



Websites for energy efficient and sustainable renovation in Sweden

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Interreg
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Europeiska regionala utvecklingsfonden



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1 Background

Renovation center Botnia-Atlantica, a Nordic centre for energy efficient renovation, has as its main goal to increase the number of skilled professionals needed to perform resource and energy efficient renovations within the Botnia Atlantica region.

The renovation centre aims to gather and enhance the information and know-how about building renovation with regard to resource and energy efficiency. In order to bring forward information of relevance, studies of the available information were done in two countries: Finland and Sweden. While the study in Finland focused on Finnish websites, the Swedish study mapped the information available on Swedish websites. Novia University of Applied Sciences has written a report about the Finnish websites that have the same structure as this report from Sweden. The aim of this study was to map the information available on websites in Sweden, with regard to the following subjects:

- Energy efficiency in renovation
- Moisture safety in renovation
- Indoor air quality
- Environmental certification for buildings

The study was made by examining a certain amount of known internet sites, and also by trying to find other sites by either following links from known sites or use keywords on search sites. The information found was analysed and evaluated for suitability to further enhance the project.

This report gives information about websites that give advice about energy efficiency and moisture safety and indoor environment but also information about networks, agencies and stakeholders supporting renovation. Some sites have more focus on new construction than renovation.

SP Technical Research Institute of Sweden will change the name to RISE Research Institutes of Sweden in January 2017.

2 Information channels

2.1 Centres, associations and networks within renovation in Sweden

In Sweden, there is a national renovation centre, Nationellt Renoveringscentrum (NRC, National Renovation Centre), a cooperation between industry and academia. The renovation centre is organisationally and administratively linked to Lunds Tekniska Högskola, LTH (Faculty of Engineering at Lund University). Another centre, also connected to Lund, is FuktCentrum (Moisture Research Centre) which includes researchers, PhD students and technicians from five different departments. In Lund, there is also a research network SIREn – Sustainable Integrated Renovation. SIREn is a national strong transdisciplinary research environment for holistic sustainable renovation that is financed by the Swedish Research Council Formas and linked to the NRC. The research partners involved are LTH (Lund), Chalmers tekniska högskola (Chalmers University of Technology, Gothenburg), Kungliga Tekniska högskolan (KTH Royal Institute of Technology, Stockholm) and Luleå tekniska universitet, LTU (Luleå University of Technology, Luleå), Umeå universitet (Umeå University), Malmö Högskola (Malmö University), Högskolan Dalarna (Dalarna University), Uppsala Universitet (Uppsala University campus Gotland) and the institutes are SP Technical Research Institute of Sweden (RISE Research Institutes of Sweden from 2017) and CBI (Swedish Cement and Concrete Research Institute).

2.1.1 Nationellt Renoveringscentrum

<http://www.renoveringscentrum.lth.se>

Nationellt Renoveringscentrum describes itself on the website:
NRC National Renovation Centre shall, through knowledge creation and dissemination of information support various participants in the construction sector to implement an effective renovation process, so that existing buildings become energy efficient and that their function is maintained or improved to meet the changing demands of users and authorities.



Remarks

The website of Renoveringscentrum acts as a hub connecting information from other sites and on-going activities within renovation. Links are provided to publications, reports, projects and events.

Nationellt Renoveringscentrum collaborates with Svensk Byggtjänst to supply and disseminate sustainable information on renovation issues, see the website “Renoveringsinfo” where all information about renovation research shall be gathered.

2.1.2 Renoveringsinfo

www.renoveringsinfo.se/

The aim of Renoveringsinfo according to the website is *to help stakeholders in the sector to implement effective renovation processes through knowledge creation and information dissemination.*

Renoveringsinfo.se is a collaboration between Svensk Byggtjänst and Nationellt Renoveringscentrum. Results from Nationellt Renoveringscentrum will be published here.



Remarks

The website gathers news, research findings and descriptions of practical renovation projects.

The idea is that all information about renovation research shall be gathered on the website. There is possibility to subscribe to information in different renovation areas to keep up the state of research. Published research is always accessible whether you are a customer or not.

2.1.3 SIREn

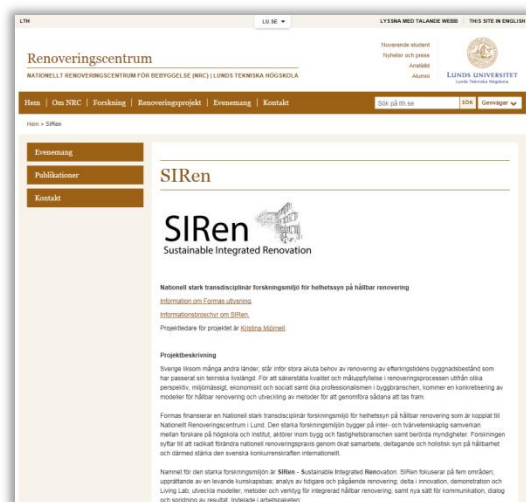
<http://www.renoveringscentrum.lth.se/siren/>

SIREn, Sustainable Integrated Renovation, is an interdisciplinary project linked to Nationellt Renoveringscentrum in Lund. The project is funded by Formas and stakeholders and is described at the website as: *a national strong trans-disciplinary research environment for holistic approach to sustainable renovation.*

SIREn focuses on five areas: Establishment of a knowledge base; Analysis of past and ongoing renovation projects; Participation in innovation, Demonstration and Living Labs (action research); Development of models, methods and tools for integrated sustainable renovation and Communication, dialogue and result dissemination.

Remarks

The web page gives a presentation of the project and links to reports from SIREn (see examples below) and links to other websites. Some examples from the SIREn report series (all in Swedish):



2014:1 *Ekonomiska aspekter på renovering av bostäder – en översikt*, Hans Lind
http://www.renoveringscentrum.lth.se/fileadmin/renoveringscentrum/SIRen/Publikationer/Hans_Lind_Ekonomiska_aspekter_nov_2014.pdf

2015:1 *Leder hyreslagens regler till rätt renovering – analys och förslag*, Hans Lind
http://www.renoveringscentrum.lth.se/fileadmin/renoveringscentrum/SIRen/Publikationer/Leder_hyreslagens_regler_till_ratt_renovering.pdf

2015:3 *Utmaningar och möjligheter vid renovering av våtutrymme*, Anders Jansson och Ulf Antonson
http://www.renoveringscentrum.lth.se/fileadmin/renoveringscentrum/SIRen/Publikationer/3_2015_Utmaningar_och_-_vaatrum_2015-09-24_Slutligversion.pdf

2.1.4 FuktCentrum

<http://www.fuktcentrum.lth.se/>

FuktCentrum (Moisture Research Centre) describes itself on the website:

“The Moisture Research Centre (FuktCentrum) in Lund is a group of researchers, PhD students and technicians from different departments. There are members from Lund University, SP Technical Research Institute (RISE 2017), Chalmers and KTH.

“The primary long-term goal behind FuktCentrum is to improve knowledge regarding the design and construction of new buildings and renovations of existing buildings in order to ensure a proper remediation of moisture damages in buildings.

Remarks

The website provides information about FuktCentrum’s courses within the moisture security area and have an information day in November every year. There are also links to publications published within the centre and PC software developed within the centre as Torka S (drying concrete constructions calculations), Klimatdata (climate data for moisture transport calculations), Risk 1 (risk for condensation), WUFI demo version 1D Light .2 (commercial PC program for calculating heat and moisture transport in building structures), Converter (calculates the moisture content in g/m^3 when temperature and relative humidity are given) and GMVP (calculates temperature and relative humidity in the middle of the building under flat foundation (platta på mark)).

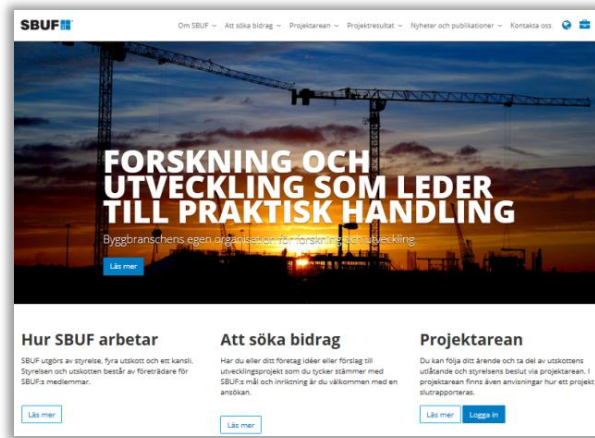


2.1.5 SBUF – Svenska Byggbranschens Utvecklingsfond

<http://www.sbuf.se>

SBUF describes itself on the website:

“SBUF is the construction industry's organization for research and development with approximately 3,000 affiliated companies in Sweden. SBUF's aim is to promote development in the building process so that better conditions are created for contractors to benefit from research and conduct development work.”



Remarks

The projects carried out within the framework of SBUF's operations result in different types of information activities. There are different types of information activities; *Newsletter* with a popular overview of SBUF projects; *Presentations of current on-going projects* with a summary of participants and timetable for each project; *Summaries of completed projects* and more deepened results; and *Doctor and licentiate theses* financed by SBUF.

Three examples of information activities conducted by SBUF are:

Energibesparing på byggarbetsplats (Energy saving on construction site):

<https://www.youtube.com/watch?v=fnEKuHRDE1o&feature=youtu.be>

SBUF Informerar om effekter på funktion och kostnad av styrd ventilation av kallvindar (Effects on the function and cost of controlled ventilation of cold attics):

<https://www.youtube.com/watch?v=mZH6gZl0sJc>

Energieffektivisering vid renovering av rekordårens flerbostadshus (Improving energy efficiency in the renovation of the record years of apartment buildings):

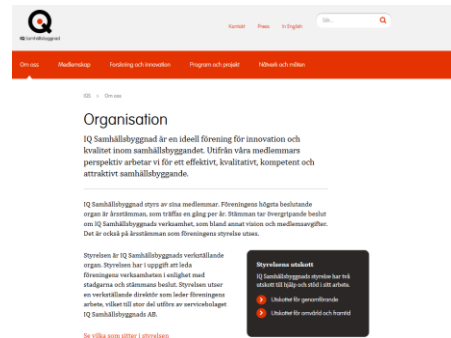
<http://www.sbuf.se/PageFiles/322/SBUF%2010-08%20Energieffektivisering%20vid%20renovering%20av%20rekord%C3%A5rens%20flerbostadshus.pdf>



2.1.6 IQ Samhällsbyggnad

<http://www.iqs.se/forskning-och-innovation/>

IQ Samhällsbyggnad (The Swedish Centre for Innovation and Quality in the Built Environment) is a Swedish member organization for companies and organizations in the built environment sector. *that combines research and innovation issues with cross-border collaboration. IQ Samhällsbyggnad comprises approximately 110 members from across the built environment sector according to the website.*



Remarks

IQ Samhällsbyggnad helps members with concrete R&I issues so they can develop their own organization. They create venues, seminars, meetings and conferences for the members.

2.1.7 Svenska Byggnadsvårdsföreningen

<http://www.byggnadsvard.se/>

Svenska Byggnadsvårdsföreningen describes itself on the website:

The Swedish Association for Building Preservation (Svenska byggnadsvårdsföreningen) is an independent, non-profit organization, concerned with buildings and environments of all types and from all periods all over Sweden. The association is taking part in the public debate to support opinions on preservation matters.



Remarks

Svenska Byggnadsvårdsföreningen arrange activities, conferences, seminars, restoration camps, guided tours. On the website, they have event lists, webshop, FAQ about building preservation, over 600 articles from the periodical, links etcetera. The Association publishes four issues of the magazine Byggnadskultur (Built Heritage) each year containing articles about preservation projects, building traditions, contemporary debates and book reviews. Each issue has a different theme - such as colour, garden, public opinion, modernism etcetera. As a member of the association you will have access to the network, tips about energy-, renovation advice with expert assistance.

2.1.8 IVA Kunglig. Ingenjörsvetenskapsakademien

<https://www.iva.se/>

IVA, Royal Engineering Academy, consists of decision makers and experts from business, academy and management. According to the website you will find *knowledge and experience from about 1300 members divided into 12 areas of expertise. In addition, more than 200 companies are represented in the IVA Business Council.*



Remarks

Here you will find reports, debate articles, IVA News - all published on the site. Use the filter to find what you are looking for.

2.1.9 SP Technical Research Institutes of Sweden

<https://www.sp.se/SV/INDEX/Sidor/default.aspx>

SP is a research institute fully owned by the Swedish government. At the beginning of 2017 the name is changed to RISE Research Institutes of Sweden as the three RISE institutes SP, Swedish ICT and Innventia are merging into RISE.

SP innan RISE

SP Sveriges Tekniska Forskningsinstitut finns över hela Sverige från Skellefteå i norr till Malmö i söder samt också i Danmark och Norge. Vi är helägda av RISE Research Institutes of Sweden AB. 2017 går SP, Swedish ICT och Innventia samman i RISE och byter då också namn till RISE.

Vårt uppdrag är att stärka företagets konkurrenskraft och att skapa innovationer som ger ett hållbart samhälle.



Det gör vi genom att uppdragsforska om allt från uthålligt fiske, matsvinn och brandskydd till värmepumpar, självkörande bilar och stadsutveckling. Med provning, teknisk utvärdering och certifiering hjälper vi företag att få ut innovationer och nya produkter på marknaden. Varje år utbildar vi tusentals människor om nya regler, standarder och tekniker så att de kan göra ett bättre jobb på hemmaplan.

According to the website *“We work closely with our customers to create value, delivering high-quality input in all parts of the innovation chain, and thus playing an important part in assisting the competitiveness of industry and its evolution towards sustainable development.”*

Remarks

SP (RISE) have a wide range of applied research, investigations, quality assurance and certifications. SP has participated in many renovation projects within different fields as energy efficiency, sustainable renovation, moisture security (Bygga F) etc. At SP Research website you can find information and publications. There are also references to large renovation project as E2ReBuild, Renobuild and Milparena that SP have participated in.

Renobuild – Hållbar renovering av byggander med hjälp av beslutsverktyg

<https://www.sp.se/sv/index/research/Renobuild/Sidor/default.aspx>

In the research project Renobuild SP in collaboration with partners developed a method for evaluating various renovation options based on environmental, economic and social perspective.

The aim is to help property owners who will carry out extensive renovations to find the most optimal combinations of measures.

Renobuild - Hållbar renovering av byggnader med hjälp av ett beslutsverktyg

I Renobuild har SP i samverkan med partners tagit fram en metod för att utvärdera olika renoveringsalternativ utifrån miljömässigt, ekonomiskt och socialt perspektiv. Syftet är att den ska hjälpa fastighetsägare som ska genomföra en omfattande renovering att hitta de mest optimala kombinationerna av åtgärder.

Förnyelse och renovering av befintlig bebyggelse har blivit allt mer aktuellt under de senaste åren. Det ökade intresset beror bland annat på det stora behovet av modernisering av det svenska byggnadsbeståndet. Idag använder de flesta fastighetsägare konsulter för att utvärdera och föreslå tekniska åtgärder för renovering, men man gör ofta de ekonomiska kalkylerna själv. Våra erfarenheter säger också att man sällan utvärderar sociala konsekvenser av olika renoveringsalternativ. De ekonomiska utvärderingarna kan tendera att dominera vid beslutsfattandet eftersom de får konsekvenser som är konkreta och lätta att förstå, men ur hållbarhetsperspektiv är det viktigt att även analysera miljöpåverkan och sociala aspekter för de olika renoveringsalternativen. Idag riskerar olika typer av utredningar och analyser utförda av olika parter att leda till splittring mellan intressenter och resultatet blir ett beslutsunderlag som är svårt att överblicka.

I Renobuild har SP i samverkan med partners tagit fram en metod för att utvärdera olika renoveringsalternativ utifrån miljömässigt, ekonomiskt och socialt perspektiv. Syftet är att den ska hjälpa fastighetsägare som ska genomföra en omfattande renovering att hitta de mest optimala kombinationerna av åtgärder. Metoden bygger på att renoveringsalternativ utvärderas utifrån hållbarhetskriterier. Fördelen med att använda den föreslagna metoden är att fastighetsägare som står inför en stor renovering kan få en jämförelse mellan olika renoveringsalternativ. Det leder till att betydande miljömässiga och sociala fördelar förhoppningsvis kommer att beaktas och genomföras.



Relaterad information

Dokument

- Renobuild - en metodik för att utvärdera olika renoveringsalternativ med avseende på hållbarhet. SP Rapport 2014:69
- Verifiering av Renobuild - en beslutsmetodik för hållbar renovering - fyra fallstudier. SP Rapport 2014:70
- Renobuild Miljökalkyl - miljöbedömning vid renovering. SP Rapport 2014:71
- Renobuild Miljökalkyl (excel)

Se även

- www.renobuildbyggnader.se

Kontaktpersoner

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Renobuild “Miljökalkyl” is a simplified LCA Excel sheet to calculate environmental impact to include material to the building and energy savings.

2.2 Authorities and stakeholders

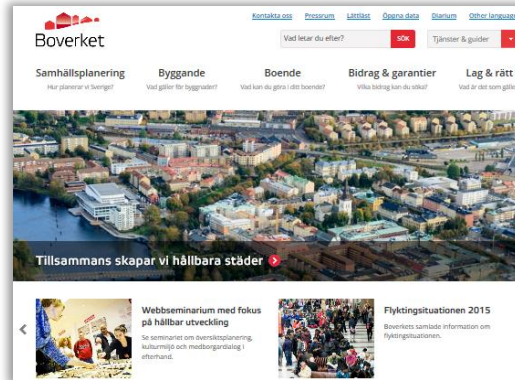
This section presents websites to Swedish agency's controlled by government and some of the larger stakeholders that finance research within the field renovation.

2.2.1 Boverket

<http://www.boverket.se/>

Boverket (The National Board of Housing, Building and Planning) is the administrative authority for issues concerning built environment, land and water areas, planning, construction and management of housing and housing finance.

The website provides information on how to plan a building project and what to keep in mind when you want to build. About human health and the environment in our surroundings, and in buildings. Safety in the buildings, and the financial subsidies or assistance that you can apply for.



Remarks

Boverket drafts mandatory provisions and general recommendations in Boverket's Building Regulations (BBR) on ventilation, moisture, water and sewage.

About energy management requirements in the Building Regulations, see: <http://www.boverket.se/sv/byggnade/bygg-och-renovera-energieffektivt/>.

For general information on health and indoor environment, see: <http://www.boverket.se/sv/boende/halsa--inomhusmiljo-i-ditt-boende/>

On Boverket website you can find and download reports for free. Two examples:

The report "Byggnaders klimatpåverkan utifrån ett livscykelperspektiv" : forsknings- och kunskapsläget (Buildings carbon footprint from a lifecycle perspective : research and knowledge situation.)



BETSI is a Swedish national survey of energy usage, technical status and indoor environment in residences and schools. It describes used survey tools and provides reference material:

www.boverket.se/sv/om-boverket/publicerat-av-boverket/publikationer/2009/enkatundersokning-om-boendes-upplevda-inomhusmiljo-och-ohalsa/

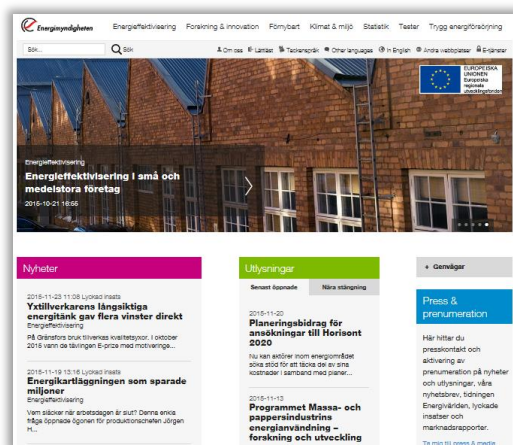


2.2.2 Energimyndigheten

<http://www.energimyndigheten.se/>

Energimyndigheten (Swedish Energy Agency) is an organization controlled by the government with the mission to inform and finance research and development within energy related issues and describes itself on the website:

Energimyndigheten, the Swedish Energy Agency, works for a sustainable energy system, which combines ecological sustainability, competitiveness and security of supply. The Agency finances research for new and renewable energy technologies, smart grids, vehicles and transport fuels of the future. The Agency supports commercialization and growth of energy related cleantec.



They finance research projects and have information through the client groups BeBo (for housing) and BELOK (for premises). The agency's research programme for energy efficiency in cultural and historical buildings is "Spara och bevara" (Save and preserve). E2B2 is a research program together with IQ Samhällsbyggnad that contributes to enhanced energy efficiency in the built environment through research, development, innovation and demonstration.

The contents of the Energimyndighetens website is extensive and divided into the following main categories:

- Energy efficiency
- Research & innovation
- Renewable
- Climate & environment
- Statistics
- Tests
- Safe energy supply

Remarks

At the website it is possible to search after project in the project database that was granted after 2008-07-01, time schedule, financing and short summary and report in PDF for free.

Energimyndigheten has developed a Swedish national strategy to increase energy efficiency during renovation in 2015 together with Boverket and Energimyndigheten.

<https://energimyndigheten.a-w2m.se/Home.mvc?ResourceId=5535>

Energimyndigheten can be compared to Motiva in Finland <http://www.motiva.fi>

Programme brochure: Research and innovation for energy efficient construction and living.

<http://www.energimyndigheten.se/globalassets/forskning--innovation/bostader-och-byggande/faktablad-energieffektivt-byggande.pdf>



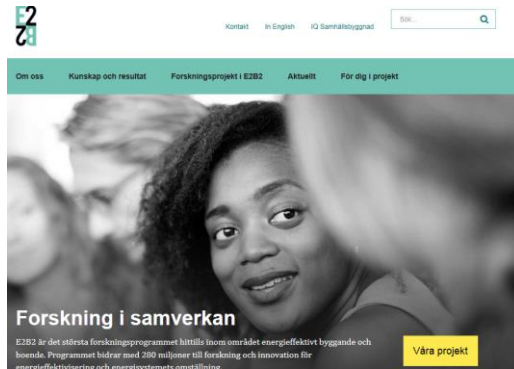
2.2.3 E2B2

<http://www.e2b2.se/>

E2B2 is a research program and according to the website

they contributes to enhanced energy efficiency in the built environment through research, development, innovation and demonstration.

The programme includes research on buildings across their entire life cycle – from planning, production, renovation and redevelopment to deconstruction and demolition. .



The programme is operated by IQ Samhällsbyggnad (The Swedish Centre for Innovation and Quality in the Built Environment) in partnership with Energimyndigheten (the Swedish Energy Agency) and will run from 2013 until 2017.

Remarks

The program is divided into eleven research areas one of them is Renovation. There are seven financed research projects about renovation.

Projects in the research program E2B2.

http://www.e2b2.se/~media/e2b2/Files/Projekt/Projekt_inom_E2B2_ver20151120.ashx



2.2.4 Arbetsmiljöverket

<https://www.av.se>

Arbetsmiljöverket, Swedish work environment authority, website gives information about work environment work, inspections, health and safety, production, industry and logistics.

At the home page they write

“The Swedish Work Environment Authority is an authority that has the mandate from the government and the Riksdag to see that laws about work environment and working hours are followed by companies and organisations.”

They are also responsible to some extent for the Tobacco Act and the Environmental Code when it comes to questions about genetic engineering and pesticides.



Remarks

The website can be read in many languages and it's also possible to listen to the text. The website gives advice and recommendation how to prevent microbial growth, risk with bad air quality, what kind of inconvenience it might cause etc.

General information (<https://www.av.se/inomhusmiljo/>) and regulations concerning indoor air is found in AFS 2009:2 ”Arbetsplatsens utformning” <https://www.av.se/arbetsmiljoarbete-och-inspektioner/publikationer/foreskrifter/arbetsplatsens-utformning-afs-20092-foreskrifter/> and AFS 2005:1 ”Mikrobiologiska arbetsmiljörisker, toxinpåverkan, överkänslighet”. Another source of information is <https://www.av.se/inomhusmiljo.>

2.2.5 Folkhälsomyndigheten

<https://www.folkhalsomyndigheten.se/>

They write at their webpage

“The Public Health Agency of Sweden has a national responsibility for public health issues and works to ensure good public health. The agency also works to ensure that the population is protected against communicable diseases and other health threats.”



Folkhälsomyndigheten has taken over responsibility for issues concerning indoor environment from the Socialstyrelsen (National Board of Health and Welfare). The Authority is responsible to support environmental and health inspectors at municipalities.

Remarks

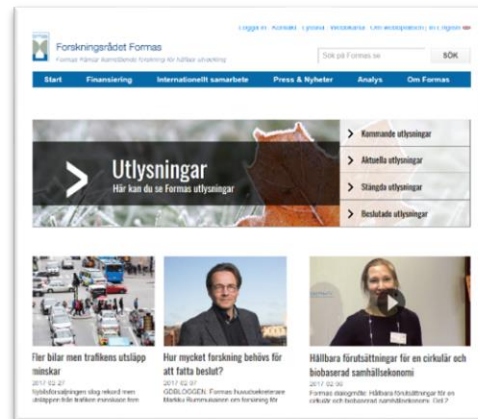
It is possible to search in the database for publications. Publications can be downloaded or read for free at the website but ordering publications cost.

2.2.6 Forskningsrådet Formas

<http://www.formas.se/>

Forskningsrådet Formas (Swedish Research Council Formas) describes itself on the website:

“The mission of Formas is to promote and support basic research and need-driven research in the areas Environment, Agricultural Sciences and Spatial Planning.”



Remarks

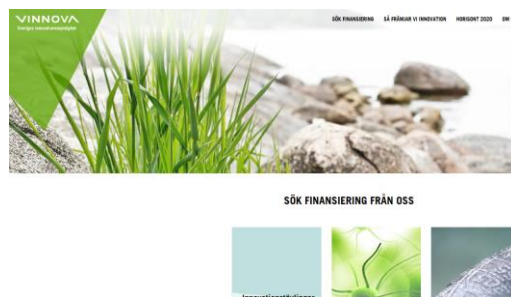
Formas has produced many publications from different projects, mainly focusing on moisture safety, even though most of the publications are subject to a cost.

2.2.7 Vinnova

www.vinnova.se

Vinnova, Sweden's innovation agency is funding needs-driven research. They write on the website

“We promote sustainable growth by funding needs-driven research and stimulating collaborations between companies, universities, research institutes and the public sector. We are also the national contact agency for the EU framework programme for research and innovation”



Remarks

It's possible to search in the database for projects that have been financed by Vinnova and also reports in their publication database.

There are agendas that support the area of renovation. One agenda is “Strategies for innovative and sustainable renovation of apartment buildings” (Ref: 2012-01898). The agenda is connected to “Renoveringscentrum”. Expectation is that the platform Renoveringscentrum will be a nod for renovation in the future and be self-supported through membership fee and profitable activity within three years' time. Another agenda is ICT-BIM “För hållbart samhällsbyggande” (Dnr 2012-01873) that includes how society is designed, built, managed, renewal, maintain and renovated.

3 Websites about renovation

In this chapter, the focus is on websites with information about renovation and how to perform it, with the aim of improving energy efficiency, moisture safety or repairing damage that have come as a result from water leakage or moisture accumulation.

Chapter 3.1 reports on websites about energy efficiency in renovation. Chapter 3.2 is about websites related to moisture, airtightness and indoor air quality. Chapter 3.3 concerns Environmental certification for buildings.

Some websites have more focus on new construction than renovation.

3.1 Websites about energy efficiency in renovation

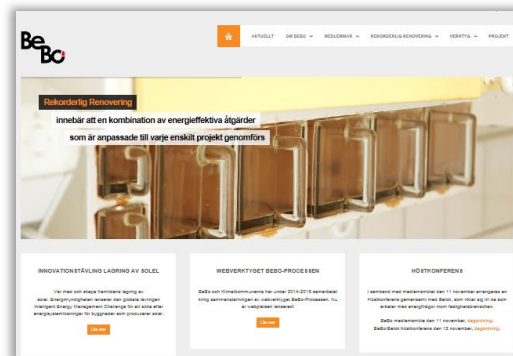
Energy efficiency usually means to prevent heat loss from the building in the winter, and in some cases to prevent heat input to the building in the summer. Moreover, it is important to use technology and appliances that uses as little energy as possible to perform the desired task i.e. providing light to a room.

Renovation with the aim of improving energy efficiency is most often about improving insulation or reducing uncontrolled draft. The following websites focus amongst others on renovating for improved energy efficiency.

3.1.1 BeBo

<http://www.bebostad.se/>

BeBo (Energimyndighetens beställar-grupp för energieffektiva flerbostadshus) is a network of real estate owners financed by Energimyndigheten. *“The main focus is to reduce dependence on energy in the form of heat and electricity in apartment buildings, as well as to reduce environmental impact. Through a collective purchasing expertise, BeBo’s activities should lead to energy-efficient systems and products coming to the market earlier. Therefore, Energimyndigheten contributes with finance and expertise to BeBo, that in turn brings it further to the real estate owners by means of, inter alia, demonstration projects implemented with the help of the members.*



Remarks

The information is in Swedish and free of charge. The method “Rekorderlig renovering”, (Reliable Renovation), is based on completed demonstration projects with the aim to reduce energy consumption by half. Reliable Renovation is carried out in three stages: preparation, realization and conclusion. Within BeBo there is a resource pool with various expert skills used in the projects. These are specialists in building physics, moisture problems, behavioural sciences, building and installation engineering and economics.

BeBo-Processen

<http://beboprocessen.bebostad.se/>

BeBo-Processen is described at the website as a guide for real estate owners who want to improve the efficiency of their real estate portfolio and get their organization to work toward a common goal of improving energy efficiency. The work is based on three questions.

- How is an energy-efficiency improving renovation implemented in a good way?
- What is required from an organization to achieve this?
- Which knowledge about these issues exists today, and how do we reach out with it to more real estate owners?

The web application the BeBo-Processen is divided into three sections:

- BeBo process
- The energy efficiency organization
- Reliable renovation

The site presents several examples of reliable renovation project, as *Utlysning för energieffektiv renovering : En förstudie i linje med Rekorderlig Renovering – Demonstrationsprojekt för energieffektivisering i befintliga flerbostadshus* (Call for energy-efficient renovation : A feasibility study in line with Reliable Renovation – A demonstration project for energy efficiency in existing apartment buildings):

http://www.renoveringscentrum.lth.se/fileadmin/renoveringscentrum/Renoveringsprojekt/Rapport_Trelleborgshem.pdf



3.1.2 BELOK

<http://belok.se/>

BELOK is Energimyndighetens (Swedish Energy Agency's) purchaser network group for premises as offices, shops and other public premises. According to the website

The network's mission is to spread knowledge and inspiration on effective methods for improving energy efficiency in local real estate. This is performed by development projects and dissemination of the results from the project to the real estate business.



Remarks

BELOK has developed Totalmetodik (Total methodology- Economy and energy efficiency in symbiosis).

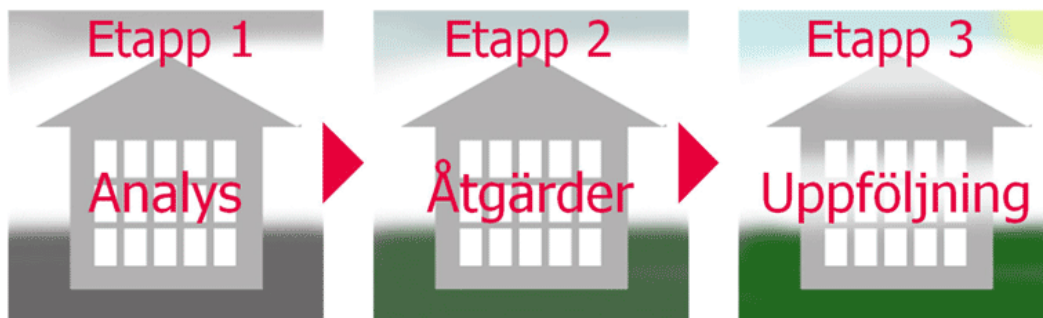
On the website, there are tools, a handbook (see below) and project descriptions available. All material on the website of BELOK is available to all and free to share. There are help-tools and guidelines for energy efficient renovation for premises (offices, restaurants, shops, warehouse and also Stockholm city hall). The software Totalverktyget (Total Tools) has it's own website as well as BV²-arch and BELOK LCC, see below. The work is based on real cases.

Totalmetodik

<http://belok.se/totalmetodiken/>

Totalmetodik (Total methodology) in BELOK goes through three steps:

- Step 1. Analys (Analyse). All potential energy savings should be identified. All identified measures will be energy calculated and priced. These measures are compiled and calculated with "Total Tool" to estimate the measures possible, based on the profitability requirements that the organization has decided.
- Step 2 Åtgärder (Action). All measures that meet the property owner's profitability requirements in step 1 are purchased, planned and implemented.
- Step 3 Uppföljning (Follow-up). In this step the actual energy consumption is measured and the profitability outcome is calculated. The measurement is in progress continuously for at least 12 months.



Totalmetodiken : Beloks Totalmetodik – Handbok för genomförande och kvalitetssäkring (Total methodology : Beloks total methodology – Handbook for implementation and quality assurance):

<http://belok.se/download/Totalprojekt%20handbok-utbildningsmaterial%20jan%202014.pdf>



Förstudie – Energianvändning under byggtiden (Prestudy – Energy use during the construction period):

http://belok.se/download/projektarkiv/PE2014_03%20%20Energianvändning%20under%20byggtiden.pdf



BELOK BV²-arch

<http://www.bv2.se/>

Belok BV² is an energy calculation program that calculates energy needs and consumption of all types of buildings.

Paketering av energisparåtgärder i småhus – energi- och miljökompetenscentrum (Packaging energy saving measures in houses - energy and environmental center of excellence):

<http://www.du.se/PageFiles/33123/Paketering%20av%20energispar%C3%A5tg%C3%A4rder%20i%20sm%C3%A5hus%20EMC%202013-3.pdf>

BELOK Total project, developed to improve energy efficiency in commercial buildings, was applied to single family houses.



BELOK LCC

<http://belok.se/verktyg-hjalp/lcc/lcc-kalkylator/>

Using BELOK LCC, life cycle costs can be calculated and compared among competing systems or equipment during their entire life. The software handles general calculations of pumps, fans, air filter, lighting systems and windows.

Remarks

The software is a tool to use before making investment decisions. It is web-based and free to use, but at the user's own risk. Read more at:

<http://belok.se/verktyg-hjalp/lcc/>



3.1.3 BeSmå

<http://energieffektivasmahus.se/>

BeSmå is an Innovation Cluster initiated and financed by Energimyndigheten (the Swedish Energy Agency) The Swedish Federation of Wood and Furniture Industry TMF (Trä- och Möbelföretagen,) is the responsible organisation.

According to the website the purpose of BeSmå's work is to run development projects to reduce energy use in new construction and renovation of single-family houses in Sweden.



Remarks

BeSmå is a network for more energy-efficient small scale buildings (as villas, terrace-houses, cottages etc), aimed at both new construction and renovation. BeSmå is led by a steering group and two reference groups. One ongoing project is “Hållbar renovering av småhus” (“Sustainable renovation of small scale buildings”), where a tool / checklist will be presented and evaluated in the project to facilitate property owners and small construction companies to renovate with energy in focus.

3.1.4 Energibygare

<http://energibygare.se/>

The website *Energibygare* (*Energy Builders*) provides an interactive web-based training developed by the Swedish construction sector to meet their need of skilled personnel who know how to build energy efficiently.

During 2016 and 2017, supervisor trainings will be given to professionals to become supervisors who shall train others to become energy builders.



Remarks

Links to course materials, workshops and interactive educations on energy-efficient construction, renovation and installation are open for everybody. The interactive education is four hour long.

According to the website, the EU project BUILD UP Skills is the base for the Energibygare education. The project aimed to identify the special skills needed and to develop an action plan for further training in the construction sector. 30 countries participated in the project. 22 of them, including Sweden, have received money to continue the effort to strengthen the national expertise in energy-efficient construction, renovation and use of renewable energy. This has resulted in the present project Build up skills SWEBUILD. Build up skills – Educating energy efficient craftsmen in Sweden 2020.

3.1.5 LÅGAN

<http://www.laganbygg.se/>

LÅGAN, a programme for buildings having a very low energy use, describes itself on the website:

“The programme started in 2010, and is planned to run for five years. It provides financial support for demonstration projects and local/regional collaboration initiatives. It also encourages new thinking by evaluating and disseminating information from demonstration projects, and by supporting development projects.”



Energimyndigheten (The Swedish Energy Agency) is funding 40 percent of LÅGAN. The programme is coordinated and administered by Sveriges Byggindustrier (The Swedish Construction Federation).

The programme is intended to:

- encourage new construction of and conversion to energy-efficient buildings
- foster a national market for buildings with low energy use, and assist in the establishment of an extensive national body of suppliers of products and services and to create confidence in them.

Remarks

Lågan focuses on new low-energy buildings. Under “Resultat”, you can find results from projects under the following headlines “Demonstration project”, Co-operation project, Development project and Calculation, Input data and user behaviour, Criterion and branding system, Quality assurance system, Technology development, Facility, Education and Processes. Under “Publikationer” (publications) there are PDF-reports and movies free of charge.

LÅGAN Marknadsöversikt (Lågan Market overview)

<http://marknad.laganbygg.se/>

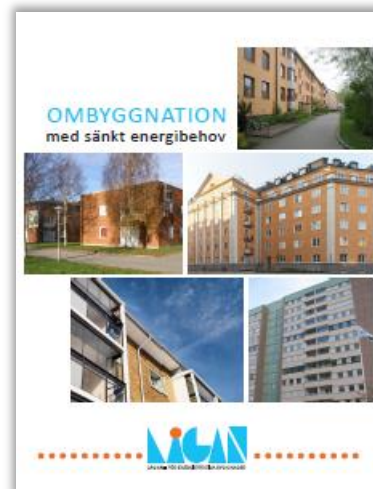
To inspire the construction and real estate business to build more low-energy buildings, there is a searchable webpage with good examples: LÅGANbygg – Marknadsöversikt. Here, developers and contractors themselves account for construction projects with low energy consumption. LÅGANbygg can today present the energy performance and technology for over 150 buildings and links to more than 500 operators who have participated actively in the construction projects.

Ombyggnation med sänkt energibehov (Rebuilding with lowered energy needs):

https://publikationer.sverigesbyggindustrier.se/sv/energi--miljo/ombyggnation-med-sankt-energibehov_854

Large parts of the existing stock of apartment buildings have poor energy performance and also face extensive renovation needs. Reconstruction projects provide excellent opportunities to reduce energy needs in buildings.

Examples are given in the brochure “Rebuilding with lowered energy needs”. According to the website the LÅGAN programme clearly demonstrates that it is possible to reduce energy need and shows how to do it. For more examples, see the website of LÅGAN.



3.1.6 OmBoende

<http://www.omboende.se/>

OmBoende is a collaboration between Boverket (The National Board of Housing, Building and Planning) and Konsumentverket (The Swedish Consumer Agency). The website was launched in January 2009. The site is directed to home owners and gives advice concerning subjects as renting or buying apartments, building a house, energy consumption, different heating systems and indoor environment.



Remarks

The site is directed to home owners. In the forum you can read and discuss issues of renovation and new construction and indoor environment.

3.1.7 Sveriges Byggindustrier

<https://www.sverigesbyggindustrier.se/>

Sveriges Byggindustrier (The Swedish Construction Federation) describes itself on the website:

“The Swedish Construction Federation is the trade association for private construction companies and employers.”



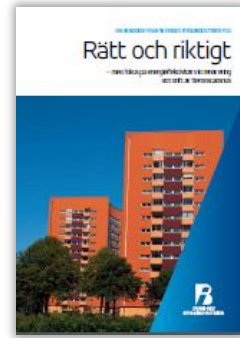
Remarks

Here you will find different types of publications - collective agreements, standard contracts, brochures, posters, reports and more - for downloading and ordering. In cases where the projects are implemented in cooperation with SBUF the reports can be downloaded from SBUF's page free of charge.

They have three publications about renovation, see below.
There are educations for the members in different areas about renovation.

Rätt och riktigt - med fokus på energieffektivitet vid renovering och drift av flerbostadshus (Right and proper - with a focus on energy efficiency in renovation and operation of apartment buildings): This manual, has been developed in collaboration between Sveriges Byggindustrier FoU Syd (Swedish Construction Federation Research and Development South) and CIT Energy Management.

https://publikationer.sverigesbyggindustrier.se/sv/handbocker-fou/ratt-och-riktigt_931



Byggandets klimatpåverkan – livscykelberäkning av klimatpåverkan och energianvändning för ett nyproducerat energieffektivt flerbostadshus i betong (Climate impact of the construction – Life cycle calculation of the climate impact and energy consumption for a newly produced energy-efficient apartment buildings in concrete):

<https://publikationer.sverigesbyggindustrier.se/sv/byggandetsklimat>



Termografering- kartläggning av köldbryggor inför renovering (Thermography – mapping thermal bridges prior to renovation):

https://publikationer.sverigesbyggindustrier.se/sv/fou-rapporter-byggmaterial/termografering--kartlaggning-av-koldbryg_943

3.1.8 Svensk Byggtjänst

<http://byggtjanst.se/>

The mission of Svensk Byggtjänst (Swedish Building service) is to make the building process less complicated. They collect and process information so that it becomes knowledge and offer it to the industry.

Svensk Byggtjänst sells literature within the construction industry. They also sell the publication series AMA, Allmän material- och arbetsbeskrivning (General material and work description).



Remarks

Svensk Byggtjänst provides a payment service for surveillance and news about building and energy efficient renovation /building:

<http://omvarldsbevakning.byggtjanst.se/>

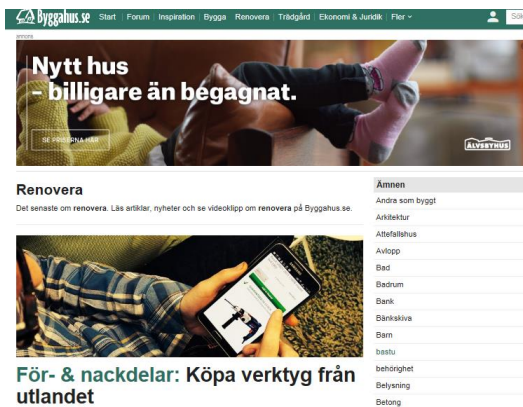
Svensk Byggtjänst can be regarded as an equivalent to Rakennustieto (<https://www.rakennustieto.fi/>) in Finland, and the AMA publications can be seen as an equivalent to RT-kortisto publications.

3.1.9 Byggahus.se

<https://www.byggahus.se/>

Byggahus.se is a portal for house owners and consumers with a wide range of information.

You can visit the site as a guest or become a member.



Remarks

This site is directed to house-owners. The portal provides information and articles on building advice, renovation and gardens. There is also a blog, photos for inspiration and “ask the experts” where an expert panel answers questions about everything from construction, renovation, heating systems and electrical fittings, kitchens and gardens.

3.2 Moisture safety and indoor air quality in renovation

This chapter describes webpages related to moisture and indoor environment from guidelines and regulations to webpages about advice to homeowners. There is also more information on Boverket, Arbetsmiljöverket and Folkhälsomyndigheten see chapter 2.2.5.

Water and moist can cause damages on buildings that require renovation and also affect indoor air quality and affect human health.

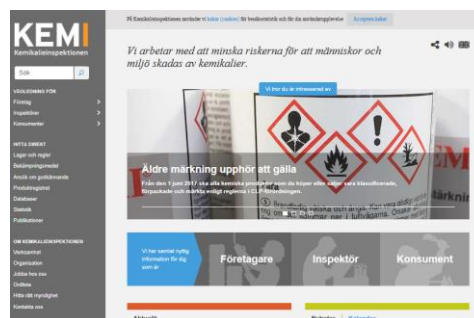
Systems for comparisons of emissions from building materials are essential for the indoor air. What is emitted and how much? Can emitted chemicals pose a risk to human health or the environment? There are several sources where information about emissions from building materials can be found. Information about a specific product can often be found at producers web sites. This information can be hard to interpret and therefore different systems have been developed where information about products has been gathered and valuated as a support in the process of choosing materials.

3.2.1 Kemikalieinspektionen

www.kemi.se

Kemikalieinspektionen (The Swedish Chemicals Agency states on it's website that:

the agency's task is to improve and strengthen health and environmental legislation concerning chemicals. We check that the industry comply with applicable rules and we handle applications for approval of pesticides before they can be used.



Remarks

In Sweden there is a proposal to a new legislation regarding chemical compounds in building materials:

<http://www.kemi.se/global/rapporter/2015/rapport-8-15-halsoskadliga-kemiska-amnen-i-byggprodukter.pdf> based on a report from [Kemikalieinspektionen: Kartläggning av farliga ämnen i byggprodukter i Sverige](#)



3.2.2 SWESIAQ

www.swesiaq.se

At the website they write

SWESIAQ is an independent and non-profitmaking association. The society is multidisciplinary with the aim to increase the knowledge concerning indoor environment and health, through co-operation between scientists and practitioners within e.g. medicine, chemistry, microbiology and engineering. SWESIAQ is a national section of the International Society of Indoor Air Quality and Climate, ISIAQ.



Remarks

On Swesiaq's website you can find more information about the indoor environment and health. They have Q&A about indoor quality.

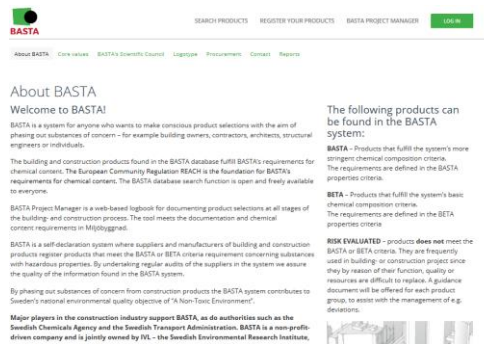
3.2.3 BASTA

<http://www.bastaonline.se/>

At the website, BASTA is described as:

“BASTA is a non-profitmaking limited company owned jointly by IVL Swedish Environmental Research Institute and The Swedish Construction Federation. The staff at IVL carry out all tasks related to the BASTA system.

BASTA is a system for anyone who wants to make conscious product selections with the aim of phasing out substances of concern – for example building owners, contractors, architects, structural engineers or individuals”



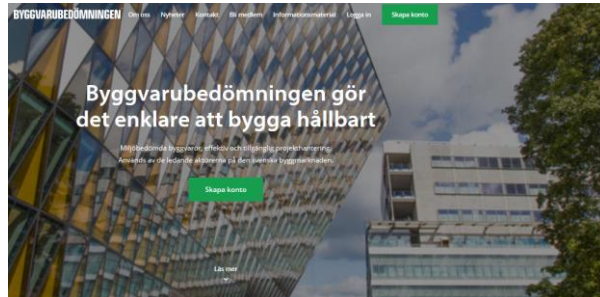
Remarks

The BASTA database search function is open and freely available to everyone.

3.2.4 Byggvarubedömningen

<https://byggvarubedomningen.se/>

Byggvarubedömningen, (The construction product evaluation) is a non-profit economic association consisting of Sweden's leading property owners and builders. According to the website *they provide a web-based tool that facilitates the selection of building and management materials. The database contains environmental assessments for the most used products / goods used in the real estate industry.*



Remarks

Byggvarubedömningen is a service that requires a license. The web-based project tool facilitates logging of building materials in real estates. The tool creates a digital logbook where a list of the property's building materials, their chemical content, quantity and location is documented.

3.2.5 SundaHus

<http://www.sundahus.se/>

SundaHus was founded in 1990 as a consulting company for a better indoor environment. According to the website they offer *property owners security, now and in the future, through a wide range of services for conscious choice of materials. With a web-based system and qualified advice.*



Remarks

Sunda Hus give advice and support through consultancy assignments. SundaHus provide a service that requires a license.

3.2.6 Byggdoktorerna

<http://www.byggdoktor.com/>

Byggdoktorerna ("Building doctors") is an association for moisture damage investigators in Sweden for both private persons and companies.



Remarks

Nätverket Byggdoktorerna – is a network of experts in humidity and moisture problems. Assignments are handled by the association affiliates persons.

3.2.7 Fuktcentrum

See presentation of Fuktcentrum in chapter 2.1.4.

Remarks

At the website information about moisture and moisture related issues are gathered with links to other websites, publications, tools and computer programs.

There are also reports about influence on health, <http://www.fuktcentrum.lth.se/verktyg-och-hjelpmedel/fuktskador/>

ByggaF – a method for a moisture resistant construction process – is a systematic method to ensure, document and communicate moisture safety throughout the entire construction process.

Even though the present version of **ByggaF** method focuses on new construction, a version for renovation is underway. ByggaF can be bought as a book or downloaded as PDF for free from Fuktcentrum or SBUF website.

The report, *ByggaF : metod för fuktsäker byggprocess*, is available to buy at Sveriges Byggindustrier:

https://publikationer.sverigesbyggindustrier.se/sv/fou-rapporter-miljo---inre-och-yttre/byggaf-metod-for-fuktsaker-byggprocess-0_717

Checklists and manuals can be downloaded from the website of FuktCentrum:

<http://www.fuktcentrum.lth.se/verktyg-och-hjelpmedel/fuktsaekert-byggande/byggaf-metoden/>



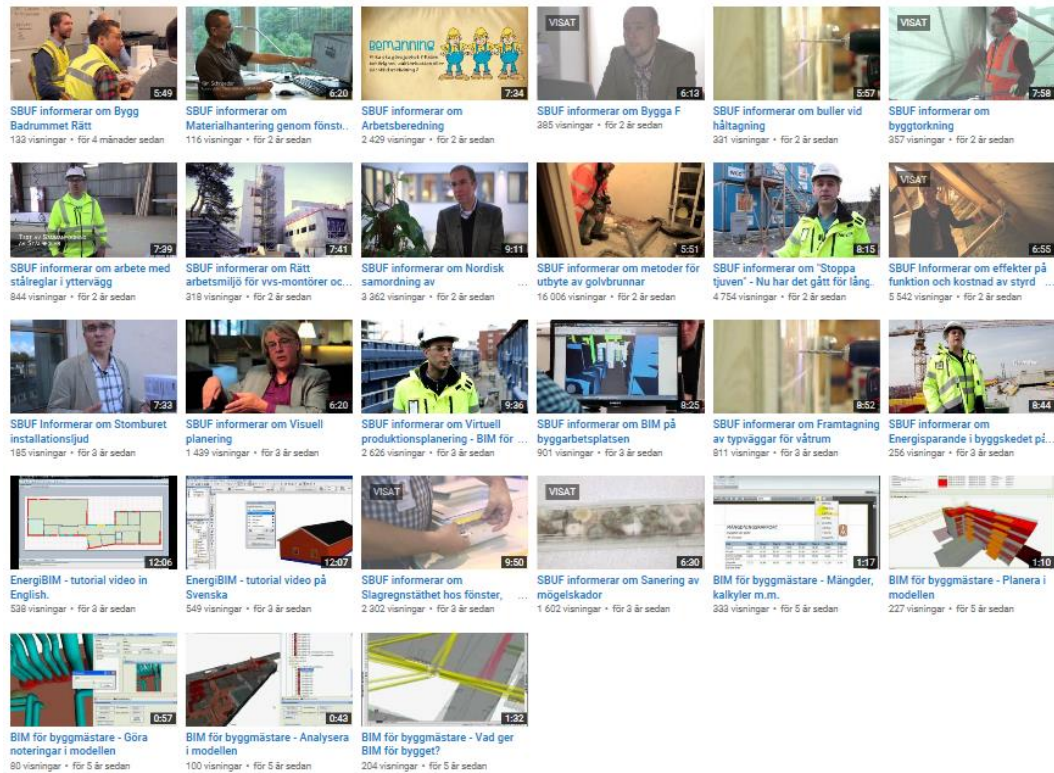
3.2.8 SBUF

See presentation of SBUF see chapter 2.1.5

Remarks

The website has many good and informational films, mostly focusing on moisture safety.

<http://www.sbuf.se/Projektresultat/Filmer/>



SBUF informs about ByggaF on YouTube

<https://www.youtube.com/watch?v=0K9EQYLpaOI>



3.2.9 SP Technical Research Institutes of Sweden

See introduction of SP chapter 2.1.9.

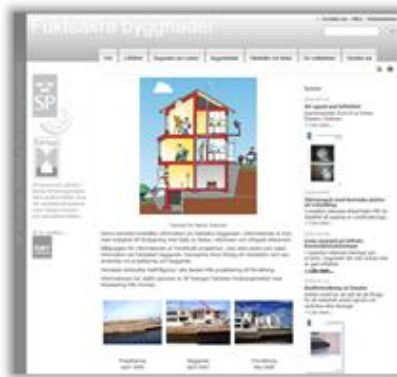
Remarks

Under Fukt (Moisture) there are several headlines in the subjects as well as under research and Energi (energy), Energi användning (energy use).

For information about Fuktsäkra byggnader (moisture-proof constructions)

<http://www.fuktsakerhet.se/>

The information on the website Fuktsäkra byggnader (Moisture-proof construction) has been compiled by SP Technical Research Institute of Sweden with funding from Formas.



Remarks

The website has good information on moisture safety in different parts of buildings and in all stages of construction, from planning to management.

For information about about Lufttäta byggnader (airtight buildings).

<http://www.lufttathet.se/>

The website deals with airtight buildings, that is an important precondition for well-performing buildings in terms of e.g. moisture safety and energy efficiency.



Remarks

ByggaL, a method for constructing airtight buildings, is available to download from the website:

<http://www.lufttathet.se/sv/Documents/ByggaL%20SP%20Rapport%202010-73.pdf>

ByggaL method focuses on new construction.

3.2.10 omBoende.se

www.omboende.se

See presentation OmBoende, chapter 3.1.6

Remarks

For information on the website of indoor environment see, <http://www.omboende.se/sv/Hyra/Inomhusmiljoproblem/>

3.3 Environmental certification for buildings

3.3.1 Sweden Green Building Council

www.sgbc.se

According to the website
Sweden Green Building Council (SGBC) is a non-profit organization owned by its members, open to all companies and organizations within the Swedish construction and real estate sector who wish to develop and influence of environmental and sustainability work in the industry.



Remarks

Sweden Green Building Council offers courses in environmental certification of buildings, neighborhoods and infrastructure. They are involved in a project among others, Innovation Incubator, which will launch innovative concepts to increase energy efficiency in renovation.

They also investigate how WELL, Certification system for health and well-being in buildings, can be combined with Miljöbyggnad or other systems and how the indoor environment indicators may change for future versions of their systems.

3.3.2 LEED

<https://www.sgbc.se/om-leed>

The LEED 2009 Green Building Rating System for New Construction and Major Renovations is a set of performance standards for certifying the design and construction of commercial or institutional buildings and high-rise residential buildings of all sizes, both public and private.



The intent is to promote healthful, durable, affordable, and environmentally sound practices in building design and construction.

http://www.usgbc.org/sites/default/files/LEED%202009%20RefGuide_Healthcare_Global_Supplement_10_0.pdf

Remarks

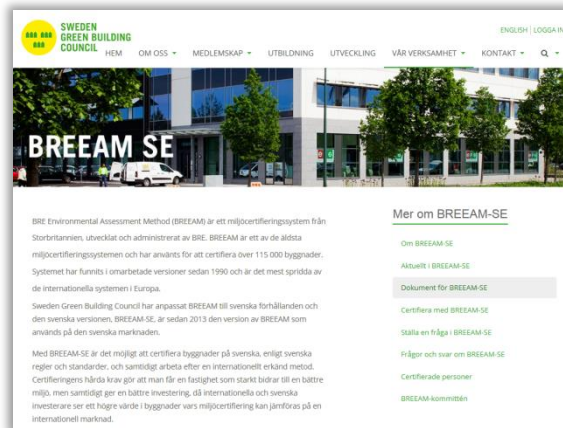
LEED require the development of an Environmental Quality Management Plan for the production and pre occupancy phases. The purpose is to minimize exposure to VOCs and prevent growth of microorganisms. LEED also focus on materials with low emissions of VOCs.

http://www.usgbc.org/sites/default/files/LEED%202009%20RefGuide_Healthcare_Global_Supplement_10_0.pdf

3.3.3 BREEAM SE

<http://www.sgbc.se/var-verksamhet/breem>

BREEAM (BRE Environmental Assessment Method), is the most widespread environmental certification system in Europe according to the website.. Since 2013, BREEAM SE is used on the Swedish market



Remarks

The indoor air is also addressed in environmental certification systems mentioned below.

BREEAM focus on flexibility in ventilation, the risk that outdoor pollution sources affect indoor air and the use of building material with low emissions of volatile organic compounds (VOCs) and formaldehyde.

<http://www.sgbc.se/docman/breem-2016/644-breem-se-svensk-manual-v2-0/file>

3.3.4 Miljöbyggnad

<https://www.miljobyggnad.se/>

Miljöbyggnad is a Swedish certification system for new and existing buildings.



Remarks

A system for certification of renovated buildings is under development. The focus is on energy and indoor environment.

<https://www.sgbc.se/om-miljoebyggnad>

Miljöbyggnad focuses on yearly average levels of radon indoor, ventilation and prevention of future moisture and mold damages. A questionnaire to investigate the satisfaction with the indoor environment among user is provided.

<https://www.sgbc.se/58-om-olika-certifieringsystem/miljobyggnad>

Conclusion

This report provides an overview of information that can be accessed through websites but does not cover all the information about renovation. For example, websites about research projects about renovation are not available in this summary.

Different information is required depending whether the renovation is in the planning stage or in the implementation stage. The renovation can be performed for various reasons, such as energy saving or repair of damages, which also affects the information needs, as well as the fact that the buildings have different ages.

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