öffentliche Bauten
- Brücken/Stege
- Türme
- Infrastrukturbauten
- Kleinbauten
- Bauteile

Möbel

Produkte

CATEGORIES

Building

- One family houses
- Block of flats (multi-family houses)
- Retirement / nursing home
- Office buildings
- Craft / industry buildings
- Farming buildings
- School buildings
- Sports facilities

Public buildings

Bridges/stay

Towers

Infrastructure constructions

Small buildings

Elements

Furniture

Products

Objekt: Überbauten Hegianwandweg / 5 MFH / 76 Wohnungen
 Bauherrschaft: Familiengenossenschaft Zürich
 Standort: 8045 Zürich
 Baujahr: 2003

Objekt: Holzhütte Hatt Haler und Brunners Erben, Ort
 Holzbauingenieur: PIRMIN JUNG Ingenieure für Holzbau AG
 Architektur: EM2N Architekten AG, Zürich

CO₂-Reduzierung: 1193 t

Holzarten: Fichte

◀ Zurück ▶ Weiter ▶▶



CO2 Institute – visualise CO2-compensation



Home

Über holz-objekte.org

Objekt erfassen

Kontakt

Suche...

KATEGORIEN

Bauten

Einfamilienh

Mehrfamilien

Hotels/Rest

Alters-/Pfle

Bürobauten

Gewerbe-/In

Landwirtsch

Schulgebäu

Sportanlage

Öffentliche

Brücken/St

Türme

Infrastrukt

Kleinbauten

Bauteile

Möbel

Produkte

Object: 5 block of flats / 76 flats

Builder-owner: Family Cooperative Zurich

Site: CH-8045 Zurich

Year of construction: 2003

Timber Work Comp.: ARGE Zschokke-Hatt Haller und Brunners Erben

Timber Construction engineer: Pirmin Jung AG

Architect in charge: EM2N Architekten AG, Zurich

CO₂ compensation: 1'193 to

Kind of wood: picea abies



Objekt: Überbauung Hegianwandweg / 5 MFH / 76 Wohnungen

(Website [↗](#))

Bauherrschaft: Familiengenossenschaft Zürich

Standort: 8045 Zürich

Baujahr: 2003

Holzbau: ARGE Zschokke-Hatt Haller und Brunners Erben, Ort

Holzbauingenieur: [PIRMIN JUNG Ingenieure für Holzbau AG](#),

[Rain](#) [↗](#)

Architektur: [EM2N Architekten AG, Zürich](#) [↗](#)

CO₂-Reduzierung: 1193 t

Holzarten: Fichte

◀ Zurück



Weiter ▶



Apartment building in Timber Work Wenlock Road, London UK



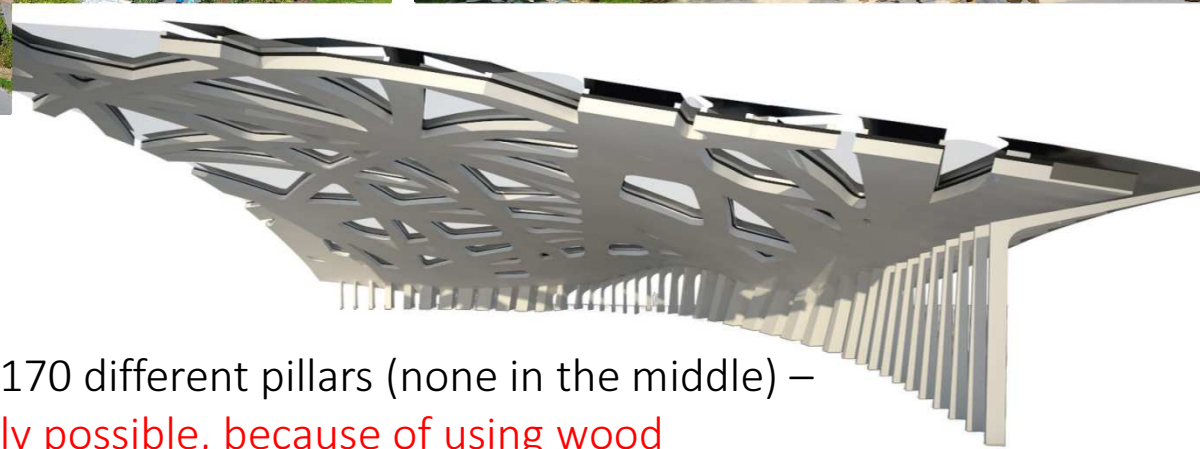


The headquarters of the media group 'tamedia:' in Zurich





The new Elephant House in the Zoo of Zurich



More than 170 different pillars (none in the middle) –
this was only possible, because of using wood



School building in Timber Work Switzerland



Objekt: Scuola Rudolf Steiner ([Website](#))

Bauherrschaft: Amici per la Pedagogia di Rudolf Steiner

Standort: 6945 Origlio

Holzbau: [Triguna sagl, Lamone](#)

Holzbauingenieur: Bloch Roussette Casale SA, Agno

Architektur: Nicola Balestra, Canobbio

CO₂-Reduzierung: 167 t

Holzarten: Fichte / Tanne



Objekt: LANDI Moléson ([Website](#))

Standort:

Holzbau: [Strüby Holzbau AG, 6423 Seewen SZ](#)

Architektur: [Strüby Konzept AG, 6423 Seewen SZ](#)

CO₂-Reduzierung: 1535 t

Berücksichtigte Bereiche:

- Tragkonstruktion
- Fassade

Holzarten: Fichte / Tanne



Objekt: Schulgebäude Büsto ([Website](#))

Bauherrschaft: Stiftung Schreinerhaus, c/o VSSM

Standort: 6363 Bürgenstock

Baujahr: 2012

Holzbau: Amstutz Holzbau AG / Gisler Holz, Stans /
Ganterschwil

Holzbauingenieur: [PIRMIN JUNG Ingenieure für Holzbau AG,](#)
[Rain](#)

Architektur: [Architektur & Baumanagement AG, Luzern](#)

CO₂-Reduzierung: 250 t

Holzarten: Fichte / Tanne / Yellow Pine



Objekt: Überbauung Hegianwandweg / 5 MFH / 76
Wohnungen ([Website](#))

Bauherrschaft: Familiengenossenschaft Zürich

Standort: 8045 Zürich

Baujahr: 2003

Holzbau: ARGE Zschokke-Hatt Haller und Brunners Erben, Ort

Holzbauingenieur: [PIRMIN JUNG Ingenieure für Holzbau AG,](#)
[Rain](#)

Architektur: [EM2N Architekten AG, Zürich](#)

CO₂-Reduzierung: 1193 t

Holzarten: Fichte



Objekt: Überbauung Hegianwandweg / 5 MFH / 76
Wohnungen ([Website](#))

Bauherrschaft: Familiengenossenschaft Zürich

Standort: 8045 Zürich

Baujahr: 2003

Holzbau: ARGE Zschokke-Hatt Haller und Brunners Erben, Ort

Holzbauingenieur: [PIRMIN JUNG Ingenieure für Holzbau AG, Rain](#)

Architektur: [EM2N Architekten AG, Zürich](#)

CO₂-Reduzierung: 1193 t

Holzarten: Fichte



Objekt: Mehrgeschossiger Wohnbau ([Website](#) ↗)

Standort: Oberbad Appenzell

Baujahr: 2007

Holzbau: [Blumer-Lehmann AG, Gossau](#) ↗

Architektur: HTS Architekten, Altdorf

CO₂-Reduzierung: 313 t



/_lib/t

Objekt: Sonnenprojekt ([Website](#))

Bauherrschaft: Privat

Standort: 6414 Oberarth SZ

Baujahr: 2010

Holzbau: [Kost Holzbau AG, Küssnacht a.R.](#)

Architektur: f-h-c architekten, Zug

CO₂-Reduzierung: 501 t

Holzarten: Fichte / Tanne / Douglasie



Objekt: ARGE Holz Grünmatt, c/o Blumer-Lehmann AG

Bauherrschaft: Familienheim Genossenschaft Zürich, FGZ

Standort: 8000 Zürich

Baujahr: 2013

Holzbau: [Blumer-Lehmann AG](#), [Gossau + Kost Holzbau AG](#),
[Küssnacht a.R.](#)

Holzbauingenieur: [PIRMIN JUNG Ingenieure für Holzbau AG](#),
[Rain](#)

Architektur: [Graber.Pulver Architekten AG, Zürich](#)

CO₂-Reduzierung: 2524 t t

Berücksichtigte Bereiche:

- Tragkonstruktion
- Fassade
- Innenausbau



Objekt: Eichli Stans

Bauherrschaft: Anita & Roger Etienne-Gyger

Standort: Stans

Holzbau: [Bucher Holzbau AG, 6064 Kerns](#)

Holzbauingenieur: [PIRMIN JUNG Ingenieure für Holzbau AG, 6026 Rain](#)

Architektur: [Boos Murer Architekten, 8048 Zürich](#)

CO₂-Reduzierung: 149 t

Berücksichtigte Bereiche:

- Tragkonstruktion
- Fassade

Holzarten: Fichte / Tanne

Davon Produkte aus Schweizer Holz: Tragkonstruktion,



Objekt: Wohnüberbauung Naturblick ([Website](#))

Bauherrschaft: Strüby Immo AG

Standort: 6491 Realp

Baujahr: 2011

Holzbau: [Strüby Holzbau AG, 6423 Seewen](#)

Architektur: [Strüby Konzept AG, 6423 Seewen](#)

CO₂-Reduzierung: 897 t



Merci