AIA Provider: Northeast Sustainable Energy Association

Provider Number: G338

Lessons from Scandinavia – SWEDEN & DENMARK

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March 5th, 2015

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

Course Description

The band got back together, with another singer.

Think Abba.

Learning Objectives

At the end of the this course, participants will be able to:

1. Assess the state of the art in Denmark and Sweden with respect to climate change development.

2. Identify trends in construction codes towards energy efficiency and how the evolution occurred.

3. Describe the social context in Scandinavia and how it compares to the United States.

4. Determine what strategies we found can work for projects here in the US.

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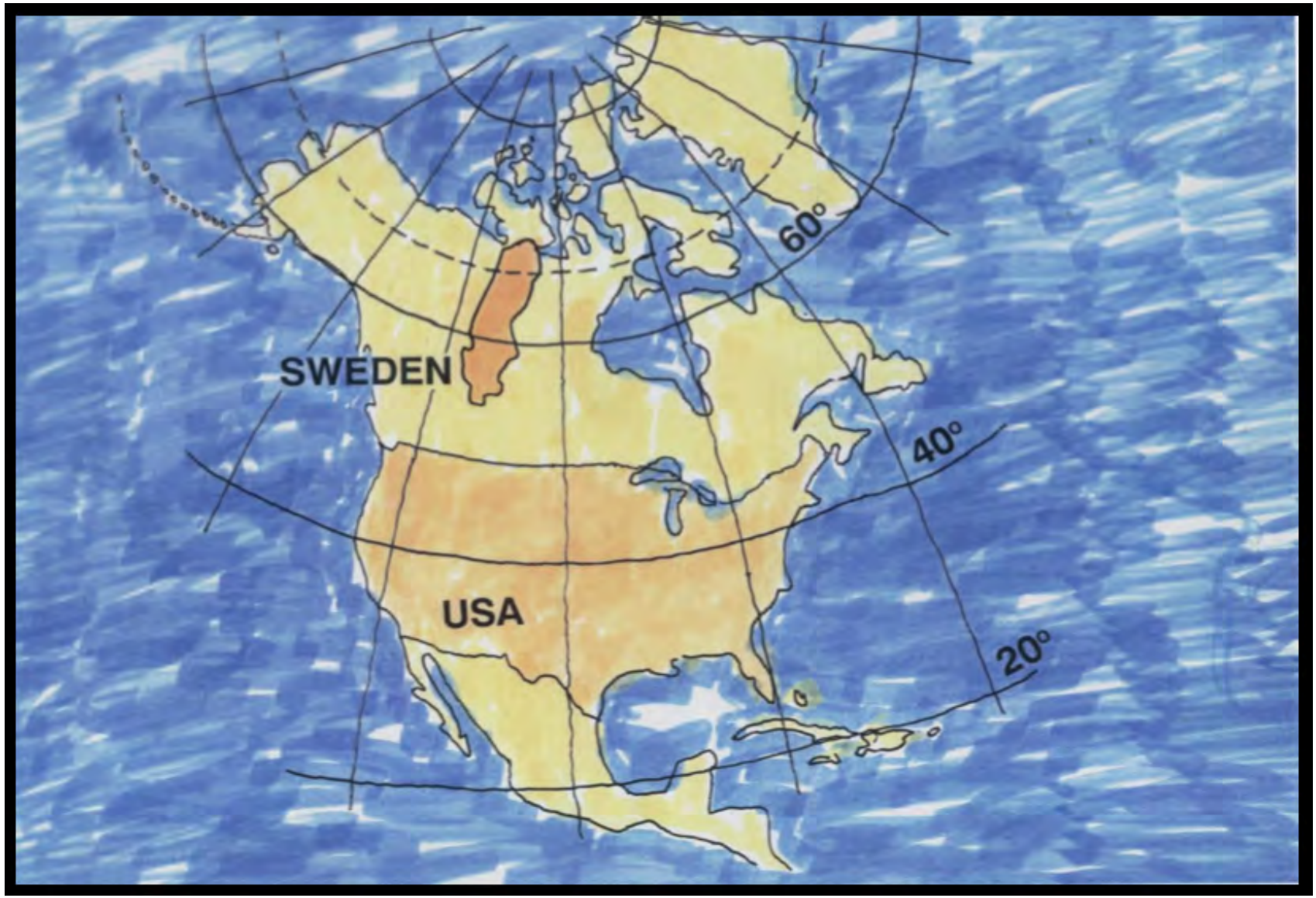
Lessons from Scandinavia - SWEDEN

Introduction and Context

NESEA Travelers

Norwegian Sea
Sweden
Norway
Gulf of Bothnia
Finland
Baltic Sea
Estonia
Latvia
North Sea
Denmark
Lithuania
United Kingdom
Ireland
Belarus
Netherlands
Poland
Belgium
Germany
Czech Rep
Slovakia
Ukraine
Austria
Moldova
Hungary
France
Imagery ©2014 Ter


SWEDEN
USA
60°
40°
20°

Bergen
Oslo
Drammen
Stavanger
Fredrikstad
Karlstad
Örebro
Eskilstuna
Västerås
Uppsala
Stockholm
Södertälje
Norrköping
Linköping
Kristiansand
Gothenburg
Borås
Jönköping
Växjö
Halmstad
Aberdeen
Klitmøller
Aalborg
Vendsyssel
Aarhus
Horsens
Esbjerg
Denmark
Odense
Copenhagen
Malmö
Sjælland
Helsingborg
North Sea
Flensburg
Kiel
Neumünster
Rostock
Stralsund
Lübeck
Hamburg
Schwerin
Bremerhaven
Bremen
Groningen
Leeuwarden
Middlesbrough
Leeds
Hull
Sheffield
Norwich
Berlin
Szczecin
Gorzów Wielkopolski
Pila
Bydgoszcz
Poland
Gdańsk
Slupsk
Koszalin
Kolobrzeg
Swinoujscie
Elblag
Tczew
Grudziadz
Olsztyn
Kaliningrad
Калининград
Klaipėda
Lithuania
Kaunas
Vilnius
Marijampolė
Alytus
Suwałki
Elk
Grodno
Гродна
Lida
Ліда
Lomza
Białystok
Baranavichy
Баранавічы
Turku
Helsinki
Tallinn
Estonia
Pärnu
Tartu
Saaremaa
Baltic Sea
Gotland
Ziemeļvidzemes biosfēras rezervāts
Strenči
Rīga
Latvia
Jūrmala
Jelgava
Liepāja
Mažeikiai
Šiauliai
Daugavpils
Hyvinkää

Stockholm
KUNGSHOLMEN
NORRMALM
ÖSTERMALM
GAMLA STAN
SKEPPSHOLMEN
KATARINA-SOFIA
SÖDERMALM
MARIA
LANGHOLMEN
REIMERSHOLME
GRÖNDAL
MARIEBERG
STADSHAGEN
Vasaparken
Humlegården
Kungsträdgården
Kulturhuset
NK Stockholm
Radisson Blu Waterfront
Grand Hotel Stockholm
Stockholms stadshus
Kungliga slottet
Vasamuseet
Junibacken
Abba The Museum
Cirkus
Gröna Lund
Fotografiska
Sankt Görans sjukhus
Tantolunden
Rålambshovsparken
Kungsgatan
Hamngatan
Strandvägen
Karlavägen
Norr Mälarstrand
Hantverkargatan
Fleminggatan
Klarastrandsleden
Torsgatan
Hornsgatan
Centralbron
Skeppsbron
Djurgårdsvägen
Narvavägen
Oxenstiernsgatan
Vallhallavägen
Västerbron
Rålambshovsleden
Sankt Eriksgatan
Dalagatan
Birger Jarlsgatan
Olof Palmes gata
Vasagatan
Löfholmsvägen
Renstiernas gata
Götgatan
160b
160a
275
222

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NESEA TRAVELERS - OUR USTREAM CHANNEL IS - buildingtours **THE TIME IN GREEN IS EAST COAST US TIME**						
20-Oct	morning		TBD; possibly Blå Jungfrun	Stockholm, Sweden	Malardrottningen Yacht Hotel & Restaurant Riddarholmen	http://skanska-sustainability-case-studies.com/pdfs/68/68_Bla_Jungfrun_v001.pdf
Monday	lunch	11:30	Gustaf Landahl; 11:30; Fleminggatan 4 **5:30pm**			https://www.linkedin.com/pub/gustaf-landahl/19/329/541
	afternoon	14:00	Hammarby Sjöstad: 14:00 to 15:30; Lugnets Allé 39 SE-120 65 Stockholm **8pm -9:30pm**			http://www.hammarbysjostad.se/inenglish/pdf/HS_miljo_bok_eng_ny.pdf
21-Oct	morning	9:00	Sustainable Järva 9:00 to 11:00 **3pm - 5pm**	Stockholm, Sweden		http://cityclimateleadershipawards.com/stockholm-sustainable-jarva/; http://www.eusew.eu/images/slider_2014/managenergy/11053.pdf
Tuesday	lunch	13:00	Arne Elmroth 13:00 **7pm**			https://www.linkedin.com/pub/arne-elmroth/39/299/9b7
	afternoon	14:30	Royal Stockholm Seaport 14:30 to 16:30 **8:30pm - 10:30pm**			http://www.stockholmroyalseaport.com/en/
	dinner		Lars Friberg **12 midnight**			https://www.linkedin.com/pub/lars-friberg/15/386/7a7
22-Oct	morning	10:00	Renzero project 10:00 to 11:30 (Anders Olsson will meet us at our hotel) **4pm-5:30pm**	Stockholm, Sweden		http://www.renzero.se/
Wednesday	lunch	11:30	Anders Olsson 11:30 - 1:00; also visit to building fair: http://www.skanskbyggtjanst.se/massa/151/ **5:30pm - 7pm**		22 Oct to 23 Oct Lilla Hotellet i Alingsås Magasinsgatan 1 441 30 ALINGSÅS +46322-10873	https://www.linkedin.com/pub/anders-olsson/41/829/679
	afternoon		travel to Alingsås			
	dinner		Hans Eek at Momenti Liberi Trattoria, V. Ringg. 7, 441 33 Alingsås **12midnight**	Alingsas, Sweden		www.momentiliberi.se
23-Oct	morning		Alingsås apartment retrofit, passive house school **3pm?**	Alingsas, Sweden		http://www.passivhuscentrum.se/
Thursday	lunch		possibly with Hans Eek **6pm**			http://www.wolf-passivehomes.com/news/hans-eek-the-vision-the-visionary-of-the-passive-house-concept.html
	afternoon	15:00	Demo House; Research Institutes of Sweden (RISE) in Borås **9pm?**	Gothenberg	23 Oct to 26 Oct STF Göteborg City Drottninggatan 63-65, 411 07 Göteborg Tel: 031-756 98 00	http://www.ri.se/en/news/sp-s-energy-smart-demo-house-in-place
24-Oct	morning	9:00	meet with John Helmfridsson; Odinsplatsen 1, 411 02 Göteborg **3pm?**			liljewall-arkitekter.se; https://www.linkedin.com/pub/john-helmfridsson/37/420/7b2
Friday	lunch	12:30	Joakim Kaminsky, 12:30, Ekmansgatan 3, 411 32 Göteborg **6:00pm**	Gothenberg		http://www.kjellgrenkaminsky.se/en/
	afternoon		Kolla Skolan with an architect from Kjellgren Kaminsky **7-12pm?**			http://www.kjellgrenkaminsky.se/en/blog/portfolio/all/kolla-school-case/
25-Oct	morning		Villa Kyoto, pick up at 9:00 and return at 11:00 **3pm-5:30pm**			http://www.villakyoto.se/
Saturday	lunch		Erik Orvarson **6pm**	Gothenberg		owner of Villa Kyoto
26-Oct			ferry to Frederikshavn, Denmark Stena Line			

Schedule

NESEA Travelers

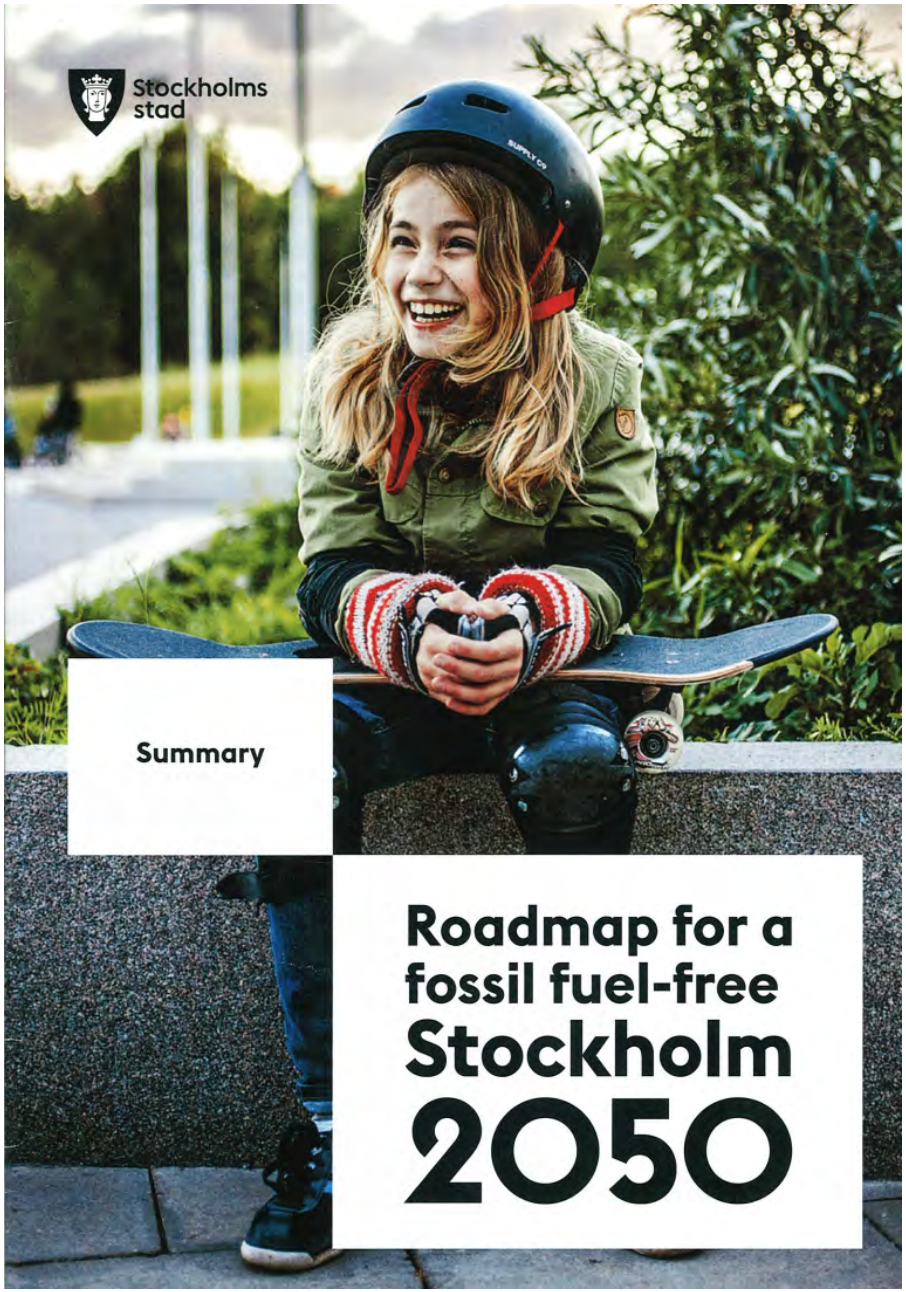
Introduction and context: Sweden

- Sweden
  - 9.7 million people
  - 175,000 square miles (CA is 164,000 square miles)
- 1960s and 1970s Million Homes Program context
- Housing stock: apartment blocks versus “villas”
- Projected migration to Stockholm and resulting housing crunch
  - Ramifications of city-owned land
- Culture of “dialogue”
- Focus on high-performance country/region/ neighborhood rather than high-performance buildings

Climate zone	I	II	III
Current, non-electric heat	120	100	80
Current, electric heat	130	110	90
2020	95	75	55

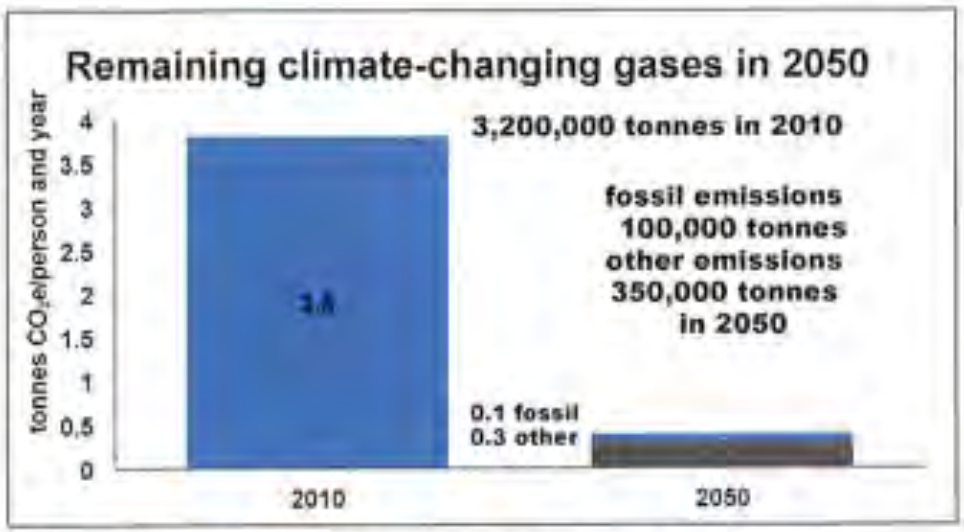
Notes:

- Values are kWh/m2/year for residential structures
- Primary energy
- Space heating, domestic hot water, and common areas
- Does not include lighting, plug, or appliance loads


Stockholms stad
Summary
Roadmap for a fossil fuel-free Stockholm 2050

Serious Climate Goals!

Based on achieving 2 degree C global climate change
by reducing emissions to <1.5 tonnes/person-yr worldwide



Estimated greenhouse gas emissions expressed in tonnes per inhabitant in Stockholm in 2010 and 2050.

Thinking about "boundary"

- Heating and cooling buildings within city
- All types of road transport within city
- Railway and shipping within city
- Other fuel use, such as process loads within city
- Air flights up to 3,000 ft

Not including:

- Travel outside the city by residents
- Production outside the city of food and goods used in the city
- Certain few chemicals

Fossil fuels now

- Coal and oil in CHP/district heating
- Oil and natural gas boilers, cooking and vehicles
- Gasoline and diesel for cars, trucks, machinery
- Aviation fuel
- Plastics in trash burned in district heat plants

To be replaced by

- Biofuels and heat pumps in CHP/District heating
  - seawater and sewage heat sources for 180 MW heat pumps!!
- Biofuels to replace natural gas and diesel for emergency power and transport
- Biogas or heat pump for individual heating

Building energy use

- Conservation critical!
- New construction at ½ mandated energy usage
  - City controls a lot of land and mandates standards on what gets built there
- 30% reduction in existing properties
  - City provides attractive financing
- Electricity in Sweden and Nordic countries assumed fossil fuel free by 2050

Stockholm Roadmap

NESEA Travelers

Fossil free transport

- Improve cycle and walking environment
- Increase public transport trips from 50% to 75%
  - double public transport services!
  - Dedicate more of roadways to public transport
- Improve telecommute options
- Reduce goods-delivery energy by 25% by coordination
- Locate high density development close to public transit
- Develop renewable fuel infrastructure

Stockholm Roadmap

From:

This is an abridged version of the City of Stockholm's Roadmap for a fossil fuel-free Stockholm 2050

Production
Planning & Environment Unit of the Environmen and Health Administration in Stockholm.

Project leaders
Örjan Lönngren and Lova André Nilsson (Asst.).

Working group
Charlotta Hedvik, Emma Hedberg, Jon Möller and Jonas Ericson.

Steering group
Gustaf Landahl and Jonas Tolf.

Editor
Anette Riedel.

Production
Blomquist.

Cover photo
Sara Mac Key.

English translation
AB Språkman.

Printed by
Edita Boberas.

Stockholm Roadmap

NESEA Travelers

Translating the Swedish Building Energy Standard

Primary Energy	Sweden Energy Standard ***does not inlcude light and pug loads***	kWh/sq.m-yr	**95**	**75**	**55**	**45**	**35**	**25**
		kBtu/sq.ft.-yr	30	24	17	14	11	8
Site Energy	Energy Standard with fossil fuel with Primary Energy Factor of 1.1	kWh/sq.m-yr	86	68	50	41	32	23
		kBtu/sq.ft.-yr	27	22	16	13	10	7
Site Energy	1800 sq.ft. home, using 4000 kWh/yr -- ***lights and plug loads only***	kWh/sq.m-yr	24	24	24	24	24	24
		kBtu/sq.ft.-yr	8	8	8	8	8	8
Site Energy	Total Energy to meet standard with fossil fuel	kWh/sq.m-yr	110	92	74	65	56	47
		kBtu/sq.ft.-yr	**35**	**29**	**23**	**21**	**18**	**15**
Site Energy	Total Energy to meet standard with ASHP COP 2.3 and Primary Energy Factor of 3.0	kWh/sq.m-yr	34	32	30	29	28	27
		kBtu/sq.ft.-yr	**11**	**10**	**9.5**	**9.1**	**8.8**	**8.4**

Translating the Swedish Building Energy Standard

Primary Energy	Sweden Energy Standard ***does not inlcude light and pug loads***	kWh/sq.m-yr	**95**	**55**	**25**
		kBtu/sq.ft.-yr	30	17	8
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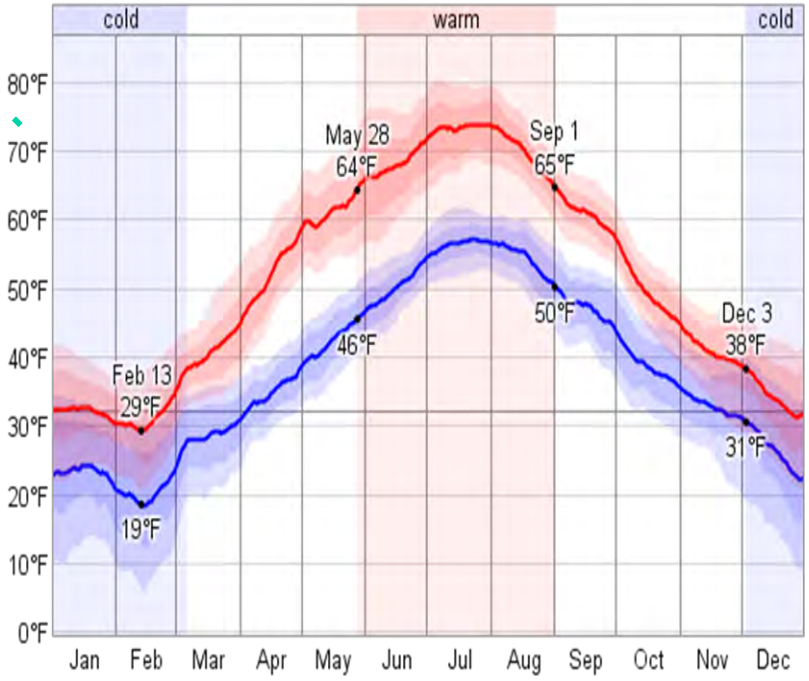
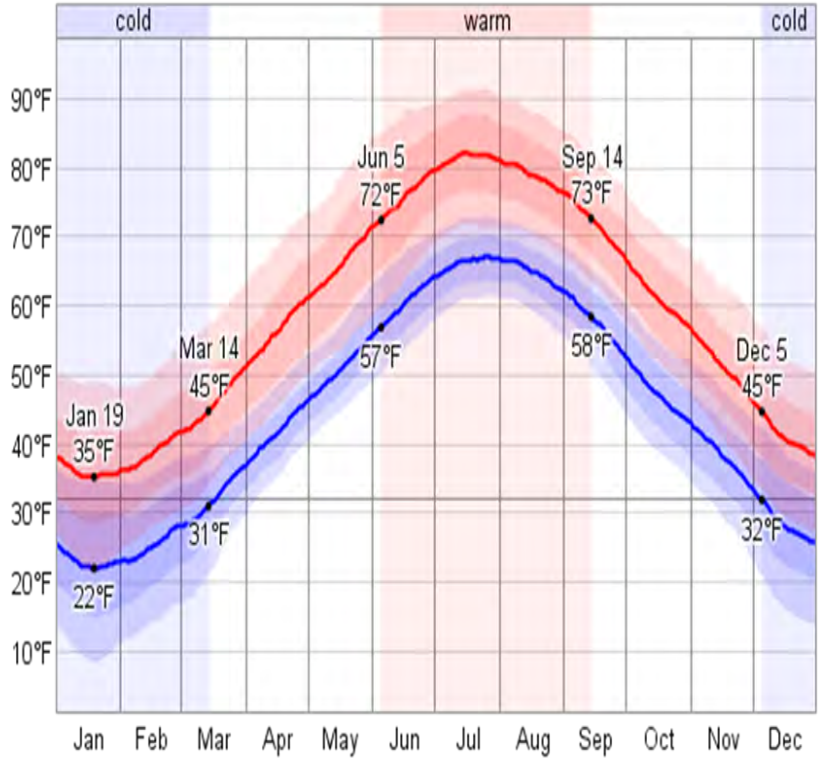
		kBtu/sq.ft.-yr	8	8	8
Site Energy	Total Energy to meet standard with fossil fuel	kWh/sq.m-yr	110	74	47
		kBtu/sq.ft.-yr	**35**	**23**	**15**
Site Energy	Total Energy to meet standard with ASHP COP 2.3 and Primary Energy Factor of 3.0	kWh/sq.m-yr	34	30	27
		kBtu/sq.ft.-yr	**11**	**9.5**	**8.4**

Daily High and Low Temperature

Stockholm

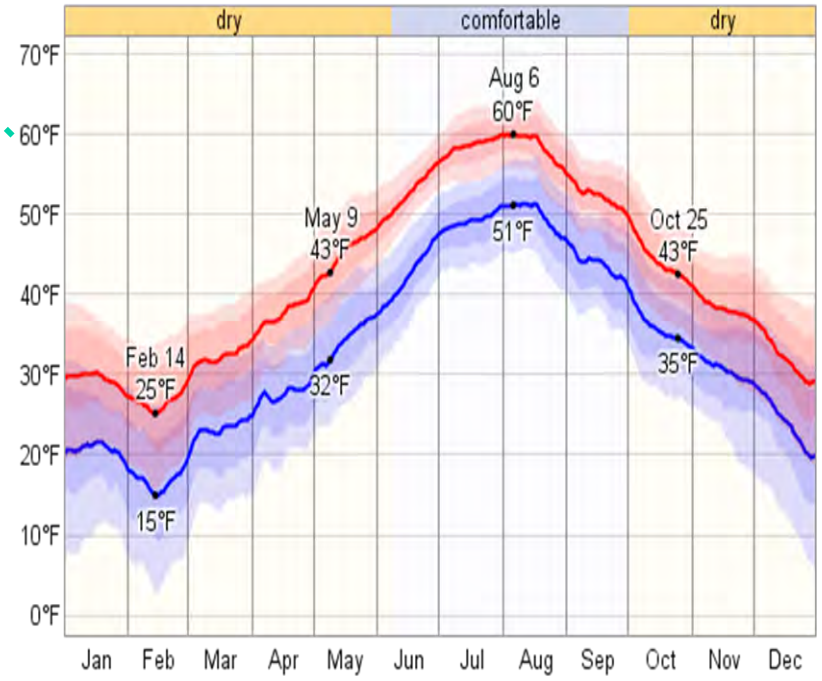




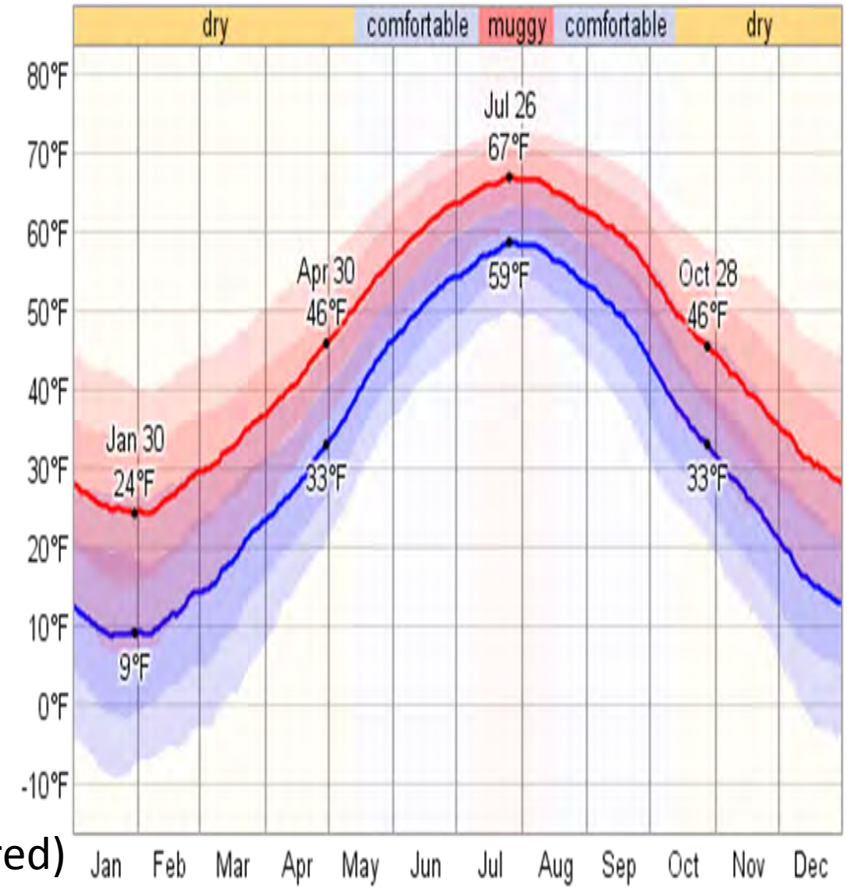
The daily average low (blue) and high (red) temperature with percentile bands (inner band from 25th to 75th percentile, outer band from 10th to 90th percentile).

Dewpoint

Stockholm



Boston



The daily average low (blue) and high (red) dew point with percentile bands (inner band from 25th to 75th percentile, outer band from 10th to 90th percentile).

Summer average high temperature and dewpoint conditions

- Stockholm 74F DB and 60F dewpoint: RH 62%, enthalpy 29.8 Btu/lb
- Boston 82F DB and 67F dewpoint: RH 61%, enthalpy 35.2 Btu/lb

- To cool 1,000 cfm of outside air
  - For inside conditions of 74F, 50% RH, enthalpy 27.5
  - Stockholm: 10,000 Btu/hr
  - Boston: **34,000 Btu/hr**

Average high temperature and dewpoint conditions

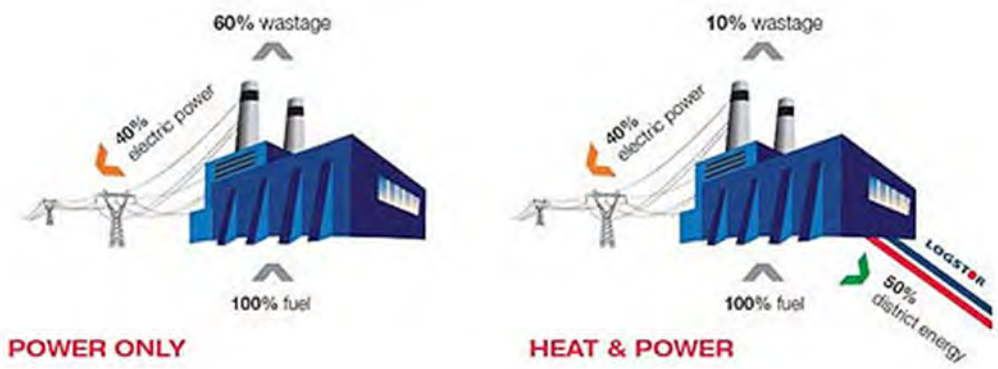
- Stockholm 74F DB and 60F dewpoint: RH 62%, enthalpy 29.8 Btu/cu.ft.
- Boston 82F DB and 67F dewpoint: RH 61, enthalpy 35.2

- To cool 1000 cfm of outside air
  - For inside conditions of 74F, 50% RH, enthalpy 27.5
  - Stockholm: 10,000 Btu/hr
  - Boston: **34,000 Btu/hr**

District Heating in Stockholm and Copenhagen

Stockholm District Heating

- Market share ~80% of load
- Fossil fuel ~20% -- 80% renewable
- CHP produces ~1/5th of Stockholm electricity
- District supplies about 5,700 GWh/yr of heat
  - 2 x 10^{16} BTU
  - Avoids ~150 MM gallons oil burned



Stockholm District Heating

- Serves ~7 MM sq.m. commercial s
- Implementing district cooling

Stockholm District Heating

- Private companies operate the systems
- Fortum plant uses direct seawater cooling, and HP's to lower water temperature in Fall when seawater warms
  - 220MW of capacity provide 350 MWh/yr
- HP's also provide heating with combustion fuel boost in colder weather
- Total HP heating capacity 600 MW
  - Used at night to charge DHW tanks
  - Low cost electricity at night
  - Sweden has 40% nuclear + 40 %hydro
    7% Wind
- Single stage, dual stage, can share heat and cool in swing season

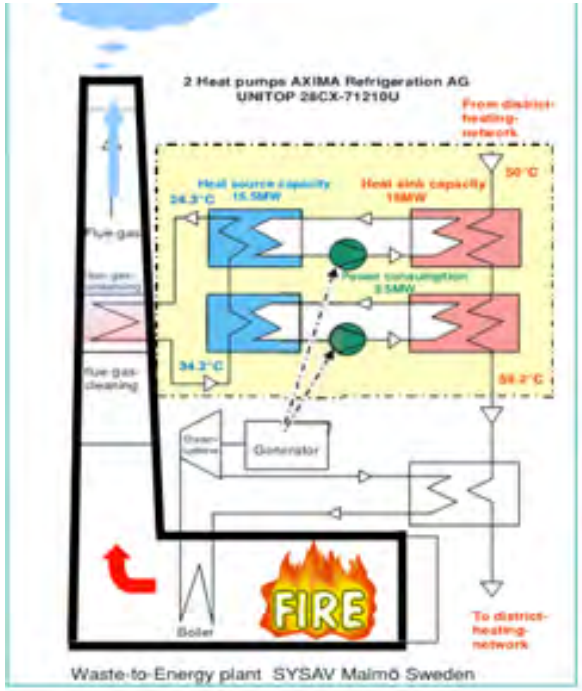
Stockholm District Heating

Working hard to optimize systems

- Waste burning CHP plant In Malmo

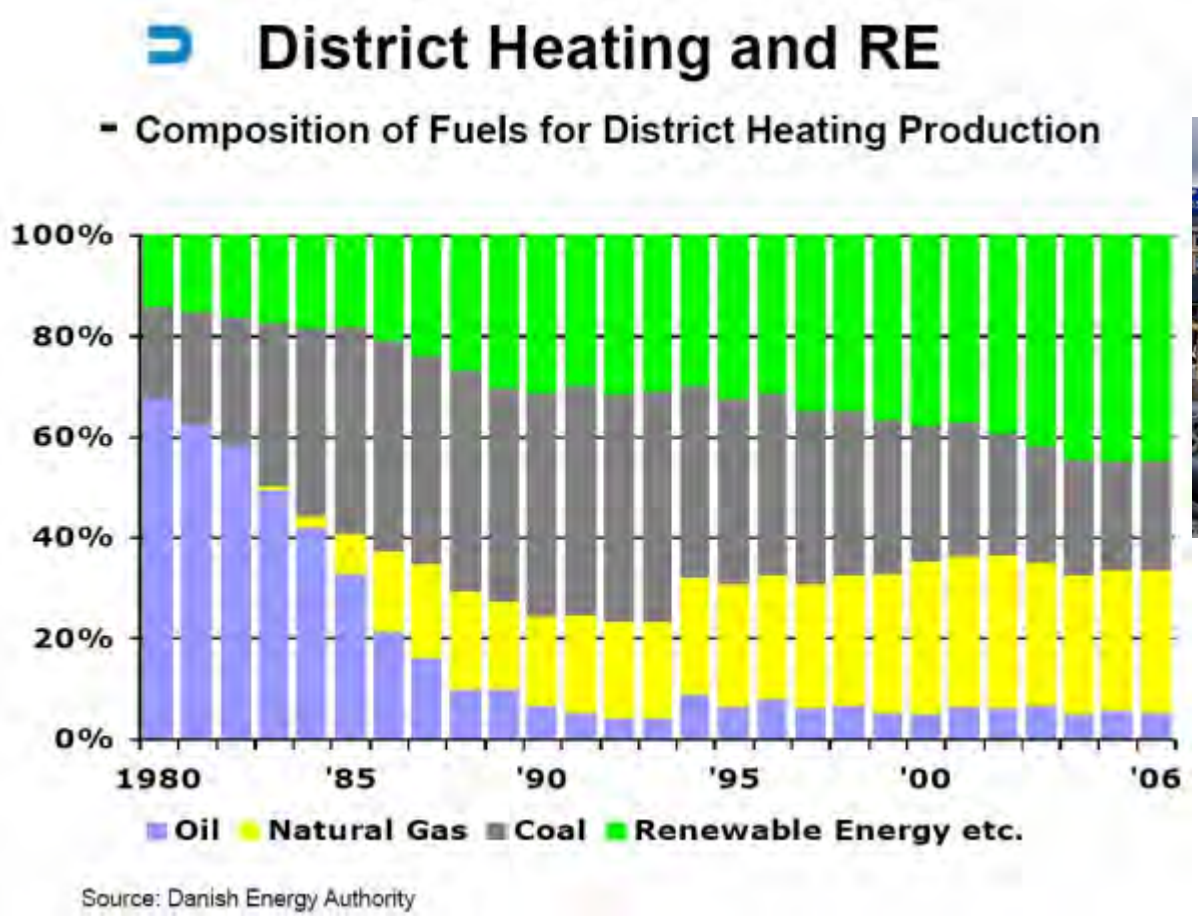
Flue gas heat recovery

- Boosts return water from 50C (122F) to 59C (138F) in district heat
- COP ~5 – 6
- 19 MW heating



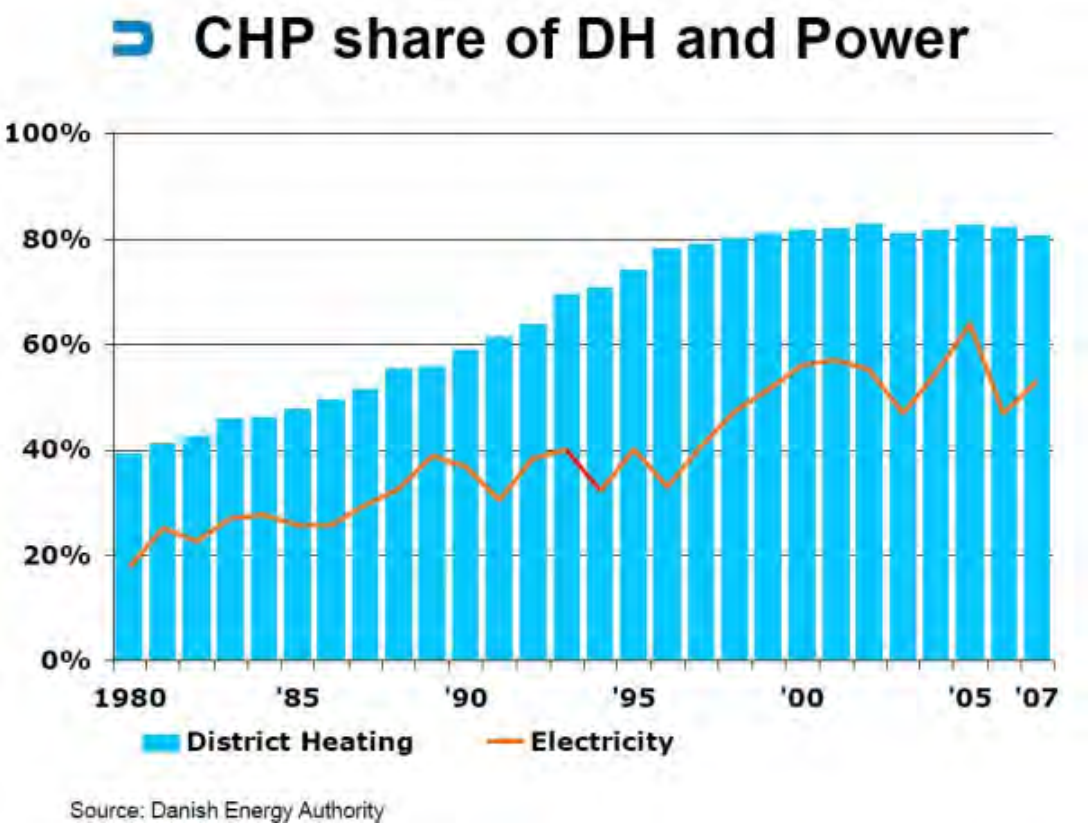
Copenhagen -- Fossil fuels

- Coal and oil in CHP/district heating being replaced
- 100% renewable sources by 2025



Copenhagen -- Fossil fuels

- CHP/district increased share of heat and power production
- 98% of heat from district heating by 2025



District Heating

Danish modern CHP plant

Copenhagen – Fossil to be replaced by

- Biofuels and heat pumps in CHP/District heating
- seawater and sewage heat sources for 180 MW heat pumps!
- Wood pellets from Baltic region. Another plant to be wood chip by 2020
- Researching deep earth geothermal

HP plant

Copenhagen

- Plastics in trash burned in district heat plants
- Will take plastic out from waste burning which will reduce energy content of trash by 45%
- 3rd party audits are done of biomass sources for sustainable management
- “Wild forest makes more CO2 than managed forest”
- At present not accounting for fossil fuel input into biomass fuel

Single-family home DERs

- Renzero Project in Stockholm
  - Demonstration retrofit of a 1960s “ranch” with donated insulation, windows, and ground-source heat pump
  - Project team sought a representative house and homeowner as a test case
- Villa Kyoto project near Gothenburg
  - Owner-occupied and –funded (?) demonstration retrofit of a 1978 villa
  - Owner-builder sought to make a case for large-scale DERs of a typical housing form in Sweden

Renzero - Stockholm

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PAROC
PAROC
PAROC

Ventilation-8 by renZERO™ Project
Ventilationsdragning på vinden. Foto byline: Paroc, renZERO-projektet
Taken on October 22, 2013
526 views, 0 comments

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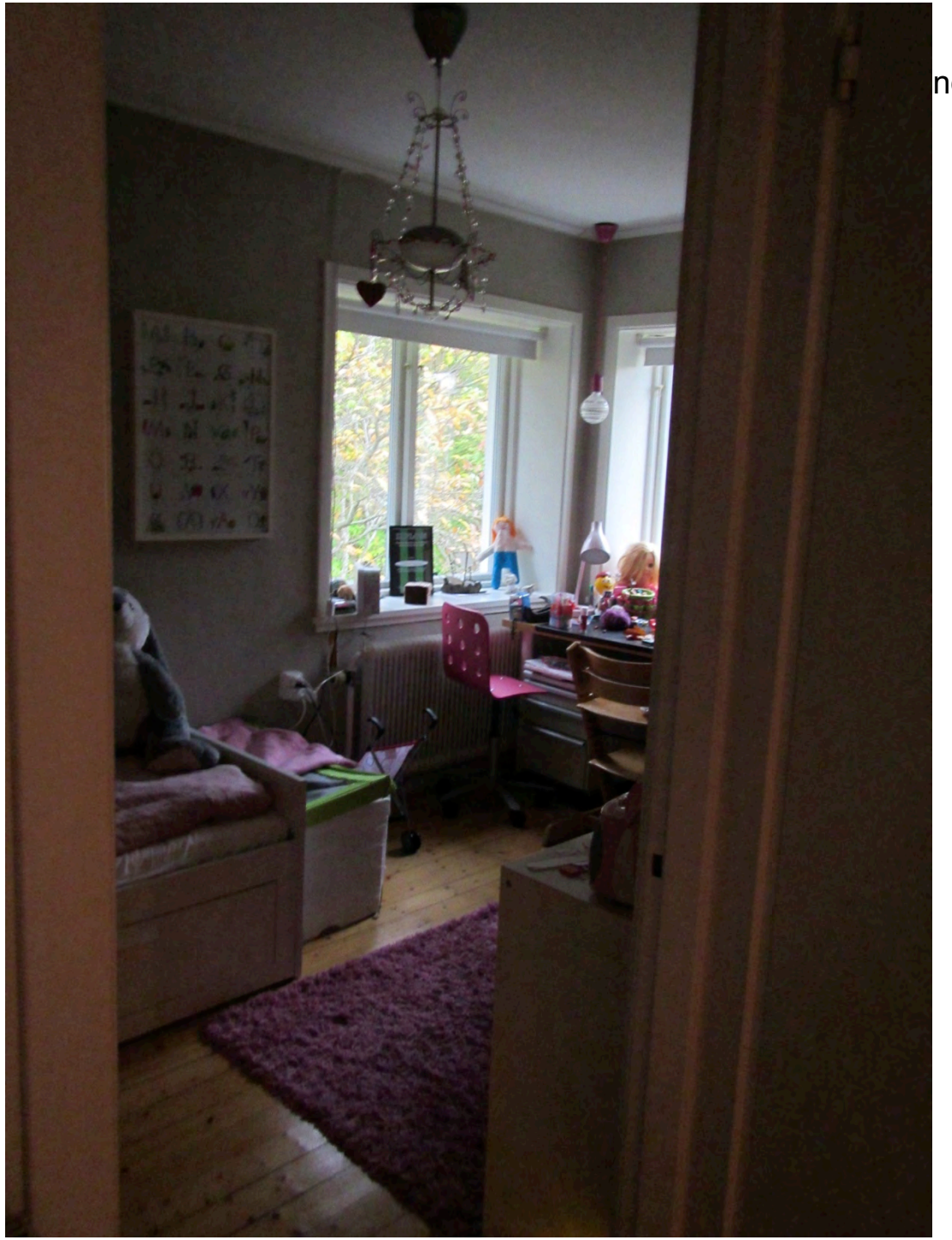

ndinavia - SWEDEN

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Energianvändning enligt dagens BBR 20

	Eluppvärmda byggnader (kWh/m²)	Icke eluppvärmda byggnader (kWh/m²)
Klimatzon I	95	130
Klimatzon II	75	110
Klimatzon III	55	90

Figur 3: Förslag till nära-nollenergikrav i Sverige enligt BBR 20

Energianvändning efter renovering med renZERO™ konceptet

	Eluppvärmda byggnader (kWh/m²)
Klimatzon I	45
Klimatzon II	35
Klimatzon III	25

Figur 4: Beräknad energianvändning efter renovering med renZERO™ konceptet

Villa Kyoto - Gothenburg

VILLA KYOTO i Göteborg. "HUSET SOM DRAR NOLL"

- Byggår: 1978
- 1 1/2-plan utan källare
- 5-rum o kök
- 134 m²
- Direktverkande el
- Elkostnader/år: 30 000 kr (inkl. hushållsel)
- 20 000 kWh
- 27 energiåtgärder och huset drar noll i energikostnader!
- Höjd ö havet: 4 m
- Visning: se hemsida

VILLA KYOTO i Göteborg

Kyoto Pyramiden

www.villakyoto.se

Samarbetspartners:

27. Heating stove with warmwater connection…
26. A small heating pump (3 kW)……

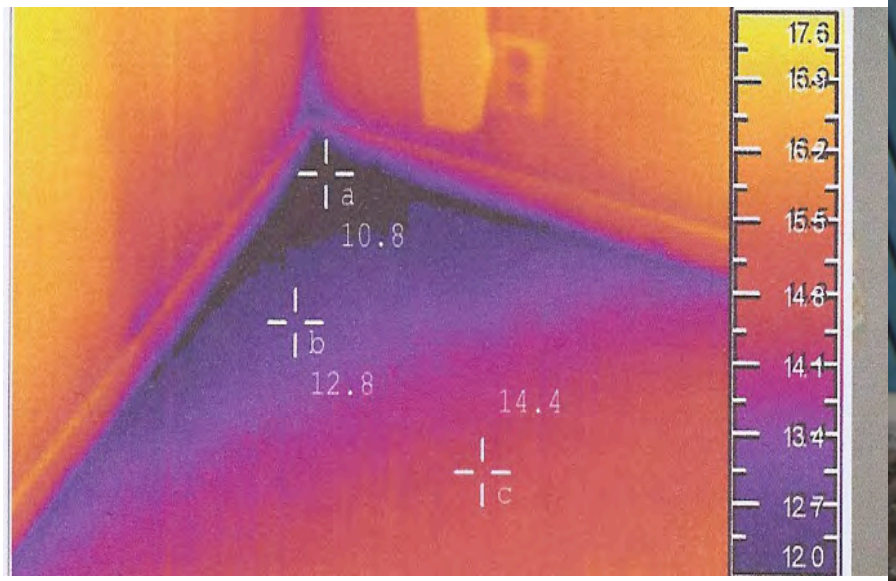
25. Accumulation tank….(750 l)
24. Sun Heating panels….
23. Solar Electric panels…

22. Energy saveing electrics sets…..
21. LED TV……..
20. Energysmart Washing machine
19. Energysmart Dish machine……
18. Energysmart Stowe……
17. Energysmart Fridge & Freezer……
16. LED lightning……

15. Sun protection blinds..
14. Energy blinds…….
13. Drain heat exchanger..
12. Sensor controlled watertaps
11. Extra insulated dormer windows..
10. Extra insulated roof hatch to the attic
9. Extra insulated attic…
8. Ensure the tightness …….. *(from 1,4 to 0,4 l/s m2 at 50 Pa)*
7. Pre warmed ventilation air
6. Sensor controlled ventilation per room and heat exchanger
5. Extra insulated garage door
4. Extra insulated front door…… *(U-value 1,0)*
3. Extra insulated windows and balcony doors…... *(0,9 U-value)*
2. Extra insulated facade ..
1. Extra insulated ground …..

Energibövare blir nollförbrukare

WINBAG
WINBAG



NESEA Travelers

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NESEA Travelers

The final result 2014

Is it possible to reburnish a villa to zero in energy cost? *Yes!*

Is it profitabel ? *Yes, in most cases!*

Is it possible to reburnish all 2 million family houses in Sweden to zero or almost zero in energy cost?

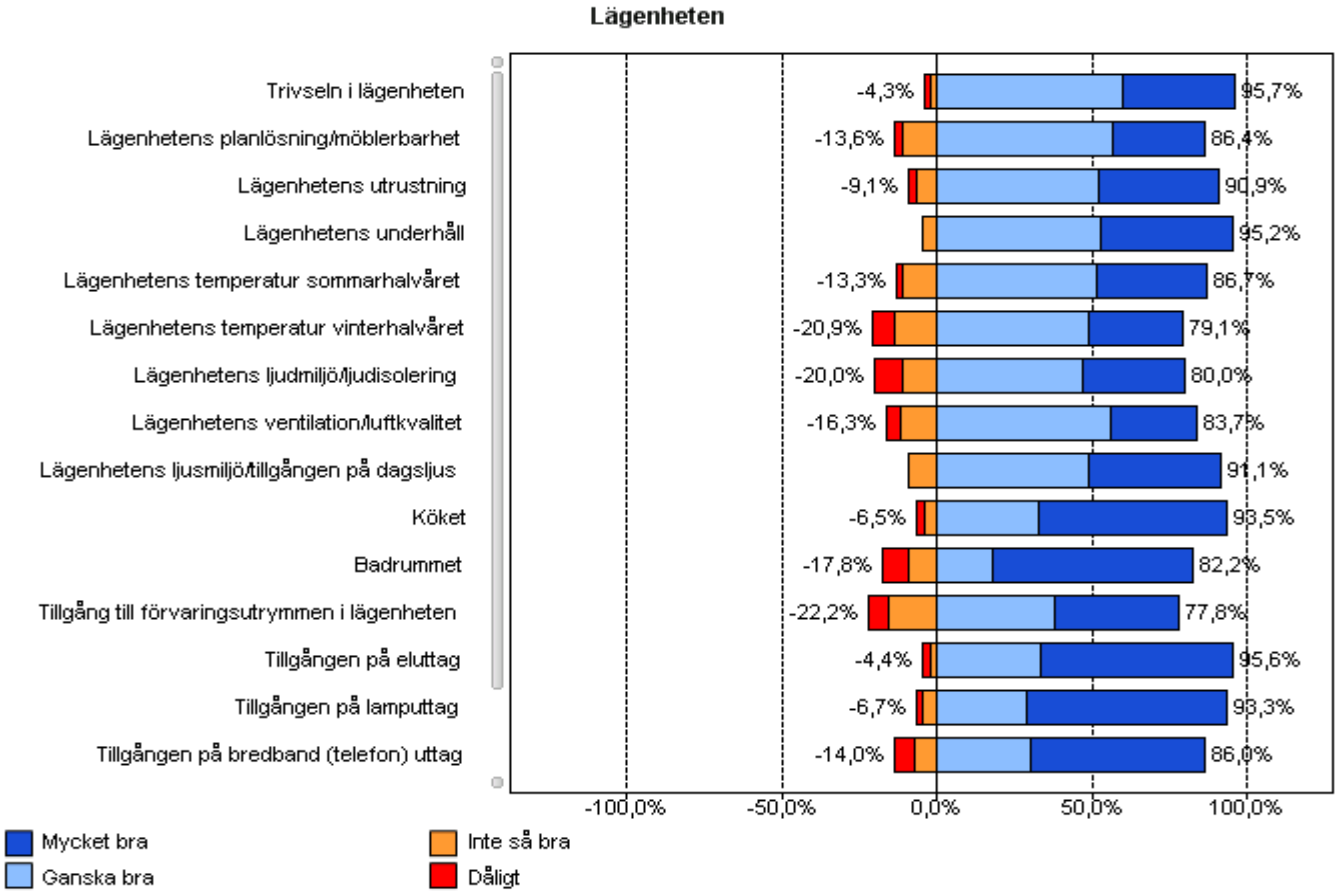
Yes, most of them!

Neighborhoods of Järva

Overall project goals for sustainable Järva

- Sustainable Järva will contribute to reaching the national environmental and energy goals for 2020 and 2050.
- Järva will be given a new identity as a environmental friendly region by investments in energy efficiency renovation, renewable energy and a new cycle network. Information and dialog with the inhabitants will be a key to this.
- The project will be sustainable in a long term perspective and include both social, environmental and economical aspects.
- Järva will be a model for the rest of the world.
- Methods and results will spread to the industry and other renovation projects in Sweden and the rest of the world.
- The projects measure will give the inhabitants in the chosen houses to be involved in the process and be inspired to a sustainable lifestyle.

Norgegatan
Oslogatan
Kupol-
Center


Lägenheten
Trivseln i lägenheten
Lägenhetens planlösning/möblerbarhet
Lägenhetens utrustning
Lägenhetens underhåll
Lägenhetens temperatur sommarhalvåret
Lägenhetens temperatur vinterhalvåret
Lägenhetens ljudmiljö/ljudisolering
Lägenhetens ventilation/luftkvalitet
Lägenhetens ljusmiljö/tillgången på dagsljus
Köket
Badrummet
Tillgång till förvaringsutrymmen i lägenheten
Tillgången på eluttag
Tillgången på lamputtag
Tillgången på bredband (telefon) uttag
-4,3%
95,7%
-13,6%
86,4%
-9,1%
90,9%
95,2%
-13,3%
86,7%
-20,9%
79,1%
-20,0%
80,0%
-16,3%
83,7%
91,1%
-6,5%
93,5%
-17,8%
82,2%
-22,2%
77,8%
-4,4%
95,6%
-6,7%
93,3%
-14,0%
86,0%
-100,0%
-50,0%
0,0%
50,0%
100,0%
Mycket bra
Ganska bra
Inte så bra
Dåligt

Avgift
alla dagar
0-24

Solen ger oss energi
Just nu
153
W
Sedan start
18470
kWh
Miljöomsorg - vi skall göra skillnad

Improved corridors -aesthetics

BE 2015

Lessons from Scandinavia - SWEDEN

Improving corridors – ventilation and safety

NESEA Travelers

Improving corridors – ventilation and safety

Improving corridors – access

ENERG
Electrolux EN3851AOW
248
kWh/annum
285 L
78 L
43 dB

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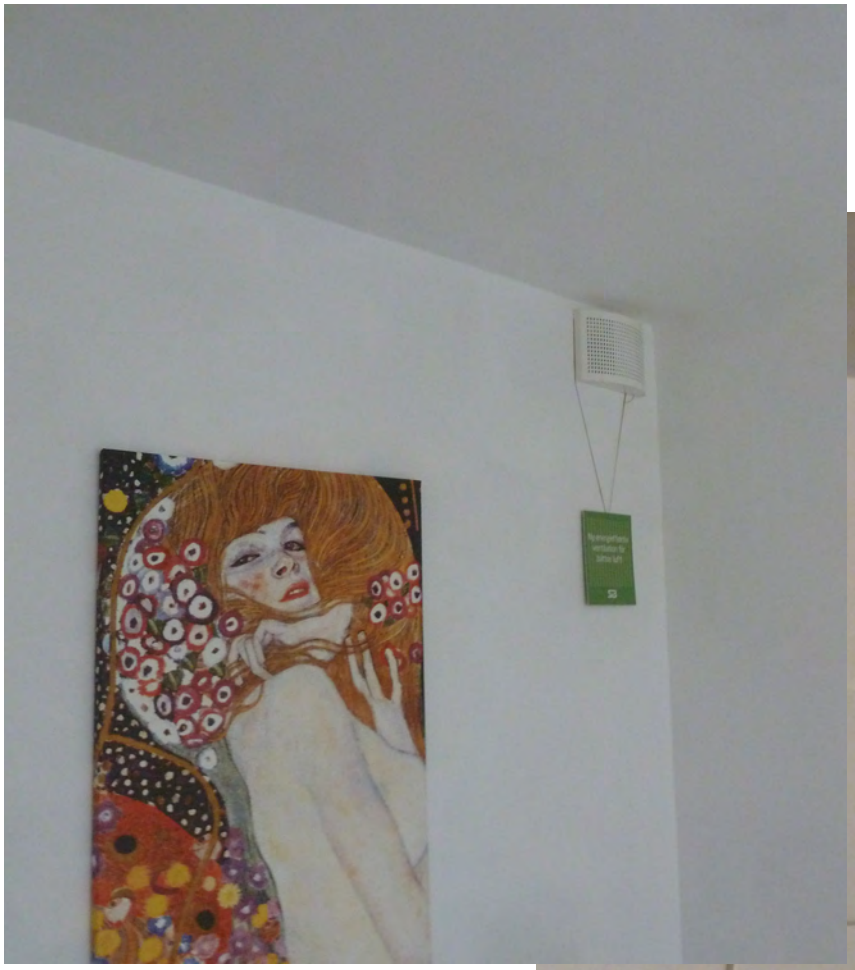
Lessons from Scandinavia - SWEDEN



Improving indoor air quality

NESEA Travelers

Same ventilation testing methods

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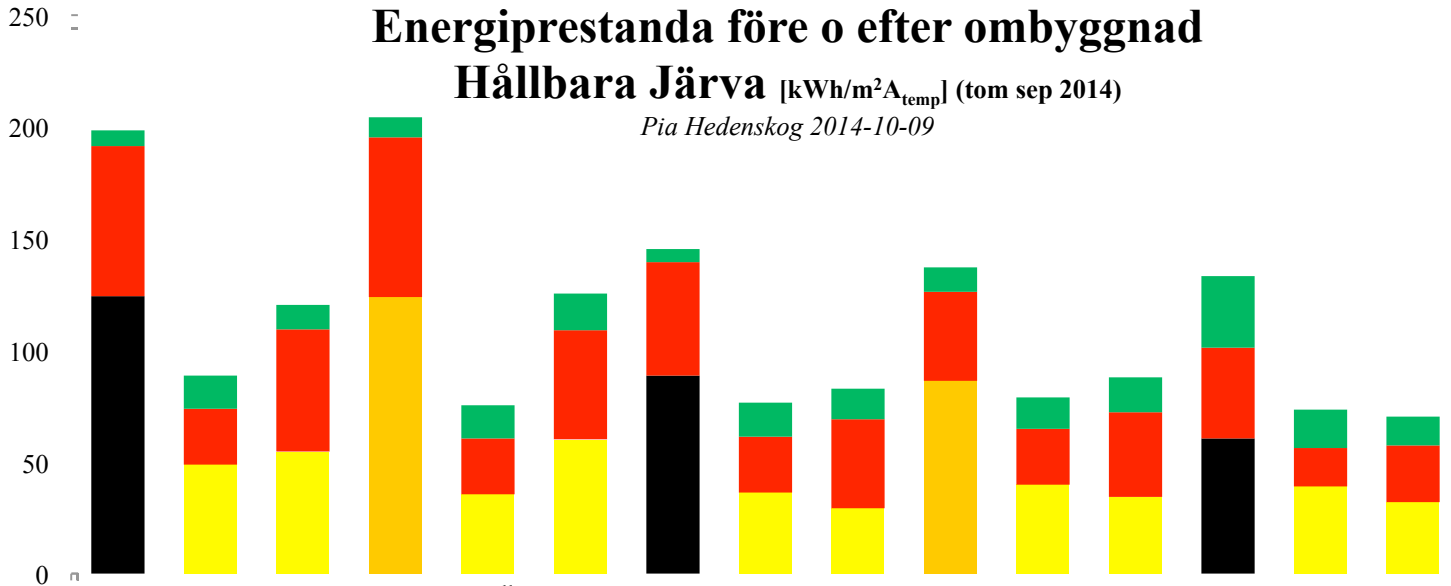
Lessons from Scandinavia - SWEDEN

Windows, fresh air

NESEA Travelers

Laundry, bike storage



	Trondheimsgatan 28 - före	Trondheimsgatan 28 - beräknat	Trondheimsgatan 28 - efter	Trondheimsgatan 30,30A - före	Trondheimsgatan 30,30A - beräknat	Trondheimsgatan 30,30A - efter	Kvarnsegret 2 - före	Kvarnsegret 2 - beräknat	Kvarnsegret 2 - efter	Nystad 7 - före	Nystad 7 - beräknat	Nystad 7 - efter	Nystad 8 - före	Nystad 8 - beräknat	Nystad 8 - efter
Fastighetsel	7	15	11	9	15	16	6	15	14	11	14	16	32	17	13
Varmvatten	67	25	55	71	25	49	51	25	40	40	25	38	41	17	25
Uppvärmning	124	49	55	124	35	60	88	36	29	86	40	34	61	39	32

Energy use data: before, projected and after

Jarva's Reflections

- The culture-historical past makes people proud of their neighborhood
- Involving residents in the development is a good idea but needs to be well planned
- In renovation projects the social part of sustainability is always an issue
- In new built area the environmental part of sustainability is always an issue
- Both parts are essential in both kind of areas
- Sustainable areas need many reminders and must be attractive

BE 2015

Pioneering work with passive houses awarded

Hans Eek and Wolfgang Feist have been jointly awarded the City of Göteborg International Environment Prize 2003 for the technology of building homes without heating systems.

Hans Eek and Wolfgang Feist, proud award winners
Photo: Sofie Hebrand

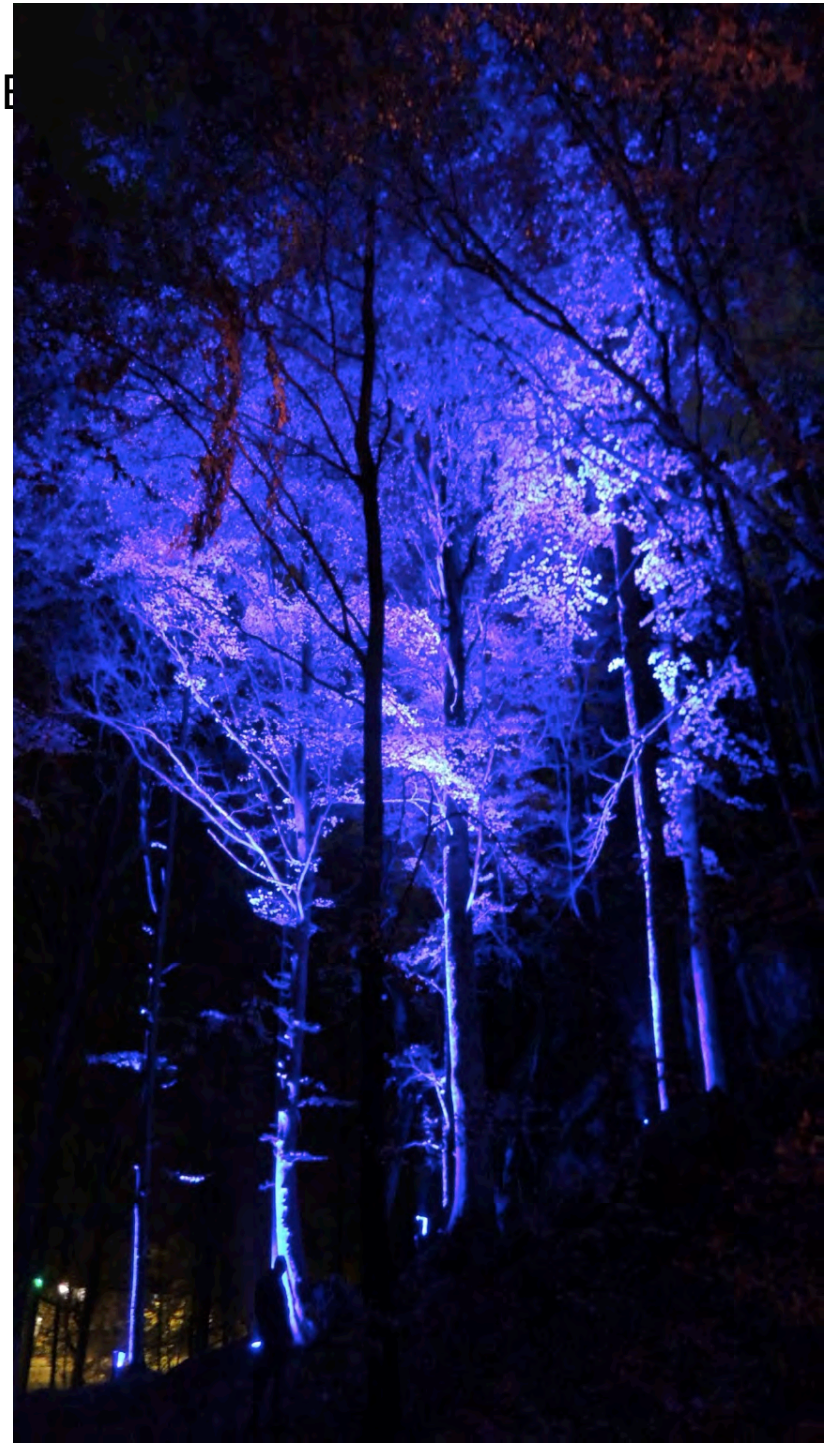
Eek and Feist are awarded for their pioneering work with so-called passive houses, in particular, residential buildings without heating systems, designed and constructed using an elegant and innovative synthesis of simple, time-tested and cost-effective technology.

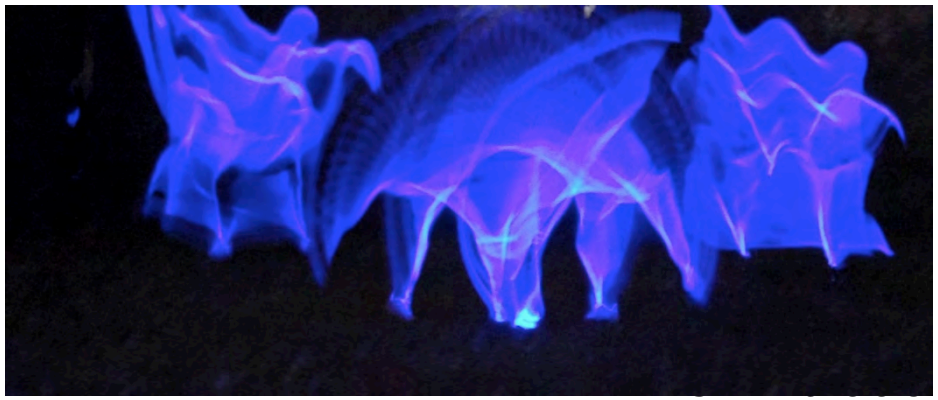
The technology, which requires great precision in methods and the building process, will, in a branch that has, up to now, been conservative, contribute to a major reduction in the consumption of fossil fuels in particular and thereby reduce society's emission of carbon dioxide, which impacts our climate. The recipients meet the prize's criteria for resource efficiency, eco-cycle thinking and process-steering innovation, locally as well as globally.

The architect Hans Eek (from Chalmers University of Technlogy) is the chief designer of the terraced housing units located in Lindås, a community south of Göteborg (Gothenburg), that has attracted international attention. They were ready for tenancy in 2001 and were recently evaluated in an interdisciplinary university study, both as pertains to technology and tenant-social environment. The basic concept - to minimise heat loss - is based on experience Eek acquired through a series of development projects run since the late 1970s, e.g., Tuggelite in Sweden and Ingolstadt-Darmstadt in Germany.

Wolfgang Feist , PhD in Engineering, has constructed similar terraced housing units in Darmstadt with very low heat loss and a minimum of active operating energy. During the years 1998-2002 Feist was the scientific director of the now completed EU project Cepheus, initiated together with Hans Eek, among others, with the purpose of promoting the passive house project, not only in Sweden and Germany, but also in Austria, Switzerland and France.

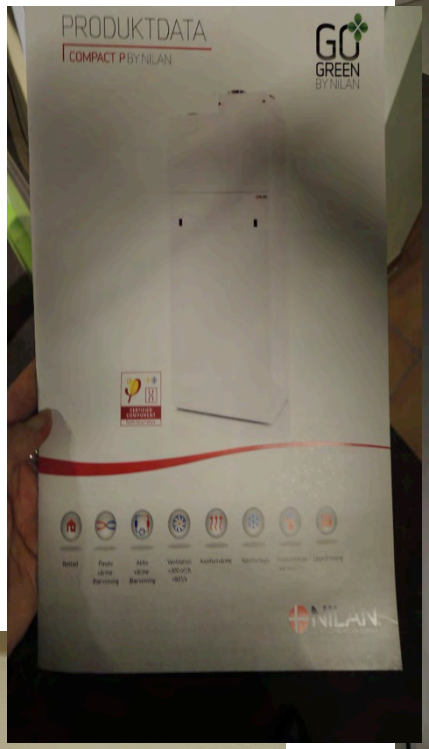
Lessons from Scandinavia - SWEDEN





Lesso

Isolering i passivhus


PRODUKTDATA
COMPACT P BY NILAN
GO GREEN BY NILAN
NILAN

NILAN

Lessons from Scandinavia - SWEDEN

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SWEDEN

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from Scandinavia - SWEDEN

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SWEDEN

Travelers

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SWEDEN

Travelers

°C
20
16
24
12
28
Danfoss

“We have never thought about to certificate a passive house in other countries than Sweden, because the certification is very close to the Swedish building standards and regulations, and also climate. Therefore it also is very difficult to certify a Swedish house with the international (means German) PHI - Passivehouse.

The "Swedish Passivehouse" is controlled by a calculation method, called "Energihuskalkyl" wich has no climate data outside Sweden. See:
http://energihuskalkyl.se/menus/index/23

There is a possibility to test the calculation in a demonstration version:
http://energihuskalkyl.se/buildings/areabuildings

For a multi family house you can fill in the data in:
http://energihuskalkyl.se/calculations/effect/3966104494

You have to go to the homepage http://energihuskalkyl.se "click" Energikalkyl, then Demoversion, then "Klicka här", then demo-flerbostadshus, then Visa kalkyler, then down the page Effektkalkylvärden -and you have the indata sheet. The grey squares are filled in automatically. After filling in all indatas, click Beräkna, and coming back to the previous sheet, click "Generera rapport".

When the result of "Värmeförlusttal" is <15W/m2 the house is a "Swedish Passivehouse“”

SWEDISH PASSIVE HOUSE DEMO CALCULATOR

go to the homepage http://energihuskalkyl.se "click" **Energikalkyl**, then **Demoversion**, then "**Klicka här**", then **demo-flerbostadshus**, then Visa **kalkyler**, then down the page **Effektkalkylvärden** -and you have the indata sheet. The grey squares are filled in automatically. After filling in all indatas, click **Beräkna**, and coming back to the previous sheet, click "**Generera rapport**".

Navigering: Mina byggnader > Kalkyleringar > Effekt-indata

Fyll in data för effektkalkyleringen. Alla data behöver inte fyllas i på en gång.

Allmänt GENERAL

Ort	Stockholm	CITY
Namn på ansvarig för kalkylen	DEMO-användare	

Klimatdata dimensionerande CLIMATE DATA

Klimatdata för ort	Stockholm [?]	CLIMATE DATA FOR CITY
Dimensionerande utetemperatur (°C)	-10.5 [?]	DESIGN OUTDOOR TEMP
Dimensionerande marktemperatur (°C)	0.9 [?]	DESIGN SOIL TEMP
Rumstemperatur (°C)	[?]	ROOM TEMP

Byggnadskonstruktion STRUCTURE

Huskategori	[?]	BUILDING TYPE
Byggnadens konstruktion	Tung [?]	BUILDING CONSTRUCTION
Boarea BOA (m^2)	1651 [?]	LIVING AREA
Uppvärmd area A_{temp} (m^2)	1688 [?]	HEATED AREA
Uppvärmt garage (m^2)	0 [?]	HEATED GARAGE

Klimatskal CLIMATE COVER

Byggnadsdel	Area (m^2) [?]	W/(m^2K) U-värde [?]	
Yttervägg (exkl. fönster- och dörrarea)	815	0.16	EXT WALL (EXCL WIND&DOOR)
Ytterdörr	7.7	1.2	FRONT DOOR
Tak mot uteluft	236	0.07	ROOF AGAINST OUTDOOR AIR
Terrasstak	44	0.18	EARTH CONTACT?
Golv mot platta på mark + krypgrund [?]	295	0.176	FLR TOWARD SLAB & CRWL SP
Vägg mot mark	3	0.176	WALL TO LAND
Köldbryggor luft		105.26	THERMAL BRIDGES TO AIR
Köldbryggor mark			THERMAL BRIDGES TO LAND
Fönster	257	0.9	WINDOWS
Glasade altandörrar	70	0.9	GLAZED DOORS
Fläktrum	74	0.17	SKYLITES?
		1	
		1	
		1	

Köldbryggor THERMAL BRIDGES

Köldbryggor mot luft [?]	Längd (m)	Y (W/(mK)) [?]	
Bottenbjälklag	77	0.05	THERMAL BRIDGES - AIR
Fönster och dörrar	770	0.031	?
Mellanbjälklag	385	0.14	WINDOWS AND DOORS
Balkonginfästningar	39	0.14	?
Taktot	77	0.15	BALCONY FIXINGS
Ytter- och innerhörn	51	0.13	EVES
	1		INSIDE AND OUTSIDE CORNERS
	1		

Köldbryggor mot mark	Längd (m)	Y (W/(mK))	
Köldbryggor mot mark (källarplan)			THERMAL BRIDGES - GROUND
Punktköldbryggor mot mark [?]			THERMAL BRIDGES BSMT
			POINT BRIDGES - GROUND

Fönster och glasade dörrar WINDOWS AND GLAZED DOORS

	Syd	Väst	Nord	Öst	
Fönsterarea brutto (m^2)	54	55	83	65	WINDOW AREA GROSS
Glasade dörrar (m^2)	37	25	3.3	4.7	GLAZED DOORS

Ventilationsdata dimensionerande VENTILATION DESIGN

Genomsnittligt frånluftsflöde (Vex)	648	(l/s)	AVG EXHAUST AIR FLOW
vindskyddskoefficient, e	0.07	[?]	WINDBREAK COEFFICIENT E
vindskyddskoefficient, f	15	[?]	WINDBREAK COEFFICIENT F
Läckageflöde q50/Aom vid provtrycknin	0.3	(l/s, m^2 $A_{omslutande}$) [?]	LEAKAGE FLOW

Värmeåtervinningsdata dimensionerande HEAT RECOVERY DATA DESIGN

Tilluftsflöde	90	(% av Vex) [?]	BALCONY FIXINGS
Värmeväxlarens återvinningsgrad, heff	89	(%) [?]	HEAT EXCHANGER RECYCLING RATE
Värmekonduktivitet uteluftkanal, Y	0.23	(W/(mK)) [?]	THERMAL CONDUCTIVITY OF OUTSIDE DUCT
Längd uteluftkanal	3	(m) [?]	LENGTH..... ?
Värmekonduktivitet avluftkanal, Y	0.23	(W/(mK)) [?]	THERM CONDUCTIVITY OF AIR DUCT
Längd avluftkanal	4.5	(m)	LENGTH OF AIR DUCT
Avfrostningstid vid DUT	0	(min/h) [?]	DEFROST AT ???
Jordvärmeväxlarens återvinningsgrad	0	% heff [?]	GEOTHERMAL HEAT EXCHANGER RECYCLING RATE

Övrigt

Namn på kalkylen	Flbh PH	NAME OF CALCULUS
Kommentarer	Arbetskopia av Flbh PH	COMMENTS

Beräkna CALCULATE

Stockholm Royal Seaport

Stockholm
The Capital of Scandinavia

STOCKHOLM ROYAL SEAPORT

NORRA DJURGÅRDSSTADEN

A VIBRANT AND SUSTAINABLE URBAN ENVIRONMENT

Stockholm Royal Seaport offers a unique geographical location with a new urbanised area emerging at the intersection of the big-city pulse on the one hand and nature, water and extensive views on the other.

The generic starting point for development of the area is the creation of an urban environment that is sustainable in the long term. The objective is for Stockholm Royal Seaport to take the lead in realising the latest innovations within climate, environmental technology and sustainable development. The district will reconcile the requirements and expectations of the modern city-dweller with world-class climate work.

The emergence of a completely new district affords particularly good opportunities for climate-adapted and future-oriented development. From pioneering energy-efficient technical solutions in buildings and infrastructure to the development of smart electricity networks that enable local production and distribution of electricity, a new urban district offers the most fertile ground for new ways of thinking. The dynamism of the development work is exciting, both to observe and to participate in – not least for people living and working in the district. Lessons learned and experiences gained from Hammarby Sjöstad will be utilised and refined. Climate-adapted solutions will minimise energy use, waste and transport requirements. Carefully thought-out resource management and a prudent recycling philosophy will be the first considerations.

Stockholm Royal Seaport will buzz with life. The port area will be an important centre of development, with new quay-berths and terminals welcoming ferry and cruise traffic, and biofuel for the new combined power and heating plant arriving at the Energihamnen port. Quayside walkways will be laid out along the port areas, with offices, restaurants, bars and shops helping to create a mixed urban development full of life and activity.

By 2030 Stockholm Royal Seaport will be a landmark for everyone arriving in Stockholm from the east.

Planned as a “World Class Urban District”

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Lessons from Scandinavia - SWEDEN

236 Hectares, 10,000 Residential Units, 135,000m2 Commercial

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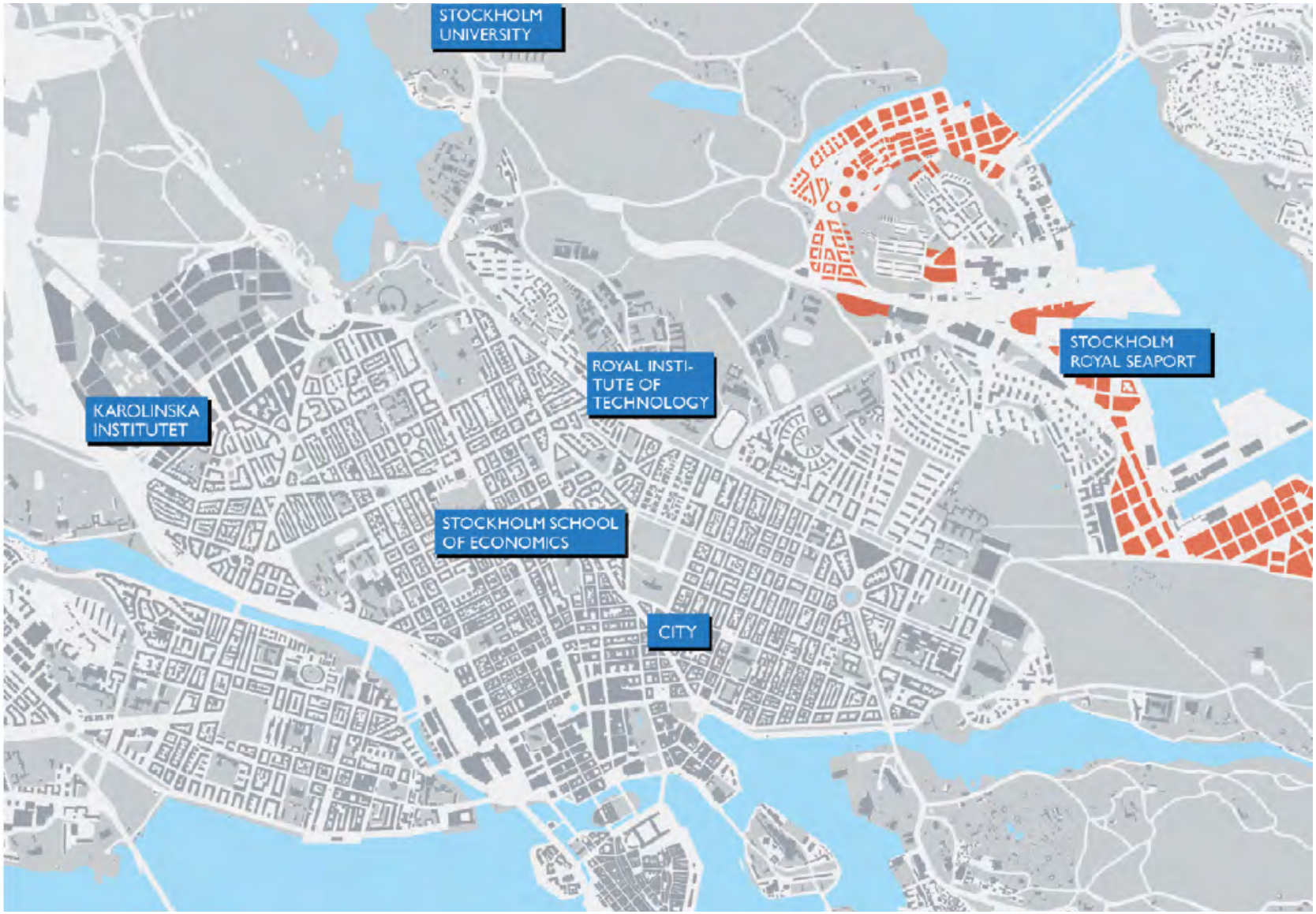
A new Cultural Center from previous brownsite



The City of Stockholm owns most of the land

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Lessons from Scandinavia - SWEDEN

EUI Performance Standard: 55 kwh/m2 per year

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Carbon Goals: fossil free by 2030 with 1.5 tons per person by 2020

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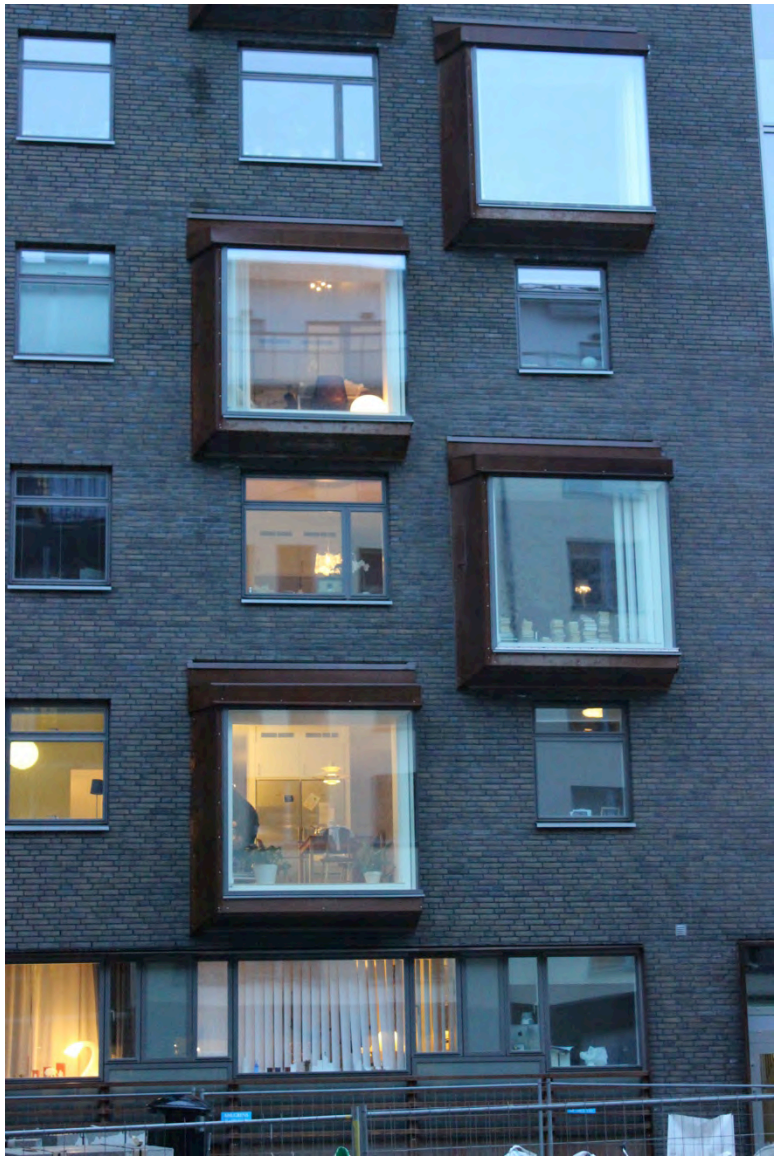

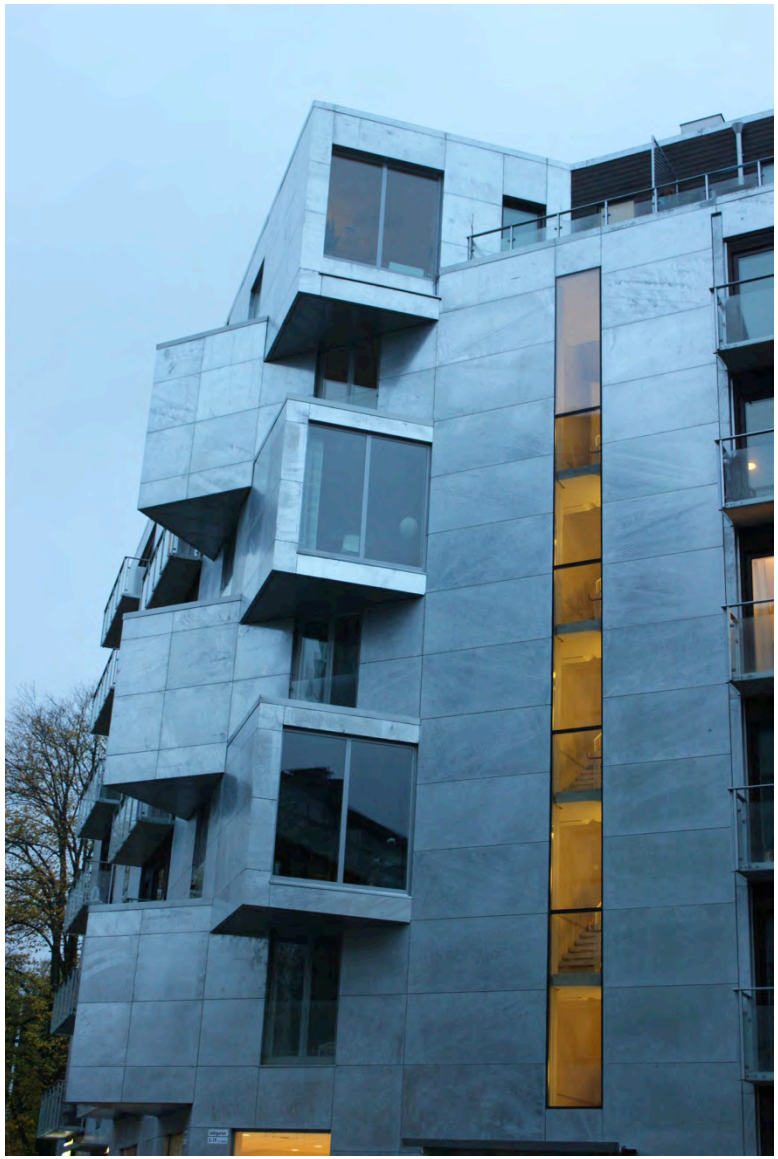

Focus: Energy & Lessons Learned from Hammerby Stojstad

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Lessons from Scandinavia - SWEDEN

Focus Area: Transportation (Kitchen waste is ground for the production of methane for use in public buses and cabs)

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Lessons from Scandinavia - SWEDEN

Focus Area: Climate Adpation & Green Space Index

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Lessons from Scandinavia - SWEDEN

Focus Areas: Recycling Systems (vacuum tubes for paper and trash, not bottles)

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Lessons from Scandinavia - SWEDEN

Focus Area: Buildings

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Focus Area: Living and Working

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Parking: 0.5 cars per unit, 2.5 bicycles per unit

Nice details- leaf diverter

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Crescent

Public commons

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Lessons from Scandinavia - SWEDEN

Dialogue of expectations vs. measured result with penalty

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TRCH End for discussion- 11:50

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This concludes The American Institute of Architects
Continuing Education Systems Course

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