Achim Schafer 15. November 2023

Swiss COFFI Market Statement 2023

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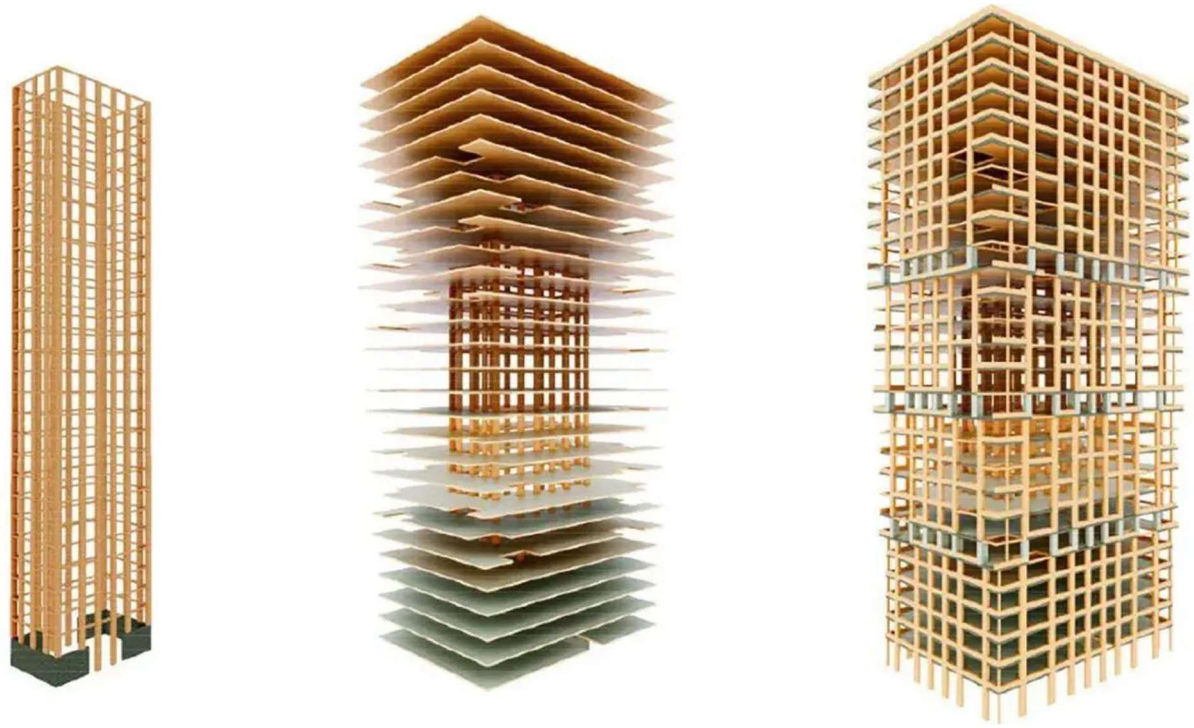

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Timber skyscrapers – high-rise construction based on the ‘tube-within-a-tube’ principle
(graphic © Implenia)

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1 General economic trends

1.1 Developments up to mid-2023

During the reporting period the global economy continued its recovery from the impact of the COVID-19 pandemic, but was increasingly hit by the effects of the war in Ukraine and the sanctions imposed by many countries on Russia. Fuelled by speculation, this led to a dramatic rise in energy and raw material prices, but they fell again to an extent over the course of 2023. The global supply chains and flows of goods, which were severely affected by the COVID-19 pandemic, have still not fully recovered from this major event. The war in Ukraine has had a major impact on food supply – especially grains and fertilisers – which is hitting poor countries in Africa particularly hard.

These developments are also leading to growing scepticism about global dependencies and greater reliance on shorter, more manageable supply chains. One of many examples is the analysis of CO_2-neutral extraction of lithium hydroxide from thermal water in the Upper Rhine Valley.

This economic climate led to a sharp rise in inflation during the reporting period, especially for energy and food. This means the wage-price spiral has already gained significant momentum, particularly in the USA and EU, preventing prices from falling more quickly. The major central banks are now paying the price for failing to tackle rising prices earlier. Even the recent, sharp interest rate hikes have so far failed to reverse the trend.

There has been a sharp fall in transport costs, which have now dropped to an almost normal level. This means east-west trade, which was severely restricted for a period, has normalised again to a large extent. However, the economic recovery after the COVID-19 pandemic – including in Switzerland – remains fragile and is jeopardised by supply chains which have still not fully recovered and ongoing wars.

Variant trends are also emerging in the export of services. The export of Swiss financial services has been declining for some time and the outlook remains gloomy. By contrast, tourism is benefiting from the fact that travel is easy again. However, there has been a shift here from visitors from the Far East, particularly China, to Swiss tourists who are rediscovering the benefits of holidaying at home. Private residential construction is faltering, not just due to higher interest rates, but also because of challenges with project implementation, such as supply shortages for alternative heating systems and a lack of specialist workers. In the retail sector, real wages have not yet made up for the 2022 downturn and rising rental, healthcare and energy costs, which is weighing on consumer sentiment.

1.2 Outlook

Growing tensions between the major power blocs, particularly in the Asia-Pacific region, the war in Ukraine, the re-ignited conflict between Hamas and Israel and local conflicts in Africa are also dampening expectations in terms of economic development. The increase in global warming, which is progressing at a faster pace and to a greater extent than scientists expected, is also having an adverse impact on the economy. This deteriorating climate has fuelled inflation in many parts of the world, thereby eroding the purchasing power of large segments of the population and causing a slump in demand for consumer goods. The measures taken to rein in inflation by state banking systems have seen huge interventions in interest rate policy, which have in turn impacted on economic development. The prospect of a COVID-19 pandemic flaring up again due to new variants of the virus is another factor. This climate makes assessment of the economic situation and development more difficult. Assumptions made today may not remain valid for as long as in previous years.

Overall, Swiss economic experts are currently forecasting 0.6% growth in real GDP for 2023, which is in line with the forecast of December 2022. There is no sign of strong growth impetus for 2024 either. The war in Ukraine – with all of its negative ramifications – is still dragging on. The real wage trend is negative, rising interest rates are holding back development, labour shortages are still having a restraining effect and the global economy is contending with high inflation. Growth of 0.9%, which is below potential growth, is forecast for 2024, while the unemployment rate will rise only slightly.

High global debt levels increase the risk of drastic market corrections, triggering negative chain reactions by acting as a catalyst. Not just the medium-sized banks in the USA, but also several companies have assumed significant risks through share buyback schemes and various governments have been

unable to resist the temptation of cheap money, spending it hand over fist. Various markets are expected to be forced to make corrections. Real estate prices, in particular, have fallen in many states.

From the perspective of Swiss business, geopolitical tensions, inflation, a slump in demand, the shortage of specialist labour and an energy crisis represent the greatest economic risks in 2023–24. Inflation and the burden of regulation are deemed lower risks.

Measures to cut CO_2 emissions and, in particular, to increase energy supply are an increasingly significant factor. The most eco-friendly and inexpensive form of energy is that which is no longer needed thanks to improved energy efficiency. Switzerland still has huge potential in this area, only a small share of which has been harnessed to date. There is much less awareness of this amongst the population, politicians and business than about renewable energy's potential which has increased significantly. Improved energy efficiency could also significantly lower dependence on the import of fossil-based energy, reduce power shortages in winter and cut Switzerland's spending on energy abroad. These funds could be invested in Switzerland to accelerate the restructuring of the economy towards a CO_2-neutral, sustainable model.

The approval by the Swiss electorate of the Climate and Innovation Act at the referendum held on 18 June 2023 was a landmark moment, setting the course for the future. Switzerland aims to be carbon-neutral by 2050. To achieve that target, the Swiss Confederation is planning various measures: The replacement of oil, gas and electric heating systems with climate-friendly alternatives will be supported with funding of CHF 2 billion. Companies in industry and commerce using innovative technology for eco-friendly energy generation will receive funding worth CHF 1.2 billion. However, major efforts will be required to ensure the adoption of the implementing ordinances needed and the amendment of other legislation and ordinances before any real progress towards this goal can be made.

There are also major opportunities in this area for wood as a domestic renewable, CO_2-neutral raw and construction material which can be processed with low energy consumption. While there is growing awareness of wood's potential, it has still not been fully recognised. The forestry and timber industries are making the public, environmental organisations and politicians aware of this potential, but this is proving a slow and difficult process.

2 Wood Resource Policy 2030 –Wood Action Plan 2021–2026 (Summary)

The Wood Action Plan is implementing the Confederation's wood resource policy. The Action Plan was launched in 2009 and supports projects focusing on the use of wood as a raw material and adding value to it. The fourth phase of the Wood Action Plan (2021 to 2026) is currently under way. The Wood Action Plan has an annual project budget of around CHF 3 million.

It promotes innovative projects that enhance and develop the use of Swiss wood (Art. 34a and 34b Forest Act). On the one hand, through applied research and development and, on the other, through communication. A response to current challenges, such as the increase in the amount of wood that has to be used due to storms, drought and beetle infestation, is being made by focusing on new ways of adding value and areas of usage, such as wood-based organic product plants.

The Federal Office for the Environment (FOEN) steers the Wood Action Plan. An advisory committee, made up of representatives from the forestry, timber and fuelwood sectors, other federal authorities, the cantons, nature and environmental protection organisations, the real estate sector and communications, provide advice on strategic matters. An expert committee provides support with the assessment of funding applications.

2.1 Public procurement

The revised Public Procurement Act (PPA) entered into force in 2021. Under the new system, the quality competition has been significantly tightened with criteria such as sustainability, life-cycle costs, innovation, plausibility of the proposal and price reliability. The tender is now awarded to the 'most favourable' proposal instead of to the 'most financially advantageous' one. The shift away from competition based purely on pricing in public procurement is in line with the international trend.

At cantonal level, the Inter-Cantonal Agreement on Public Procurement (ICAPP) has been harmonised with the PPA. The agreement enters into force in the respective canton after the adoption and enactment of a cantonal introductory act.

Together with the Forest Act, which entered into force in 2017, the revision of public procurement opens up new opportunities for wood as a construction and general material. In the Forest Act, the Swiss Confederation undertakes to promote the use of sustainably produced wood where suitable in the planning, construction and operation of its own buildings and facilities. Sustainable and natural forestry management and the goal of reducing greenhouse gas emissions are to be taken into account during the procurement of wood products.

2.2 **Timber trade regulation in Switzerland**

With the Ordinance on Placing Timber and Wood Products on the Market, which entered into force on 1 January 2022, the Federal Council – at the behest of the Swiss Parliament – created an equivalent regulation to that of the European Union (EU; EUTR 995/2010). This aims to ensure that no timber or wood-based products illegally felled or traded are placed on the market. Combating illegal felling and trading in timber helps to stem both deforestation and the loss of biodiversity. This helps in the battle against climate change. Further trade barriers between Switzerland and the EU are also to be removed. (Source: FOEN)

2.3 **'Schweizer Holz' label**

New regulations on the 'Schweizer Holz' (Swiss Wood) label entered into force on 1 July 2022. Whereas industrial products, such as particle board, fibreboard or pellets, had to contain 60% Swiss wood, like all other wood products bearing the 'Schweizer Holz' label, these products will also have to consist of at least 80% Swiss wood in future.

In accordance with Swissness regulations, all labelled products must provide evidence that at least 60% of their production costs were incurred in Switzerland and that the main processing stage took place there. For major components (e.g. the entire structural framework) and entire buildings to be awarded the 'Schweizer Holz' label, evidence must be provided showing that at least 60% of the wood is labelled. The 80% rule continues to apply to the labelling of individual components (e.g. a façade).

The new provisions on the 'Schweizer Holz' label take account of the requirements of all elements of the forestry and wood value chain and establish a viable common basis for all market participants.

3 Developments in forest products markets

3.1 Overview and general trends

The Swiss forestry and wood industries are generally subject to the same conditions as the economy as a whole. The sustained strong demand for Swiss raw timber, processed wood and wood products has also led to an improvement in the economic situation of the forestry companies.

The trend towards more sustainable construction remains a strong driver in terms of the attractiveness of timber in construction. The figures on the timber harvest produced by the Federal Statistical Office show usage has been rising slowly, but constantly for several years. This confirms the trend towards greater usage. However, this is still well below the sustainable timber harvest potential of 7 to 8 million m^2. The use of timber must play a much more important role if Swiss climate and energy policy targets are to be met. This calls for great effort across the entire wood chain, including forestry, wood processors and final consumers.

Processing into sawnwood, laminated timber, laminated beams, cross-laminated timber, box girders and other flooring systems etc., generating a high level of value creation, is also increasing in Switzerland thanks to the investment being made. The general climate for the sawmill sector in Switzerland is currently robust. It is benefiting from a high level of demand from construction and renovation projects, customer proximity with short transport routes and strong links with world-leading wood research institutions in Switzerland. It is developing strongly thanks to these favourable conditions.

Rising electricity costs are also making the installation of rooftop photovoltaic systems more attractive for companies in the wood-processing industry. The rooftop space being used for this purpose by the sawmills is now close to 150,000m^2. The energy and climate policy conditions are also seeing a rise in the prices of fuelwood pellets as well as sawmill by-products, which is in turn making the purchase of raw materials for wood-based, paper and cardboard products in Switzerland more difficult and expensive. In particular, this development applies to sawdust, the preferred raw material for the production of wood-energy pellets.

3.2 Outlook

Despite the persistently challenging and generally gloomier geopolitical conditions and global economic climate in 2023 and 2024, the Swiss forestry and timber sectors are looking to the future with confidence thanks to a strong domestic environment. Over the coming years, clever and consistent use must be made of the positive climate policy conditions established for raw, construction and general materials and the trend towards sustainable, eco-friendly and climate-compatible construction.

Demand in the residential construction sector will remain high in 2023 and 2024. The environmentally-friendly densification of existing urban developments by adding storeys to existing buildings will provide greater opportunities for timber as a lightweight construction material.

The interest rate trend and its impact on mortgage rates and the rise in construction costs represents something of a sword of Damocles. However, timber’s competitor materials, such as steel and concrete, are exposed to the same risks. By making justifiable interventions, the Swiss National Bank (SNB) has kept prices against the US dollar and euro within a viable range for the Swiss export industry. If that continues, it will also help forestry and timber processors to achieve further positive development.

4 Excellence in Swiss timber construction

Timber-framed, high-rise developments – innovative research and engineering

The percentage share of GDP accounted for by the Swiss forestry and timber sectors is much lower than in the Scandinavian countries, Canada, the USA and in neighbouring Austria, but Switzerland can compete with the world leaders when it comes to timber-framed construction. This is best illustrated by the leading discipline of high-rise extensions using timber and timber-hybrid construction methods. Current projects are set to exceed the 100-metre barrier over the coming years. Examples include:

A 100-metre-high, timber-framed rocket in Winterthur

The industrial estate near the railway station in Winterthur, canton of Zurich, where the ‘Schweizerische Lokomotiv- und Maschinenfabrik’ (SLM) made globally acclaimed locomotives from 1873 to 2005 and on which Sulzer operated an engineering plant, is being repurposed. Incorporating heritage-protected, converted industrial buildings of these two companies, a district known as the ‘Lokstadt’ is being developed to provide residential accommodation, workspace and leisure activity facilities. Construction on the ‘Rocket’ high-rise residential tower – which, at a height of 100 metres, is currently the tallest timber-framed building planned in Switzerland – will get under way in this district in 2024. The project is being developed by Implenia, the construction and real estate group. The building is named after 'Stephenson's Rocket', an early steam locomotive invented by British engineer Robert Stephenson in 1829, which was a technologically pioneering achievement in its time. The tower will rise above the base structure called the ‘Tigerli’, named after a small shunting locomotive made by SLM.

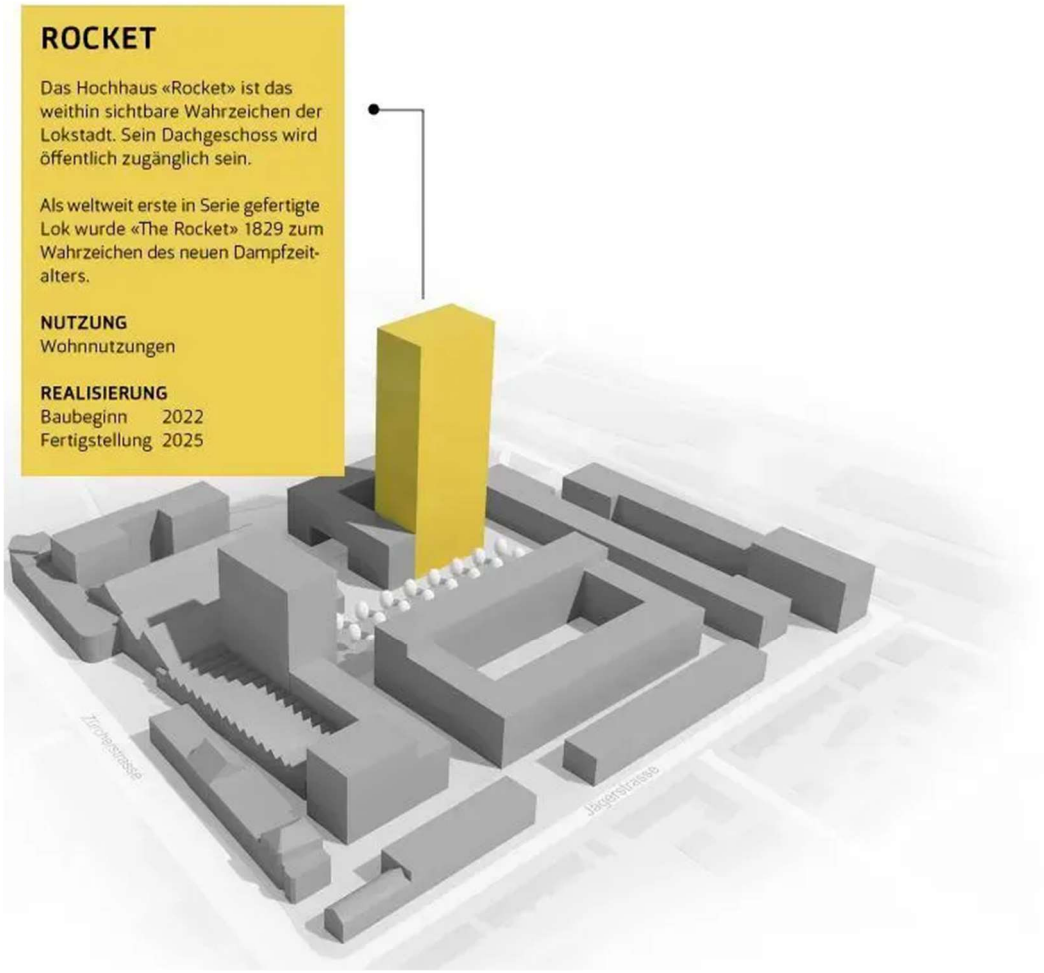

Fig. 1 Block image of the ‘Lokstadt’ district with the ‘Rocket’ residential high-rise development highlighted.

(graphic © Implenia)

Fig. 2 Green islands around 'Tigerli' which is connected to the 'Rocket' high-rise building.

(graphic © Implenia)

The design was produced by the architect teams at Schmidt Hammer Lassen from Copenhagen and Cometti Truffer Hodel from Lucerne. The high-rise development is based on a new type of timber-framed construction jointly developed by ETH Zurich. This 'tube-within-a-tube' method is based on a vertical support element in the core structure and an external framework made of beech-veneer plywood. The real innovation lies in the timber-concrete composite floors, which are no thicker than steel-concrete floors but are stable and allow span widths of up to nine metres. This kind of construction has only been permitted since 2015 after the revision of Swiss fire protection regulations. The proportion of timber used in the 'Rocket' building will be around 80%. It weighs a third less than conventional construction methods, greenhouse gas emissions are halved and there are benefits in terms of planning and quality as the timber elements are pre-manufactured.

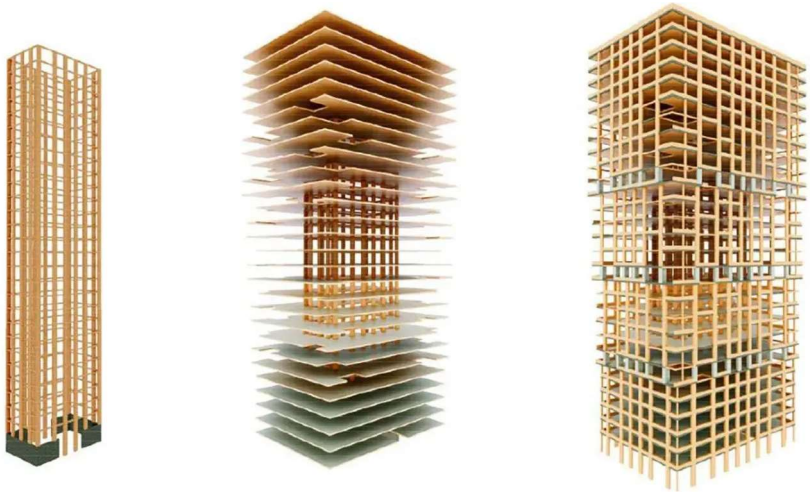

Fig. 3 The principle of the 'tube-within-a-tube' method

(graphic © Implenia)

The façade is partially covered with red terracotta. The 'Rocket' high-rise residential development will contain small and large apartments ranging from 2.5-room units to the penthouse with 5.5 rooms. As well as student accommodation, the 'Tigerli' base structure will also incorporate part of a Radisson RED hotel.

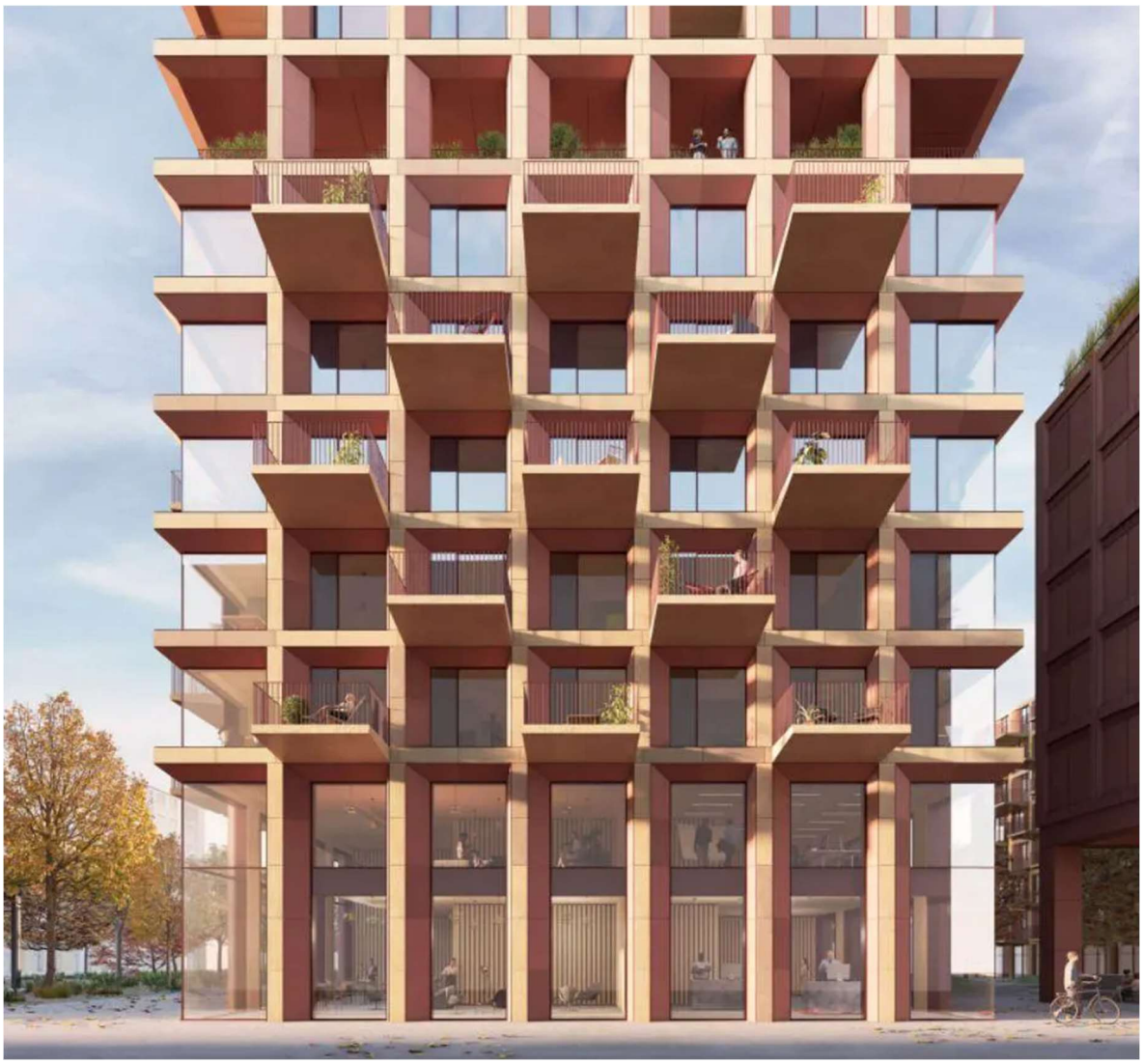

***Fig. 4 Façade partially clad with terracotta*.**

(images © Implenia)

83-metre-high, timber-hybrid H1 high-rise in Regensdorf

The timber-hybrid, high-rise development called 'H1', standing at a height of 83 metres, is under construction in the Zwatt zone near the railway station in Regensdorf, canton of Zurich. Above a three-storey solid base structure for commercial usage constructed using the conventional steel-concrete method, a slender tower consisting of 21 storeys for residential usage will be built using timber-framed construction. The developer is Pensimo, a Zurich-based investment foundation. The development costing CHF 55 million was designed by Boltshauser Architekten AG in Zurich.

A photovoltaic system with colour-coated solar modules will be integrated into the breastwork cladding of the façade. In tandem with an extensive rooftop photovoltaic system, this will generate an output of up to 130,000 kWh/a, meeting the electricity requirements of around 50% of the apartments.

Fig. 5 Full view of the timber-hybrid high-rise H1.

(images © Boltshauser Architekten Zürich – studio boomen Zurich)

Fig. 6 Structural model of the H1 timber-hybrid high-rise building.

(images © Boltshauser Architekten Zürich – studio boomen Zurich)

The design is a timber-hybrid high-rise building. The core access structure, base levels and floor slabs are made out of concrete. The load-bearing support structures, beams and façade are made of timber elements. Compared with solid construction in the load-bearing structure, this method cuts CO_2 emissions by around 20% or 670 tonnes over the development's 60-year life-cycle. Timber, a natural, regenerative raw material, also provides a greater level of comfort and better ambient air quality and reduces construction time.

The apartments on the standard floors are laid out around the central access core. The apartment types have a modular design and layout based on the timber-framed structure. This enables a high degree of flexibility in terms of both the horizontal and vertical organisation of the apartment units.

Fig. 7 Communal space and façade of the H1 timber-hybrid high-rise development

(images © Boltshauser Architekten Zürich – studio boomen Zurich)

More information on timber-framed high-rise construction in Switzerland: https://www.lignum.ch/auf_einen_klick/news/lignum_journal_holz_news_schweiz/news_detail/holz-hochhaeuser-haben-in-der-schweiz-konjunktur/

Swiss timber-frame construction is world-leading and gaining market share

The share of timber construction continues to grow, particularly in the area of multi-storey residential buildings right up to large-scale constructions in wood. Building with wood is back in fashion: the number of planning permission applications for apartment blocks mainly made of wood has more than doubled since 2005. Wood as a building material has received a boost from new fire safety regulations, lower production costs, short construction times with less inconvenience for residents and through the quality that can be achieved through extensive prefabrication with clearly structured work processes in enclosed halls. In high-density building, when adding on to existing buildings, the weight advantages of wood as a building material are naturally a factor. The increasingly visible appearance of wood as a building material is acting as a catalyst in this development.

The Prix Lignum, which is awarded every three years, plays a key role in raising the profile of the importance of domestic and renewable wood as a building material and of the quality of buildings realised in wood. Once again in the 2021 competition, the prize recognises a broad range of very different wooden structures, from a small garden pavilion to large residential complexes and industrial buildings. Even for Switzerland's internationally-renowned star architects, being involved in modern timber construction is now de rigeur and has become a must. This development is thanks in no small part to the Prix Lignum.

Load-bearing building components are increasingly being replaced successfully with glued beechwood. In this way, building components made from energy-intensive steel and concrete can be replaced by those made from renewable, domestic beechwood, which require significantly less energy to process. Interest in such heavy-duty components made from beechwood is growing, but the corresponding production capacities in Switzerland still need to be developed. Efforts in this area are under way. The cost-effective, industrial fabrication of glued, high-performance construction components made from domestic beechwood is technically demanding, however, and requires significant investment. If these efforts are successful, the share of sales of the most important type of hardwood in Switzerland can be strengthened in sales channels with high added value. At present, a disproportionately large proportion of high-quality beechwood has to be used to generate energy or is exported at low prices to Italy and Asia.

Timber construction is the most successful area of the Swiss forestry-wood chain and is internationally renowned. This is also supported by the research activity at the two Swiss federal institutes of technology in Zurich and Lausanne, the Swiss Federal Laboratories for Material Science and Technology (Empa) and the universities of applied sciences. The digitisation of design and construction of buildings and building components, and the robotic production of complex structures have reached a high standard in Switzerland and are rapidly being developed. This research is carried out in close cooperation with the timber construction sector. However, the success in research and in the timber construction sector does not fully penetrate, and only slowly, through to forestry and the first stage of production – sawmills. Nevertheless, production capacity for glulam timber sections is also being increased in Switzerland due to the high demand. But significant quantities of glulam components will have to be imported from Austria and Germany for a few years yet. They will be produced partly from previously exported Swiss roundwood.

The next 'Prix Lignum' will be held in 2024. The submission deadline for projects is 1 December 2023.

More information on the 'Prix Lignum' 2024: https://prixlignum.ch/index.php?vi=179&vl=0&vv=142

4.1 Example 1: Knie's magician's hat – circus performances, concerts, cultural events and presentations under one hat made of wood

Fig. 8 The building's design picks up on the traditional circus theme of the magician's hat.

(Image source: © Prix Lignum – photo by Faruk Pinjo)

Fig. 9 The interior resembles a circus tent with a ring.

(Image source: © Prix Lignum – photo by Carlos Martinez Architekten)

Fig. 10 The interior space can be flexibly used for a wide range of events.

(© PrixLignum – photo by Luca Zanier)

Roll up, roll up!

A shimmering building in the heart of the zoological gardens of Knie, the Swiss National Circus which has a rich tradition, will be used as an all-year-around performance venue in future. The building's design, with roof cladding made from rhombic sheeting, resembles a cloth being lifted by a magician's hand. The 'magician's hat' roof shape is produced with a complex, double-curved shell structure. The timber-framed folded structure is held together with wooden pressure sleeves and a concrete ring. Resembling a cloth being lifted by a magician's hand to reveal what's beneath, the new building enhances the centre of the Knie children's zoo. The striking design is an iconographic reference to the rich tradition of the circus and will be used as an all-year-around performance venue in future.

In the north section, the hat-like roof lies on the side rooms of the circus ring which make up the spine of the building. On the south side, the tent-like pavilion, calling out "roll up! roll up!", is lined by extensive openings stretching between the load-bearing support structures. Pull-out seating mean the interior space can be used in a wide variety of ways and can be transformed from a circus arena with a ring into an event room in an instant.

The roof shape resembling a magician's hat is produced with a complex, double-curved shell structure. The timber-framed folded structure is held together by two wooden pressure sleeves and the load is distributed via a concrete ring. The strict rotationally symmetric design enables the cost-effective production of 12 identical and 12 mirrored timber elements. Each two roof elements make up a pair which are installed at one of the 12 low points in the recesses in the concrete tension ring. The most remarkable feature is the 'hat', a special element representing the finishing touch.

The use of a parametric model enabled high-precision pre-planning of the timber elements and polygonal roof tiles made of zinc sheeting. A mock-up was used to check aesthetic aspects in advance and gain vital experience for the detailed implementation and production stages.

To create optimal architectural acoustics, the shell structure made up of the 24 elements was fully clad-ded internally with curved, perforated three-layer sheets.

The ribs and transverse ribs of the pre-manufactured roof elements are made of laminated timber. After insulation was installed, 13-millimetre-thick diagonal formwork was added to the elements which was

bent and nailed in by hand. The wood selected was Swiss spruce which the architectural design team used in a natural way in the complex structure to enable the material's strengths to be fully exploited. (source: Prix Lignum, edited by EJB)

- Project: Cultural event, concert and conference venue, public building, new build, exploration of ideas with wood
- Completion: 2020
- Project location: CH-8640 Rapperswil, canton of St Gallen
- Project submitted for: Prix Lignum 2021
- Type of wood mainly used: spruce/fir
- Treatment of wood: varnished
- Client: Gebrüder Knie, Schweizer National-Circus AG, Franco Knie, Rapperswil SG
- Architecture/planning: Carlos Martinez Architekten AG (architect), Carlos Martinez, Berneck SG, Ghisleni Partner AG (general planner), Stefano Ghisleni, Rapperswil SG
- Woodwork carried out by: Blumer-Lehmann AG, Richard Jussel/Jan Hempel, Gossau SG
- Engineering services: PIRMIN JUNG Schweiz AG, Thomas Rimer, Rain LU and HTB Ingenieure AG, Roland Merk, Rapperswil-Jona SG
- Carpentry work: Blumer-Lehmann AG, Jan Hempel, Gossau SG
- Carlos Martinez Architekten AG, Carlos Martinez, Berneck SG
- Project link: http://prixlignum.ch/p?de/2140
- Link: www.knieszauberhut.ch

4.2 Example 2: Living under a tree – extension on a traditional town house with an exterior space made of wood and glass.

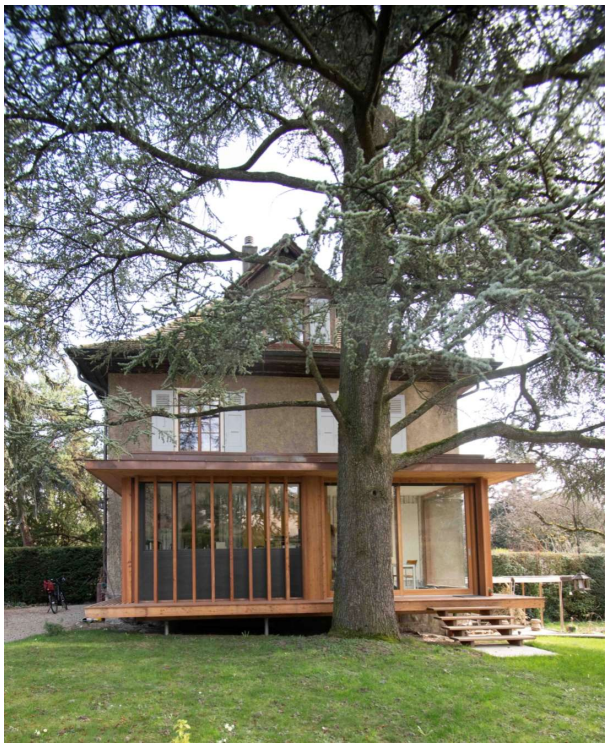

Fig. 11/12 The extension lies between the house and a large cedar tree.

Image source: © Prix Lignum – photo by Sophia Benett)

Fig. 13 The timber-framed basement under construction.

(Image source:© Prix Lignum – photo by Sophia Benett)

Living under a tree.

The owner, who lives in a tree-lined district of Geneva, wanted to add a small 20m^2 extension to his house to make space for a kitchen. As it sits under a large cedar tree near to the original building, the use of wood was an obvious choice.

Almost completely glazed overlooking the garden, the space lies between two horizontal lines, which are defined by the roof projection and a slab, which protect the space and embrace surrounding nature.

This town house from the early 20th century is located on a plot surrounded by majestic trees in a residential district of Geneva that is protected as a nature conservation area by the canton's 'Office du Patrimoine et des Sites'. The extension, which is built onto one of the façades, lies directly beneath the crown of a large cedar tree, creating a proximity that did not previously exist, while also entering into dialogue with the original building. Extensively glazed, it houses the kitchen and provides new direct access to the garden which enjoys natural light.

The roof projection, which is adjoined to the existing building, protects the façades against sunlight and branches, while the overrun of the slab is bored to remove the various tree remnants (fallen needles, chestnuts, residue from pine cones) in a natural way.

The flooring consists of a BLC girdle and a spruce wood slab containing insulation filling and an external thermal break layer.

Larch was selected for the visible external sections and joinery work due to its buckling resistance and closeness to cedar. The load-bearing support system on the façade consists of a repetition of small larch sections without corner posts which also serve as a claustrum in the part of the space which comes into contact with the entrance to the property.

In the interior space, the larch floor panels were tinted and deliberately left visible as a final wainscot without adding veneer or parquet while heating is provided by a visible wall radiator.

As timber-framed construction is easier than conventional methods, a Krinner foundation (screw-in system made of steel) was used without the need for a mini-excavator or concrete to respect the cedar's root system. This enabled construction work to be completed quickly on the owner's own land with little waste generated.

Despite its modest size, the extension has completely changed the living space in the original building by creating a close relationship with the garden and surrounding natural environment. (Prix Lignum, edited by EJB)

- Project: extension on traditional town house
- Project location: CH-1209
- Completion: 2020
- Project submitted for: Prix Lignum 2021
- Type of wood mainly used: larch
- Other woods used: spruce
- Treatment of wood: oiled
- Client: private
- Architecture/planning: Eyre Architecture, Loïc Chareyre, Geneva
- Woodwork carried out by: Charpente-Menuiserie Ateliers Casaï SA, Geneva/Ferblanterie, Hauri Toiture Grand-Saconnex, Geneva
- Engineering services: Timbatec AG, Stefan Zöllig, Bern
- Joinery: Charpente-Menuiserie Ateliers Casaï SA, Geneva
- Project link: http://prixlignum.ch/p?de/2130

4.3 Example 3: Multi-generational house in Appenzell – Appenzell log-construction method, an old tradition transformed for the modern age.

Fig. 14 The two houses in the dispersed settlement landscape typical of Appenzell.

(Image source: © Prix Lignum – photo by Andrin Winteler, bürobureau gmbh, Zurich)

Fig. 15 Steps and door to the wet room on the first floor
(Image source: © Prix Lignum – photo by Andrin Winteler, bürobureau gmbh, Zurich)

Fig. 16 Living room with traditional tiled stove and view of the Appenzell snuggery in building II

(Image source: © Prix Lignum – photo by Andrin Winteler, bürobureau gmbh, Zurich

Fig. 17 Attic floor in solid Douglas fir and larch.

(Image source: © Prix Lignum – photo by Andrin Winteler, bürobureau gmbh, Zurich

Traditional Appenzell log-construction method brought into the modern age thanks to cutting-edge technology

Well over 1000m^3 of larch, Swiss pine and Douglas fir were left to dry for two years in the Engadin mountain air for use as raw materials. A team of sawyers, traditional carpenters, CNC specialists, timber-construction specialists and engineers was tasked with bringing the traditional log-construction method into the modern age using the latest technology. A pioneering, multi-generational project was constructed from the useful raw materials, creating a remarkable testament to the past for future generations.

What at first glance looks like a traditional Appenzell log building is so much more on closer inspection. A log building for modern living. A timber-framed lift shaft connects all five floors. The log building was constructed with wood running transversally across three floors, but eliminating any risk of subsidence. Building technology systems and electrical installations which are ahead of their time and a standard of insulation and wood thermal storage mass that makes heating practically superfluous were used. The atmosphere and air is permeated with the scent of Swiss stone pine. It is a pleasant, but very present aroma that creates a cosy atmosphere.

There is a long tradition of ‘Strickbau’, or log construction, in Appenzell, but ways of transforming this method for the modern age seem to have been discarded to some extent. Could the simplicity of a low-tech construction method be maintained despite the use of high-tech systems? Can components be pre-stressed with the log construction method? Can solid wood be dried cost-effectively, worked accurately to size and installed without using adhesives? Can traditions be implemented in a modern way? The outcome is a building that has the original, typical character of log construction from the outside. The interior is very neat as the technical systems preventing subsidence are not visible to the neutral observer.

A number of challenges had to be overcome and opportunities seized to construct the timber-framed building. How could high-quality solid wood be dried? How can spiral grains, curvature and other whims of nature be corrected to enable beams of up to 12 metres to be planed and worked on a CNC machine? Which machines are the best option for ‘knitting’ the timber joins together? How can a wall of 10 tonnes per linear metre be pre-stressed and held? Can double shell walling and modular construction be used in log construction to minimise the build time? How can the floor slabs made of timbers be engineered to meet high deformation and sound insulation requirements? Which partners adopt a solution-oriented approach and can help to assume responsibility?

In this project a high degree of fairness and transparency was shown towards all participants and, in particular, towards the client. Joined-up thinking and teamwork meant the project was a tremendous learning experience for all participants, even if it sometimes left them sleep-deprived. This is a project that will continue to provide the participants with satisfaction, happy memories and pride many years after its completion. Project details. (Prix Lignum, edited by EJB)

- Project: single-occupancy residential unit, multi-generational house, exploration of ideas with wood
- Project location: CH-9050 Appenzell, canton of Appenzell Innerrhoden
- Completion: 2020
- Project submitted for: Prix Lignum 2021
- Type of wood mainly used: Swiss pine
- Other woods used: larch
- Treatment of wood: untreated
- Client: Jan Schoch, Appenzell
- Architecture/planning: rsp bauleitungen ag, Thomas Steingruber, Herisau AR
- Roger Bechtiger Architektur, Roger Bechtiger, St Gallen
- Woodwork carried out by: Albert Manser, Gonten AI, Mettler Holzbau GmbH, Walter Rotach, Schwellbrunn AR, Frei Holzbau AG, Sepp Steiger, Kriessern SG, Tschopp Holzbau AG, Ivan Tschopp, Hochdorf LU, Natürlich Meister GmbH, Thomas Meister, Thayngen SH
- Engineering services: IHT Rafz Ingenieurholzbau + Holzbautechnik GmbH, Markus Zimmermann, Rafz ZH Création Holz AG, Hermann Blumer, Herisau
- Project link: http://prixlignum.ch/p?de/2103

4.4 Example 4: New school building – respectful addition to the existing structure.

Fig. 18 The new building with a veranda complements the traditional, substantial old building in a discreet and respectful way.

(Image source: © Prix Lignum – photo by Damian Poffet.)

Fig. 19 The wooden pillars and coffered ceiling incorporate elements of traditional, local architecture. (Image source: © Prix Lignum – photo by Michel Bovin)

Fig. 20 Warm colours and flooring made of natural materials create a pleasant environment.

(Image source: © Prix Lignum, photo by Michel Bovin)

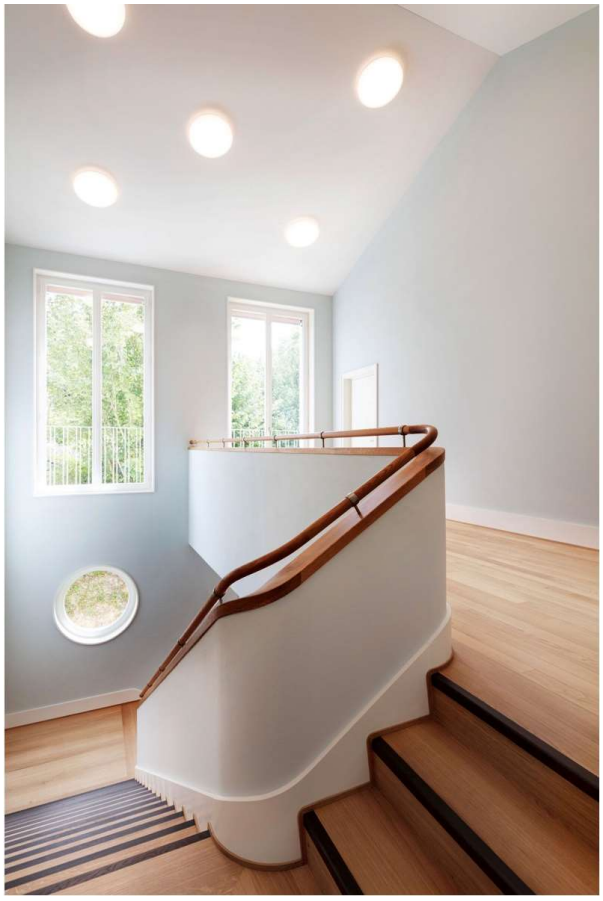

Fig. 21 Harmonious and skilful use of wood for the stairs and handrail.

(Image source: © Prix Lignum, photo by Michel Bovin)

The concept of historical continuity determines the design and colour scheme

The concept of historical continuity determines the design and colour scheme of the additional school building in Seedorf. Wood was selected as the main construction material based on the surrounding agricultural buildings and in view of the reasonable build time. The set of buildings making up the 'school village' embraces the local Jura landscape with timber-framed porticos. The new building is distinguished, both internally and externally, by wood painted in different shades, a half-hipped roof and round windows.In Seedorf in the Bernese Seeland region, a new, two-storey, timber-framed building complements an existing school building which was renovated at the same time. The new building respectfully plays a subordinate role, preserving the presence of its older counterpart which shapes the local area's identity. The set of buildings making up a 'school village' has a three-sided schoolyard embracing the surrounding Jura landscape. Wood was selected as the main building material based on the surrounding agricultural buildings and Seedorf's former town hall.

Behind the graceful, vertically planked façades with upright window formats are classrooms for children in the early years of school, nursery rooms, a library and a multi-purpose hall in a prominent location. A porch roof for the entrance to the new building has been constructed as an extension of the half-hipped roof which is supported by striking round-timber columns consisting of transverse sections of solid spruce. This weather-protected area is the centrepiece of the new school building.

Coffered panelling gives the inner area a sense of scale and creates a cosy atmosphere. Attached spruce slats cover the butt joints of the three-layer panels. Portholes in the upper corridor and the colour scheme provide light in the interior space. Fabric coverings made of pure new wool in a soothing shade of blue are used on the ceilings, a feature which improves the architectural acoustics and purifies the air. The wood's surface was treated, both internally and externally, without concealing its original qualities, such as the wood structure. This achieves optical enhancement and makes maintenance easier.

The new building was constructed entirely as a timber-framed system except for wood-concrete composite flooring. All walls and the roof are made from wood components. The roof design uses a tension girdle system that is unsupported in the hip ends. The choice of materials and the direct, vertical load-transfer system complies with the Minergie-ECO building standard.

The architectural language typical of the local area and the dignified solidity of the old structure are converted for contemporary use and transformed into wood for the new building. The timber-framed windows on the longitudinal façades make reference to the old building's stone window surrounds. The colourful overall concept creates a relationship between the historical school building, the new building's façade design and the new spatial atmosphere. The new timber-framed building in Seedorf is distinguished by its belief in historical continuity and meticulous attention to detail. (Prix Lignum, edited by EJB)

- Project: Schulbau, Öffentlicher Bau, Neubau
- Project location: CH3267 Seedorf, canton of Bern
- Completion: 2019
- Project submitted for: Prix Lignum 2021
- Award: recognition – central region
- Type of wood mainly used: spruce/fir
- Treatment of wood: painted opaquely
- Client: Einwohnergemeinde Seedorf, Stefan Hübscher, Seedorf BE
- Architecture/planning: Thomas De Geeter Architektur GmbH, Thomas De Geeter, Zurich
- Woodwork carried out by: Zaugg AG Rohrbach BE, Daniel Käser, Rohrbach BE
- Engineering services: Pirmin Jung Schweiz AG, Michael Enz, Rain LU
- Joinery: Zaugg AG Rohrbach, Daniel Stöckli, Rohrbach BE / bbf weber ag, Roland Weber, Fehraltdorf ZH
- Project link: http://prixlignum.ch/p?de/2135

4.5 Example 5: Impressive new farmhouse building – a eye-catching feature on a busy road.

Fig. 22 The new building complements the existing barn and stables.

(Image source: © Prix Lignum – photo by Heidi Fischli)

Fig. 23 Elements of the traditional, local architectural language shape the well-proportioned façade.

(Image source: © Prix Lignum – photo by Heidi Fischli)

Fig. 24 An eye-catching structure and a great advert for wood as a natural material.

(Image source: © Prix Lignum – photo by Heidi Fischli)

Fig. 25 The generously sized attic floor with the solid-wood roof truss.

(Image source: © Prix Lignum – photo by Heidi Fischli)

Great advert for wood on busy road

The impressive replacement build of this farmhouse on the cantonal border of Bern and Lucerne looks like a traditional framework structure, but instead has rear-ventilated solid wood formwork. Gable-end arbours and ornate support stanchions indicating the year make it look like an historic farmhouse, but with all the features of a new build. Swiss wood is used for the building structure and façade.

Slightly elevated and located directly on the heavily used cantonal road between Altbüron and St Urban, an eye-catching wood building was constructed in early 2021. The development that replaced an old farmhouse has a new lustre and re-interprets historical features.

The façade looks like a traditional framework structure, but has rear-ventilated solid-wood formwork. The arbour balustrades are decorated with hearts and tulips, the window ledges have rounded profiles, and ornate support stanchions indicate the year of construction – with great attention to detail, the new farmhouse incorporates many traditional features. Only Swiss wood was used for the building structure and façade.

The home of the extremely satisfied farming family in Altbüron, canton of Lucerne, blends outstandingly well into the set of farm buildings, including stables, sheds and an organic farm shop. The residents are tremendous ambassadors for timber-framed construction as they are pleased to tell many of the around 3,700 motorists who pass by every day – and stop off just to admire the new building – about their positive experience with the construction project. (Prix Lignum, edited by EJB)

- Project: Farmhouse/single-occupancy residential unit, replacement new-build
- Project location: CH--6147 Altbüron, canton of Lucerne
- Completion: 2021
- Client: Pirmin & Jasmin Bucheli, Altbüron LU
- Project submitted for: Prix Lignum 2021
- Award: Prix Lignum acknowledgement in the eastern region
- Type of wood mainly used: spruce/fir
- Treatment of wood: varnished
- Architecture/planning: dubach plant ag, Fabian Dubach, Hüswil LU
- Woodwork carried out by: Dubach Holzbau AG, Thomas Wechsler, Hüswil LU
- Project link: **http://prixlignum.ch/p?de/2349**
-

4.6 Example 6: Modern accents in wood in 17th century manor house

Fig. 26 The Balliswil manor house ensemble from the south.

(Image source: © Prix Lignum – photo by Rolf Siegenthaler)

Fig. 27 Modern fitted kitchen in wood beneath the historic wooden ceiling on the ground floor.

(Image source: © Prix Lignum – photo by Rolf Siegenthaler)

Fig. 28 The new wooden flooring and fittings in the 'green room' contrast with the wall painting and 17th century ceiling decorated with floral designs made of pulp.

(Image source: © Prix Lignum, photographer: Rolf Siegenthaler)

Fig. 29 Minimalist wood fittings, e.g. for use of the room as an office, contrast with the painted wooden ceiling from the 17th century.

(Image source: © Prix Lignum, photographer: Rolf Siegenthaler)

Reversible work in solid wood make the 17th century manor house fit for modern living

The renovation of the Balliswil manor house features the use of two unique materials for all new works in the existing structure. The modern fittings enter into dialogue with the manor house's old textures, bringing vibrancy to the rooms.

Set amidst fields, just a few kilometres from Fribourg, lies the hamlet of Balliswil made up of several agricultural buildings, a chapel and a manor house known as 'Schloss Balliswil'. The house is well known to historians for its rich painted decorations and architectural qualities of its era. It was uninhabited for several years before the owner decided to renovate it. One of the challenges of the project was creating three residential units through reversible partitioning of the building which is much too big for modern use as a home.

A major problem arose: the rooms of the house had very irregular floorplans and most were very large, with painted wall and ceiling decoration, significantly restricting the layout options for rental apartments. To overcome these complex problems, the project uses two unique materials for all new works: fir, cut into 4cm x 4cm sections, and brass for rooms with greater humidity. These two shapeable materials typify the new work in the building. They provide surfaces that can age with time, while giving the various rooms a certain vibrancy and new lightness.

Ceilings, dividing walls, doors and furnishings are made with a unique pattern consisting of the adjacent positioning of the solid fir sections. To enhance the livability of the rooms, the project puts permanent furnishings made of fir in every room. Dressing rooms, kitchen, storage rooms, home offices and coffee tables are structuring elements providing design options for the furnishing of the rooms. (Prix Lignum, edited by EJB)

- Project: Renovation and modification of historic manor house to meet modern living requirements
- Project location: CH-3186 Düdingen, canton of Fribourg
- Client: Gisela Muheim, Düdingen FR
- Type of wood mainly used: spruce/fir
- Treatment of wood: stained
- Architecture/planning: lvph architectes Sàrl, Paul Humbert, Fribourg
- Woodwork carried out by La Passion du Bois Sa, Martin Curty, Belfaux
- Joinery: Jean Barras Sàrl, Jean Barras, Botterens FR
- Project link: http://prixlignum.ch/p?de/2485

4.7 Example 7: Embedded in the heart of the village – new-build BLS railway station in Reichenbach im Kandertal.

Fig. 30 The cladding of the façade with roof shingles provides a connection with traditional woodwork in the region.

(Image source: © Prix Lignum – photo by Thomas Telley)

Fig. 31: The new railway station building between Dorfstrasse and the rail facilities with an extensive entrance area provides retail space for a major chain.

(Image source: © Prix Lignum – photo by Thomas Telley*)*

Modern new-build railway station creates a connection with traditional woodwork.

The new replacement building creates a link between the railway track and the village's historic centre. The obvious positioning within open space makes the building stand out. The newly planted line of trees along the street enhances the transport facility. The truss design makes the timber-framed building, which has been awarded the 'Schweizer Holz' label and has a rooftop photovoltaic system, look neutral in terms of usage. The building opens up invitingly on the gable ends. The longitudinal façades are covered with larch wood shingles.

The BLS railway station at Reichenbach im Kandertal is part of an historically significant transport axis to the south. It is located outside of the original village centre parallel to the nearby River Kander. The construction of the railway line with the Lötschberg Tunnel led to a major economic upturn in the Kandertal region from the early 20th century thanks to tourism. A Postbus connection to Kiental has run since the 1930s from the railway station along Bahnhofstrasse, which is steeped in history. In place of the original railway station, a two-storey building was constructed in the 1960s with a loading ramp and Swiss Post travel agency.

After the complete renovation of the rail facilities with accessible platforms, a solution for the design of the site between the tracks and Kantonsstrasse was sought based on a competition by invitation. The new replacement building provides a link between the railway station and the village. The obvious positioning within open space and architectural design makes the building stand out. To the north is the Postbus station, while private transport parking for the Park&Ride scheme and a delivery zone are located to the south. A row of maples enhances the transport facility, provides a spatial boundary and improves local climatic conditions.

A truss structure efficiently spans the new building's interior space. This provides flexibility and can be modified for any future change of usage in a resource-efficient way. The longitudinal façades with natural, hand-made larch wood shingles and the roof structure with a photovoltaic system are made of prefabricated timber construction components. The gable-end façades consist entirely of a metal-glass structure. The building stands on a shallow reinforced-concrete foundation where the greatest possible use of recycled materials was made. The new building has been awarded the 'Schweizer Holz' label and its shell structure meets the requirements of an energy-plus building as defined by the canton of Bern's Office of Energy and the Environment.

Wood shingles, which are typically found on historic buildings in Reichenbach, were specifically selected as the material for the façade of this contemporary railway station building. This material welcomes travellers, builds an identity-shaping bridge with local architectural heritage and helped to preserve the craftsmanship of specialists from Kiental. (Prix Lignum edited by EJB)

- Project details: New-build replacement for railway station building
- Project location: CH-3713 Reichenbach im Kandertal, canton of Bern
- Completion: 2019
- Project submitted for: Prix Lignum 2021
- Type of wood mainly used: spruce
- Other woods used: larch
- Treatment of wood: untreated
- Client: BLS Netz AG, Bern
- Architecture/planning: Kocher Minder Architekten GmbH, Michael Minder, Steffisburg BE
- Woodwork carried out by: feller Holzbau GmbH, Jonas Geissbühler, Worb BE
- Engineering services: Indermühle Bauingenieure GmbH, Daniel Indermühle, Thun BE
- Project link: http://prixlignum.ch/p?de/2487

4.8 Example 8: Traditional Swiss Alpine horn made of moon wood.

Fig. 32 An Alpine horn made of moon wood against the backdrop of the Churfirsten mountain range on Walensee lake.

(Image source: © Prix Lignum – photo by Beat Kollegger)

Fig. 33 Air-dried sheets of spruce moon wood, sawn workpieces and the finished tube end of an Alpine horn. (Image source: © Prix Lignum – photo by Beat Kollegger)

Fig. 34 Alpine horn mouthpiece made of walnut. (Image source: © Prix Lignum – photo by Beat Kollegger)

The manufacture of Alpine horns in Alvaneu, a small mountain village in Graubünden which stands at 1,200 metres above sea level.

Only moon wood is used to make the horns. Everything from the sourcing of the trees to the finished product and sales was carried out in-house. This company has seven employees, including one with a disability and an apprentice. In addition to traditional craftsmanship, the company also uses the very latest machinery. The wood used is sourced entirely from the region and grown on shaded slopes near the tree line at over 1,800 metres above sea level.

The timber is felled on specific days in winter, shortly before the new moon, and is left lying with the treetop facing downwards in the forest for a period before being transported away. The logs also undergo a ‘matchstick test’ at the forestry site, i.e. one person gently taps a matchstick or a twig on the front while the other person holds their ear to the other side of the log. Only after this sound conductivity test and a visual inspection (spiral growth, fragility, straightness, uniform year rings, discolouration, few and acceptable intergrown knots, etc.) are the logs transported to the communal sawmill and cut to the sizes required.

After drying out, the wood is then processed in the workshop. The Alpine horns are made of spruce, while Swiss walnut is used for the additional elements (tube bands, mouthpiece attachment). In addition to Alpine horns, the company also makes traditional Swiss accordions, another folk music instrument, from scratch in its workshop. (Prix Lignum, edited by EJB)

- Project: artwork, other wood products
- Project location, CH-7492 Alvaneu Dorf, canton of Graubünden
- Completion: 2021
- Project submitted for: Prix Lignum 2021
- Type of wood mainly used: spruce
- Other woods used: walnut
- Treatment of wood: varnished
- Client: Instrumentenbau, Beat Kollegger, Davos Platz
- Project link: http://prixlignum.ch/p?de/2793

5 Roundwood: sawlogs, pulpwood and fuelwood

5.1 Developments up to mid-2023

The summers of 2022 and 2023 were very hot with dry periods lasting weeks, which raised forest temperatures and caused the autumn colours to arrive early. This also increased the risk of infestation of weakened trees by bark beetles and other forest pests, resulting in a higher proportion of wood from forced felling.

The Swiss timber harvest in 2022 stood at 5.2 million m^3 – an increase of 4%, or 0.2 million m^3, compared with 2021. There was a sharp rise in the two main types with an increase of 4% in logs and 7% in fuelwood. The energy crisis, strong demand for construction timber and the consequent rise in wood prices provided an incentive for private forest owners to increase usage in view of the favourable market environment. This is illustrated by the forestry statistics of the Federal Statistical Office (FSO) and the forestry Test Enterprise Network of the Federal Office for the Environment (FOEN). Based on a comparison of several years, the share of the total timber harvest made up by logs (sawnwood) fell by just under 20%. This share was still around 70% in 2002. More wood was harvested in 2022 than in the previous year in all forest zones with the sharpest increase in the Alps and Alpine foothills, both standing at 8%.

Broken down by wood type group, around 3.5 million m^3 of softwood and 1.7 million m^3 of hardwood were harvested in the Swiss forests in 2022. This means 67% of the timber harvest was made up of softwood and 33% of hardwood. This ratio changed very little compared with the previous year (69% to 31%). While the softwood harvest remained relatively stable in terms of volume compared with 2021, the hardwood harvest increased by 11%. Over 60% of softwood is harvested in the Swiss Plateau region and the Alpine foothills (32% and 28% respectively), while hardwood comes mainly from the Swiss Plateau region (46%) and the Jura (30%). Almost three-quarters of hardwood (74%) is used as fuel. Fuelwood from the forest – as a regenerative, domestic and CO_2-neutral source of energy – is playing a more important role now than for decades. In 2022, 2.1 million m^3 was harvested, which is up by over 7% on the previous year. Fuelwood is the second largest category, accounting for over 40% of all felling. Its share has almost doubled over the past 20 years.

The growing importance of fuelwood is explained by the rising number of wood-fuelled systems and the energy crisis. 1.3 million m^3 or 62% of forest fuelwood consisted of wood chips in the year under review. This share has been falling slightly since 2020. Logs are increasingly popular and their share has continually risen since 2020. This can be seen as a response from smaller private fuel wood consumers to the uncertain energy supply situation and rising energy prices.

The amount of industrial wood fell sharply by 12% compared to the previous year and its share of the total wood harvest dropped below the 10% mark in the year under review. This development is partly attributable to stronger demand for fuelwood, but also to restructuring in the Swiss wood-based material and paper sectors.

Rising wood prices are revitalising wood usage by private forest owners. Switzerland's forestry area broke down into 71% public and 29% private land ownership in 2022 – exactly the same as in the previous year. The wood harvest on privately owned land rose compared with 2021 by 170,200m^3 or just under 10% to 1.97 million m^3. Rising wood prices played a key role here. In particular, use of the log/sawnwood (11%) and fuelwood (12%) categories is increasing. The bigger wood harvest in private forestry in 2022 was most evident in the Swiss Plateau region at 70,000m^3 or 9%, followed by the Alpine foothills at 67,000m^3 or 11% and the Alps at 24,000m^3 or 21%. The volumes harvested in the public forests are roughly the same as in the previous year.

The financial situation of the companies has improved but there is still a deficit. The 649 forestry enterprises operating in Switzerland in 2022 posted revenues of CHF 584 million and expenditure of CHF 602 million. On a Switzerland-wide basis, that amounts to a loss of around CHF 18 million, compared with a deficit of CHF 7 million in 2021 and of CHF 44 million in 2020. Losses were recorded in the Swiss Plateau region, the Alps and the Southern Alps. In contrast, the balance sheets of the forestry

enterprises in the Jurassic Arc and Alpine foothills were pleasing, with total profits of CHF 4.4 and 2.4 million respectively.

At the companies which are part of Switzerland's Test Enterprise Network, the losses from overall operations (forest management, manufacturing and services) fell sharply from CHF 29/ha in 2021 to CHF 2/ha in 2022, almost balancing the books. The Test Enterprise Network is made up of 160 forestry enterprises using a full-cost accounting method. This significant improvement in the financial situation of the test enterprises is mainly due to lower losses in forest management, which stood at CHF 16/ha in 2022. They were much higher in 2021 at CHF 33/ha. This reduction was achieved thanks to a CHF 10 increase in average revenues from wood sales to CHF 79/m^3. The price of softwood logs climbed by CHF 12 to CHF 97/m^3.

More information can be found at: https://www.bfs.admin.ch/bfs/en/home/news/whats-new.gnpdetail.2022-0574.html

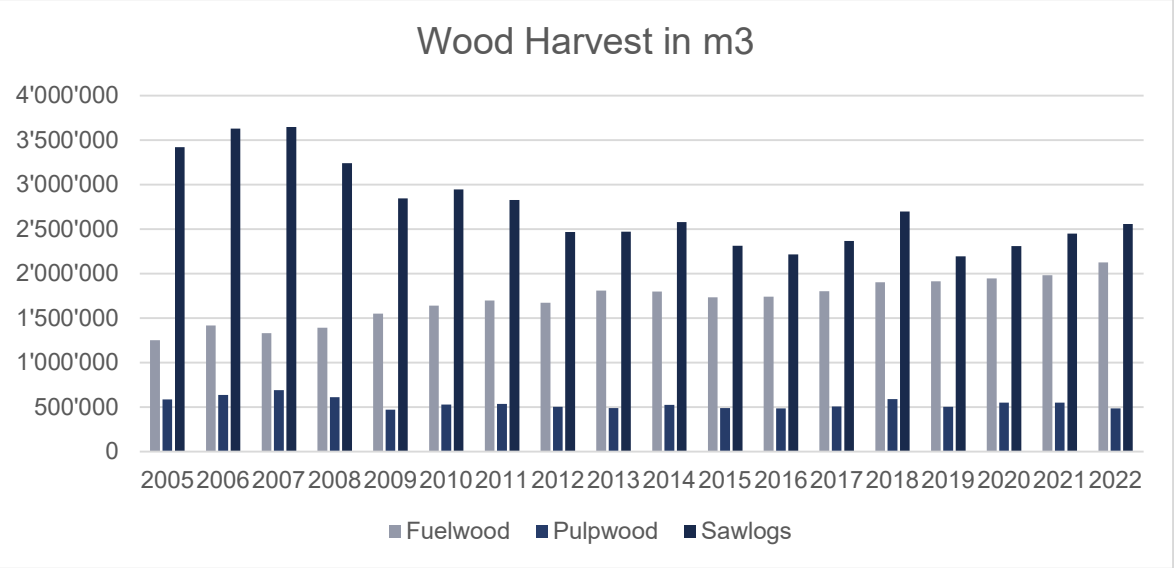

Fig. 35 – Wood harvest in Switzerland 2005 – 2022 in m3

5.2 Timber assortments and price trends

Of the total amount of 5.178 million m^3 of wood harvested from Switzerland's 1.273 million hectares of forestry land in 2022, 3,463 million m^3, or 66.9%, was softwood and 1.716 million m^3, or 33.1%, hardwood.

0.485 million m^3 or 9.4% of industrial wood was felled in 2022, of which 6.0% was softwood and 3.4% hardwood. Industrial wood, to which higher quality requirements apply than energy wood, is sorted as a by-product of sawnwood in Switzerland and is specifically harvested in young forests.

The remainder of 2.13 million m^3 or 41.1% of the wood harvested in 2022 is energy wood. Of this total, 0.85 million m^3 or 16.5% is energy softwood, of which 4.4% is made up of logs for manually fed small fires and 12.1% wood chippings for automatically fed medium-sized and large wood-fired systems. Of the 1.27 million or 24.5% of energy hardwood, 11.1% is logs and 13.4% wood chippings.

The Swiss sawmills and industrial wood processors were generally well supplied with raw timber during the period under review, despite a decline in the amount of forced wood usage compared with 2022-2023.

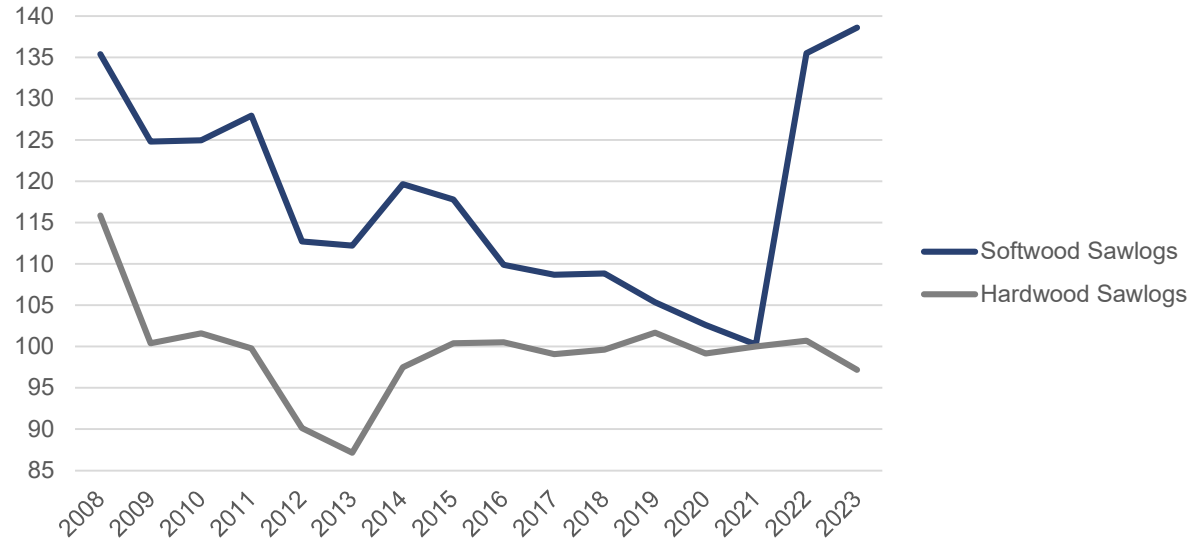

Fig. 36 – Price index for Sawlogs, 2008-2023 (Sep-Oct 2020 = 100)(Source: Swiss Federal Statistical Office)

-> For more information, see: https://www.bfs.admin.ch/bfs/en/home/statistics/prices/producer-prices-import-prices/producer-prices.assetdetail.18824304.html

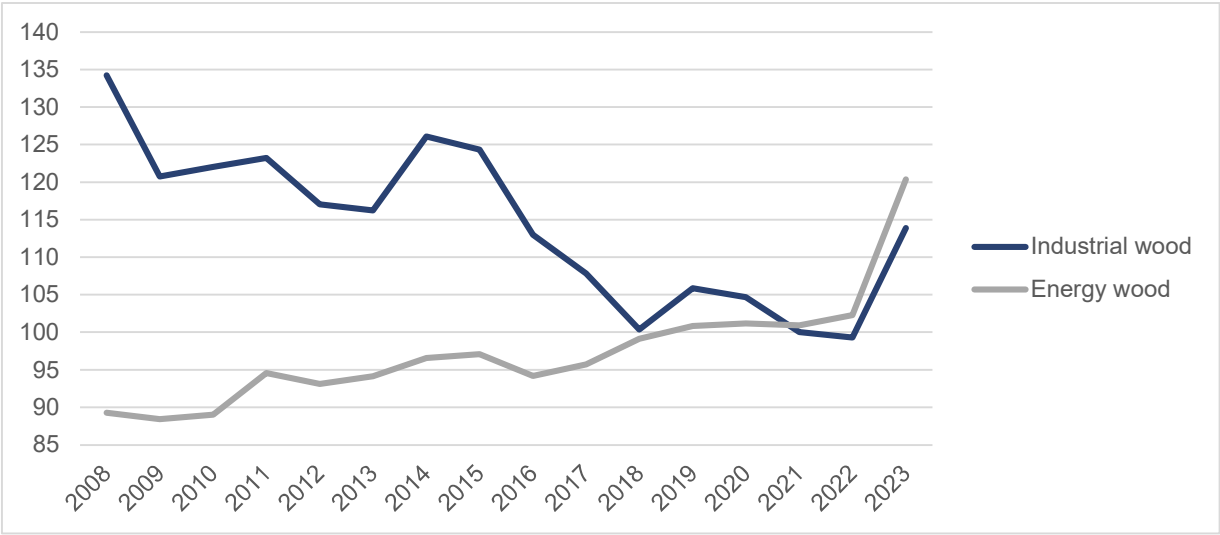

Fig. 37 – Price index for industrial wood (pulp wood) and for energy wood, 2008-2023 (Sep-Oct 2020= 100)

5.3 Economic situation of the forestry sector

Public forestry operations manage 71% of Switzerland's productive forest area. Despite considerable cost-reduction efforts, the operating results of the Swiss forestry sector improved in 2017. The corresponding data were collected via a test network of 160 forest enterprises distributed across Switzerland in the forest regions of the Jura, the Central Plateau, the Prealps and the Alps.

Higher timber prices reduced the deficit of forestry companies in 2021: The 656 public Swiss forestry companies generated total revenue of CHF 583 million in 2021. Expenditure stood at CHF 590 million, resulting in a deficit of around CHF 7 million. In 2020, the deficit was CHF 44 million. This development is explained by the higher timber prices – the strong demand has seen prices rise so much that they are considered to be at a 'normal' level by timber market experts.

Losses in test operations were halved. Among the companies that are part of Switzerland's forestry test operational network. comprising 160 selected forestry companies which carry out full-cost accounting, losses were halved in 2021 compared with the previous year. The losses in the forestry industry in 2021 came in at CHF 33/ha compared with CHF 66/ha in the previous year.

In terms of the wood supplied, there was a loss of CHF 8/m^3. The figure for 2020 was twice as high at CHF 16/m^3. Losses in terms of total operations (forest management, material goods and services) were cut from CHF 59/ha to CHF 29/ha. The losses were halved due to a CHF 8/m^3 increase in average timber revenues which rose to CHF 69/m^3. Sawn softwood prices rose by CHF 13/m^3 from CHF 72/m^3 to CHF 85/m^3.
-> For more information, see: https://www.bfs.admin.ch/bfs/en/home/news/whats-new.gnpdetail.2022-0574.html

5.4 **Wood energy**

The overall Swiss energy statistics indicated that Switzerland's energy consumption decrease by 3.9% in 2022 compared to the previous year, from 795,810 TJ (Terajoule) to 765,070 TJ. The main reasons for this is primarily due to the warmer weather: The number of heating degree days, an important indicator of energy consumption for heating products, decreased by 17.2% compared to the previous year. The federal energy-saving campaign and the significantly higher energy prices are likely to have contributed to the reduction of energy consumption in 2022. On the other hand, factors determining the long-term growth trend in energy consumption increased slightly. Factors that determine the long-term growth trend for energy consumption also went up slightly: The permanent resident population increased by 0.8%, gross domestic product by 2.1%, the number of motor vehicles by 0.5% and the housing stock increased, but no detailed figures are currently available. However, efficiency improvements and substitution effects are having a restraining effect on growth in energy consumption.

End consumption of petroleum-based fuel for heating purposes decrease by 18.7% between 2021 and 2022 from 1111,710 to 90,770 TJ. With regard to fuels, end consumption of petrol decrease by 2.9% from 87,970 TJ in 2020 to 85,410 TJ in 2022. The figure for diesel oil decrease by 0.2% from 111,240 TJ in 2021 to 111,030 TJ in 2022, while that for aviation fuel went up by 76.1% from 34,000 TJ in 2021 to 59,880 TJ in 2022. Combined end consumption of fossil-based, imported combustibles and fuel saw a 0.6% increase on a crude oil basis from 344,920 TJ in 2021 to 347,090 TJ in 2022. The share of total energy consumption in 2022 rose to 45.4%. This proportion is still alarmingly high in view of the current geopolitical situation and the impact of CO_2 emissions on global warming.

End energy consumption of gas increased by 8.3% from 122,500 TJ in 2021 to 101,650 TJ in 2022. As in most European countries, a large proportion of this natural gas comes from Russia which is a major issue in view of the war in Ukraine and the consequent sanctions imposed on Russia. An additional 1523 TJ of biogas was fed into the natural gas grid and recorded under gas in 2022.

There was a 1.9% decrease in the end consumption of electrical energy from 58,113 GWh or 209,210 TJ in 2021 to 57,030 GWh or 205,3210 TJ in 2022. In 2022, end consumption of electrical energy accounted for 26.8842% of total end energy consumption. Production of electricity from photovoltaic systems went up by 9.3% from 2,599 GWh in 2021 to 2,842 GWh in 2022, accounting for a 6.6% share of domestic net power production. This means the potential for generating electricity from photovoltaic systems in Switzerland is only being harnessed to a very small extent.

Swiss fuelwood statistics for 2022 include all wood-fuelled systems and describes their annual final energy consumption from 1990 to 2022.

In 2022, the number of wood-fuelled systems fell by around 12,100 compared with 2021, which represents a 2.3% decline. This fall is mainly due to the declining number of single-room and building heating systems. The decrease in the number of open and closed fireplaces, wood-burning stoves and wood-fired cookers is the main reason for this development. The total number of systems, covering all categories, is around 510,600 which is around 26% below the figure for 1990.

The total amount of installed power for all wood-burning systems was down by 59 MW (-0.6%) in 2022 compared with the previous year. The installed power of single-room and building heating systems, in

particular, is falling and dropped by 101 MW and 31 MW respectively (-2.0% and -2.2%). There was an increase in the nominal capacity of automated wood-fuelled systems (+79 MW or +2.5%). Special wood-burning systems saw a slight decrease in nominal capacity of 0.9% or 6 MW. Overall, the installed nominal capacity, excluding waste incineration plants, currently stands at around 10.2GW. That is 18.7% less than in 1990.

2022 – with 2,796 heating degree days (HDD) – was warmer than the previous year (3,378 HDD). This meant effective end energy sales dropped by 9.6% (gross consumption of wood incl. waste incineration plants in TJ), while the corresponding weather-adjusted figure remained practically unchanged (increase of 0.1%). Overall, effective wood sales (incl. waste incineration plants) of 5.25 million m^3 were recorded for 2022, which means end energy sales (gross consumption of wood) stood at 51.3PJ. Excluding waste incineration plants, this equates to 4.84 million m^3 or 47.3PJ.

Weather-adjusted wood sales in 2022 totalled 5.98 million m^3 or 16.3 TWh. This represents an increase of 7.5 TWh or 84.9% since 1990. Year-on-year, weather-adjusted wood sales went up by 0.1%. Excluding waste incineration plants, the weather-adjusted wood sales for 2022 came in at 5.56 million m^3 or 15.2 TWh. The wood used is currently made up of around 59.4% natural wood, 12.9% wood residues, 14.4% waste wood and 13.2% wood pellets.

The weather-adjusted useful energy production from wood stood at 11.6 TWh in 2022 (incl. waste incineration plants). That equates to a 132.7% increase since 1990. Compared with the previous year, useful energy production fell by 3,200 MWh or 0.03%. Excluding waste incineration plants, weather-adjusted useful energy production was 11.1 TWh in 2022.

Electricity production’s share of total useful energy production remains low at 695 GWh or 6%. Compared with the prior year, electricity production rose by 4.3% (28.9 GWh).

Since 2005, an updated model has been used to produce the wood energy statistics which are reconciled with the latest ex-post analysis of Prognos on an annual basis. The database of automated wood-fuelled systems and the statistics on renewable waste systems were, as every year, updated and the analysis of wood energy statistics was retroactively adjusted back to 1990. The updates and model adjustments undertaken resulted in a maximum difference of 1% in the time series of gross wood consumption compared with the previous year’s survey.

(source: Swiss fuelwood statistics 2022, Summary, FSO)

Heat and power from wood pyrolysis gas

Energie 360° and Schweizer Zucker jointly opened a wood-fired combined heat and power (CHP) plant in Frauenfeld in May 2022. For this venture, they founded a company called Bioenergie Frauenfeld AG which produces electricity, heat and biochar.

Wood from the region is the energy source for the plant. This wood would otherwise often be unused, such as wood residues from forestry and landscape management, windthrow or pest infested wood. In a first stage, this wood is dried at the plant. Wood pyrolysis gas is then generated in modern floating fixed-bed reactors using a thermochemical process at 850 °C. Four gas motors made by the Tyrol-based company Syncraft use this to produce renewable electricity. This is enough to meet the annual consumption of around 8,000 households. The heat generated during power production is used in the sugar refinery and by the Thurplus district heating network. Syncraft’s wood-fired CHP plants are amongst the most efficient in the industry with fuel efficiency of up to 92%.

Biochar is also obtained from this process. This is around 90% carbon. The wood is processed with reduced air supply which is why no combustion takes place. This means some of the CO_2 stored in the wood is not released and is permanently removed from the atmosphere in the form of biochar. This biochar is used in agriculture for soil improvement, as a feed supplement and as activated carbon in water treatment.

Heat from wood instead of nuclear power – the wood-fired CHP plant project in Döttingen.

Fig. 38 The four floating fixed-bed reactors at the wood-fired CHP plant in Frauenfeld

(Source: syncraft.at)

Since the Fukushima nuclear power plant disaster in spring 2011 and the subsequent ban on the con

struction of such plants in Switzerland, the REFUNA AG district heating network has been looking for a new heat source to replace the Beznau I and II nuclear power plants, which are set to be decommissioned in 2030. REFUNA AG provides 2,700 customers in 11 communes located around the two nuclear power plants with 175 GWh of heat a year via well-insulated supply lines. Measured in terms of annual heat energy sales, REFUNA AG operates Switzerland's sixth largest district heating network after Basel, Zurich, Geneva, Lausanne and Bern. This means a replacement heat source on the same scale is needed.

The investment in the district heating network was made 40 years ago and has been fully depreciated since 2018. A new heating source must be constructed and amortised to secure future heat supply. After in-depth studies, it emerged that the construction of a wood-fired CHP plant would be the most suitable option to provide a new CO_2-neutral heating source in good time when the two nuclear plants are decommissioned. The planned wood-fired CHP plant in Döttingen will provide an output of 37.5 MW. The heat provided by the Turgi waste incineration plant and existing emergency boiler can continue to be used in summer. The Döttingen plant should be operational by October 2027.

In April 2023, the Aargau Cantonal Parliament approved the amendment to the structure plan required to build the new wood-fired plant. This means the Döttingen wood-fired CHP plant has reached a major milestone and project planning can move onto the next stages. The construction plans and environmental impact analysis should be completed by the end of 2023. The processing of waste wood and wood residues will now also be an integral part of the wood-fired plant. A forestry wood commission has been set up to involve regional forest owners at an early stage of planning.

Plans for a future-oriented energy eco-system with integrated wood-fired CHP plant

A future-oriented energy eco-system that is unique within Switzerland is to be constructed in Dagmersellen in the canton of Lucerne over the next few years. The transport company Galliker, the milk processor Emmi, the industrial gas producer PanGas (a subsidiary of Linde plc) and the energy supplier Centralschweizer Kraftwerke CKW have signed a joint declaration of intent. The project aims to

drive the energy transition forward and make a major contribution to decarbonising and diversifying energy supply through the new energy eco-system planned.

Fig. 39: Image of the planned wood-fired CHP plant in Döttingen (Source© REFUNA AG)

Further information: https://holzheizwerk.ch

At the beginning of the energy eco-system is a wood-fired CHP plant operated by CKW for the production of heat and power. PanGas will use some of the power generated to make hydrogen to supply Galliker's HGV fleet. Galliker Transport aims to be CO_2-neutral by 2050. PanGas also obtains green CO_2 from the combustion process, e.g. for use in the food industry. Emmi will use the renewable energy generated by the wood-fired plant to meet some of its heating energy requirements at its Dagmersellen production facility where cream cheese specialities and powdered milk are made. The project marks a milestone in the net-zero reduction target Emmi aims to achieve by 2050 and represents a further step towards cutting in-house CO_2 emissions by 60% by 2027. Emmi will also provide demineralised water from the manufacture of dairy products for hydrogen generation to create a closed-loop cycle.

When fully completed, the wood-fired plant will produce 100 GWh of power and 130 GWh of heat. Emmi uses around 50 GWh of heat. Other potential heat customers include local industry and district heating networks in the surrounding villages. The wood-fired plant will be fuelled by regional forest wood chips and waste wood as far as possible. 200,000 tonnes of wood a year will be needed. In total, the four companies are planning to invest around CHF 200 million in the production, distribution and use of renewable energy. Based on current plans, the plant will be operational by 2027 at the earliest.

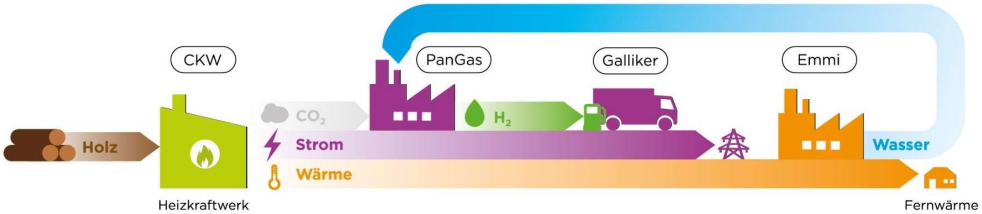

Fig. 40 Diagram of the energy eco-system (source: © CKW Energie)

5.5 Certified forest and forest products

5.5.1 FSC and PEFC certification

Approximately 0.65 million ha of Swiss forest (i.e. 51% of the total forest area) was certified in 2014. Of these certified areas, more than the half have both FSC and PEFC certification. Of the timber harvested in Switzerland in 2014, 66% was certified. The corresponding was were not surveyed from 2015 since the revision of the Swiss forestry statistics.

At present, over 900 companies operating at all levels in the timber processing sector hold a certificate. In contrast to the situation in the forestry sector, the majority of these companies hold only the FSC certificate. Thus, the Swiss wholesale distributors, which also hold a significant share of the market in the DIY sector, are FSC-certified. 30% hold both the FSC and PEFC certificate. At present there are no companies in Switzerland that are solely PEFC-certified.

In 2009 a national certification standard, which forms the basis of certification for FSC and PEFC in Switzerland, was introduced by both label organisations. However, this harmonisation is criticised today as the competition between the private labels is disappearing as a result of its introduction.

The main driving forces for certification in Switzerland are the DIY sector and the demand for certified paper products. However, the sellers of certified wood cannot demand a higher price ('green premium'). Thus, the market does not compensate for the additional costs incurred in certification. For this reason, certification is a contentious issue in the forestry and timber sector.

5.5.2 New Timber Trade Ordinance (TTO) with diligence obligation

Placing illegally harvested timber and the products made from it on the market in Switzerland has been banned since 1 January 2022. The new Timber Trade Ordinance (TTO) came into force simultaneously with the amended Environmental Protection Act (EPA). It requires all market players to comply with their due diligence obligation and to minimise the risk of illegal timber.

Illegal timber harvesting is a global problem with negative environmental, economic and social consequences. To combat it, many governments have enacted regulations on the trade in timber and wood products. Illegal timber is banned in the USA by the Lacey Act, in Australia by the Illegal Logging Prohibition Bill and in the EU by the European Timber Regulation (EUTR). All the regulations require products to be checked with the necessary due diligence before they come on the market.

Further information: https://www.bafu.admin.ch/bafu/en/home/topics/forest/info-specialists/strategien-und-massnahmen-des-bundes/timber-trade-regulation.html

5.6 Sawnwood

The construction industry, particularly timber-framed construction, remains the most important sales market for sawnwood. The fire protection standards for timber structures, revised in 2015, have led to a marked increase in the construction of multi-storey residential and office buildings, with towers of up to 80 metres high and more. The timber construction sector is continuing on the path to success and gaining market shares.

Analysis of the building database at Bern University of Applied Sciences' Higher Technical School of Wood in Biel/Bienne shows wood is making up a growing share of the materials used for load-bearing structures. In 2022, the share of wood used in support structures for residential buildings above three units stood at 9.3%, for hospitals, other buildings in the healthcare sector and care homes at 15.5%, for industrial buildings at 16.0%, for commercial and administration buildings at 17.3%, for residential buildings of up to two units at 18.9%, for teaching and education buildings at 22.2%, for sport and leisure facility buildings at 22.6% and for agricultural buildings at 35.6% (the highest of all). The share stood at 15.6% across all building categories in 2022. A driving force behind the increasing level of interest in timber-framed construction is the need to cut CO_2 emissions as part of the fight against human-induced global warming. This means there is still great potential for significantly increasing the

share of wood used in construction and making even better use of wood's potential for CO_2 avoidance as a regenerative, indigenous construction material.

The dynamic growth in timber construction keeps gathering pace and is increasingly influencing the mood of the suppliers, the sawmill sector. They are again optimistic about their future prospects, which is reflected in increased willingness to invest, e.g. in production facilities for glulam structural timber and photovoltaic installations for in-house power generation. But a high percentage of glulam structural timber in particular is still imported from the neighbouring countries of Austria and Germany. The Swiss sawmill industry is recovering thanks to investment in glued laminated timber production and will also benefit from proximity to customers in this area.

In 2022, the 292 sawmills in Switzerland processed 2.065 million m^3 of sawnwood into 1.242 million m^3 of sawn timber, which equates to efficiency of 60.1%. 39.2% of this amount is cut by five large sawmills with cutting capacity of over a 100,000m^3 of roundwood per year. 95.8% or 1.186 million m^3 of the sawn timber generated is sawn softwood, 97.2% is spruce/pine and 2.8% is other types of softwoods. Of the hardwood share of the sawnwood, 4.2% or 56,400m^3, the greatest proportion is accounted for by beech at 43.4%, while 56.6% is other types of hardwood, such as oak, ash and maple.

In 2022, Swiss sawmills generated 831,300m^3 of sawmill residue, of which 95.8% was softwood reside and just 4.2% hardwood residue. 21% of the wood residue is used to generate energy by the sawmills themselves, 43% is used to produce energy by third parties, 31% goes to the paper, cardboard and wooden composite board industry as raw material and 6% is used for other purposes, such as bedding for horses.

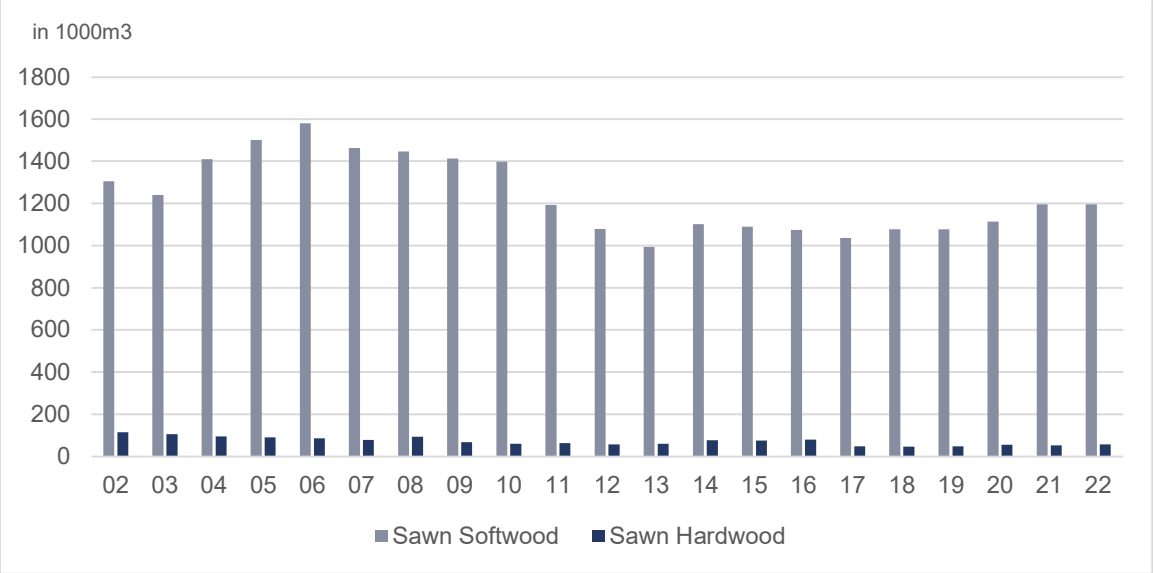

Fig. 41 – Sawnwood production in Switzerland, 2002-2022

Source: Swiss Federal Statistical Office)

Swiss sawmills largely cover their sawlog requirements from domestic sources – at prices charged in Swiss francs. They also export sawnwood and sawnwood residues into the euro zone. As a result, they face a double, and correspondingly severe, competitive disadvantage vis-à-vis their competitors from the EU. Moreover, the Italian sawnwood market, a traditional sales channel, is declining, and, on the domestic market, traditional wood boards cut to the customer's specifications for construction purposes, are being increasingly replaced by further processed semi-finished products such as glued construction timber. The prices of imported glued-laminated beams correspond approximately to those that Swiss laminated wood producers have to pay for domestic sawnwood. Given that the increase in the average prices of the sawnwood assortments was lower than those of sawn roundwood, the economic scope available to the sawmills decreased further.

The sawnwood price index rose dramatically during the January/February 2021 survey period from 101.9 percentage points to a high of 130.2 percentage points in the July/August 2022 survey period, only to slip back to 121.0 in May/June (basis September/October 2020 = 100).

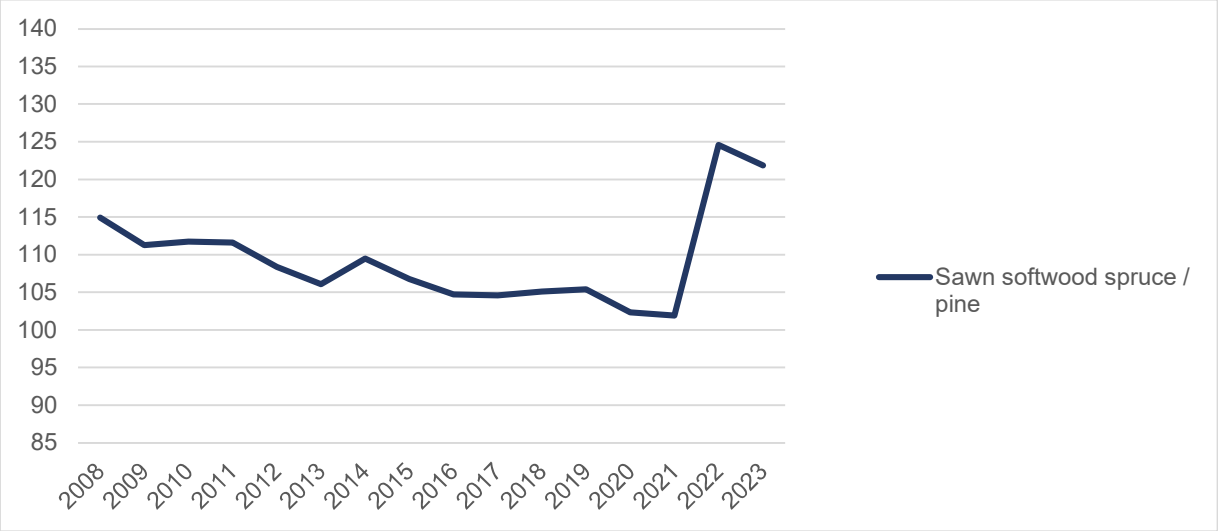

Fig. 42 – Price index for soft sawnwood, 2008-2023(Sep-Oct 2020 = 100)
(Source: Swiss Federal Statistical Office)

5.7 Pulpwood-processing sector

5.7.1 Wood-based panels

Wood-based panels can also be used to a much greater extent in multi-storey, timber-framed buildings, thanks to the new fire protection regulations. Production of these products has nevertheless largely been relocated abroad due to high location costs in Switzerland. As only chipboards and OCR boards were still produced in Switzerland in 2020 and the only manufacturer of fibreboards ceased production in Switzerland in 2019, the production volume has to be estimated for data protection reasons. It stood at around 400,000 m^3 of chipboards, including OCR boards, and around 200,000 m^3 of MDF/HDF boards in 2021. Plywood production – for skis, seating on trains and other high-quality products – is marginal at 7,000 m^3.

5.7.2 Pulp and paper

Chemically processed pulp has not been made in Switzerland since 2008. The change in the national framework conditions and the concentration process taking place globally has seen production volumes relocated from Switzerland to other company locations over recent years. Only one plant in Switzerland now makes paper for newsprint.

After the coronavirus pandemic levelled off, the Swiss paper, cardboard and packaging industries faced new challenges in the form of high energy prices and disrupted supply chains after the new war in Ukraine and the sanctions imposed on Russia. Paper production is very energy-intensive which means the energy shortage situation and high energy prices had a major impact on the sector. If a plant uses 200 GWh of electricity per year, a price increase of 1 centime/KWh results in additional annual costs of CHF 2 million. The industry nevertheless increased its revenues during the period under review despite declining demand for paper because it raised its prices due to sharp rises in paper, cardboard and energy costs. The sharp increase in the cost of waste paper and other raw materials had to be offset by higher prices. The situation on the procurement markets remains tight.

From 2021 to 2022, sales of newsprint paper fell by 3.6% from 340,000 to 327,000 tonnes, while those of other graphic paper, such as for magazines and catalogues, decreased by 11.6% from 165,000 to 146,000 tonnes. This meant a trend which has been evident for a number of years continued in 2022,

reflecting the progression of the digitalisation of business operations and the media. The sales volumes for toilet paper, kitchen roll and other types of paper were maintained. The sales volume of packaging materials went up by 1.8% from 404,000 to 412,000 tonnes. Total sales of paper and cardboard by Swiss producers declined by 2.3% from 1.024 million to 1 million tonnes.

The use of waste paper at Swiss production plants went up by 1% from 937,000 in 2021 to 947,000 tonnes in 2022. 1% less waste paper was collected in Switzerland in 2022 (1.104 million tonnes) than in 2021 (1.174 million tonnes).

Total Swiss consumption of paper and cardboard dropped by 4.6% from 1.446 to 1.380 million tonnes between 2021 and 2022. That represents consumption of 166kg per capita for the permanent resident population in 2021. The figure for 2022 is just 156kg per capita of the permanent resident population, or 6% less.

Further information: https://spkf.ch

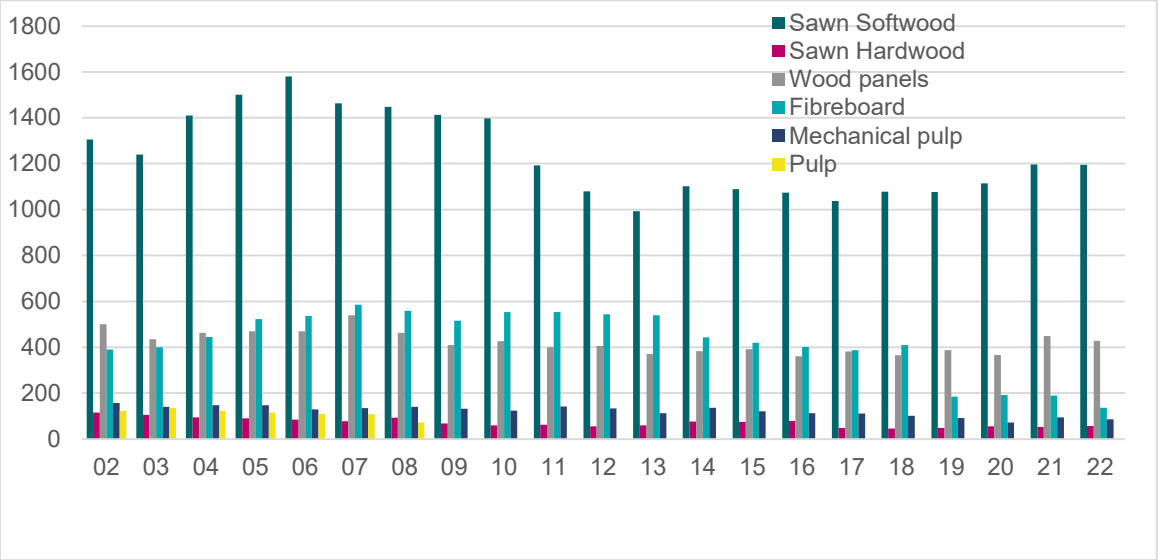

Fig. 43– Production of wood panels, fibreboards, mechanical pulp and wood pulp in 1000m3 2002-2022

(Source: Estimated values; Federal Office for the Environment FOEN, Forest Division)

6 Tables

6.1 Economic Indicators for Switzerland

Economic Indicators for Switzerland

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Economic growth in % [1]	2.4	2.7	3.8	3.8	2.2	-1.9	3	1.8	1	2	2	0.8	1.5	1.4	2.8	1.2	-2.5	3.4	2.1	1.9	1.0
Inflation in % [2]	0.8	1.2	1.1	0.7	2.4	-0.5	0.7	0.2	-0.7	-0.2	0	-1.1	-0.4	0.5	0.2	0.4	-0.7	0.6	3.0	2.5	2.5
Unemployment rate in % [3]	3.9	3.8	3.3	2.8	2.6	3.7	3.5	2.8	2.9	3.2	3.0	3.2	3.3	3.1	2.5	2.3	3.1	3.0	2.0	2.5	3.0
Interest yields in 10-year gouvernement bond in % [4]	2.7	2.1	2.5	2.9	2.9	2.2	1.6	1.5	0.7	0.9	0.8	0.7	-0.4	0.0	0.2	-0.5	-0.5	-0.2	-0.1	0.2	0.5
Currency rate [4]																					
EUR	1.54	1.55	1.57	1.64	1.59	1.51	1.38	1.23	1.21	1.23	1.2	1.07	1.09	1.13	1.15	1.11	1.07	1.08	0.95	0.95	0.90
USD	1.24	1.25	1.25	1.2	1.08	1.09	1.04	0.89	0.94	0.93	0.90	0.96	0.98	0.98	0.98	0.99	0.94	0.95	0.96	0.96	0.96

1) State Secretariat for Economic Affaires SECO, revised 2012 in accordance with NOGA 2008 (Nomenclature Générale des Activités économiques), statistical series retrospectively revised
2) Consumer Price Index, Swiss Federal Statistic Office BFS
3) State Secretariat for Economic Affaires SECO
4) Swiss National Bank SNB

6.2 Forest products production and trade 2019-2021; Estimations and Forecasts 2022–2023

UNECE

TF1

TIMBER FORECAST QUESTIONNAIRE

Roundwood

Country:	**Switzerland**		**Date: 12.10.2023**
Name of Official responsible for reply:	Achim Schafer		
Official Address (in full):			
Federal Office for the Environment FOEN			
Monbijoustrasse 40, 3011 Bern			
Telephone:	41584691796	**Fax:**	
E-mail:	achim schafer@bafu.admin.ch		

Product Code	Product	Unit	Historical data 2021	Historical data 2022	Revised 2022	Estimate 2023	Forecast 2024
1.2.1.C	SAWLOGS AND VENEER LOGS, CONIFEROUS						
	Removals	1000 m^3 ub	2'224	2'290 N	2'290	2'350	2'400
	Imports	1000 m^3 ub	52 #	55 #	55	60	65
	Exports	1000 m^3 ub	341 #	310 #	310	310	310
	Apparent consumption	1000 m^3 ub	1'935	2'035	2'035	2'100	2'155
1.2.1.NC	SAWLOGS AND VENEER LOGS, NON-CONIFEROUS						
	Removals	1000 m^3 ub	226	265 N	265	275	280
	Imports	1000 m^3 ub	27 #	35 #	35	40	40
	Exports	1000 m^3 ub	149 #	155 #	155	160	160
	Apparent consumption	1000 m^3 ub	104	145	145	155	160
1.2.1.NC.T	of which, tropical logs						
	Imports	1000 m^3 ub	0 #	0 #	0	0	0
	Exports	1000 m^3 ub	0 #	0 #	0	0	0
	Net Trade	1000 m^3 ub	0	0	0	0	0
1.2.2.C	PULPWOOD (ROUND AND SPLIT), CONIFEROUS						
	Removals	1000 m^3 ub	338	279 N	279	280	280
	Imports	1000 m^3 ub	20 #	20 #	20	20	20
	Exports	1000 m^3 ub	90 #	90 #	90	90	90
	Apparent consumption	1000 m^3 ub	268	209	209	210	210
1.2.2.NC	PULPWOOD (ROUND AND SPLIT), NON-CONIFEROUS						
	Removals	1000 m^3 ub	160	162 N	165	165	170
	Imports	1000 m^3 ub	3 #	3 #	3	3	3
	Exports	1000 m^3 ub	40 #	40 #	40	40	40
	Apparent consumption	1000 m^3 ub	123	125	128	128	133
3	WOOD CHIPS, PARTICLES AND RESIDUES						
	Domestic supply	1000 m^3	772 C	772 C	772 C	772 C	772 C
	Imports	1000 m^3	772 C	772 C	772 C	772 C	772 C
	Exports	1000 m^3	58 C	58 C	58 C	58 C	58 C
	Apparent consumption	1000 m^3	1'486	1'487	1'487	1'487	1'487
1.2.3.C	OTHER INDUSTRIAL ROUNDWOOD, CONIFEROUS						
	Removals	1000 m^3 ub	13	8 N	9	9	9
1.2.3.NC	OTHER INDUSTRIAL ROUNDWOOD, NON-CONIFEROUS						
	Removals	1000 m^3 ub	3	3 N	3	3	3
1.1.C	WOOD FUEL, CONIFEROUS						
	Removals	1000 m^3 ub	750	769 N	769	770	775
1.1.NC	WOOD FUEL, NON-CONIFEROUS						
	Removals	1000 m^3 ub	1'055	1'169 N	1'169	1'230	1'250

Please return by e-mail no later than 02 October 2023.

By e-mail to stats.timber@un.org.

Questions? Please contact Ms. Subashini Narasimhan at the above address.

The historical data are from the most recent Joint Forest Sector Questionnaire (blank) or the Timber Forecast Questionnaire (#). For explanations please see cover letter.

These data are flagged with E, R, N or C for secretariat estimate, repeat, national estimate or calculated totals (from subitems). If there is no flag, this indicates officially supplied data

UNECE

TF2

TIMBER FORECAST QUESTIONNAIRE

Forest products

Country: Switzerland | Date: 12.10.2023

Name of Official responsible for reply: Achim Schafer

Official Address (in full):

Federal Office for the Environment FOEN

Monbijoustrasse 40, 3011 Bern

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Product Code	Product	Unit	Historical data 2021	Historical data 2022	Revised 2022	Estimate 2023	Forecast 2024
6.C	SAWNWOOD, CONIFEROUS						
	Production	1000 m^3	1'196	1'196 N	1'186	1'200	1'210
	Imports	1000 m^3	300	300	300	310	320
	Exports	1000 m^3	215	215	215	210	205
	Apparent consumption	1000 m^3	1'281	1'281	1'271	1'300	1'325
6.NC	SAWNWOOD, NON-CONIFEROUS						
	Production	1000 m^3	52	52 N	52	53	54
	Imports	1000 m^3	50	50	50	51	52
	Exports	1000 m^3	24	24	24	25	25
	Apparent consumption	1000 m^3	78	78	78	79	81
6.NC.T	of which, tropical sawnwood						
	Production	1000 m^3	3	3 N	3	3	3
	Imports	1000 m^3	6	6	6	6	6
	Exports	1000 m^3	0	0	0	0	0
	Apparent consumption	1000 m^3	9	9	9	9	9
7	VENEER SHEETS						
	Production	1000 m^3	0 C	0 C	0	0	0
	Imports	1000 m^3	4 C	4 C	4	4	4
	Exports	1000 m^3	1 C	1 C	1	1	1
	Apparent consumption	1000 m^3	4	4	3	3	3
7.NC.T	of which, tropical veneer sheets						
	Production	1000 m^3	0	0 N	0	0	0
	Imports	1000 m^3	0	0	0	0	0
	Exports	1000 m^3	0	0	0	0	0
	Apparent consumption	1000 m^3	0	0	0	0	0
8.1	PLYWOOD						
	Production	1000 m^3	7 C	7 C	7	7	7
	Imports	1000 m^3	203 C	203 C	203	203	203
	Exports	1000 m^3	4 C	4 C	4	4	4
	Apparent consumption	1000 m^3	205	205	206	206	206
8.1.NC.T	of which, tropical plywood						
	Production	1000 m^3	0	0 N	0	0	0
	Imports	1000 m^3	3	3	3	3	3
	Exports	1000 m^3	0	0	0	0	0
	Apparent consumption	1000 m^3	3	3	3	3	3
8.2	PARTICLE BOARD (including OSB)						
	Production	1000 m^3	425 E	402 E	420	425	425
	Imports	1000 m^3	237	237	237	237	237
	Exports	1000 m^3	281	281	281	281	281
	Apparent consumption	1000 m^3	381	358	376	381	381
8.2.1	of which, OSB						
	Production	1000 m^3	0 N	0	0	0	0
	Imports	1000 m^3	96	96	96	96	96
	Exports	1000 m^3	1	1	1	1	1
	Apparent consumption	1000 m^3	95	95	95	95	95
8.3	FIBREBOARD						
	Production	1000 m^3	135 C	97 C	97	100	105
	Imports	1000 m^3	308 C	308 C	310	315	320
	Exports	1000 m^3	167 C	167 C	165	160	155
	Apparent consumption	1000 m^3	276	237	242	255	270
8.3.1	Hardboard						
	Production	1000 m^3	0	0 N	0	0	0
	Imports	1000 m^3	24	24	24	24	24
	Exports	1000 m^3	5	5	5	5	5
	Apparent consumption	1000 m^3	18	18	19	19	19
8.3.2	MDF/HDF (Medium density/high density)						
	Production	1000 m^3	135 E	97 E	97	97	97
	Imports	1000 m^3	88	88	88	88	88
	Exports	1000 m^3	161	161	161	161	161
	Apparent consumption	1000 m^3	62	24	24	24	24
8.3.3	Other fibreboard						
	Production	1000 m^3	0	0 N	0	0	0
	Imports	1000 m^3	196	196	196	196	196
	Exports	1000 m^3	1	1	1	1	1
	Apparent consumption	1000 m^3	195	195	195	195	195
9	WOOD PULP						
	Production	1000 m.t.	94 C	87 C	87	87	87
	Imports	1000 m.t.	101 C	101 C	101	101	101
	Exports	1000 m.t.	0 C	0 C	0	0	0
	Apparent consumption	1000 m.t.	195	187	188	188	188
12	PAPER & PAPERBOARD						
	Production	1000 m.t.	1'168 C	1'168 C	1'160	1'155	1'150
	Imports	1000 m.t.	644 C	644 C	640	635	630
	Exports	1000 m.t.	786 C	786 C	780	775	770
	Apparent consumption	1000 m.t.	1'026	1'026	1'020	1'015	1'010
5.1	WOOD PELLETS						
	Production	1000 m.t.	324	324 N	330	335	340
	Imports	1000 m.t.	79	79	80	80	80
	Exports	1000 m.t.	0	0	0	0	0
	Apparent consumption	1000 m.t.	403	403	410	415	420

Please return by e-mail no later than 02 October 2023.

By e-mail **to stats.timber@un.org.**

Questions**? Please contact Ms. Subashini Narasimhan at the above address.**

The historical **data are from the most recent Joint Forest Sector Questionnaire (blank) or the Timber Forecast Questionnaire (#). For explanations please see cover letter.**

These data are flagged with E, R, N or C for secretariat estimate, repeat, national estimate or calculated totals (from subitems). If there is no flag, this indicates officially supplied data.