

IN ESTONIA AND LATVIA





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Scan them and watch short movies about our industrial heritage objects in your device.













Industrial Heritage for Tourism in Estonia and Latvia

Industrial heritage is a part of our cultural heritage. It demonstrates the development of industrial technology, the changing production methods and working conditions, and helps us to understand the history and development of society more broadly.

The oldest preserved industrial heritage in Estonia and Latvia goes back to the 18th century, when the two countries were under the power of the Russian Empire, and major businesses and land holdings were in the hands of the privileged Baltic German aristocracy. In the countryside, the right to engage in commerce belonged to the manor lords; in the cities – to the guilds and shops.

After the end of serfdom in 1816 in Estonia and 1819 in Livonia, and the introduction of land purchase in the second half of the 19th century, people were free to move. Cities and industry grew rapidly. Thanks to a favourable location, gigantic industrial facilities sprung up in Estonia and Latvia - the biggest in Europe at the time - aimed at the Russian market. First it was textile and paper mills, breweries and vodka distilleries. In the last decades of the century, factories dependent on manual labour were joined by more productive steam-powered facilities, with machine-building, metalworking and other industries being established.

Industrial development in Estonia and Latvia got a further boost in the 1860s and 1870s with the arrival of the railroad, which connected the local sea ports with Russia. Widespread construction of **railroad** lines began. In addition to mainlines, narrow-gauge tracks were laid down- they were cheaper to build and maintain, and solved the cargo and passenger transport needs of smaller regions.

Steam-powered factories and railroads led the construction of **water towers**, which provided steam engines and locomotives with water. Starting in the late 19th century, water towers were also erected in cities and manors, to provide drinking and fire-fighting water.

Marine traffic on the Baltic Sea was very much a part of Russia's interests, so as the 19th century turned into the 20th, Estonia and Latvia's coastlines received many new **lighthouses**. Stone lighthouses were joined by fancy new assembled-on-location metal structures of English and French origin, which used state-of-the-art kerosene-fuelled optics.

In the early 20th century, Tallinn rose to the rank of Russia's fourth biggest port by cargo turnover, and the city of Riga grew to become the Empire's fifth largest by population.

Land ownership, good education and artisan skills stoked the flames of indigenous Estonian and Latvian entrepreneurship and national awareness – various small businesses sprang up, including **mills**, lime and tar kilns. After World War I, Estonia and Latvia got their independence, and the well-educated and entrepreneurial locals became the main drivers of the economy. The massive Russian market disappeared. Only the textile and cellulose industries managed to adapt, and giant factories were replaced with numerous smaller producers. A strong agricultural foundation led to the development of the food industry, which became a significant source of exports.

Industry was supported by a high level of education, and also received help from the state. New innovative products were born. For example, Riga's VEF factory made radios and tiny Minox photo cameras that were exported to Europe and America. The vest-pocket-sized Minox was invented by Estonian-born Walter Zapp, and these James Bond cameras are still made to this day in Germany, in digital guise.

Estonia and Latvia also has remarkable industrial heritage from the Soviet days.

Industrial heritage tourism is a growing trend, and an excellent opportunity to preserve and present old production facilities, equipment, and the skills of using them.



SK steam locomotive, made in Estonia at the Franz Krull factory. At the start of the 20th century, rolling stock was often manufactured locally- from steam locomotives to tram cars.



ER2T train made at the Latvian Rīgas Vagonbūves rūpnīca (RVR) factory. The Phoenix machine factory, founded by Oscar Freywirth in 1895, became one of the largest builders of electric and diesel trains in the Soviet Union.



In 1698, the English inventor and engineer Thomas Savery patented the first primitive steam engine. In 1712, the English toolmaker Thomas Newcomen improved the machine, creating the first practical industrial steam engine. Newcomen's engine did not need external cooling to condense the water, and he separated the pump from the machine.



Newcomen's steam engine

Factories

Factories are large industrial production facilities that use machines to make goods. Factories were preceded- before the age of steam power- by manufactories, which did feature wage work and separation of labour, but all the production was by manual force.

The oldest surviving industrial heritage in Estonia and Latvia dates back to the 18th century, when the countries were part of the Russian Empire. All of Estonia and most of Latvia were under the Baltic special rule.

Land was mostly owned by the Baltic German nobility, while cities used the guild system. Only those whose names were included in the list of nobility could claim political and economic privileges in Estonia and Livonia; for everyone else, opportunities were limited- for example, they would be forbidden from marketing beer or erecting a large mill.

Russia was the primary market for Estonian and Livonian nobility. Vodka distilleries were founded at manor estates to satisfy Russian demand; the production waste was used to fatten bulls, which were similarly sent to the market in the East. The nobles saw a great potential for benefit in industry, so they created ever more facilities: textile mills, paper factories, and others. (The Räpina Paper Factory was founded in 1734, the Līgatne Paper Factory in 1816, the Kärdla Broadcloth Factory in 1829, the Sindi Broadcloth Factory in 1834.) Equipment needed to be maintained and upgraded, which led to the creation of an indigenous metalworking and machine-building industry.

In the second half of the 19th century, just as steam engines were coming into widespread use, railroad connections were spreading, and freedom of labour movement was introduced, a time of rapid modernization began. Factories replaced manpower with efficient steam engines, and massive manufacturing enterprises arose, aimed at the Russian market.

A well-educated workforce made Estonia and Latvia a great location for heavy industry; machine-building, metallurgy, and chemical production developed here. The construction materials and furnitures industries also saw rapid growth.

Reaching the underdeveloped domestic market of the Russian Empire was a dream of many industrialists in Western Europe. Due to the Baltic special rule, Estonia and Latvia remained under the control of the Baltic Germans, which in turn gave the investors additional confidence in bringing their capital here. Germans were interested in the cellulose industry, the French and Belgians - in shipbuilding, while the British focused on textiles.

When Estonia and Latvia became independent in 1918, local corporations had to find new markets - all-consuming Russia was now off limits. Only the textile and paper industries managed to hold on, eventually reaching stability, if not former glory. Instead of large enterprises, there were now small ones, aimed mainly at the domestic market. A strong agriculture led to the development of a food industry using local ingredients (butter, bacon, eggs).

Estonia and Latvia began to develop their energy industry: peat and shale mining grew, and many hydroelectric stations were built. Electricity became commonplace.

Local corporations proved themselves to be successful and innovative. Many inventions came out of this era, impacting industrial production (Ivan Kondakov's synthetic rubber), photography (the Minox mini-camera and Walter Zapp), and military technology (Karl Papello's "electronic ear" for directing anti-aircraft cannons).

Old factories are a part of our industrial heritage. They give a good overview of the technologies used in days past, the equipment and work processes, as well as the products and markets of that time.

Some of those old factories are still working today, demonstrating not only old technologies, but also new work processes, and displaying a contrast between past and present manufacturing.

Between 1781 and 1784, the Scottish engineer James Watt made repeated improvements to the steam engine, significantly improving its power, efficiency, and value; he also adapted the motor to produce a spinning motion. Efficient machines quickly made their way to both industry and transport.



Watt's machine

These machines were heat engines that transferred the energy of pressurized water steam to other mechanisms.

The most important part of a steam engine was the water-filled steam boiler. Water was boiled into steam using rock coal in the furnace. The resulting steam drove pistons, which then moved wheels. On the piston's return stroke, the used steam was returned to the condenser, it cooled and turned back into water. The condenser was separately cooled by cold water.

Räpina Paper Factory











Răpina Paper Factory Pargi 23, Răpina, Põlva County, Estonia 58°5'48''N 27°27'18''E www.visitestonia.com/en/rapina-paper-factory At the edge of Lake Räpina in South Estonia stands the country's oldest and still operational paper factory, whose building is among Europe's most unique examples of industrial architecture.

With the help of a guide, you can learn about the factory's history, as well as the former and current production processes, technology, and machines. Old and new equipment works side by side here. "Oldie", the steam-cylinder machine manufactured at the Sigel factory, has parts that date back to the 1860s.

A guided tour takes you above enormous pulp pools, sifters, and felt-lined presses that squeeze water out of the pulp. Among other things, this factory makes products from recycled old paper money- including out-of-circulation Estonian kroons and Finnish marks.

The history of the paper factory goes back to 1728, when Count Karl Gustav von Löwenwolde, a courtier to Peter I, harnessed the rich flow of the Võhandu for the benefit of industry. Locally-made bricks were used to build saw, flour and paper mills.

The papermill, featuring recycling technology, started work in 1734, using linen rags for raw materials.

In 1865, the sawmill became a factory: the first paper machine arrived from Germany, followed by three more in short order. Higher grades of paper were now produced, including filter paper for pharmacies, drying paper, cigarette paper and silk paper.

Today, the factory has been modernized, and produces a wide range of sustainable packaging materials and paper products.

Līgatne Paper-Mill Workers' Flat

Līgatne is the workers' village of the oldest paper-mill in Latvia, and its historical appearance has remained unchanged. Moreover, Līgatne in general is a unique and uniform industrial heritage ensemble.

The flat is located inside a unique wooden building of Ligatne paper-mill village, the construction of which dates back to the end of the 19th century. The paper-mill of the manufacture was founded already in 1815. While paper-mill was in need for workers, the workers - for a place to live. A walk along the village guides you through all stages in the life of a paper-mill worker: there are former hospital buildings, a school for the local children, and residential terrace houses with small gardens. One of the workers' flats is renewed to look like original. The authentic environment invites you for a tea made on fire while watching a historic movie about the everyday life of local families.





Līgatne Paper-Mill Workers' Flat Brīvības 5-6, Līgatne, Latvia 57°14'02.0"N 25°02'25.0"E www.visitligatne.lv/ligatnes-papirfabrikas-ciemata-vesturiskaiscentrs?lang=eng

Estonian Printing and Paper Museum











The Estonian Printing and Paper Museum is located in an old industrial compound in Tartu's city center.

The museum is the only memorial institution for this field in the area, and it illuminates the history of printing, the technologies involved, and the chemical and physical processes used to make paper. You can do everything with your own hands: make paper, set up a page of movable type, print the result, and try some 3D paper art.

The Printing Museum lets you look back to the time of the builder of the first printing press, the goldsmith Gutenberg; the spread of the printing press and the written word, and their effect on the Reformation and censorship. By seeing different machines and technologies in turn, and trying them out, you can learn about the development of the art of printmaking - including small nuggets like letters that were common at the time of the first printing of Oskar Luts's Kevade, but are now gone from their native alphabets.

Aside from historical techniques, the museum offers a lot of modern activities, combining digital photography and the power old presses. The museum is a rare environment of knowledge and motivated enthusiasts. The museum also features the reading room Fahrenheit 451.



Estonian Printing and Paper Museum Kastani 48, Tartu, Estonia 58°22'15"N 26°42'58"E www.visitestonia.com/en/printing-and-paper-museum

Long House – Kärdla Broadcloth Factory Museum and Former Director's Residence





Kärdla, the central town on Hiiumaa, ows its name to a small village of Swedish settlers - but it grew into a city thanks to the broadcloth factory. Founded in 1829 by the barons Ungern-Sternberg, this was one of Estonia's first large textile enterprises, and it retained a prominent role up to the early 20th century. The factory was destroyed in the Second World War.

The factory settlement was carefully designed, and inspired by similar efforts in England. In 1844, the factory workers started to receive plots of land and loans to build homes. The factory square (former factory yard) is surrounded by former shop masters' houses - single-storey buildings with large gardens, and a 60-meter long wooden house resembling a country manor, the former residence of the factory's director. Now it holds the Hiiumaa Museum, whose permanent exhibition shows the life of a broadcloth factory worker, as well as that of a gentleman.

The museum features a quiz on the life and history of the factory, as well as trial of the skills and knowledge required of a broadcloth factory worker; the latter also needs a fair bit of teamwork.

Sindi Broadcloth Factory Museum





Just outside the city of Pärnu, Sindi enchants you with its impressive old alley and the broadcloth factory's shop master houses that line it. One of these contains the Sindi Museum, which talks about the history of the factory, the life of its workers, and the town itself.

The Sindi broadcloth factory was one of the first truly mechanized major enterprises, founded in 1833 by J. C. Wöhrmann, a trader from Riga, who moved the machinery from a factory in Poland to Russian Imperial territory to avoid import duties.

An enormous sum was invested in the construction of the factory complex, much of which was state aid. 3.4 million bricks were used to erect the production buildings, requiring a brick kiln with eight furnaces to be put up on site before the factory structures, and resulting in the formation of the Sindi Reservoir.



Long House – Kärdla Broadcloth Factory Museum and Former Director's Residence Kärdla, Hiiumaa, Estonia 59°0'15''N 22°44'47''E www.visitestonia.com/en/long-house-of-the-hiiumaa-museum

Sindi Broadcloth Factory Museum

Sindi, Pärnu County, Estonia 58°24'26''N 24°39'14''E www.visitestonia.com/en/sindi-museum

Hiiu Wool





On the island of Hiiumaa, bearing towards Käina as you exit the port, among the juniper-lined pastures of Vaemla, stands a family enterprise - the Hiiu Wool Factory. This facility, which is still in day-to-day use, operates vintage machines - some from as far back as the late 1800s. A master who knows the machines down to the last bolt is on hand to explain the details. Originally driven by steam, the devices are now powered by Soviet-era electric motors.

This factory is a great place to see the entire wool processing chain: the "wolf" whose teeth make the raw wool pliable, the carder that spins the fibers into yarn, the twisting machine that makes the yarn thick and uniform, and the reeling machine that arranges the yarn onto spindles.

The factory store sells yarn and clothes made from Hiiu wool; in the summer, there is a cafe.

The wool factory is located in a building that was originally built in 1841 as a hay barn for Vaemla manor. The vintage equipment was brought here in the 1950s from mainland Estonia.

Süvahavva Wool Factory





The Süvahavva wool factory is located in Põlvamaa, at the Viia mill on the Võhandu river. Built in 1958, this white stone building houses a working wool factory/museum that uses vintage equipment. The oldest machines are from the 1890s.

On the top floors of the mill, you can see the traces left by the feet of the woolmakers as they shuffled across the shop floor. Wool products can be purchased at the factory.



Hiiu Wool Vaemla, Hiiumaa, Estonia 58°49'53"N 22°49'38"E www.visitestonia.com/en/hiiu-vill

Süvahavva Wool Factory

Viia veski, Süvahavva, Räpina Parish, Põlva County, Estonia 57°59'19"N 27°13'4"E www.visitestonia.com/en/suvahavva-wool-factory-and-museum

Wool factory "Limbažu Tīne"

The first wool factory was launched in 1876, however, the joint stock company "Limbažu Tīne" was established in 1914.

It is a unique industrial heritage site, and the factory still processes wool using the historical equipment. Wool yarn, high-quality wool and linen fabrics, blankets, liners, rugs, table cloths, towels, scarves and other textile garments are produced here. The factory is also among the few to weave ethnographic cloths based on authentic samples of the Baltic Region. Folk costume patterns from Estonia, Latvia and other countries are kept here.

Visitors are offered to view the factory machinery and activities in a safe and convenient way. A separate room is devoted to the factory and textile processing techniques. The factory store sells the manufactured products.





Wool factory "Limbažu Tīne" Pļavu 4, Limbaži, Latvia 57°30'42.5"N 24°42'21.9"E www.limbazutine.lv

Industrial Heritage Tower in Kuldīga

Over 70 years, from 60s of the 19th century until 30s of the 20th century, there were four needle factories in Kuldīga – Levinsons & Co Needle Factory, Kuldīga Needle Factory, "Meteor" and "Planet". Until the beginning of manufacturing, the needles were brought from England by the Lithuanian jew Simon Hirschmann. Once he calculated that the construction of a needle factory would not cost more than an annual expenditure on needle transportation from England. This is how the first needle factory was built, which was initially located in a small one-storey building at Liepājas Street 37 and for a long time was one of the few in the Russian Empire.

Nowadays, the building with its adjoining tower features an exhibition on four floors to demonstrate the impact of a needle on the human advancements in medicine, geography, and clothing manufacture. The exhibition ends with the story of the needle factory history in Kuldīga.



Pāce Wool Factory

Pāce is the only place in Kurzeme to still process wool, and it is also the only full-cycle wool processing factory in Latvia. Colourful yarn is exported to 16 countries worldwide! Raw materials are purchased from sheep farmers in Latvia Estonia and Lithuania. Yarn is not chemically treated and it contains a high content of the natural substance lanolin – sheep sebaceous secretion, which accounts for the "warmth" of the wool yarn.

Wool processing traditions in Pāce date back to the end of the 19th century, during the first era of the Republic of Latvia broadcloth was rolled here.





Industrial Heritage Tower in Kuldīga Kalpaka 2, Kuldīga, Latvia 56°58'07.0"N 21°57'46.0"E visit.kuldiga.lv/en/

Pāce Wool Factory

Pāce, Dundaga County, Latvia 57°29'48.3"N 22°16'32.4"E www.facebook.com/dundagaswool

Siimusti Ceramics



Siimusti Ceramics operates from the clay factory, which was founded in 1886 by Joosep Tiimann, a man born from a family of farmers. The location was suitable due to the clay deposits present here. At first the brick manufactury was created; afterwards they started producing oven pots and dishware. Nowadays you can get acquainted with the manufacturing process of ceramics: The pouring of clay into the mold and the firing and glazing processes.

The end product can be bought onsite.

Piebalga Porcelain Factory



The only porcelain factory in Latvia is located in the former dairy building of Vecpiebalga manor. The "White gold" is now among the symbols of Piebalga region. Here, porcelain is an art and tourist attraction. Careful hands turn the material into fine dishes, promotional items and special gifts for corporate and other festive events. Here, visitors are explained the secrets of making the fragile material, and the history of the factory and porcelain.

Articles made at the factory are exhibited in the nearby Vecpiebalga manor house.

The hands-on workshop introduces the visitors to porcelain painting, and the decorated porcelain objects are burned and later handed over to its master.



Siimusti Ceramics

Siimusti, Jõgeva Parish, Jõgeva County, Estonia 58°43'35''N 26°20'30''E www.visitestonia.com/en/siimusti-clay-industry

Piebalga Porcelain Factory

"Piensaimnieki", Ineši Parish, Vecpiebalga County, Latvia 57°01'16.0"N 25°49'52.0"E piebalgasporcelans.mozello.lv

Cēsis Brewery



The brewery in Cēsis was built in 1878 and was an integral part of the newly established Cēsis Castle Park. It was a distinct landmark of Cēsis for more than four hundred years. At present, it is a unique industrial heritage – the brewery premises reveal the traces and history of the 19th and 20th century. Since 2013, the owner and host of the premises is the NGO "Vides risinājumu institūts", which strives to turn it into the Science and Art Centre.

The NGO organises various science, art and cultural events to enable visitors of the brewery be part of its transformation process.

Beer Museum "Aldaris' Beer Workshop"





Most modern Brewery Museum in the Baltics and the first in Latvia. The beer museum is located in the historic brewery area, on the outskirts of Riga – in Sarkandaugava. Following an extensive reconstruction and more than 1.5 million euro investment in the restoration of the historical building and establishment of the beer exposition, the museum was opened in May 2015.

Here, you can see the authentic beer boiling hall, which has remained unchanged since 1938. The ancient copper pots are a rarity in modern times. Interactive technologies tell about the magic of the four key ingredients used to make beer – water, hops, malt and yeast.

The museum is located on three storeys. The second wing of the building is home to "Aldaris" brewery, which is part of the Carlsberg Group since 2008.



Cēsis Brewery Lenču 9/11, Cēsis, Latvia 57°18'53.0"N 25°16'15.0"E

5/°18'53.0"N 25°16'15.0"E www.videsinstituts.lv/en/cesis-brewery/cesis-brewery

Beer Museum "Aldaris' Beer Workshop" Tvaika 44, Rīga, Latvia 57°00'18.4"N 24°07'17.4"E alusdarbnica.lv/en/about-us/

A. Le Coq Beer Museum

The beer museum is located across the six floors of the former malt tower at A. Le Coq's 1898 brewery building.

The exhibition speaks of the history of beer, from the beer culture of Ancient Egypt up to today. Here you can see homebrew gear and old industrial brewing equipment, hear about the profession of the brewer, and the drinking habits of students. You can taste the product that went directly to the Tzarina's table, as proven by a letter from the Winter Palace. Other exhibits include the factory's own money, and medals from world fairs.

An excursion to the A. Le Coq beer museum includes a visit to the ultra-modern factory, and ends with a tasting of A. Le Coq products in the museum's pub.





A. Le Coqi õlletehase hooned 1905. aastal. Sel ajal tegutses siin õllevabrik Tivoli nime all.











A. Le Coq Beer Museum Laulupeo 15, Tartu, Estonia 58°23'7''N 26°42'27''E www.visitestonia.com/en/a-le-coq-beer-museum

"Laima" Chocolate Museum









The museum is located in a building, which was designed in 1939 by Stanislav Aloiz Borbal and which is included on the list of industrial heritage in Latvia. It tells about the history of chocolate manufacturing and lets you experience and enjoy it with all your senses – seeing, tasting, listening, and feeling.

A total of 100 kg of cocoa beans were used to arrange the exposition, while the eldest exhibit is more than 120 years old.

There are two more rooms – the Creative Chocolate Workshop and the Laboratory of Taste. The workshop is a hands-on experience to create chocolate, while the Laboratory invites to taste and celebrate life. The aura in the Laboratory of Taste has always been special, since it is the former laboratory to create new "Laima" products and new chocolate sweets formulas.

Rūjiena Dairy





"Laima" Chocolate Museum Miera 22, Rīga, Latvia 56°57'47.2"N 24°07'54.2"E www.laimasokoladesmuzejs.lv/en/about-museum/exposition/

Rūjiena Dairy

Upes 5, Rūjiena, Latvia 57°53'45.0"N 25°19'37.0"E www.rujienassaldejums.lv Built in 1912 to meet the needs of Rūjiena Dairy Farmers' Society due to decreasing flax and grain prices worldwide, which made the farmers change their standard business and switch to cattle-breeding. The modern machinery installed indoors had a capacity of processing 10,000 litres of milk daily. Its construction cost 40,000 Gold Roubles. Due to war and changing political regimes its further growth was suspended, and it re-opened on 1 February 1922. The dairy continued its successful operation to become the largest butter exporter in Latvia, exporting as much as 433.5 tonnes in 1939. Since 1988, ice-cream "Rūjienas saldējums" is produced, and the dairy is open for visitors to explain the ingredients and process of ice-cream production along with a tasty follow-up (sampling).

Vijciems Cone Drying Facility

Vijciems was the ideal location for a cone drying facility due to the need for reafforestation as a result of vast forest fires in Northern Vidzeme. Vijciems cone drying facility is among the eldest in Latvia and it is still working and seeds are extracted for sowing new forests. The facility is open for tours to track the way a seed makes to a forest.





Alatskivi Drying Barn

Alatskivi Manor's large Historicist drying barn harkens back to the manor estates of a century ago. Here is preserved a complete manor compound, with a castle, old nobles' house, a park, and outbuildings.

Attached to the 19th century barn is a drying facility with an enormous drying rack, heated by wood fires one storey below. Drawings on the walls explain the dryer's operating principles, and show the rich variety of folk tales about barn dwellers.

The Alatskivi castle, manor compound, barn-based nature center and drying facility are a beloved stopover on the Onion Road along the shore of Lake Peipus.







Vijciems Cone Drying Facility

Vijciems Parish, Valka County, Latvia 57°35'32.0"N 26°02'23.0"E www.mammadaba.lv/en/objects/top-12/vijciems-cone-drying-facility

Alatskivi Drying Barn

Alatskivi, Tartu County, Estonia 58°36'7''N 27°8'8''E www.visitestonia.com/en/alatskivi-cultural-heritage-landscape-andnature-centre

Estonian Peat Museum in Tootsi



Just off the Pärnu-Rakvere highway, a meandering road follows a rail line to the village of Tootsi and its briquette factory. The introduction to the 1938 factory begins as you pass through the settlement that grew up around it.

The haughty Tootsi briquette factory's premises now house a peat museum, which tells the story of the factory itself, its equipment, and peat and its processing.

A narrow-gauge railroad leads off from the building into the peat fields and the Tootsi Bog; this carries an old peat workers' train. You can also have a ride on a handcar.

The use of peat for fuel began over a thousand years ago. In Estonia and Latvia, peat production started at the end of the 18th century. By the middle of the 19th, plenty of manors had their own peat quarries. Mechanized peat mining in Estonia goes back to efforts like those at the Sindi broadcloth factory starting in 1861.

A national peat briquette industry got its start in Estonia in 1936. A year later, the decision was made to build a briquette factory at Pööravere. This was quickly renamed after the nearest train station, and became the Tootsi Briquette Works.

Even in the winter, as many as 200 people worked here. In 1938, part of the bog was drained, and a railroad track leading through the thicket to the Tootsi station was built on undulating ground.

The Tootsi Briquette Works was one of the most modern facilities in Estonia at the time; production began in 1939.



Estonian Peat Museum in Tootsi Tootsi, Pärnu County, Estonia 58°35'17.5"N 24°47'06.1"E eestiturbamuuseum.ee

Lümanda Lime Park

The Lümanda Lime Park is located in western Saaremaa. An adventure trail through more than ten old lime kilns, old and new quarries, and a slaking bath introduce the process, including the chemical reactions that turn limestone into lime, and then turn the lime mortar or limewash on your walls back into limestone.

Upon reaching the lime park, you can take a hiking trail that is equipped with multi-lingual explanatory plaques, leading you through the field of lime kilns. Back at the main building, you can see a film and experiment with lime - get the stone to boil without heating, and make bubbles in clean water to produce limescale.

The lime kilns, which are nearly a century old, have been cleaned, repaired and arranged in such a way as to demonstrate different stages of the ancient lime-producing technique. The lime kilns have different shapes and sizes - each one following the ideas of its owner. They come from a time when making and selling lime was a profitable activity, so every farm in the area set up its own lime firing kiln on this resource-rich land, trading slivers of coastal property to neighbours if needed.

The process of firing lime takes between 50 and 75 hours, at a temperature of 1100 to 1300 degrees Celsius. The kilns can fit up to 30 tons of stone at a time. (CaCO3=CaO+-CO2)

After firing, the limestone cools over 2-3 days and nights. Then the quicklime is taken to a slaking bath, where the chemically active rock is mixed with water. (CaO+H2O=-Ca(OH)2)

In grout, the hydrated lime reacts with carbon dioxide and turns back into CaCO3, the main component of limestone. (Ca(OH)2+CO2=CaCO3+H2O)

The theme park has picnic, bonfire and BBQ facilities. The main building can be used to host events.





Lümanda Lime Park Lümanda, Saaremaa, Estonia 58°17'36"N 22°1'17"E www.visitestonia.com/en/saaremaa-lime-park

Riga Water-Supply Museum







Riga Water-Supply Museum "Baltezers" pump station, Ādaži County, Latvia 57°02'11.6"N 24°19'37.5"E www.rigasudens.lv/about-company/history/museum/en/ The museum in Ādaži was launched in 1988, and is among the most significant water-supply museums in Europe. It tells the 400-years' history of Riga urban water supply system, which dates back to the mid-17th century. At that time, a horse-driven pumping station and wooden pipeline system was established, and the city residents were supplied water directly from the River Daugava. At the end of the 19th century, the system no longer met the needs of the city.

In 1883, large amounts of good quality groundwater was discovered in Bukulti, Rembergi and Zakumuiža areas. The groundwater extraction systems in Bukulti manor area, a pumping station facility near Lake Mazais Baltezers, and pipelines to supply the water to Riga were started to be built.

Baltezers water pumping facility was launched in 1904 and operated until 1950. The former water pumping machinery hall is now home to the Riga Water-Supply Museum. Compound-type steam machines, cast iron syphon ducts and penstocks, manufactured in Riga at the Felzer mechanical engineering factory, are preserved and exhibited. The steam boilers were manufactured in Riga at R.Pole mechanical engineering factory.

Museum of Energy

Permanent and temporary exhibitions are located at a significant place – in Kegums, on the left bank of Daugava, next to Kegums hydroelectric plant.

The exhibition "Development of electric energy in Latvia" provides an insight into the history of the industry in Latvia – it tells about the generation, transmission and distribution of electricity, and demonstrates the historic technologies, such as, Kegums' and Plaviņas' hydro turbines, various outdoors switching equipment and other industrial heritage objects.

The depositories of the Museum are located in Riga, Andrejsala – in a building designed by the architect Karl Felsko (1844–1919). Here, you can study a collection of glass plate negatives of Eduards Kraucs (1898–1977) of the construction of Ķegums power plant, view various tools, steps, safety belts, helmets of an electrical technician, measuring devices and electric energy meters.



The depositories of the Museum Andrejostas 19, Rīga, Latvija 56°58'00.3"N 24°05'38.0"E Permanent and temporary exhibitions Ķeguma prosp. 7/9, Ķegums, Latvija 56°44'24.5"N 24°42'15.4"E www.latvenergo.lv/eng/museum_of_energy

A mill is a grinding device and a building where solid materials are crushed, ground or cut into smaller parts by mechanical force. The first mills got the energy needed from natural forces- usually water or wind.

A watermill gets its power from the pressure exerted by falling or flowing water on the paddles of a wheel. This makes the waterwheel spin, and the energy produced is transferred to machines. Therefore, a water wheel is a hydroturbine and a power plant, converting the flow of water into mechanical energy, and using that energy to power machines.

A windmill is a structure that turns towards the wind to catch the breeze with its blades. It uses the energy of the turning blades to drive millstones or a belt pulley.

The first records of watermills date back to before Ancient Greece; waterwheels were widespread in the Roman Empire, and were used throughout Medieval Europe.

Watermills started to become commonplace in Estonia and Latvia in the 13th and 14th centuries.

The tasks of a watermill throughout history have included grinding grain into flour, sawing and splitting logs, processing wool, and weaving cloth. These devices have also been used to pump water, crush rocks, and help with metal production. The advent of flour mills greatly improved grain processing - previously it had been ground manually using hand-powered millstones.

Using wind energy for the benefit of mankind has been a dream for a long time. Hammurabi, founder of the great Babylonian state, looked for ways to use wind in irrigation projects. The first windwheel was constructed in the 1st century by the Ancient Greek engineer and mathematician, Heron of Alexandria.

The oldest known wind-powered machine was used by the Persians, who set between six and twelve sails spinning around an axis. The sails were used to lift water and grind grain.

Knowledge of Persian windmills came to Europe with the crusaders, and they were adapted to frequently shifting winds. This is how post mills (which could turn into the wind entirely) and tower mills (with turning heads) came to be.

Windmills came into use in Europe slightly later than watermills, and showed up in Estonian and Latvian territories no later than the 14th century.

Coastal areas generally preferred post mills, whose entire body could be shifted to face the wind. Elsewhere in Estonia, manors erected large Dutch-type tower mills with turning heads. Construction of the latter accelerated at the turn of the 19th century, when the right to build them was granted to farmers.

A post mill consists of the trestle and the body, which sits on top and turns entirely around a central post. A post mill has one pair of millstones. The mill is generally separated into two floors: the top floor houses the moving parts (millstones and gears), while the ready flour is funneled down to the bottom floor.

A Dutch mill (or tower mill) is a multi-storey, usually wooden or stone windmill, with only its head able to turn into the wind. It usually has two or more pairs of millstones.

Mills have been an inseparable part of our cultural landscape for centuries; they have served as landmarks and examples of the application of technology and natural forces for the benefit of humans. Old mills demonstrate an amazing variety of construction and carpentry skills, and the ingenuity of the master, miller, or owner.

In the past, mills have mostly been used for grinding grain into flour. Starting in the 1920s and 1930s, as electricity consumption grew, mills were adapted to produce power in addition to being exhibits of heritage culture.

The first electricity-generating windmill

The first windmill to generate electricity was constructed in July of 1887 by the Scottish scholar James Blyth, for the purpose of powering the lights at his summer house.

Hill of Windmills at Angla

The island of Saaremaa had a place where an entire hill of windmills has been preserved in its original form. This hilltop was the windiest place around, so all the village windmills were put here. The impressive windmill theme park grabs your attention from afar, but it is when you go inside the

Eemu Windmill

mills themselves that you become stunned by the variety- each windmill is a reflection of its owner and his ingenuity.

Out of the five surviving windmills, four are typical Saaremaa post mills, built at the end of the 19th and beginning of the 20th century. Among them stands a slightly taller Dutch-type tower mill from 1927, with a mill attendant's residence next to it.

In the summer, a miller is in attendance at one of the windmills, and flour is being made. The park also has a cultural heritage center, where you can have a meal, check out old agricultural equipment, bake bread, and participate in workshops.

In 1925, when there were 13 farms in Angla, this windy hilltop held as many as nine different mills.

1880 - Lause post mill; 1800 - 1810..? - Reinu post mill; 1910 - Viita post mill; 1913 - Vilidu post mill; 1927 - Tedre farm's Dutch mill

Before you reach Estonia's biggest island, you must drive across the island of Muhu, and at is farthest point you may notice an old post mill. The Eemu windmill is a typical wooden structure, with a set of stairs attached to its body (turning together with the rest of it!). Climbing these stairs, you reach the mill's two floors, where you can see the old grinding mechanism.

Next to the windmill is a manual millstone that you can use to experience flour-making the very old-fashioned way.

Hill of Windmills at Angla Angla, Saaremaa, Estonia 58°31'49"N 22°41'52"E www.visitestonia.com/en/angla-windmill-mount

Eemu Windmill

Muhu, Saaremaa, Estonia 58°34'56''N 23°9'57''E www.visitestonia.com/en/eemu-windmill

Hellenurme Mill

On the shores of the Elva river, at Hellenurme, stands Estonia's oldest watermill to still keep its original shape: it was built by the Middendorff manor lords in 1880. Across the four floors of the facility, which still uses water to drive its equipment, you can see, touch, feel, and taste how cereal grains become something else.

As visitors arrive, the century-old turbine is engaged, and the mill comes alive. You can follow from start to finish as the grain into flour, semolina or groats, with all four storeys taken up by the mechanisms.

Here you can learn the origins of folk sayings, such as why two hard stones won't grind good flour, and see the literal wheat separated from the chaff; and find out that you bring one bag to the mill and take seven bags back.

The appetizing smell emanating from the cozy bakery lets you know that a tray of fresh bread is nearly ready. Alternatively, you can take part in the old-fashioned baking yourself!

The compound originally included a sawmill; its remains have been conserved.

The watermill operates as a museum. The mistress of the mill (the granddaughter of the former owner) and the miller are there to greet guests by prior appointment.

Hellenurme Watermill

Hellenurme, Palupera Parish, Valga County, Estonia 58°8'13''N 26°23'11''E www.visitestonia.com/en/hellenurme-watermill-museum

Vesirataste tüübid

Rideļi Mill

In 1863, due to the lake being connected with the Gulf of Riga, the water level of Lake Engure fell by two metres. Therefore, count Landsdorf built the big mill. The river Kalnupe runs to the Lake Engure through the mill, and the machinery was run by the water wheel.

Once, wool carding, spinning, and grain milling machinery was found at the mill. The mill burnt down during World War I. Following the manor land reform, the mill walls and the lake was bought from the state.

The mill was restored in 1924 and the water wheel was replaced by a turbine and a generator.

At present, the historical water wheel and the grain milling machinery is restored and accessible to be visited.

Rideji Mill Engure, Latvia 57°09'07.1"N 23°06'08.2"E www.rideludzirnavas.lv/en

Jaunpils Mill

Jaunpils mill was built in 1802 (1803) during the reign of baron von der Recke. It was once used for grain processing, and has been a sawmill and a joinery. The windmill was affected by the massive riots of 1905, when they were burned down. Later restored and continued to operate.

Nowadays, the former mill equipment of 20s and 30s is preserved, along with the hydraulic engineering structures and water reservoir.

The object is equipped with a modern touchscreen display, which tells about the history of the mills. The food inlets are explained by a printout mill guide and the tour led by the Miller's wife. The visitors are demonstrated various type of grain, ready-made grain products and, subject to prior announcement, can enjoy a nice meal (pancakes, buns, or something else for the sweet tooth).

Jaunpils Mill

Dzirnavu, Jaunpils, Latvia 56°43'49.3"N 23°01'18.3"E visittukums.lv/lv/Ko-skatit/Ekas-ielas-un-citas-buves/Jaunpilsudensdzirnavas

Lahmuse Mill

A few hundred meters past the Lahmuse manor is a beautiful lake, and on its shore stands the Lahmuse watermill. It features well-preserved machines and an old round-vaulted grain dryer.

Here you can learn about Estonian mills, the history of grain processing from stone-age pestles to medieval grindstones, and the rise of mills and their mechanisms. You can also touch examples of the output.

A film shows the local millstones, groat machine and fine grinder at work, and shows you how and why each type of grain was milled, and how much flour it produced.

The building's basement floor is for gearheads: here you can see the watermill's turbine, cam drives, and a remarkable Deutz piston engine.

The mill played an important role in the village: it was the source of fine, bread and feed-quality flour, grits and groats, and haymeal. Every family would visit the mill several times a year.

Carl Robert Jakobson Farm Museum Mill at Kurgja

On the shores of the Pärnu river, a bit over ten kilometers from Vändra in the direction of Rakvere, sits one of Estonia's most famous farm museums. The farm features a flour- and sawmill with its own millpond. It was built in 1879 by C. R. Jakobson, a famous Estonian writer, newspaper editor and educator. The renovated watermill is a part of the Kurgja farm museum.

Lahmuse Watermill

Altveski, Lahmuse, Suure-Jaani Parish, Viljandi County, Estonia 58°33'36.8''N 25°26'59.2''E

Carl Robert Jakobson Farm Museum Mill at Kurgja Kurgja, Vändra Parish, Pärnu County, Estonia 58°39'44''N 25°15'28''E www.visitestonia.com/en/the-farm-museum-of-cr-jakobson-at-kurgja

Ķoņi Mill

A mere five kilometers from the Latvian-Estonian border, on the shores of Latvia's Rūja river, stands what was one of the first mechanized production facilities in the local countryside: the Ķoņi watermill. Here you can see the workings of the old waterwheel, as well as the wool processing machines that it powered. The facility still works the wool for its customers to this day; electricity-generating turbines were installed in 2000.

The building's three floors offer the chance to see how a mill is built, get a glimpse of the turbines, watch an old spinning wheel in action, participate in workshops, and purchase the products of local masters. The oldest machines here are from the 19th century. A unique exhibit is a Russian-made "three-in-one" machine, which washes, cards and spins the wool.

A film selection tells the story of the mill and its workings, and the process of turning wool into yarn. What you learn here will help you in hands-on workshops.

The romantic setting brings many people here to celebrate the most important events of their lives. The mill features a cafe and accommodation.

Making bread, sewing a quilt or working with wool at this facility is the first interaction with old-fashioned skills for many of the guests. Children can spend a weekend in the countryside with "Grandma", with all the associated activities.

The mill was built 210 years ago by the Baron J. von Menzenkampf, whose family managed it until 1922. In the Soviet days, the mill was run by the local collective farm. Today it is once again in private hands.

Koni Mill

Ķoņi Parish, Naukšēni County, Latvia 57°56'36.0"N 25°22'22.0"E www.konudzirnavas.lv

Krīgaļi Watermill

The watermill was erected on River Mergupe in 1938. According to locals, in 1936 the old master/ miller from Riga was granted a credit of five hundred thousand Lats from the national bank "Latvijas Banka", and over a period of two years he built the most modern mills in Latvia at that time. The mill is preserved to the present days, and all devices and machinery are still on site and in working condition to produce flour, semolina, pearl barley, groats, and there are devices for grain purification. A small hydroelectric power plant was built in 1998. Tours are offered to demonstrate its operational principles.

Āraiši Windmill

Āraiši windmill was built to suit the needs of Drabeši manor, around mid-19th century. During its first reconstruction, a boulder bearing the inscription – ANNO 1852 - was found and assumed to be the year of its construction. By its structure, it is a Dutch type mill, since the mill has a rotating "head", called "cap". With a special mechanism, standing at the foot mill, the mill "head" was turned to the wind, to make it blow right into its wings. Once, the mill was a place to grind groats, as well as flour for black bread and animal feed. At present. the four floors of the windmill tell the how a grain is turned into flour, and offer a special grinder's meal made of barley groat and meat.

Krīgaļi Watermill Nītaure Parish, Amata County, Latvia 57°03'41.0"N 25°08'45.0"E

Āraiši Windmill

amata.lv/krigalu-mill/

Āraiši, Drabeši Parish, Amata County, Latvia 57°14'53.0"N 25°16'14.0"E amata.lv/3636-2

Kalnvēveri Windmill

Kalnvēveri farm was first documented at the end of the 19th century, and the windmill is said to be built around 1880. The mill was operated until around 1912, but later on it slowly deteriorated and only an empty casing was left at the end of the 20th century. In 2008, the Ethnographic Open-Air Museum of Latvia reconstructed the mills to preserve the historically valuable building and prevent it from getting lost within its historic settings.

Valdgale Windmill

The boulder windmill was built in approximately 1840. The mill was part of the large Valdgale manor and up until 1921 it belonged to the family of baron Fircks. In 2000, the mill was found to be in a very poor condition, considering the fact that it had been standing roof-less for 40 years! It was bought and restored by the Italian Giuseppe Riccardi. A tour throught the building leads you to the roof balcony offering a broad view over the nearby landscape. One can only imagine the magnificent sunsets! The mill features six floors connected by stairs. The host has installed a lift to move up or down various things, such as, dishes. A romantic rustic kitchen, four bedrooms, a living-room, even a cabinet and a private bathroom. A fire-place heats the place.

Kalnvēveri Windmill

Vecpiebalga County, Latvia 57°06'59.0"N 25°50'49.0"E brivdabasmuzejs.lv/en/museum/museum-veveri/

Valdgale Windmill Valdgale, Valdgale Parish, Latvia 57°17'10.4"N 22°34'18.0"E windmilltower.eu/en/

Leevaku Hydroelectric Plant

Near Räpina in South Estonia stands the Leevaku hydroelectric plant, famous among Estonians thanks to the book "Järvesuu Boys' Brigade" by Juhan Smuul. In the summer, the building hosts a museum that tells the power plant's history and demonstrated the technology used to harness the might of water. The facility, owned by AS Generaator, is a working electricity producer, contributing to the use of renewable energy. You can watch the power plant's mechanisms at work using cameras, and check out the dam that directs the water's flow, the two turbines, and the process of making electricity.

The hydroelectric plant's building was constructed in 1933, but the first mill to use the force of the Võhandu river' flow was erected here as far back as 1835. Water power was used drive a flour mill, a saw mill, and a woolworking facility.

Leevaku Hydroelectric Plant

Peri, Leevaku, Põlva County, Estonia 58°5'24''N 27°20'45.2''E www.visitestonia.com/en/leevaku-hydroelectric-power-station-andmuseum

Ööbikuoru Hydro Workshop and Museum

Located near Leevaku and also using the force of the Võhandi river, the Ööbikuoru Hydro Workhop and Museum displays equipment that uses water power: metalworking benches, manual tools, etc.

The workshop and power plant was built in the early 20th century, and until 1940, it powered the Rõuge school house, cultural center and church.

Cīrava Watermill

The NGO "Cita Abra" has taken over the management at Cīrava mill – now it is a place of informal education, artist residency and culture centre "Kultūras dzirnavas" (ENG: Culture Mill).

The NGO strives to save and restore Cīrava watermill by integration of the nearby natural and man-made resources to make it a social gathering and event site for locals and a creative venue for various arts, dance, theatre, multimedia, and music projects.

Ööbikuoru Hydro Workshop Museum

Ööbikuoru 3, Rõuge, Võru County, Estonia 57°43'40''N 26°55'49''E www.visitestonia.com/en/oobikuoru-hydro-workshop-museum

Cīrava Watermill

"Dzirnavas", Cīrava, Cīrava Parish, Latvia 56°44'11.4"N 21°23'04.0"E www.facebook.com/citaabra

In 1829, England – as the driver of industrialization – held railroad trials to find the best steam locomotive on the first intercity rail line between Liverpool and Manchester. The winner's design would be used for regular service. To determine average speed and fuel consumption, each locomotive travelled the 56-kilometer line both loaded and unloaded. The Rocket, steam locomotive built by George Stephenson (1781–1848) and his son Robert Stephenson (1803–1859), won the competition. The Rocket had a separate tender carriage for rock coal and water; steam came from a new multi-pipe boiler, heated by a 61x91 cm furnace. Cylinders were no longer vertical, but at an innovative 35-degree angle, which improved the locomotive's stability; the piston drove the 146 cm front wheels through connecting rods. The rear wheels were 79 cm in circumference, and unconnected to the fronts. From 1830, the cylinders were mounted horizontally.

Railroad Heritage

A railroad is a transport system using metal tracks, used to transport people or goods. The track network includes the buildings, technical systems and equipment needed to maintain it.

The railroad's earliest predecessor is probably Ancient Greece's stone-lined grooved roads, used with wheeled vehicles pulled by humans and animals to transport ships over the Corinth isthmus.

In the 16th century, wooden tracks with horse-drawn carts came into use, primarily for hauling coal; as locomotives appeared and grew heavier in the second half of the 18th century, the rails eventually became metal. The advent of steam engines jump-started the development of metalworking and machine-assisted manufacturing; new technologies made metal parts cheaper. The development of steam locomotives was spurred by Richard Trevithick (1771–1833), who in 1802 received a patent on a pressurized steam machine, where excess steam was released into the atmosphere, not into a condenser as with prior devices. When the steam engine was put on rails, the first steam locomotive was born (1804).

Russia's first general-use railroad, stretching 27 km from the capital of St Petersburg to the Emperor's summer residence at Tsarskoye Selo, was completed in 1837. In 1851, the St Petersburg-Moscow rail line was opened.

The first stretch of railroad in the present-day territory of Latvia was constructed in 1860 from Karsava to Daugavpils, as part of the St Petersburg–Warsaw line. In 1861, the 232 km Riga–Daugavpils railroad was constructed, later connecting to the St Petersburg–Warsaw line.

In Estonia, the Baltic Railroad from Paldiski via Tallinn to St Petersburg was inaugurated in 1870. The Tapa-Tartu line was finished by 1877, and the Valga-Pskov line by 1887.

What followed was a frenzy of railroad construction, and Estonia and Latvia was covered in rail tracks. Alongside the broadgauge railroads, there were narrow-gauge branches, which were cheaper to build and used lighter rolling stock; these solved the cargo and passenger transport needs of smaller regions. By the turn of the century, the narrow-gauge railroad reached nearly everywhere. Industrial rail lines moved peat, lime, glass, paper products, cellulose, cement, textiles, bricks, beer, and other goods.

Railroad heritage includes old stations, service buildings, machines, spurs of track, and the experience railroads where you can take an old-fashioned ride.

Rocket

A steam locomotive is driven by a standalone steam power plant, consisting of a steam boiler and a steam engine.

Gulbene-Alūksne Narrow-Gauge Railroad

Gulbene–Alūksne Narrow-Gauge Train Viestura 16G, Gulbene, Latvia 57°10'59.0"N 26°45'51.0"E www.banitis.lv The narrow-gauge railroad line Stukmaņi (Pļaviņas)-Gulbene-Alūksne-Valka was built in early 20th century. And nowadays a 33 km railway section is still preserved and operated: Gulbene-Alūksne-Gulbene is the only narrow-gauge commercial train in Latvia. During the war period, it has seen many owners coming and going – Russians, Germans, Soviets, and even the Estonian army. The interwar period made it a key railway hub.

In terms of architecture, a visitor shall pay attention to the station building, built in 1926. The importance and need for the narrow-gauge railway dropped in the 70s, and only due to some enthusiasts the railway was preserved.

Recently, the exhibition "Railway and Steam" was established, and the manual railcar has also been reconstructed to be offered to visitors. The former depot tells about its everyday routines, and demonstrates the old locomotives, wagons, and a locomotive turnplate. Order a special train on a steam or diesel locomotive, ride the various manual railcars, stay overnight at the former depot building or the parlour car from the Soviet Estonia.

At the end station, in Alūksne, a multimedia exhibition "Alūksne Bānītis Station" was opened at the reconstructed historical luggage barn of the station. It tells about railway history, provides insight of the everyday life, and the narrow-gauge train as an assistant, job and source of inspiration.

Ventspils Seaside Open-Air Museum

The museum was founded in 1954 as the Open-Air Museum of Sea Fishery. The first boats, residential and farming buildings of the fishermen, and the narrow-gauge railway train were brought to the future museum by its initiator and first director Andrejs Šulcs.

The indoors exhibition tells about the key stages in the development of fishery – fishing various species of fish, building boats.

A favourite entertainment and an educational activity at the museum is the narrow-gauge train, which runs on two lines – the 1.4 km long Rinka Line and the 3.0 km long Kalna Line. Station buildings are copies of authentic buildings from railway lines in Kurzeme.

In 2018, the exhibition was extended with the renovated Mazirbe Goods Shed, which is the only original building on the narrow-gauge railway exhibition. Outdoors, there is a collection of anchors with more than 140 different anchors, the eldest of which date back to the 18th century.

Ventspils Seaside Open Air Museum Riņķa 2, Ventspils, Latvia 57°23'07.2"N 21°32'16.4"E muzejs.ventspils.lv/en/seaside-open-air-museum/ narrow-gauge-railway/rail-facilities

Baloži Peat Extraction Railway/Museum

In the centre of the Medemu peat-bog, between the sand dunes, the peat factory "Baloži" was built shortly after World War II by German prisoners of war.

Soon after that, the present town of Baloži emerged around the factory to be inhabited by the factory workers. The bog extracted peat predominantly used as fuel, litter, and to make peat insulation panels. For the purposes of peat transportation, a narrow-gauge railway network (750 mm) with a total length of 28 km was built. Nowadays, the Baloži Peat Extraction Railway/Museum is a 2.5 km long railway section preserved by enthusiasts.

The railway is restored since 2013 and in 2018 the first regular excursions along the restored railway section (1.1 km long) were launched. The railway collection features some rare and unique locomotives and wagons, for example, an authentic peat railway canteen wagon.

Eisenstein's Communication Centre in Keipene

Keipene is deemed the capital of cinema history of Latvia. The station building on the railway line Riga-Ērgļi was built in 1950 and it is the only public exposition dedicated to the fabulous filmmaker, film director Sergey Eisenstein.

Here, one can find a lighthouse with mailboxes devoted to the film director Juris Podnieks, a 5 m high table devoted to the fabulous Eisenstein, a tunnel of motion pictures on a rail section reminding of the first movie demonstration, and "Potemkin's well".

Baloži Peat Extraction Railway/Museum Rīgas 51, Baloži, Ķekava County, Latvia 56°52'37.2"N 24°06'22.3"E www.kudrasbanitis.lv/index.php/en/

Eisenstein's Communication Centre in Ķeipene Ķeipene, Ogre County, Latvia 56°53'45.5"N 25°11'14.1"E www.latvia.travel/en/node/222649

Estonian Museum Railroad at Lavassaare

The Estonian Museum Railroad is located at the village of Lavassaare, 17 km outside Pärnu and deep in the bogs. It was created thanks to the hard work of rail enthusiasts.

The Museum Railroad has over 80 different sets of rolling stock, including 5 steam engines, and a range of technical appliances. Exhibition pieces include working steam engines and handcars; one of the locomotives is in use on the Gulbene-Alūksne railroad.

Working vehicles are on display at the depot (1924). The former peat-making residence exhibits photos, items and documents from the history of the narrow-gauge railroad. The most exciting exhibits are the rail bicycle, the hand-powered fire pump, and the uniforms. A narrow-gauge spur has been renovated, and visitors have a chance to ride the old machines into the center of the peat bog.

The main consumer of Lavassaare's peat output was the Sindi Broadcloth Factory. Between 1922 and 1924, the State Central Fuel Materials Committee constructed a 28-km long narrow-gauge railroad from the Lavassaare bog, via Pootsi station, straight to the right bank of the river Pärnu, just across from the Sindi factory. The only surviving part of the Lavassaare peat railroad is the remarkable bridge over the Sauga river, and the bog network, at one end of which lies the Lavassaare Railroad Museum.

Mõisaküla Museum

The village of Mõisaküla on the Estonian-Latvian border was founded and grew in connection with the railroad. The old station master's house (1932) is now a museum of the history of Mõisaküla and the railroad. Here you can see locomotives' factory plates, models and miniatures, and tools used to construct a narrow-gauge track. The museum also displays a bronze ashtray from the state railcar of Nicholas II, Tzar of Russia- this was preserved when the car was dismantled at the Mõisaküla factories in the 1920s.

The Pärnu–Mõisaküla railroad was a nearly 50 km long stretch, constructed in 1895-1896 as a narrow-gauge supply line connected to the Valga–Ruhja–Pärnu railroad. 1897 saw the inauguration of the Mõisaküla-Viljandi line, nicknamed the Mulgi Railroad (after the term used for people from the area). Railroad workshops and a factory were built in 1900, to repair the steam locomotives. In 1934, the train factory started to produce passenger railcars. The era of the narrow-gauge railroad between Pärnu and Mõisaküla ended in 1975, when the last general-service narrow-gauge train left Mõisaküla; it was replaced by a broad-gauge railroad that formed part of the Tallinn-Pärnu-Riga line. The poor quality of the tracks, however, meant that rail service could only be kept up for a little over a decade.

Estonian Museum Railroad at Lavassaare Lavassaare, Pärnu County, Estonia

58°31'14"N 24°21'2"E www.visitestonia.com/en/estonian-museum-railway-at-lavassaare

Mõisaküla Museum

J. Sihveri 4, Mõisaküla, Viljandi County, Estonia 58°5'33''N 25°11'11''E www.visitestonia.com/en/moisakula-museum

Railroad and Communications Museum in Haapsalu

Railroad and Communications Museum in Haapsalu Haapsalu, Lääne County, Estonia 58°56'17"N 23°31'56"E www.visitestonia.com/en/railway-and-communications-museum The Railroad and Communications Museum is located in the ornate, historical wooden building and grounds of the Haapsalu Terminal. It takes you on a journey through the history of Estonian railroads and communications.

Visitors are greeted by a respectable 1930s-era station master, and you may visit the terminal's post office.

The station has an unusually long (213,6 meter) covered platform. The former terminal atmosphere and steam-engine noises are summoned at the push of a button.

The collection of rolling stock includes both steam and diesel locomotives, passengers cars and handcars. The station's grounds contain a water tower, depot, turntable, and the railroad workers' residences.

The terminal building was constructed as the Keila-Haapsalu track section was completed at the start of the 20th century. The building was specially designed, and more ornate than others, intended to welcome the Russian emperor and his family members. The station hall includes an Emperor's Pavilion and a large summer buffet room. The resort town was beloved of Russian imperial family, and the Emperor himself was said to have supported the idea of the building, and helped make it a reality.

The first scheduled train arrived in Haapsalu in 1904, and the last one in 1995.

The excursion train Peetrike leaves from the museum on a tour of the town.

Railway Museum of Latvia

The museum is a unique proof of the history of railway and its development in Latvia. It exhibits the largest-in-Baltics collection of broad-gauge rollings. Locomotives of various times, wagons and track maintenance machinery are parked next to each other on four rail tracks. The museum collection features photographs, documents, maps, schedules, uniforms, inventory items from the station telling about Latvian railway history. Yet the exhibition is an adventure in itself for the whole family, where you can enjoy the special feeling of the train era, and pretend to be a station's officer or a locomotive driver.

Railway Station "Airīte"

Former railway station "Airīte" is located in Kurzeme, on the Riga-Liepāja railway line section, between the towns Saldus and Skrunda. The station's brick building was built in 1935 according to a standardized project, similar to the stations "Josta" and "Tadaiķi". It was neglected since 2001, but in 2013 it was bought by family Stumburs aiming to renew it. The interactive exhibition is placed in waiting room and cashier's office, and the exhibits may be touched, operated; the exhibition tells about the development of the railway line, and the work, routine and life of the residents.

Railway Museum of Latvia Uzvaras bulvāris 2/4, Rīga, Latvia 56°56'27.5"N 24°05'40.1"E railwaymuseum.lv/en

Railway Station "Airīte"

Airīte, Zirņi Parish, Salduse County, Latvia 56°42'21.4"N 22°10'22.7"E www.facebook.com/airitestation

A water tower

A water tower consists of a high raised water tank, a pump that forces the water up to it, and the pipework that delivers the water to consumers. The higher the tank, the bigger the water pressure. This pressure is created by the effect of gravity on the water's own mass. When a tap is opened at the end of the pipework, the water comes out of the tap under pressure.

Water Towers

A water tower is a clever and simple solution for ensuring a desired volume and pressure in the distribution network for potable water, fire-fighting, and supplying locomotives or factories. Water is pumped to the vessel at the top of the tower, from where it is forced down into the pipes by the pressure of gravity and its own weight, spreading out to consumers.

Compared to European nations, Estonia and Latvia's water tower is brief. The first water towers were built in the 1860s-1870s, with the advent of the railroad in the Baltics, and the construction of large steam-powered factories.

The steam engines and locomotives in use at the time needed water to produce steam; the supply needed to be topped up regularly. Early steam locomotives needed to refill their water tanks every 11-16 kilometers. By the end of the 19th and beginning of the 20th century, water towers showed up in cities and manors, providing potable and fire-fighting water.

The water in the tank can be used even if the pump is not working, since the water in the pipes comes out under the force of its own weight.

Water consumption is inconsistent throughout the day – in the morning, everyone in the city needs water at once: to take a shower, brush their teeth, brew coffee. At such times, regardless of the pump's power, the water flows into the pipes under its own weight. Gradually, depending on its power, the pump refills the tank, preparing for new peak consumption. The construction, use and deprecation of water towers testifies to the development of the plumbing system. Water towers are widely familiar landmarks, which are valuable today by the view they offer, often being the highest points in a given region.

Bīriņi Castle Water Tower

Bīriņi manor ensemble consists of castle building, manager's house, stables, servants' house, water tower, farmers' affairs commission house, watermills, crypts, parks and trails over a total area of 50 ha.

The new Bīriņi manor house was built during the time of August von Pistohlkors in 1860, according to a design by the architect F.W. Hesse. It was followed by a beautiful well: \sim 10 axles or 14.91 metres deep well with a pipeline running to manor kitchen. Until then, water was brought by 2 horse-driven carts from the lake. To improve and simplify water supply, in 1875 a water tower was built above the well.

Water was pumped and supplied to the castle and buildings of the nearby manor centre by wind power.

Later, the performance of the water tower was improved by an electric motor, which is run when there is no wind. The sophisticated tower architecture provides it with a neo-Gothic look.

At present, the ground floor exhibits models to demonstrate the process how water is pumped from the well into a container and how it moves along the pipes; the old well is seen under a glazed floor. The 2nd floor plays a meditative water sound track and shows light installation, while the 4th floor takes you to the former water reservoir, which further takes you up on the roof of the flower to demonstrate the wind rotor, wings, and the surrounding area.

Bīriņi Castle Water Tower Bīriņi, Vidriži Parish, Limbaži County, Latvia 57°14'38.0"N 24°39'34.5"E www.birinupils.lv/en/

Zilaiskalns Water Tower

Zilaiskalns water tower is an art deco style building, which used to supply water to the peat factory and the village.

The tower and its ancillary building are home to an exhibition with its own architectural value and provide a 360-degree panoramic view from top of hill Zilaiskalns; the exhibition tells about the peat factory and the nearby workers' village, local nature features and the water supply system established for the purposes of the village.

Virtual glasses will take you on a flight over the hill Zilaiskalns to tell about the everyday life of ancient tribes, legends and stories of the hill; from Zilaiskalns station, the journey continues in a narrow-gauge train. Visitors can see the water reservoir on the top floor, where one will also find the viewing platform.

Zilaiskalns Water Tower Parka 2, Zilaiskalns, Kocēni County, Latvia 57°33'25.0"N 25°12'53.0"E visit.koceni.lv

Viljandi's Old Water Tower

In the town's historical district, on the high shore of Lake Viljandi, stands the old water tower -a 30-meter red-brick structure, topped with a wooden extension resembling an eight-sided house with tiny windows.

The tower's third floor contains permanent exhibitions and a historical overview of the water town and the town. Upon reaching the top floor, you get an astounding panoramic view of the town and the surrounding nature. Photos on the walls repeat the views from the windows and offer the chance to match the mapped important structures to what your own eyes can see.

The tower was put into use in 1911, and Viljandi was one of the first towns in Estonia that got central running water and sewers. The volume of the water tank was 100 cubic meters, and the water tower was in use until 1960, when a new residential water tower was built.

Risti Water Tower

The Risti water tower is one of those meant to serve the railroad, and was erected at Risti station on the Haapsalu-Keila line in the early years of the 20th century. A sign off the Haapsalu highway, *Küüditatute mälestusmärk* ("Deportees Memorial"), leads here – it points not only to the old station compound, but also to a memorial to the deported people of Western Estonia. Today, the railroad to Haapsalu has been replaced by a bike path that follows the old right of way.

The exhibition set up in the water tower introduces the railroad compound and the tower's workings. Visitors can enjoy the water tower's interior with its preserved tank and meter. From the top of the tower, you get a view of Risti village. The model water tower helps figure out how the water was pumped to the steam locomotives and how the tower and the system as a whole were meant to work.

The tower supplied steam locomotives with water via a 60 m3 tank at its top end, supported by a flared stone wall. The water was raised to a height of some 15 meters via a steam-powered pumping station. The tower is thought to have fulfilled its main function – providing water for steam locomotives – up until the 1970s.

Viljandi's Old Water Tower

Johan Laidoneri 3, Viljandi, Estonia 58°21'46''N 25°36'3''E www.visitestonia.com/en/viljandi-vana-veetorn-viljandi-old-water-tower

Risti Water Tower Risti, Lääne County, Estonia 58°59'53,1''N 24°02'59,3''E

Aizpute Water Tower

Aizpute water tower with its volume of 90 cubic meters of water may be called the heart of the town, since it supplied drinking water to the majority of town residents for 50 years (built in 1960). However, as the capacity of the tower and water quality failed to meet the requirements, it was shut down. Following the construction of the new iron removal facilities, the issue of the future of the neglected, degrading object was highlighted – should it be demolished or blown up? Yet the water tower found its place in tourism, and is now turned into a viewing tower with panoramic viewing platform. The highest point of the roof is 27 m above ground. The tower exhibits the former water-supply network taps. A hands-on 3D model of the water tower provides an insight into its operational principles, while the ground layer location is explained with the help of a drinking-water borehole model. The original of the depicted borehole is 280 m deep.

The rural farm "Garīkas" is found next to Aizpute with another industrial heritage object used for water supply – the hydraulic ram: a device used to pump water without electric power.

Aizpute Water Tower Atmodas 32C, Aizpute, Latvia 56°43'01.9"N 21°36'18.4"E visitaizpute.lv/en

Lasva Water Tower Gallery

Located on the edge of Võrumaa, at Lasva, this water tower is decorated with a Rõuge belt pattern and has won a design award; it functions as a regional cultural and tourist center and gallery. The tower's walls host an exhibition about the area. Movement between the floors is via a unique piano stair, where every step creates a new world of sound. The tower's grass roof provides a beautiful view of the surroundings, and is just made for a picnic.

Sigulda Water Tower

The water tower (built in 1951) was aimed to supply water to steam locomotives to enable their operation and further journey after the travellers from Riga and other places had visited Sigulda. After the era of steam locomotive had ended, the tower stood unused for a long time, until it was finally transformed into the Sigulda Cultural and Art Room "Sigulda Tower". Ground floor exhibits photos and information of its history, while the top floors exhibit artworks taking the visitors to the 5th floor where a lounge is established. From here, similar as from the top of Turaida castle tower, visitors may enjoy the panoramic view over Sigulda.

Lasva Water Tower Gallery Lasva, Võru County, Estonia 57°51'49''N 27°10'46''E

www.visitestonia.com/en/lasva-water-tower-gallery

Sigulda Water Tower

Ausekļa 10, Sigulda, Latvia 57°09'11.6"N 24°51'15.1"E www.tourism.sigulda.lv/culture-and-art-room-sigulda-tower/

Karosta Water Tower

The tower is a landmark of the historical landscape of the former Liepāja Fortress Naval Town "Морской город" of the Russian Tsar Alexander III. An exact year of construction remains unknown. According to written sources, it might be between 1903 and 1905. The author of the design remains unknown; however, according to literature it might be Stephan Galenzovsky, an architect from St. Petersburg. The water tower was built to serve as a technical structure within the Naval Port (Karosta), whose primary function was to supply the naval port residents with drinking water. Until 1920, the water tower belongs to the Russian Ministry of Warfare, and from 1925 to 1940 - to the Ministry of Warfare of the Republic of Latvia. After World War II, the tower was taken over by the USSR Ministry of Defense. With the Soviet army leaving, the water tower was transferred to be managed by the local public utilities company "SIA Liepājas ūdens". The tower is no longer used for its original purpose since 1989. The water tower was driven by a steam power unit featuring two coal boilers, one of which served for back-up function. A transmission operated four pumps, two of which fulfilled the back-up function. Water was pumped from four boreholes up to its fifth floor, to the tank.

A separate technological marvel is the drawbridge over the Karosta river, manufactured to a blueprint by Gustave Eiffel.

Karosta Water Tower Ģenerāļa Baloža 29, Liepāja, Latvia 56°33'10.7"N 21°01'26.5"E karostascietums.lv/en

Lighthouses

Lighthouses are structures which are built on the coast, in order to make travel over water safe, and to ease navigation. Usually they are towers with a balcony on top, containing a lightsource with special optics. From sea, each lighthouse can be distinguished by its shape and paintwork, as well as the color and pattern of its light. Every lighthouse has its own blink pattern, resembling the barcodes used at checkout counters. Thus, lighthouses can be distinguished by their light pattern. During heavy fog, sound and radio signals may also be used.

As is common in life, the construction and augmentation of lighthouses has been chaotic, based on specific needs, increased interest, enthusiastic people - or changes in construction techniques, lamp fueling systems, or luminosity-enhancing optical inventions. Building and running a lighthouse is expensive, so every lighthouse is the result of a well-considered decision and testifies to its location's importance for marine traffic.

The first major desire for safer seafaring came about with the rise of commerce, when Estonian and Latvian cities were part of the medieval Hanseatic Union, and an important East-West trade route passed through here. Since 1629, the Estonian and Latvian coastline was controlled by the Kingdom of Sweden. As the threat of war decreased, and trade grew, there was once again a need to mark out dangers on the sailing paths. In 1649, lighting was added to the oldest lighthouse in the region, at Kõpu on the island of Hiiumaa (built in 1531). It is also known that Sõrve (1646), Ruhnu (1646) and the Kolka cape at the northern tip of Courland had metal firebaskets lifted using a counterweighted wooden boom, a system commonly used throughout Scandinavia.

In 1721, Estonia and Latvia came under the rule of the Russian Empire, as the Estonian and Livonian governorates. Russia had major military and commercial intentions for the Baltic, and as Peter I gained his "window into Europe", the Russian capital moved to St Petersburg near the Baltic coast in 1712.

Active changes came about early in the 19th century, when lighthouses became state property and were equipped with modern lighting devices, switching from wood and coal to oil-burning. Nineteen new structures were put up, and a map of the region with all its lighthouses was issued in four languages. These major changes were primarily driven by Captain Leontiy Sparafyev, who was in charge of the local lighthouses for 30 years (1807-1837), and turned them into some of the most modern facilities of that time.

In the second half of the 19th century, there were general grumblings over the small number of lighthouses in these dangerous waters. The railroad connection from Russia had reached Estonia and Latvia, strongly encouraging commerce and increasing the importance of local ports. Stone lighthouses were joined by more modern, assembled on-site English or French designs, originally made of cast iron, then cheaper boiler plate; these had state-of-the-art kerosene-fuelled optics. Most of the lighthouses on the Estonian and Latvian coast that survive to this day hail from the late 19th and early 20th century.

With the development of navigation technology, the importance and number of lighthouses has decreased. Estonian and Latvian lighthouses that are open to the public serve to introduce the history of their region, as well as the development of optics and marine safety technology; they also provide spectacular views.

Kõpu Lighthouse

The Kõpu lighthouse is located in the village of Mägipe in the hills of the Kõpu peninsula, on the island of Hiiumaa, in Western Estonia. It is the oldest continuously operating lighthouse on the Baltic Sea, and the third oldest in the world.

The white, four-sided colossus with supporting pillars has a balcony and a red lantern room.

Climbing the narrow, steep stairs carved out of the tower, you see the amazing history of one of the world's oldest lighthouses, testifying to the development of seafaring, construction and science. Next to the tower is a charming café, children's playground, and a souvenir shop.

The giant daytime sea mark, or beacon, was originally constructed at the highest point on Hiiumaa at the behest of the Tallinn magistrate in 1504. The tower was erected to show the way and provide safe passage to Hanseatic ships. Prior to this, boats on the Baltic would have to hug the shore, so the shipping lane followed Aland and the Finnish coast; afterwards, the sailors would cross the Baltic directly. The Kõpu highland was the first landmark they would notice on the horizon. In 1649, the tower's upper platform was flattened to hold a bonfire; a firepit, external ladder and a winch for delivering fuel were installed. The beacon became a lighthouse, and by the end of the century, the top of the tower was hollowed out to create a guardroom for the crew and fuel storage.

From 1810, the tower was owned by the navy. Stairs were carved into the southwest pillar, and two floors were added to the top of the tower, all crowned with a 12-faceted lantern room housing 25 oil lamps with brass reflectors shining in three directions.

In 1900, a new lantern room was purchased for the lighthouse from the Paris World's Fair. This featured a dioptric optical device spinning on a bath of quicksilver, and radiating via a kerosene-fueled incandescent mantle. Later on, the tower's optics were repeatedly modernized, and the facility switched to electrical power.

At the end of the 20th century, a strong reinforced-concrete jacket was poured around the base of the tower, to prevent it from collapsing.

Kõpu Lighthouse Kõpu, Hiiu County, Estonia 58°54'58''N 22°11'55''E www.visitestonia.com/en/kopu-lighthouse

Kõpu Lighthouse development

Oviši Lighthouse

Oviši lighthouse in Kurzeme is deemed the eldest working navigational structure in Latvia, built in 1814. The lighthouse tower is 37 m high. It is a double-cylinder structure – the diameter of the tower is 11.5 m, but inside of the stone wall is another tower with a diameter of 3.5 m. In the 18th and 19th century, lighthouses if this type were used in Europe also as defence structures in case of enemy attack. Once, there was also an illumination apparatus with searchlight lenses run by a clock mechanism, but it was transported to Russia in 1915. German occupation authorities installed a new lighting equipment with acetylene burner, which was used to 1961. White rotary light, which is visible 7.5 miles far, flashes every 7.5 seconds. Next to the previous exhibits navigation objects, which were used at different periods by various lighthouses, also in Oviši –, the lighthouse now features new interactive exhibits. The navigation history demonstrated at the lighthouse museum catches your eye, and invites to listen and touch it. From the top of the lighthouse, the nearby Miķeļbāka lighthouse, the highest lighthouse in the Baltic states (62 m), is visible on the coast and the youngest lighthouse in Latvia, the Irbe lighhouse (1986), is seen in the sea.

Oviši Lighthouse

Oviši, Tārgale Parish, Ventspilsi County, Latvia 57°34'07.0"N 21°42'57.0"E www.portofventspils.lv/en/sustainability/lighthouses

The first lighthouse lamps were open bonfire pits, using wood for fuel. In the 18th century, the fire became enclosed under a dome. Fire-based optics were most greatly influenced by the inventions of Sweden's Jonas Nordberg in the second half of the 18th century, featuring arrangements of parabolic mirrors that originally swung back and forth, then circled around the flame. By the end of the 18th century, beacons started using Aimé Argand's constant oil pressure lamps, which burned much more brightly and gave off no soot. Massive progress in lighthouse technology came about with dioptric glass lenses, which consolidated the light beam in a desired direction.

In the second half of the 19th century, Baltic lighthouses started to experiment with fossil fuels, primarily kerosene. In the early 20th century, acetylene gas was introduced. The automatic flashing regulator and gas incandescent lamp resulted in an automated lighting system. Modern lighting systems use electric incandescent and LED bulbs.

Kihnu Lighthouse

At the southern tip of the island of Kihnu is a slim, cast-iron lighthouse, fabricated in England and assembled onsite in 1864. Visitors can climb the tower's interior spiral staircase to the balcony, take a look at the lantern room, enjoy an astounding view of the wide waters, and purchase Kihnu handicrafts or locally made treats from the old kerosene shed adjacent to the lighthouse – this was built in 1882, when liquid fuel started to be used for lighting.

The Kihnu lighthouse was built due to the interest of Tzarist Russian, Latvian and Estonian traders in marking a safe passage through the Väinameri. First requested as far back as 1833, the lighthouse was finally built 30 years later, as construction technology moved forward and the Gordon castiron modular system was introduced. This was both faster and cheaper than building lighthouses out of stone. A Fresnel lensed lighting system was ordered from England. The Kihnu lighthouse has retained its original appearance; only the lighting equipment has been upgraded.

The slender beacon was also an important feature of the islanders' life, as before the installation of telephone cables, it was the only means of communication with the mainland.

Vormsi Lighthouse

Located on Cape Saxby on the western shore of the island of Vormsi, this cast-iron lighthouse manages traffic through the Hari Straight, between Väinameri and the Gulf of Finland.

Cast-iron modular lighthouses were erected on both Kihnu and Vormsi islands in 1864, but frequent fogs and a growing forest meant that the latter 17-meter tower was far too short. A 7-meter taller copy was ordered from the Liepaja factory, while the old lighthouse was moved to the island of Vaindloo.

Despite the numerous wars, the lighthouse compound has been well-preserved. A residence, kerosene shed and well from 1864 survive to this day.

Kihnu Lighthouse Kihnu, Pärnu County, Estonia 58°5'51''N 23°58'20''E www.visitestonia.com/en/kihnu-lighthouse

Vormsi Lighthouse Vormsi, Lääne County, Estonia 59°1'29''N 23°7'3''E www.visitestonia.com/en/saxby-lighthouse

Tahkuna Lighthouse

The Tahkuna peninsula at the northern tip of Hiiumaa is the site of Estonia's tallest cast-iron lighthouse. The 43-meter high, state-of-the-art white tower with a green cupola was assembled in 1875 from parts manufactured in France. The slender, distinctively square-patterned lighthouse's various floors host exhibitions and installations, and the facility is used for theater performances and concerts. The lantern room and balcony are accessible via an elegant, characteristically French spiral staircase. A seaside hiking trail leads from the lighthouse to another landmark, the Tahkuna greatstone, and onwards into primal forest. Smart benches provide an overview of the lighthouse's history, the local nature, military heritage, and seafaring traditions.

Tahkuna Lighthouse Tahkuna, Hiiumaa, Estonia 59°5'29''N 22°35'10''E www.visitestonia.com/en/tahkuna-lighthouse At the foot of the tower is a café and souvenir shop.

With the completion of the St Petersburg-Paldiski railroad, the importance of local ports increased, so lighthouses that helped improve navigation in the Gulf of Finland were prioritized. Designs for Tahkuna were drawn up at the same time as the Ristna beacon, and together they were meant to mark the Hiiu shallows.

The tower's square-pattern look is due to its cast-iron construction, with specially shaped parts that cover joints in such a way as to keep moisture out of the interior. Castiron towers did not require buttressing, and rested on their own weight.

The cast-iron modular tower was developed by English engineer Alexander Gordon, and his building method – first introduced at a Jamaican lighthouse in 1841 – quickly gained fame.

The Tahkuna lighthouse is well-preserved. Only the prismatic glass of the dioptric light source, damaged in WWI, was replaced with optical lenses ordered from England in 1920.

The Tahkuna compound gives a good overview of the lifestyle at a shore-side lighthouse. Surviving outbuildings include a sauna from the second half of the 19th century, a stone kerosene store, a cellar, and a 20th century wooden residence and generator building.

Ristna Lighthouse

At the western tip of Hiiumaa, close to the Kõpu beacon, is the bright red Ristna lighthouse. The tower consists of two metal cylinders placed one on top of another, with a spiral staircase inside; its distinguishing features include eight wrought-iron support pillars and a five-meter service room extending outwards from the top of the tower, with the lantern room on top of that. There is also a small eatery next to the tower.

The nearby Kõpu lighthouse was frequently obscured by fog, so it was decided to build a new lighthouse at the tip of the peninsula. The new structure also had an extra job: its red blinking light would warn of the dangers of obstructing ice movements in the Gulf of Finland. The lighthouse's dainty frame was severely damaged in WWI, so in 1920 the buttresses were encased in a strong concrete jacket.

Unlike the imposing Gordon type cast iron towers, boiler plate lighthouses were significantly cheaper and faster to erect, with less assembly work and cheaper materials.

In 1884, a 20-pood (328-kilogram) fog bell was installed in the Ristna lighthouse. A year later, the lantern room received spinning occluding screens with a clockwork and weight-based mechanism; these were engaged when the Gulf of Finland was experiencing ice flows. In 1889, an iron-sheet shed was completed next to the tower; this held Estonia's first steam siren.

Ristna Lighthouse Ristna, Hiiumaa, Estonia 58°56'24''N 22°3'19''E www.visitestonia.com/en/ristna-lighthouse

Building a tower from **cast-iron** parts

Erecting a **boiler plate** lighthouse

Užava Lighthouse

The lighthouse is built on a high dune, 28 m above sea level, next to the beach. The tower itself is 19 metres high, but the lighthouse is 44 m above sea level; its light stretches as far as 15 nautical miles. The diameter of the lighthouse lantern is 3 metres. The height of the light is 46.5 metres (white light with group flashes) and the rotary light flashes twice every 10 seconds.

The first structure, similar to the present one, was finished in 1879. During World War I, the lighthouse was almost completely destroyed, and restoration was finished in 1925. In 1930, the dune next to the lighthouse was strengthened with juniper wicker baskets filled with pebbles, and large boulders were also placed there; during the 70s, the coast was strengthened with concrete blocks.

Užava Lighthouse

Užava, Užava Parish, Latvia 57°12'33.3"N 21°24'53.3"E www.portofventspils.lv/en/sustainability/lighthouses

Akmeņrags Lighthouse

The first 18 m high lighthouse in Akmeņrags was built in 1864. This is an extraordinary lighthouse in Latvia: it is located at a place, which is among the riskiest navigational sites along the coastline of the Baltic Sea. It highlights a rocky, approximately two navigational miles or 3.7 km long shallow, which stretches into the sea direction NW. The sea is slightly more than two meters deep there. Despite the fact that a navigational light was present here since 1879, Akmenrags has faced many ship catastrophes. Notorious is the stranding of the Latvian steamer "Saratow" in September 1923. The present 37 m high lighthouse tower was built in 1921. The rotary lights of Akmenrags lighthouse are flashing green every 7.5 seconds. A winding staircase of 126 steps takes you to the top of the lighthouse. The lighthouse reveals also a collection of amber and stones.

Šlītere Lighthouse

Šlītere lighhouse is located on the edge of a steep slope of the hills Zilie kalni in Šlītere, 5.3 km off the coastline. It is the second eldest navigation building in Latvia. The fifth floor of the lighthouse takes you roughly 100 m above the sea level. The tower itself is 26 m high, while the rotary light – 102.2 m above the sea level. At clear weather, the tower of Sõrve Lighthouse on Saaremaa island (Estonia), Irbene radio telescope and Miķeļbāka lighthouse are visible. Šlītere lighthouse was built in 1849 by the Dundaga manor's baron for the purposes of forest fire surveillance and as a day-time landmark for ships navi-

gating Irbe Strait in the Baltic Sea. The rotary light at the lighthouse was operated from 1961 until 1999. Since 2000 the lighthouse serves as a tourism and environment education sightseeing object in Slītere National Park. The five floors of the lighthouse exhibit educational information about other Latvian lighthouses, Slītere National Park, coastal nature, and the history of the Livonians. The lighthouse is also the starting point of a loop trail leading down the steep slope of Zilie kalni' hills in Šlītere and running through a natural forest for 1.2 km.

Akmenrags Lighthouse

Saka Parish, Latvia 56°49'54''N 21°03'25''E www.portofventspils.lv/en/sustainability/lighthouses

Šlītere Lighthouse

Šlītere, Dundaga, Dundaga County, Latvia 57°37'42.0"N 22°17'21.0"E slitere.lv/sakums/apmekletajiem/sliteres-baka/

Sõrve Lighthouse

The Sõrve lighthouse is located on the southern tip of Saaremaa's Sõrve peninsula. The long spit of land extends into the sea, as if it is the end of the world, with nothing but water beyond it. The tower is one of the most important markers on Estonia's western shore, and helps ships to navigate through the frequently shallow Courland Straight. The 52-meter tall, blackand-white painted tower was constructed in 1960 using reinforced concrete, and is among the highest towers on the Baltic.

The lighthouse and nearby visitor center provide an overview of Estonia's most important lighthouses, and the area's seafaring history. 248 steps take you to a viewing platform at a height of 45 meters, from where on a clear day you can see Latvia!

The first signal fire is known to have existed here as early as 1646 – a metal fire basket raised on a wooden boom using counterweights. To refill the basket, the boom was lowered; once the firewood had caught, the basket was hoisted back up. In 1650, this was replaced with a stone tower.

The lighthouse was destroyed during the World Wars. Temporary towers were replaced in 1960 with one of Estonia's tallest reinforced-concrete towers. The lantern room housed a spinning lamp, powered by a diesel generator and batteries. The light source stood at 52 meters above sea level, visible from 19 miles away.

Sõrve Lighthouse

Sõrve, Saaremaa, Estonia 57°54'35''N 22°3'19''E www.visitestonia.com/en/sorve-lighthouse

