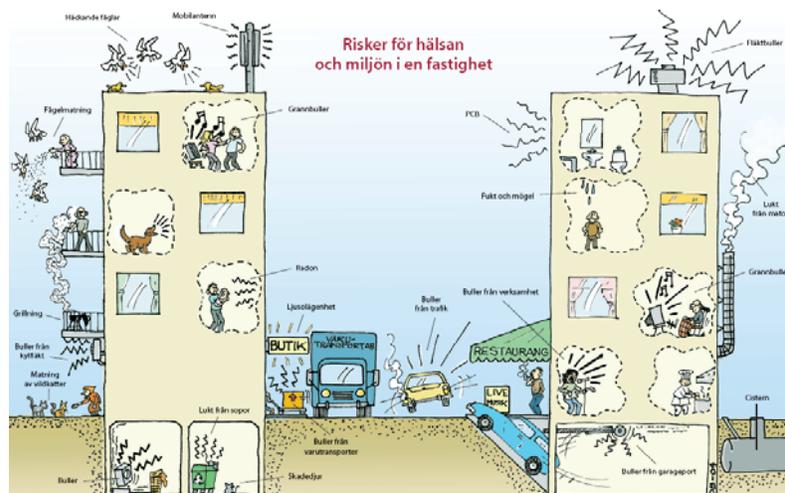


# Environmental issues for a residential real estate company

Henrik Ivarsson, 2011-04-05

## Introduction

Environmental issues for real estate companies are a huge and wide ranging subject that can be discussed endlessly. All issues can arise from different types of environmental issues, depending on whether it is indoor climate, noise, outdoor environment, the remediation of land before construction, energy, products we use in maintenance of our apartments and so on. The most common environmental issues for our tenants can be summarized as the picture below.



*The most common environmental issues for our tenants*

## **The Environmental Act**

The Environmental Act aims to promote sustainable development of a healthy and good environment to our present and future generations. The legislation should be applied to protect the human health and the environment against damage and nuisance. The property owner has the responsibility, according to the Environmental Act, to eliminate or at least minimize these risks in indoor environments.

The property owner has a general responsibility to conserve energy, follow the rules of waste products and avoid products that contain chemicals that pose risks to human health and the environment. They also have the responsibility of minimizing nuisance to human health and the environment caused by the building itself or the ground. In this case, nuisance refers to heat, cold, drafts, moisture, noise, air pollution, radon, mildew and other similar disorders.

The Burden of proof rule implies that it is the property owner and not, as previously, the Municipality Environment Centre which is required to investigate health issues.

If a tenant in a residential apartment feels discomfort from the environment and there is reason to believe that these problems are caused by something in the building itself, it is the property owner who has to investigate the matter and take steps to eliminate the problem. Otherwise, the property owner has to prove that there is nothing in the building that causes the tenants problem.

## **Environmental Policy**

Each real estate company should have an environmental policy that clearly shows how to achieve environmental goals set by the authorities and the company. It should include who does what and should be well familiar to the staff of the company. The Akelius Environmental policy can be found on our intranet.

## **Some of the issues included in our daily business as real estate owners (only the issues, not the solutions).**

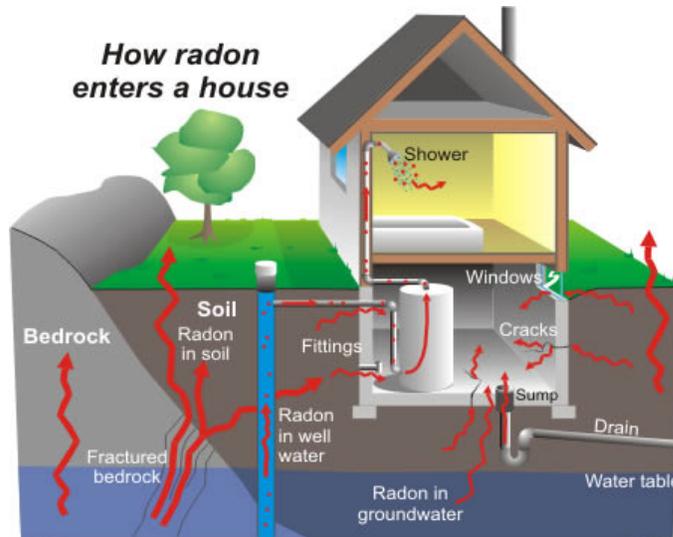
### **Radon**

Radon is an odourless and colourless radioactive gas that exposed to indoors is an example of a public health issue that may pose a nuisance to human health. Therefore, there is a benchmark for existing housing and a threshold for new housing. The benchmark is a recommendation, while the threshold is a binding rule. The National Board of Health guideline for annual average of radon in indoor air is 200 Becquerel per cubic meter of air (Bq/m<sup>3</sup>). According to the Building Regulations (BBR), a newly built real estate has to have a radon concentration (annual average) of less than 200 Bq/m<sup>3</sup>.

Lung cancer is a health effect associated with radon in indoor environment. About 15 percent of all lung cancer cases in Sweden are caused by radon in homes. Radon represents around 500 cases of lung cancer per year. 50 of those cases claim themselves to be non smokers. That is why Radon is one of the major health risks to be eliminated in the indoor environment.

Radon in indoor air comes from soil, water or building materials. Some of the factors that affecting radon levels are:

- Radon from the ground, leaks into the building through cracks or leaks in the foundation, the floors, walls or pipes and command glands. In residential real estate buildings it is estimated that 84% of the radon comes from the ground.
- How much blue light concrete supplied to the building and where in the building it is situated. The Blue concrete was produced between 1929 and 1975 and it was commonly used as a building material.
- If the water comes from its own well or from municipal water drains.



*How radon enters the house*

## PCB - PolyChlorinated Biphenyls

PCB is a group of persistent organic compounds that was found in the environment in the mid-1960s. These substances are persistent - stable - which means they end up in the food chain when they enter the environment. PCBs are bio accumulates, which means that there are higher levels of PCBs in living organisms than the surrounding environment. PCB has therefore harmful effects on animals and humans.

Most PCBs are viscous oil-like liquids. They have several useful technical features and have been used in electrical equipment such as transformers and capacitors, as well as softeners in plastics and sealants. PCBs were often used in Sweden in the major investment of housing production in the 60's, the million program, in which PCB was added to soften the caulking used to seal and absorb movements in the facade concrete elements.

PCBs in buildings can be found at the following locations:

- Sealants applied 1956-1973
- Floor loads, (Acrydur) from 1956 – 1973
- Insulating glass mounted 1956 - 1973 or later if they are imported
- Capacitors, mainly small capacitors

When we became aware of the effects of PCBs in the environment, PCBs were banned in 1972 in the open use in Sweden, and were totally forbidden in 1995.

PCBs are spread both by the leak from sealants in our buildings, and by PCB that already exists in the environment moves with the wind and water. an assessment has been made that there are about 2 tons of PCB per year that fall down from the sky over Sweden. The leaks coming from the building materials we are able to prevent by cleaning up the PCB-containing material that involves great risk to health and environment.

PCBs affect our fertility, nervous system, immune system, learning by children, etc. The people of Sweden gets there consumption of PCBs primarily through fatty fish from the Baltic Sea.

### **Legislation**

The law requires that owners of a building or other facility where sealant or anti-slip floor mass may have been used during the years 1956-1973, to make an inventory of PCBs and report the results to the environmental office. The owner of the property has to verify that the work is carried out under the Environmental and safety legislation regulations.

Before servicing or demolition of a part or a complete building, the owner is required to find out if there are environmental and health hazardous substances that will be affected by the planned measures.

### **Asbestos**



*Ceiling tiles made of asbestos*

Asbestos is a mineral fibre that is so small and thin that they can penetrate the body. Dust with fibres which enter the lungs and can cause more serious lung diseases.

Asbestos has been banned for a long time, but are mainly left in the older buildings. There is therefore a risk to those who are working in the construction industry.

Asbestos has been used as fire protection of steel structures, ventilation, garbage rooms, as thermal insulation of pipes and boilers, noise reduction and reinforcement of panels, conduits and floor tiles, in layers of plastic carpets, paints and plastics, and fix and correct to tile.

Although the use of asbestos is banned since 1982, the most dangerous kind since 1976, asbestos is still a major health hazard in the construction industry.

## **Legionella**

Legionella is the name of a bacterial family that causes two different kinds of illnesses: Legionnaires' disease, which is a form of pneumonia, and the Pontiac fever, whose symptoms are similar of having the flu.

The name Legionella comes from a number of former soldiers (legionaries) that held a conference in Philadelphia 1977, where 221 people were affected of pneumonia and 34 of them later on died. No one knew what had caused the disease, but when the bacteria were identified, it has been given the name Legionella pneumophila (the one who loves lungs). Since that time it has been identified at least 50 species of Legionella.

Legionnaires' disease is a severe form of pneumonia International research shows that particular immunodeficiency, smoking history and the age of the person are important for developing this disease. Disease Control estimated that approximately 2-5 percent of all cases of pneumonia in Sweden are caused by Legionella bacteria.

Pontiac fever is also caused by Legionella bacteria, and causes flu-like symptoms. The disease is acute, short-lived and goes away by itself.

Legionella bacteria occur naturally in small quantities in rivers, lakes and soil. The bacteria are dormant, meaning it does not multiply at temperatures below 20°C. The bacteria multiply mostly at water temperatures between 25 and 40°C and dies within a few hours when water temperature exceeds 50°C. At 60°C it only takes a few minutes.

It is important that the pipe system is functioning correctly and the hot water temperature never sinks below 50 degrees at any location in the hot water circulation system.

Points in a building with a particularly high risk of Legionella growth are:

- Too cold hot water
- Too hot cold water
- Large systems without HWC (hot-water circulation), or poorly aligned hot water circulation systems
- Hot water heaters with the low temperatures, thermal stratification and bottom sediments
- Blank lines, standing water

## **OVK - Mandatory Ventilation Inspection**

As a residential real estate owner you are obliged to make a mandatory ventilation inspection in specific time intervals depending in type of ventilation system and type of local. This has to be done to ensure a good indoor environment where people frequently stay or spend a long time. OVK was introduced in 1991 because of the serious situation in poor indoor air in many homes, schools and other venues. It is always the owner's responsibility to ensure that the laws are followed. The inspection has to be done by a competent surveyor and a protocol must be submitted to the municipal building office. A certificate of the satisfactory inspection should be posted in the property.

## **Refrigerant Control**

Refrigerants can be found in refrigerators, cold boxes, freezers, fire extinguishers, heat pumps and air conditioners. They are used to convert coldness into heating and vice versa. Some refrigerants deplete the ozone layer and greenhouse effect negatively. Therefore, there are rules governing the handling of harmful refrigerants.

As a property owner, you have a report to the Health and safety regulations office each year. For stationary sources, the results from the annually periodic inspection shall be reported, not later than 31<sup>st</sup> March of each subsequent year. That is only in cases where the total refrigerant volume exceeds 10 kg. The total refrigerant charge is not included stationary units with more than 3 kg refrigerant. The owner of the unit per January 1<sup>st</sup> is responsible for reporting throughout the year.

From 1<sup>st</sup> January 2000 it is prohibited to use CFCs as a working fluid in the existing plants in commercial purpose. Since 1<sup>st</sup> January 2002 also prohibits the filling of HCFCs in existing facilities.

## **Energy Performance Certificate**

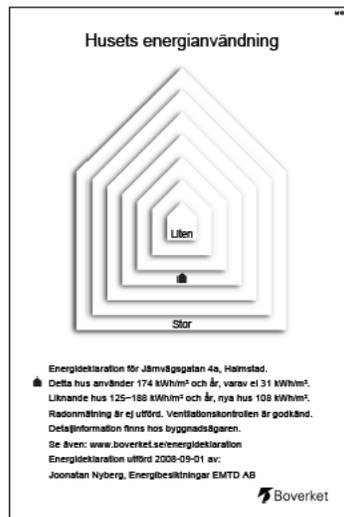
Energy Performance Certificate has its originate as a result of the Kyoto agreement, which later on became an EU directive. The EU has jointly taken the decision that the Member States shall implement the energy performance certification of buildings and it has been legislation in Sweden since June 2006. By this directive, the government' wants to achieve an environmental goal meaning the energy consumption should decrease by 20 percent by 2020 and 50 percent by 2050, based on the consumption of 1995.

Energy Performance Certificate includes:

- Information on the building's energy use and surfaces.
- Information on if mandatory ventilation inspection (OVK) has been performed.
- Information on radon if measurements have been performed.
- Reference values for the building which make it possible to compare similar buildings energy use.
- Proposed measures which can make the building more energy efficient

An energy declaration is valid for ten years. There is an opportunity to make a new energy performance certificate before that time period ends. It can be a good idea if you have implemented energy-saving activities, created a new annual consumption, or made a new mandatory ventilation inspection and want to show this for the tenants or possible buyers.

Since January 2009, all residential real estates have to have an Energy Performance Certificate and all villas have to be declared when they are about to be sold.



*Energy Performance Certificate*

## Environmental Rated Building

Fastighetsägarna Sverige, HSB, Riksbyggen, SABO and Tenants' Association have agreed to advocate Environmental Rated Building on the environmental classification of residential buildings as well as Commercial units. It is used mainly for the comparison of the property market at a national level. A rating under the Environmental Rated building is proof that special qualities have been secured in high level of indoor environment, little impact on the external environment and the well-known dangerous substances are not present in the building.

The classification includes three areas: indoor environment, energy and materials/chemicals. The system involves a classification of residential and local properties at different levels. Buildings that have been approved will be rated as – classified, bronze, silver or gold. Gold class can only be obtained if the property owner has made a tenant survey. This rating could be used, for example, to communicate the property owners' environmental responsibility to the tenants.

The Environmental classification systems objective is to reward:

- Low level of energy consumption with a small impact on the environment
- Good indoor environment,
- To use correct materials and knowledge of which materials that has been used when the building was produced and maintenance.

Environmental classification under the Environmentally Rated Building can be seen as part of the internal environmental management work for property owners and a way to identify important environmental aspects. Environmental classification will most likely reduce the building's operating costs and improved the indoor climate if a higher environmental classification is obtained. It is also a possibility to increase the value of the property in the future.

How is building rating system structured?

As mentioned before, the classification is made in three areas:

- Energy.
- Indoor environment.
- Materials and chemicals.

A fourth area, specific environmental requirements, applies only in buildings with its own water and sewage systems.

The ranking system is based on four levels: areas, aspects, indicators and rating criteria. The grade for each aspect is determined by the rating of one or more indicators. The indicators have classification criteria for grading.

Indicator	Aspect	Area
1. Purchased energy	Energy efficiency	Energy
2. Heat loss measure	Energy needs	
3. Solar heat load measure		
4. Shares of different energy types	Type of energy	
5. Assessment on site/Audio class	Sound environment	Indoor climate
6. Content of Radon	Quality of air	
7. Stream of fresch air and technical design		
8. Nitrogen dioxide content indoor		
9. Assessment of construction and dampness	Moisture security	
10. Transmission factor/Max and mintemp.	Thermally climate	
11. Solar factor/Temperature simulation		
12. The window glass area by floor/day light	Daylight factor	
13. External hot water temperature	Risk of legionella	
14. The presence of certain hazardous substance	Hazardous substances	Materials and chemicals

### ***The ranking system***

Rating of the indicators will be aggregated to an environmental category of aspect. The aspects will be aggregated into a rating by area, which will give us the final grade for the building.

The classification is done in four different levels: classified, bronze, silver and gold. Classified is the worst grade of classification and gold is the best. Bronze should reflect the basic requirements. The classified rating means that the basic requirements are not being fulfilled.

Environmentally Rated Building uses a stepwise aggregation. It means that the classification of indicators aggregates to an environmental class per aspect, after that per area and finally an environmental rating for the entire building. The result provides an indication of the weak points of the building from an energy and environmental point of view. Through different kinds of measures the property owner has the opportunity to raise these lower ratings and then achieve a better overall rating.

The Environmental classification is mainly held in three parts:

1. Collect information.

- The latest report of the mandatory ventilation inspection (OVK).
- Details of purchased energy and Energy Performance Certificate.
- Drawings and specifications (at least local plan/site plan, plans, facades and a typical section).
- Calculations/assessment of acoustic conditions in the building.
- Calculation of daylight.
- Moisture Damage Investigation or similar documentation of risk constructions.
- Report from radon measurement.
- Report from an environmental audit or other documentation which proves that hazardous substances will not appear.
- Log of building materials and input chemicals if the building has been completed after 1<sup>st</sup> July 2009.
- Compilation from the results of the tenant survey (for gold).

2. Visit the building and make the inspections, measurements and controls that are necessary. Interview the tenants.

3. Fill in the input protocol and prepare annexes in the form of documented estimates, calculations and measurements. The results will aggregate gradually and give the final environmental classification. This constitutes the Environmental classification report.

A rating certificate is valid for a maximum of 10 years unless you make major changes in the property. Changes could lead to a decrease or hopefully an improvement of the environmental classification of the building.

Byggnad	Områden	Klass	Aspekter	Klass	Indikatorer	Klass
KLASSAD	Energi	BRONS	Energianvändning	GULD	Köpt energi	GULD
			Energibehov	KLASSAD	Värmeförlusttal	SILVER
			Energislag	GULD	Solvärmelasttal	KLASSAD
	Innemiljö	BRONS	Ljudmiljö	BRONS	Bedömning alt ljudklassning	BRONS
			Luftkvalitet	BRONS	Radonhalt	BRONS
			Fukt	SILVER	Ventilation	BRONS
			Termiskt klimat	KLASSAD	Trafikföroreningar	BRONS
			Dagsljus	KLASSAD	Fuktsäkerhet	SILVER
			Vatten	BRONS	Transmissionsfaktor	SILVER
					Solvärmefaktor	KLASSAD
	Material och kemikalier	KLASSAD	Förekomst	KLASSAD	Dagsljus	KLASSAD
			Dokumentation	KLASSAD	Tappvarmvattentemperatur - legionella	BRONS
			Utfasning	KLASSAD	Förekomst av utpekade farliga ämnen.	
					Dokumentation av byggvaror och kemiska ämnen	
				Verifiering av att särskilt farliga ämnen inte byggts in		

**Aggregation on an existing building with alterations**

## Summary

As a Real Estate property owner, you have a great deal of responsibility for environmental issues. Almost any kind of issue that concerns the tenant can be related to the Environment. In this essay I have mentioned some of the issues that are quite well known, and therefore very important.

# Group work relating to Environmental issues for a residential real estate company

Henrik Ivarsson, 2011-04-05

## Introduction

As mentioned in the essay, Environmental issues for real estate companies are a huge and wide ranging subject that can be discussed endlessly. All issues can arise from different types of environmental issues, depending on whether it is indoor climate, noise, outdoor environment, the soil remediation before construction, energy, products we use in maintenance of our apartments and so on.

## Task

Besides the issues that were mentioned in the essay, list at least five more bullet points that are important from an environmental point of view for a real estate owner. Why it is important and what can we do to eliminate or minimize the problems (if it is a problem). Prepare a discussion and be ready to present your statement within 30 minutes.