

University
of Ljubljana

Biotechnical Faculty
*Department of Wood Science
and Technology*



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Contemporary Slovenian Timber Constructions: an Architectural Design Approach



Slovenia - green heart of Europe...

The timber region of the future

Surface area of forested land 1,184,526 ha

Forested area of Slovenia 58.4 %

Number of naturally occurring tree species 71

Growing stock 337,816,717 m³

Annual growth of growing stock 8,419,974 m³

Potential annual harvest:

(2012 forest management plans) 5,748,834 m³

Hardwoods 3,066,824 m³

Softwoods 2,682,010 m³



Forest

32% beech,

32% spruce,

softwood species:

fir, pine, larch and

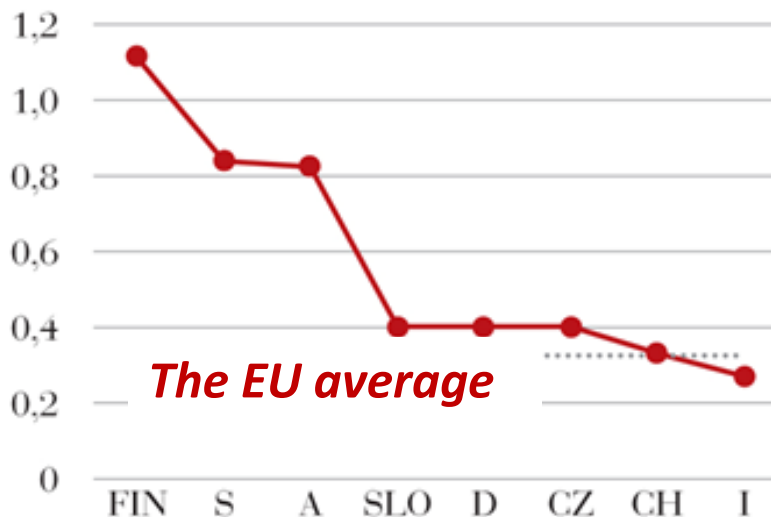
hardwood species:

oak, maple.

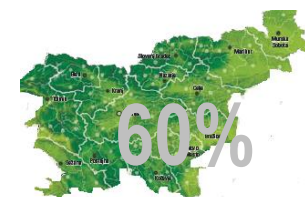




More than 71 domestic wood species in Slovenia




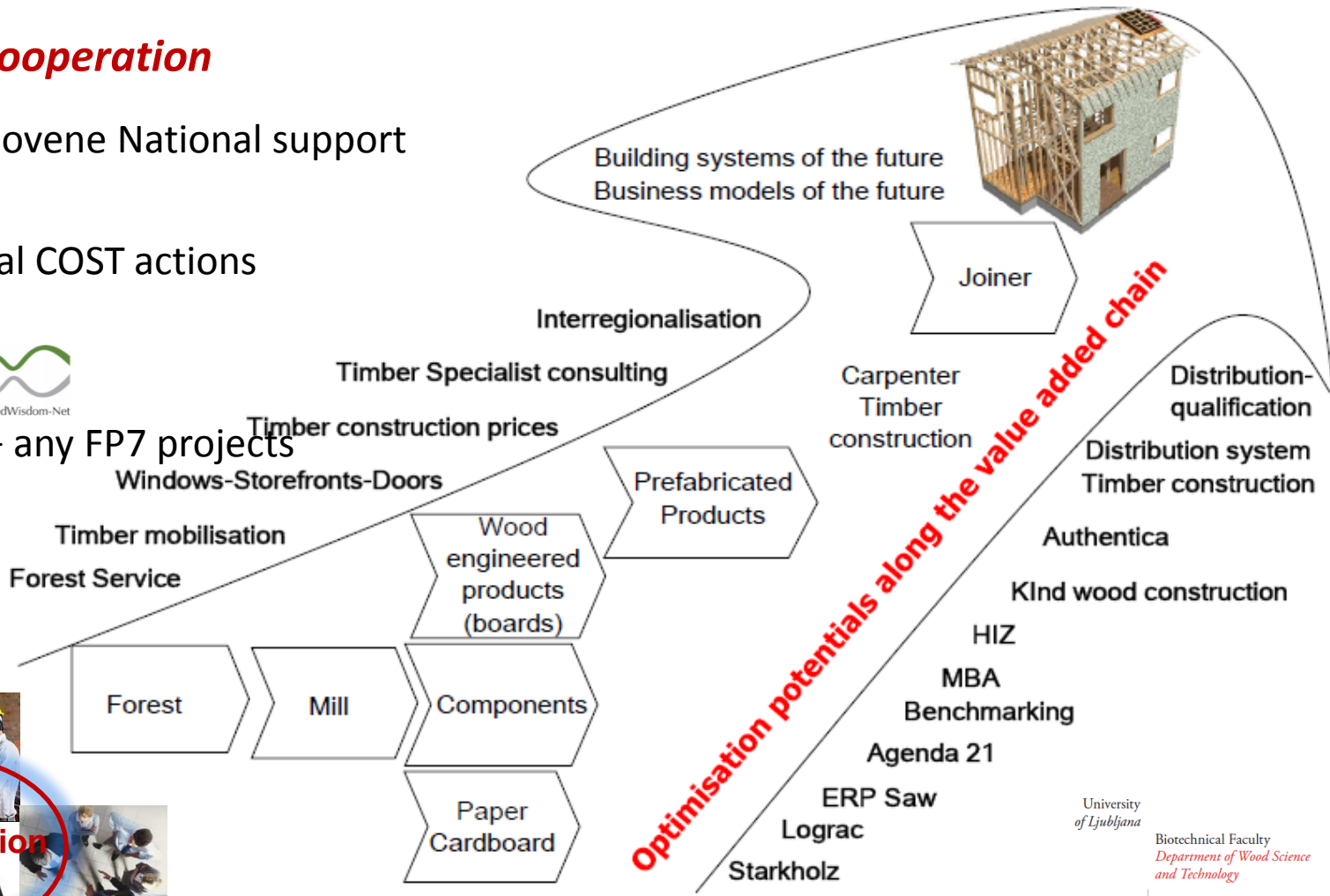
Annual wood consumption (m³ per capita) in selected countries of the EU



Leading project in Slovenia

International Cooperation

- Involved in the Slovene National support group of the FTP
- Partners in several COST actions
- Bilateral project
- WoodWisdom 
- other ERA-Nets + any FP7 projects
- Horizon 2020



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Contemporary Slovenian Timber Architecture for Sustainability, *Manja Kuzman, Andreja Kutnar*

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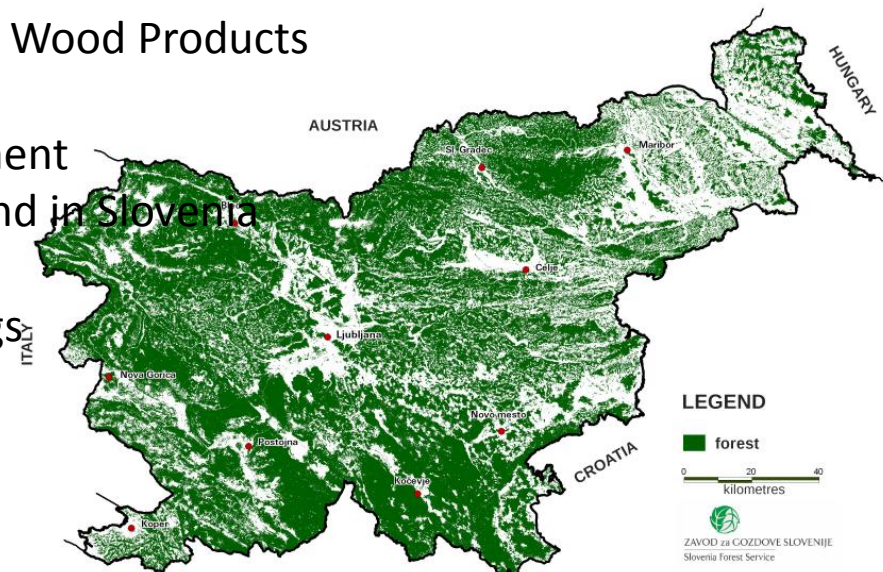
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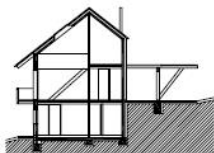
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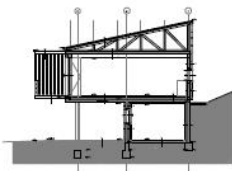




Lokacija | Vešter, Škofja Loka
 Izvedba | 2008
 Arhitektura | 3 BIRO; prof. Janez Koželj u.d.i.a., Blaž Rupar u.d.i.a., Tina Rupar Kobe u.d.i.a.
 Projektivno podjetje | Uniarh d. o. o.
 Statika | Grad-art d. o. o.
 Energetska učinkovitost | nizkoenergijska 25 kWh/(m²a)
 Površina | 180 m²
 Izvajalec | Jelovica hiše d. o. o.



Lokacija | Gabrje, Ljubljana
 Izvedba | 2010
 Arhitektura | prof. Janez Koželj u.d.i.a., Blaž Rupar u.d.i.a., Tina Rupar Kobe u.d.i.a., sodelavci: Jernej Šipoš, Tea Pristolič
 Projektivno podjetje | 3buro
 Energetska učinkovitost | nizkoenergijska 34 kWh/(m²a)
 Površina | 186,6 m²
 Izvajalec | Lumar IG d.o.o.



Lokacija | Slovenske Konjice
 Izvedba | 2009
 Arhitektura | Boštjan Matul u.d.i.a.
 Projektivno podjetje | AB objekt d. o. o.
 Statika | Stanka Špegelj u.d.i.gr.
 Energetska učinkovitost | nizkoenergijska 29,8 kWh/(m²a)
 Površina | 310 m²
 Izvajalec | Rihter d. o. o.



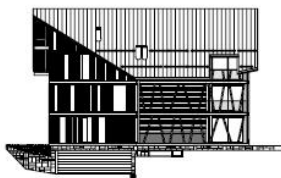
What kind of building would you choose?



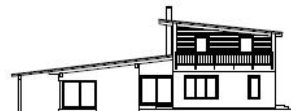
The number of people opting for a wooden building is higher than 5 years ago!



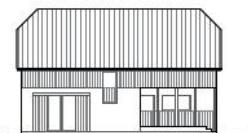
Lokacija | Podkoren
 Izvedba | 2009
 Arhitektura | Vanja Gregorc u.d.i.a. in Aleš Vrhovec u.d.i.a.
 Projektivno podjetje | Gregorc Vrhovec arhitekti d.o.o.
 Statika | dr. Bruno Duijč, CBD d.o.o.
 Energetska učinkovitost | nizkoenergijska
 Površina | 505 m²
 Izvajalec | Riko hiše d.o.o.



Lokacija | Brezje pri Mariboru
 Izvedba | 2002
 Arhitektura | Miha Miholič u.d.i.a.
 Projektivno podjetje | Marles hiše Maribor d.o.o.
 Statika | Marles hiše Maribor d.o.o.
 Energetska učinkovitost | nizkoenergijska 50kWh/(m²a)
 Površina | 306,6 m²
 Izvajalec | Marles hiše Maribor d. o. o.



Lokacija | Čezsoča
 Izvedba | 2005
 Arhitektura | Rok Klanjšček u.d.i.a., Blaž Zalar u.d.i.a.
 Projektivno podjetje | REAL Engineering d.o.o., Blenkuš-Florjančič, d.o.o.
 Statika | Projektivni biro Osterman
 Energetska učinkovitost | nizkoenergijska
 Površina | 117 m²
 Izvajalec | Riko hiše d.o.o.



Lokacija | Pekre pri Mariboru
 Izvedba | 2008
 Arhitektura | Biro Kager hiša d.o.o.
 Projektivno podjetje | Kager hiša d.o.o.
 Statika | Kager hiša d.o.o.
 Energetska učinkovitost | nizkoenergijska 28,01 kWh/m²
 Površina | 209 m²
 Izvajalec | Kager hiša d.o.o.



Lokacija | Velike Lašče
 Izvedba | 2009
 Arhitektura | Jasna Ariana Starc u.d.i.a.
 Statika | Piring Vojko Pirjevec s.p.
 Energetska učinkovitost | pasivna hiša 14kwh/m²
 Površina | 200 m²
 Izvajalec | Tesarstvo Kregar s.p.



Classifications of Energy-efficient buildings

According to the *Slovene legislative framework*, particularly to the Energy Act, the system of energy performance certification is defined in Rules on the methodology of construction and issuance of building energy certificates.

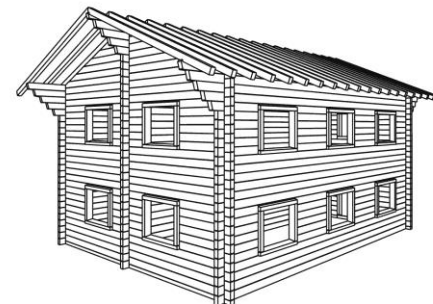
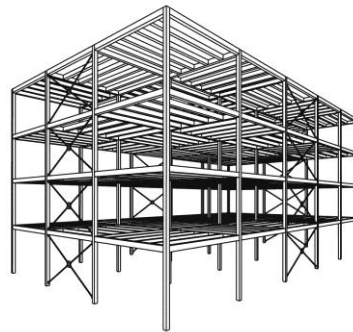
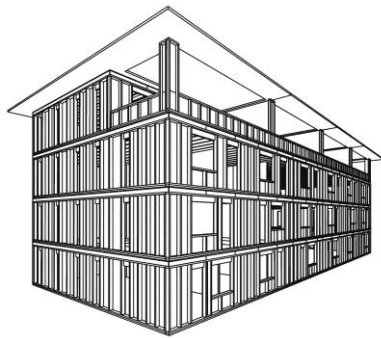
Degree / Classification in accordance with the rules	Generally used classification in practice	Q_h^* (kWh/m ² a)	Variation of execution (according to Praznik and Kovič, 2010)
Class C	minimal requirements for low-energy house	35 – 50 (60)	classical prefabricated construction, conventional heating system, contemporary windows (doors), no central ventilation system
Class B2	low-energy house	25 – 35	thermally improved building envelope
Class B1	better low-energy house	15 – 25	thermally improved building envelope + HRV** + HP***
Class A2	passive house	10 – 15	additionally thermally improved building envelope + HRV + HP
Class A1	1-litre house	≤ 10	additionally thermally improved building envelope + HRV +HP + improved U-value of windows (doors)

* specific annual heating demand, **heat recovery ventilation, ***heat pump



The Section of Prefabricated Houses

Association of Wood and Furniture Industries





The Čurile House



LONGITUDINAL SECTION



GROUND FLOOR PLAN



Residential building

Year | 2010

Architecture | **prof. Janez Koželj, Tina Rupar Kobe, Blaž Rupar**

Architectural firm | **3BIRO, Janez Koželj s.p.**

Structural engineer | **CBD d.o.o.**

Energy efficiency | **low-energy**

Surface | **245 m²**

Site area | **3345 m²**

U-value (W/m²K) | **wall 0,16, floor 0,20, roof 0,16, window 0,90, glass 0,70, frame 1,10**

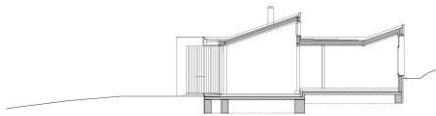
Construction system | **timber-frame**

Construction time | **12 months**

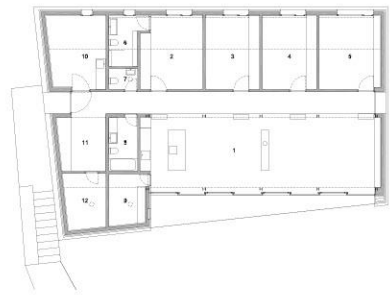
House technique | **heat pump, comfort ventilation with heat recovery**

The MJ House

Novo mesto



LONGITUDINAL SECTION



GROUND FLOOR PLAN



Residential building

Year | 2011-2012

Architecture | **Tomaž Čeligoj, Ana Grk, Blaž Kandus, Alenka Korenjak, Tjaša Mavrič, Tina Rugelj**

Architectural firm | **Kombinat d.o.o.**

Structural engineer | **Proding d.o.o.** (concrete part), **Projektivni biro Osterman s.p., Riko Hiše d.o.o.** (wooden part)

Energy efficiency | **low-energy 40 kWh/(m²a)**

Site area | **1495 m²**

Surface | **195,6 m² + 51,5 m² garage**

U-value (W/m²K) | **wall 0,19, roof 0,15, windows 1,10**

Construction system | **timber panel**

Construction company | **Riko Hiše d.o.o.**

Construction time | **1 year**

House technique | **air-to-water heat pump, comfort ventilation with heat recovery, floor heating system**

3 Houses in Rožna Dolina

Ljubljana



Residential building

Year | 2013

Architecture | IDZ + PGD: Brina Vizjak, Tomori arhitekti d.o.o,

PGD + PZI: Kombinat: Tomaž Čeligoj, Ana Grk, Alenka Korenjak, Blaž Kandus, Tina Rugelj, Brina Vizjak

Architectural firm | Kombinat arhitekti, projektiranje

Structural engineer | Lumar IG d.o.o.

Energy efficiency | low-energy 18 kW /m²a

Surface | 3 x 175 m²

Site area | 1890 m²

U-value (W/m²K) | wall 0,12, roof 0,07, floor 0,10

Construction system | panel construction

Construction company | Lumar IG d.o.o.

Construction time | 2 six-month phases

House technique | heat pump, comfort ventilation with heat recovery



SECTION

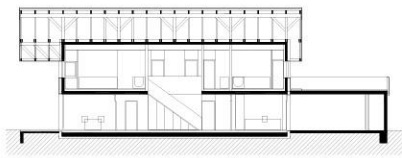


GROUND FLOOR PLAN

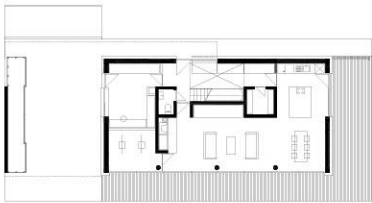


The Lesce House

Lesce



LONGITUDINAL SECTION



GROUND FLOOR PLAN



Residential building

Year | 2013

Architecture | **prof. Janez Koželj, Tina Rupar Kobe, Blaž Rupar**

Architectural firm | **3BIRO, Janez Koželj s.p.**

Structural engineer | **Gorazd Mravlja Sora Inženiring d.o.o.**

Energy efficiency | **low-energy**

Surface | **235 m²**

Site area | **742 m²**

U-value (W/m²K) | **0,16, floor 0,20, roof 0,16, window 0,90, glass 0,70, frame 1,10**

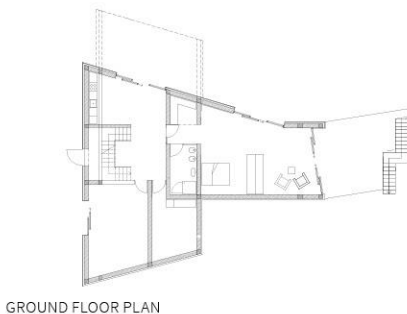
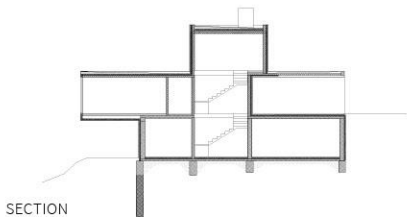
Construction system | **timber-frame, solid timber**

Construction time | **12 months**

House technique | **heat pump, comfort ventilation with heat recovery**

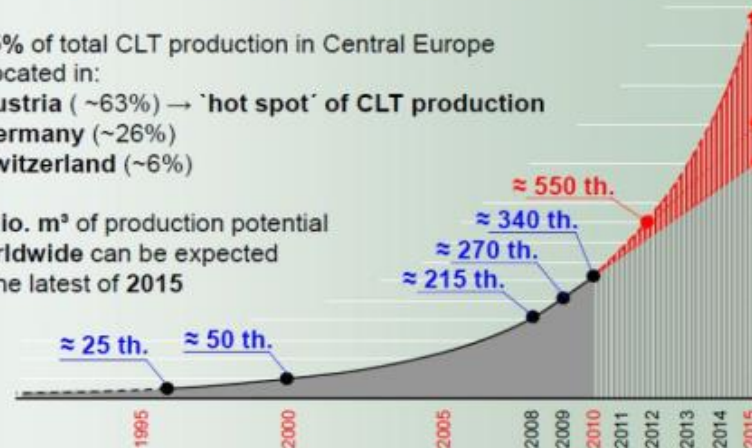
The Forma Villa House

Ravne na Koroškem



Development of European CLT Production

- current 15 main CLT production sites (2011/12: ~20 or more)
- ~95% of total CLT production in Central Europe is located in:
 - Austria (~63%) → 'hot spot' of CLT production
 - Germany (~26%)
 - Switzerland (~6%)
- 1 Mio. m³ of production potential worldwide can be expected at the latest of 2015



Residential building

Year | 2011

Architect | **Arhitektura Jure Kotnik**
 Architectural firm | **Arhitektura Jure Kotnik**

Structural engineer | **CDB d.o.o.**

Energy efficiency | **low-energy**

Surface | **340 m²**

Site area | **1100 m²**

Construction system | **solid timber construction**

Construction company | **CBD d.o.o.**

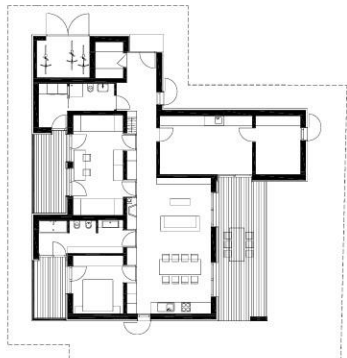
Construction time | **14 days**

The NMII House

Ljubljana



LONGITUDINAL SECTION



GROUND FLOOR PLAN



Residential building

Year | 2013

Architecture | Rok Bogataj, Miha Dešman, Eva Fišer Berlot, Vlatka Ljubanović, Katarina Pirkmajer Dešman

Architectural firm | dans arhitekti d.o.o.

Structural engineer | Marko Markoja, Arhe d.o.o.

Energy efficiency | low-energy PHPP
22 kWh/(m²a)

Surface | 135,10 m²

Site area | 419 m²

U-value (W/m²K) | wall 0,13, roof 0,06,
floor 0,10, glass 0,60, frame 1,20

Construction system | timber-frame
construction

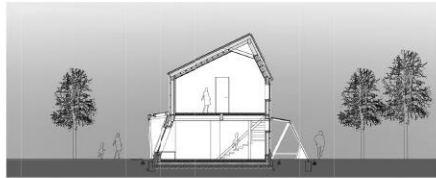
Construction company | Damahaus d.o.o.

Construction time | 5 months

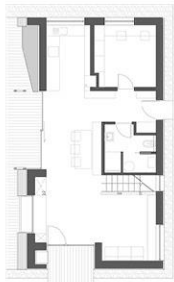
House technique | comfort ventilation with
heat recovery, floor heating system

The House in Šujica

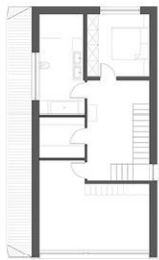
Šujica



CROSS SECTION



GROUND FLOOR PLAN



FIRST FLOOR



Residential building

Year | 2011-2012

Architect | **Jasna Starc, sod.** | coll.:
Ana Šušteršič, Jernej Valenčič

Arhitekturni studio | **Arhitektura Starc**

Structural engineer | **Piring,**
Vojko Pirjevec s.p.

Energy efficiency | **low-energy PPHP**
18 kWh/(m²a)

Surface | **147 m²**

U-value (W/m²K) | **wall 0,11 roof 0,10,**
glass 0,60, frame 1,60

Construction system | **timber-frame**

Construction company | **Tesarstvo Kregar,**
Stavbarstvo Žerjal s.p.

Construction time | **1 year**

House technique | **heat air-to-water heat**
pump, comfort ventilation with heat
recovery, rain water collector, biological
wastewater treatment plant

The HF House

Murska Sobota



Residential building

Year | 2011

Architect | Daniel Grah

Architectural firm | Grah arhitekti, projektiranje, Daniel Grah s.p.

Structural engineer | Riko Hiše d.o.o.

Energy efficiency | low-energy 35 kW /m²a

Surface | 240 m²

Site area | 1687 m²

U-value (W/m²K) | wall 0,17 , roof 0,11, glass 0,70 , frame 1,70

Construction system | timber panel

Construction company | Riko Hiše d.o.o.

Construction time | 30 days

House technique | water to water heat pump, comfort ventilation with heat recovery, floor heating, smart installation, central vacuum system



CROSS SECTION

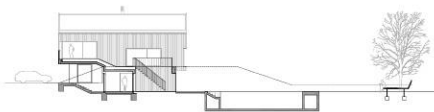


GROUND FLOOR PLAN

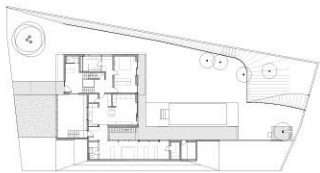


The Scandinavian House at Kurešček

Kurešček



CROSS SECTION



GROUND FLOOR PLAN



Residential building

Year | 2013

Architect | **Mojca Gregorski, Miha Kajzelj**

Architectural firm | **Arhe d.o.o.**

Structural engineer | **Proding d.o.o.-
betonski del | concrete part, CBD d.o.o.
leseni del | wooden part**

Energy efficiency | **low-energy**

Surface | **300 m²**

Site area | **1100 m²**

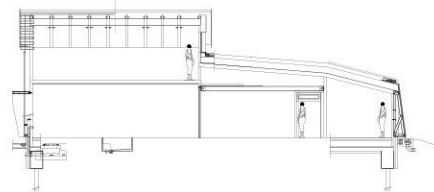
Construction system | **solid timber
construction**

Construction company | **KLH Massivholz
GmbH**

House technique | **heat pump, floor-wall
heating, intelligent installation**

The Tango House

Ljubljana



SECTION



GROUND FLOOR PLAN



Residential building

Location | Ljubljana

Year | 2014

Architect | Boštjan Debelak

Architectural firm | Boštjan Debelak, samostojni arhitekt

Structural engineer | CBD d.o.o.

Energy efficiency | low-energy

Surface | 142m²

Site area | 548m²

Construction system | solid timber Xlam construction

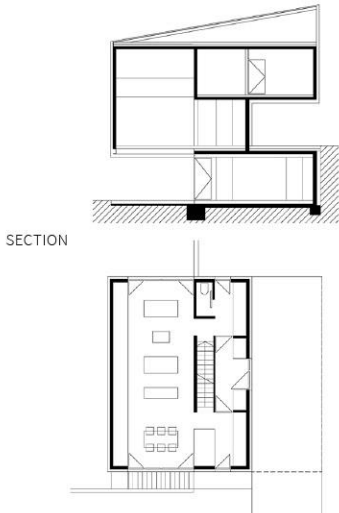
Construction company | CBD d.o.o. s kooperanti

Construction time | 7 months

House technique | heat water to water heat pump, floor heating, open fireplace

The Rant House

Škofja Loka



SECTION

GROUND FLOOR PLAN



Residential building

Year | 2013

Architecture | prof. Janez Koželj, Tina Rupar Kobe, Blaž Rupar

Architectural firm | 3BIRO, Janez Koželj s.p.

Structural engineer | CBD d.o.o.

Energy efficiency | low-energy
25 kWh/(m²a)

Surface | 184 m²

Site area | 800 m²

U-value (W/m²K) | wall 0,25, roof 0,20,
glass 1,10

Construction system | timber-frame, solid
timber construction

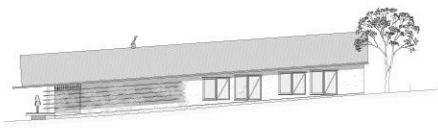
Construction company | Lamo d.o.o.

Construction time | 1 year

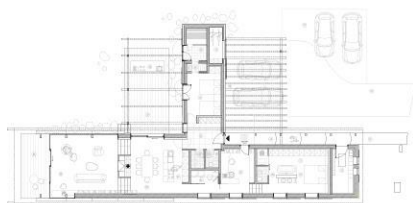
House technique | comfort ventilation with
heat recovery, floor heating system, rain
water collector

A House for the Best Years

Trata pri Velesovem



ELEVATION



GROUND FLOOR PLAN



Residential building

Leto | Year | 2011

Architect | **Matej Gašperič**

Architectural studio | **Biro Gašperič**

Structural engineer | **Cibos, Ciril Bogataj**

Energy efficiency | **low-energy**

23,5 kW /m²a

Surface | **155 m²**

Site area | **1116 m²**

U-value (W/m²K) | **wall 0,15, roof 0,13, glass 0,70, frame 1,20**

Construction system | **timber-frame**

Construction company | **Bauta d.o.o**

Construction time | **6 months**

House technique | **air-to-water heat pump**

The Active House

Dragočajna



Residential building

Year | 2013

Architecture | Jernej Gartner,
Brigita Babnik, Gregor Košorok

Architectural firm | Košorokgartner
arhitekti d.o.o.

Structural engineer | Luka Pavlovčič,
Lumar IG d.o.o.

Energy efficiency | plusenergy PHPP
15 kWh/m²a

Surface | 151 m²

Site area | 511 m²

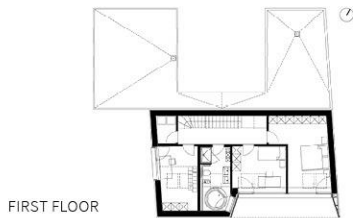
U-value (W/m²K) | stena | wall 0,10, streha
| roof 0,10, tla | floor 0,12, okno | window
0,87, steklo | glass 0,60, okvir | frame 0,86

Construction system | panel construction

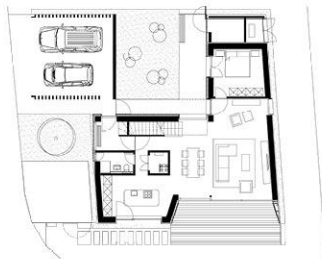
Construction company | Lumar IG d.o.o.

Construction time | 1 year

House technique | heat air-to-water heat
pump, floor heating, solar collector,
photovoltaic power station, comfort
ventilation with heat recovery, rain water
collector, comfort ventilation with heat
recovery, floor heating system, smart
installations



FIRST FLOOR

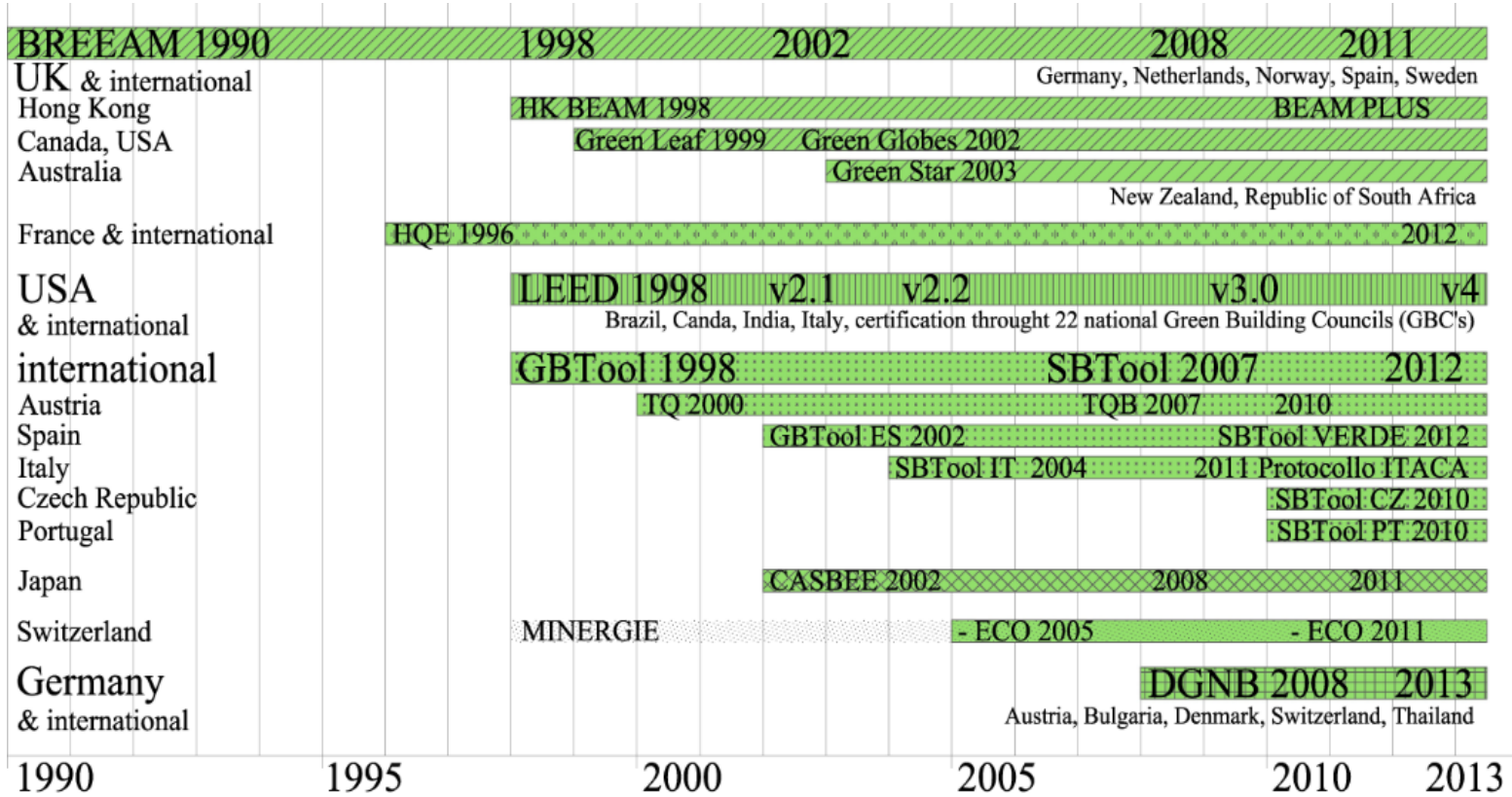


GROUND FLOOR PLAN



Certificates

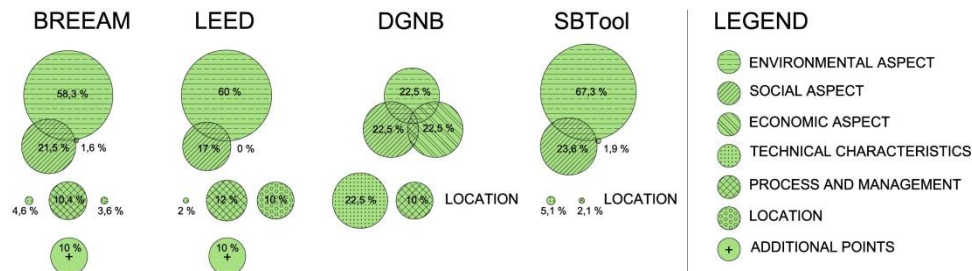
In recent decades several methodologies have been developed to assess the quality of buildings:



showing the development of building sustainability assessment methods.



Graphical representation of the shares of individual categories in different building assessment methods.



Passive house Component Award

Slovenian company M Sora

Certificate for Building sistem



Certificate
 Certified Passive House Component
 for cool temperate climates, valid until 31.12.2014

Category: **Window Frame**
 Manufacturer: **Marles PSP, d.o.o.**
 2363 Podveka, SLOVENIA

Product name: **MEGA PASIV-P with Vivaprofil**

This certificate was awarded based on the following criteria:

Given a Ug value of 0.70 W/(m²K) and a window size of 1.23 m by 1.48 m,

$U_{W} = 0.79 \text{ W/(m}^2\text{K)} \leq 0.80 \text{ W/(m}^2\text{K)}$

Taking into account the installation based thermal bridges and provided that the installation is, with regard to the thermal bridges, equal or better than shown in the data sheet, the window meets the following criterion.

$U_{W,installed} \leq 0.85 \text{ W/(m}^2\text{K)}$

Thermal data

	U _g -value [W/(m ² K)]	Width [mm]	Ψ _g [W/(m ² K)]	f _{R,ISO,25} [-]
Spacer			Superspacer Triстал	
Bottom	0.77	136	0.033	0.70
Side/top	0.72	115	0.033	

*Spacers of lower thermal quality, especially those made of aluminum, lead to significantly higher thermal losses and lower temperature factors.

For further information, please see the data sheet

www.passivehouse.com 0499w03

Certificate
 Certified Passive House Component
 for cool temperate climates, valid until 31.12.2014

Category: **Window Frame**
 Manufacturer: **Marles PSP, d.o.o.**
 Podveka 3, 2363 Podveka, SLOVENIA
 Tel.: +386 2 87 70 302
 Email: INFO@MARLES-PSP.SI, WWW.MARLES-PSP.SI

Product name: **MEGA PASIV-P with Vivaprofil**

This certificate was awarded based on the following criteria:

Given a Ug value of 0.70 W/(m²K) and a window size of 1.23 m by 1.48 m,

$U_{W} = 0.79 \text{ W/(m}^2\text{K)} \leq 0.80 \text{ W/(m}^2\text{K)}$

Taking into account the installation based thermal bridges and provided that the installation is, with regard to the thermal bridges, equal or better than shown in the data sheet, the window meets the following criterion.

$U_{W,installed} \leq 0.85 \text{ W/(m}^2\text{K)}$

Thermal data

	U _g -value [W/(m ² K)]	Width [mm]	Ψ _g [W/(m ² K)]	f _{R,ISO,25} [-]
Spacer			Superspacer Triстал	
Bottom	0.77	136	0.033	0.70
Side/Top	0.72	115	0.033	
Flying Mullion	0.80	172	0.032	0.70

*Spacers of lower thermal quality lead to higher thermal losses and lower glass edge temperatures.

For further information, please see the data sheet

www.passivehouse.com 0499w03

Certificate
 Certified Passive House component
 For cool temperate climates, valid until 31 December 2014

Passive House Institute
 Dr. Wolfgang Feist
 64283 Darmstadt
 GERMANY

Category: **Building System**
 Manufacturer: **LUMAR IG d.o.o.**
 2000 Maribor, SLOVENIA

Product name: **LUMAR PASIV EKO**

This certificate was awarded based on the following criteria:

Heat transfer coefficient of building envelope:
 $\sum U_{a,ext} \leq 0.15 \text{ W/(m}^2\text{K)}$
 with τ temperature reduction factor

Thermal bridge free design:
 $\Psi_a \leq 0.01 \text{ W/(mK)}$ for key connection details
 with Ψ_a : linear heat transfer coefficient
 $U_{a,standard window, installed} \leq 0.85 \text{ W/(m}^2\text{K)}$
 with standard window: width 1.23 m; height 1.48 m

Interior surface temperatures above 17°C
 at $t_{air} = 10^\circ\text{C}$ and $t_{ext} = 20^\circ\text{C}$

Airtightness of all components and connection details is provided

Certified connection details as per the certification report are listed below:
 Enumeration of thermal bridge free connections

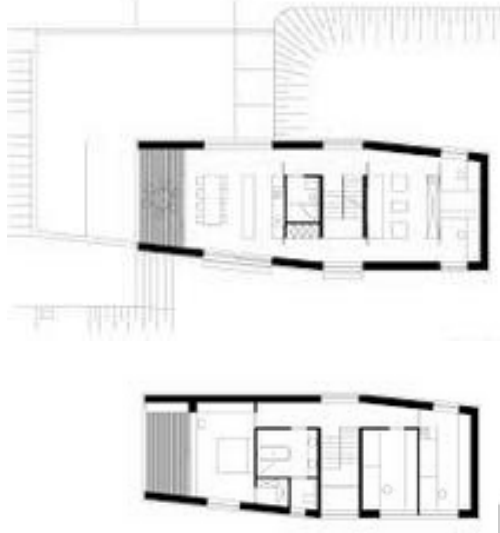
Foundation/
 exterior wall: LU_12_AW-BP, LU_14_AW-KD-UK_AW, LU_14_AW-KD-UK_KD

Exterior wall: LU_10_AW-AK, LU_23_W-AW

Roof: LU_15_AW-DK(T), LU_16_AW-DK(O), LU_17_DK-Z, LU_18_AW-Z(O), LU_19_AW-PD(T)-V01, LU_20_AW-PD(O)-V01, LU_21_AW-PD(T)-V02, LU_22_AW-PD(O)-V02

Windows: F1, F3

www.passivehouse.com 0365w03



MSora

Passive House Component Award
 Awardees in the category Wood

Natura Optimo XLT

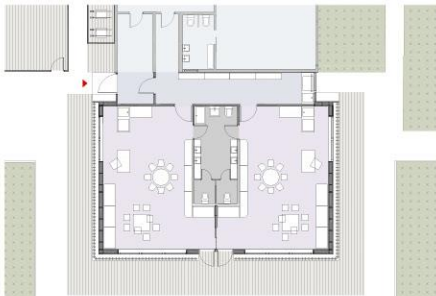


The Kekec Kindergarten

Ljubljana



SECTION



GROUND FLOOR PLAN



Building for education

Year | 2010

Architect | Jure Kotnik, Andrej Kotnik

Architectural firm | Arhitektura Jure Kotnik

Structural engineer | CBD d.o.o.

Energy efficiency | low-energy 40 kWh/(m²a)

Surface | 123 m²

Site area | 250 m²

U value (W/m²K) | wall 0,20, roof 0,19,
window 1,20, glass 0,70, frame 1,50

Construction system | panel construction

Construction company | Riko Hiše d.o.o.

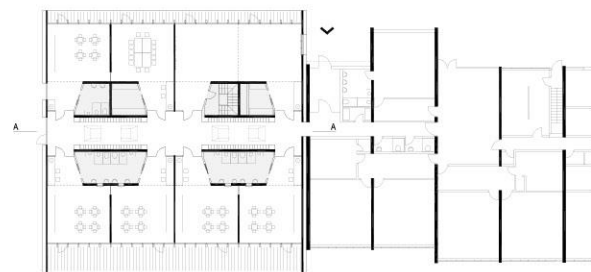
Čas gradnje | Construction time | 2 months

The Polzela Kindergarten

Polzela



SECTION AND ELEVATION



GROUND FLOOR PLAN



Building for education

Investor | **Občina Polzela**

Year | **2013 project, 2014 construction**

Architecture | **Mojca Gregorski, Matic Lašič**

Architectural firm | **MODULAR arhitekti d.o.o.**

Structural engineer | **Proding d.o.o.**

Energy efficiency | **low-energy 38 kW/m²a**

U-value (W/m²K) | **wall 0,12, roof 0,11, window 1,10**

Surface | **740 m² bruto (new development) + 83m² (reconstruction)**

Site area | **3170 m²**

Construction system | **timber-frame**

Construction company | **Remont d.d, Rubner, Avstrija**

Construction time | **5 months**

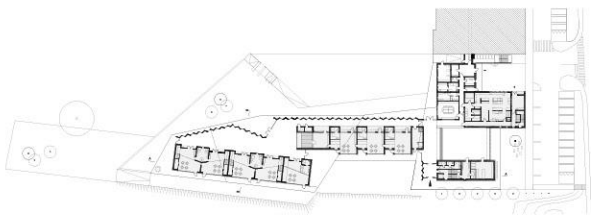
House technique | **floor heating, comfort ventilation with heat recovery, biomass heating systems - preparation**

The Poljčane Kindergarten

Poljčane



ELEVATION



GROUND FLOOR AND SITE PLAN



Building for education

Investor | **Občina Poljčane**

Year | **2012 project, 2014 construction**

Architecture | **Mojca Gregorski, Miha Kajzelj, Matic Lašič**

Architectural firm | **MODULAR arhitekti d.o.o.**

Structural engineer | **CBD d.o.o. (wood), GRAVITAS d.o.o. (concrete)**

Energy efficiency | **low-energy**

U-value (W/m²K) | **wall 0,16, roof 0,12, glass 0,50, window 1,10**

Surface | **2760 m²**

Site area | **7405 m²**

Construction system | **massive wood construction**

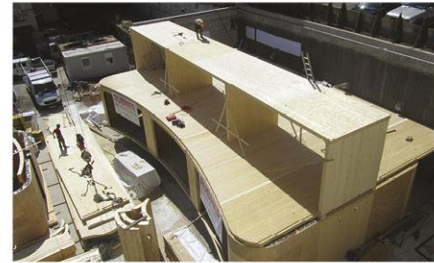
Construction company | **GP PROJECT ING d.o.o (Hoja d.d., HASSLACHER Holding GmbH)**

Construction time | **18 months**

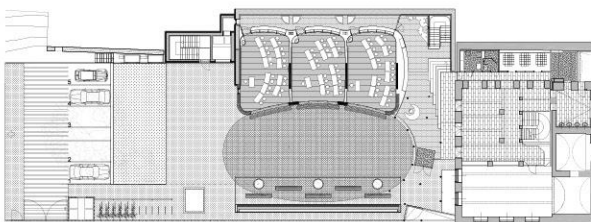
House technique | **water to water heat pump, floor heating, comfort ventilation with heat recovery, rain water collector, biological wastewater treatment plant**

Extension with a Hall - Waldorf School

Ljubljana



ELEVATION



GROUND FLOOR PLAN



Building for education

Year | 2009-2012

Investor | Mestna občina Ljubljana,
Paritas d.o.o.

Architect | author: Ira Zorko,
co-authors 2003-2006: Janko Rožič,
Aleksander Saša Ostan, Nataša Pavlin,
Gašper Drašler, Primož Gašperšič, Katja
Žagar, Oona Johnsen.
collaborators 2006-2011: Barbara Grilc,
Gregor Gašperšič, Dušan Moll, Primož
Roškar

Architectural firm | Landart d.o.o.

Structural engineer | CBD d.o.o. (wood),
Proming d.o.o. (concrete)

Energy efficiency | low-energy 35 kWh/
(m²a)

Surface | 1726 m²

Construction system | panel construction

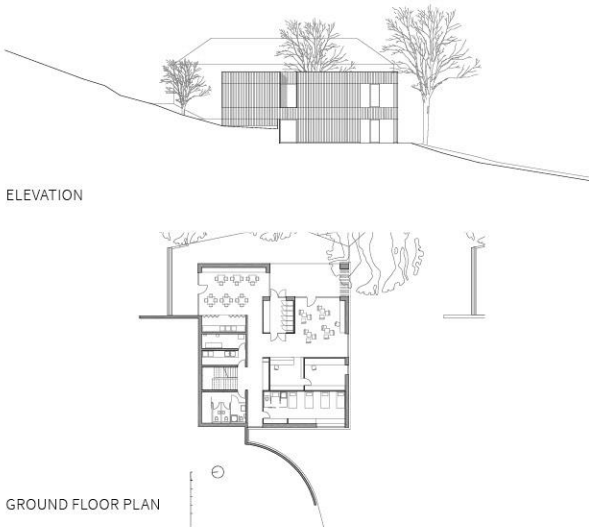
Construction company | RUBNER d.o.o.,
Moena d.o.o., SGP Tehnik d.o.o.

Construction time | 3 years

House technique | comfort ventilation
with heat recovery, own water resource

The Punkl Youth Hostel

Ravne na Koroškem



Tourist facility

Year | 2011

Architect | Maruša Zorec, Uroš Rustja,
Martina Tepina, Mitja Novak

Architectural firm | Arrea d.o.o.

Structural engineer | CBD d.o.o.

Energy efficiency | low-energy
22 kWh/(m²a)

Surface | 518,5 m²

Site area | 1574,6 m²

U-value (W/m²K) | wall 0,12, roof 0,08,
floor 0,08, window 1,00

Construction system | solid timber
construction

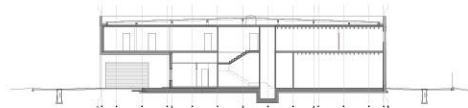
Construction company | Kograd IGEM d.o.o.

Construction time | 4 months

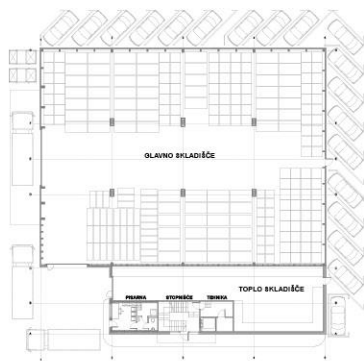
House technique | comfort ventilation with
heat recovery, air-to-water heat pump

The Ekoprodukt Commercial Building and Storehouse

PC Žeje pri Komendi



LONGITUDINAL SECTION



GROUND FLOOR PLAN



Industrial building

Year | 2012

Investor | Ekoprodukt d.o.o.

Architecture | Milan Rađenović, Arhi-3K d.o.o.; Peter Pavšič, Arhipetrus; Matjaž Križman, Krizzman Studio

Structural engineer | CBD d.o.o.

Energy efficiency | passive 20 kWh/(m²a)

Surface | 1200 m²

Site area | 2500 m²

U-value (W/m²K) – administration: wall 0,14, roof 0,15, floor 0,19, glass 0,74, frame 0,73

U-value (W/m²K) – storehouse: wall 0,22, roof 0,15, floor 0,30, glass 1,10, frame 1,20

Construction system | solid timber

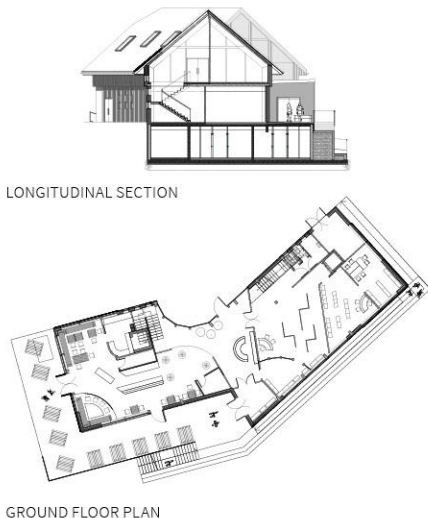
Construction company | Ekoprodukt d.o.o.

Construction time | 7 months

House technique | air-to-water heat pump collector

The Kope Center

Mislinja



LONGITUDINAL SECTION

GROUND FLOOR PLAN



Tourist facility

Year | 2014

Architecture | Vesna Novak Temniker,
Boštjan Temniker

Architectural firm | Arhitekturni ATELJE
ARTENOVA, Vesna NOVAK TEMNIKER s.p.

Structural engineer CBD d.o.o.

Energy efficiency | low-energy

U-value (W/m²K) | wall 0,11-0,28, roof
0,15-0,20, glass 0,89-1,40

Site area | 1289 m²

Construction system | solid wood
construction

Construction company | GG SG d.d.,
Lesoteka hiše d.o.o., GLI d.o.o., Štajerles
d.o.o. (partners)

Construction time | 10 months

House technique | floor heating, biomass
heating system

The Retirement Home

Kočevje



Public building

Year | 2013-2014

Architecture | design (2006) author **Lidija Malerič Kamnikar, Seniorprojekt d.o.o.**

Content design | **Franci Imperl, Seniorprojekt d.o.o., Hans Peter Winter, KDA Koln**

Siting and architecture plan (PGD in PZI | project for acquisition of a building permit and project for execution: 2010 do 2011 | **Lidija Malerič Kamnikar**

Arhitekturna firma | **Ab- biro d.o.o.**

Investor | **Republika Slovenija**

Structural engineer | **Ambiens d.o.o.**

Energy efficiency | **low-energy**

Surface **2500 m²**

U-value (W/m²K) | **wall 0,11-0,28, roof 0,15-0,20, glass 0,89-1,10**

Construction system | **timber panel**

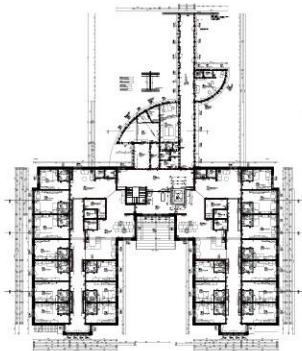
Constructor | **CGP d.d Novo mesto, Jelovica Hiše d.o.o.**

Construction time | **3 months**

House technique | **air to water heat pump, floor heating, comfort ventilation with heat recovery**



ELEVATION

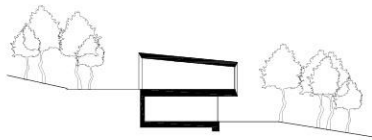


GROUND FLOOR PLAN

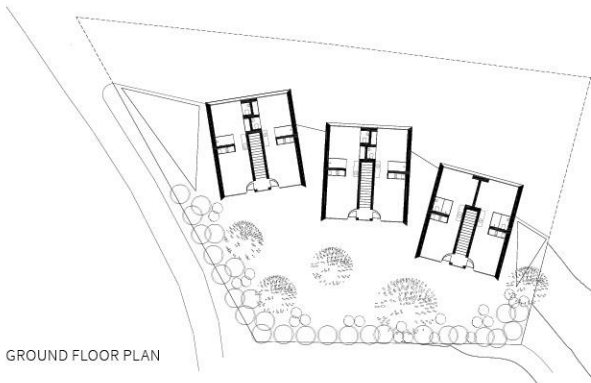


The Ortenia Eco Apartments

Podčetrtek



CROSS SECTION



GROUND FLOOR PLAN



Tourist facility

Year | 2013-2014

Investor | MK projekt, d.o.o.

Architecture | Petra Ostanek,
Tinka Beltram Prekovič

Architectural firm | O+P>A

Structural engineer | Cibos Ciril Bogataj s.p.

Energy efficiency | low-energy
30,7 kWh/(m²a)

Surface | 427 m²

U-value (W/m²K) | wall 0,13, roof 0,09,
floor 0,15, window 0,75, glass 0,75

Construction system | timber-frame

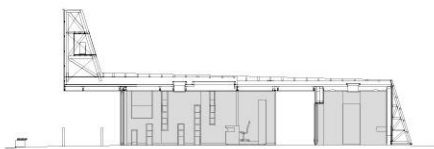
Izvajalec | Construction company | Cibos
lesena gradnja Ekoart d.o.o.

Construction time | 12 months

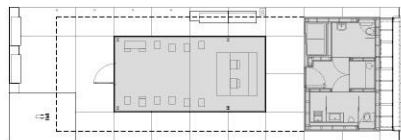
House technique | water to water heat
pump, floor heating, comfort ventilation,
rain water collector

The Tourist Information Center

Postojna



LONGITUDINAL SECTION



GROUND FLOOR PLAN



Tourist facility

Investor | **Občina Postojna**

Year | **2014**

Architecture | **mag. Polona Filipič, dr. Peter Šenk, Marko Pretnar, sod.** | coll. **Primož Špacapan, Nejc Jurič**

Architectural firm | **Arco d.o.o. Nova Gorica, Studio Strarum**

Structural engineer | **CBD d.o.o.**

Energy efficiency | **low-energy**

Surface | **62 m²**

Site area | **1002 m²**

Construction system | **timber-frame and timber ribbed roof structure support**

Construction company | **Kolektor Koling d.o.o**

Construction time | **2,5 months**

The Bohinj Bicycle Trail

Bohinj



Architectural Landscape arrangement

Year | 2007-2011

Architect | **Aleksander Ostan**,
 co-authors: **Nataša Pavlin**, **Saša Malenšek**,
Tomaž Dobravec,
 collaborators: **Lea Prezelj**, **Sanja Simič**,
Urška Špoh

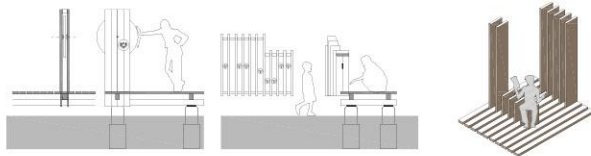
Architectural firm | **Atelje Ostan Pavlin**
 Structural engineer | **Edvin Hadžiahmetović**
 Graphics | **Žiga Okorn**

Size of bicycle trail area | **11,5 km**
 Construction company | **Gorenjska gradbena družba d.d.**

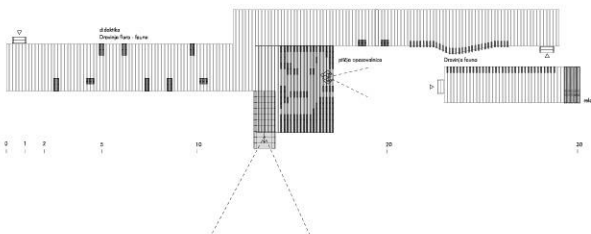
Construction time | **9 months**

The Birds Observatory

Poljčane



AN OUTDOOR CLASSROOM THAT ALLOWS FOR CONCEALED OBSERVATION OF THE SURROUNDING NATURE



GROUND FLOOR PLAN



Landscape arrangement

Year | 2013

Architect | **Maša Živec**

Architectural firm | **Arrea d.o.o.**

Educational program | **Andreja Senegačnik**

Structural engineer | **Aleksander Steblovnik**

Surface | **12,0 m² + 100,0 m² terasse**

Construction system | **timber-frame construction**

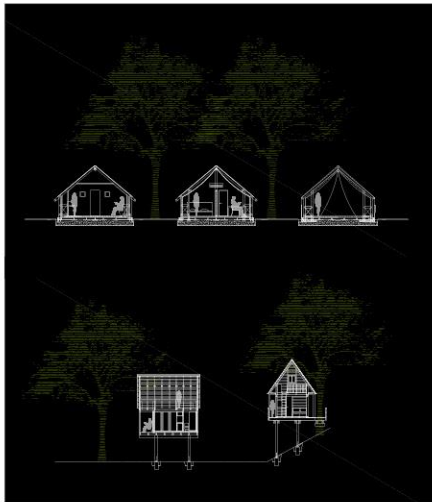
Construction company | **Gradbeništvo Jože Rahle, s.p.**

Construction time | **1 month**

Coordinator of the project | **Klavdija Majer**

The Garden Village

Bled



CROSS SECTION



Landscape arrangement

Year | 2014

Investor | **Turistična kmetija** | Tourist farm
Ročnjek, Gorjuše – družina | family Borut
Kelih LEAN d.o.o.

Idea leader | **Borut Kokelj** in investor
LEAN d.o.o.

Design of individual residential structures |
Landscape d.o.o., B&B Kokelj

Natural swimming pool | **Landscape d.o.o.**
in **Objem narave d.o.o.**

Interiors | **B&B Kokelj** in **Landscape d.o.o.**

Architectural firm | **Landscape d.o.o.**

Urban landscape | **Landscape d.o.o.,**
Gregor Vreš, Tina Demšar Vreš

Surface | **6.500 m²**

Site area | **6.500 m²**

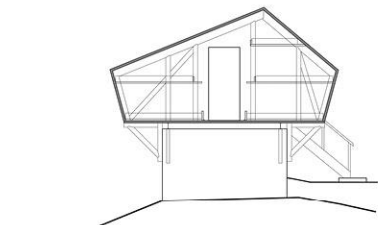
Construction system | **timber frame**

Construction company | **local companies**

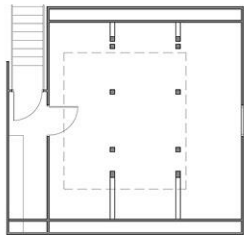
Construction time | **18 months**

The Prehodavci Bivouac

Triglavski narodni park - Julijske Alpe



CROSS SECTION



GROUND FLOOR PLAN



Tourist facility

Year | 2013

Architect | **Aleksandra Penca**

Project manager | **Danilo Istenič,**
Planinsko društvo Radeče

Architectural firm | **Premica d.o.o.**

Investment | **Planinsko društvo Radeče**

Surface | **29 m²**

Structural engineer | **CBD d.o.o.**

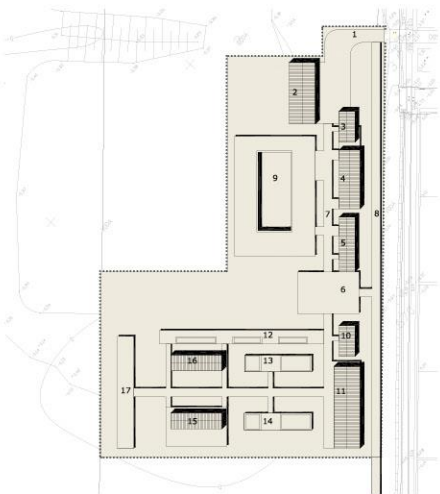
Construction system | **solid wood construction**

Construction company | **CBD d.o.o.,**
RR Gradnje d.o.o. together with
Planinsko društvo Radeče

Construction time | **3 days**

Lepa Vida Thalasso Spa

Sečovlje, Portorož



SITEPLAN



Tourist facility

Location | Sečovlje Salt pans

Year | 2011-2013 (project | 2007-2011)

Architect | Stanislava Pustoslemšek,
Adriano Coren, Uršula Koren, Pascal Fusil

Architectural firm | PIA studio d.o.o.
Portorož

Surface | 1590 m²

Site area | 4250 m²

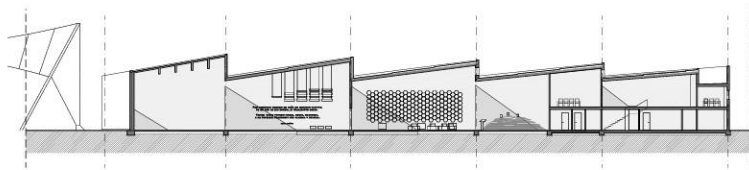
Construction system | timber-frame

Construction company | Soline Pridelava
soli d.o.o

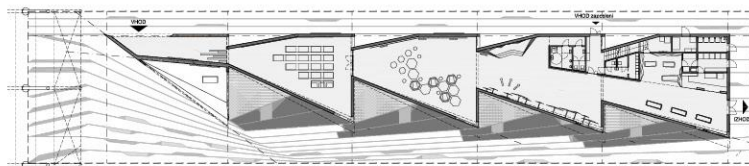
Construction time | 2010-2015

The Slovenian Pavilion Expo Milano 2015

Milano



LONGITUDINAL SECTION



GROUND FLOOR PLAN



Tourist facility

Year | 2015

Architect | **SoNo Arhitekti**: Edvard Blažko, Marko Volk, Nina Tešanović, Nejc Batistič, Samo Radinja

Art director | **Matija Kocbek**

Landscape Architect | **Tomaž Bavdež**

Architectural firm | **SoNo Arhitekti**

Structural engineer | **CBD d.o.o.**

Energy efficiency | **low-energy**

Surface | **800 m²**

Site area | **1910 m²**

Construction system | **panel construction**

Construction company | **Lumar IG d.o.o.**

University
of Ljubljana

Biotechnical Faculty
*Department of Wood Science
and Technology*



Thank you

Assist. Prof. dr. Manja Kitek Kuzman | manja.kuzman@bf.uni-lj.si

Contemporary Slovenian Timber Constructions: an Architectural Design Approach

