



As in many other countries much of the electricity in Sweden is based on nuclear power. Three of the biggest nuclear power plants are placed in southeast of Sweden, outside the city of Oskarshamn. In Oskarshamn the local newspaper Nyheterna is covering the production at the nuclear power plants, but also much of the discussion how to handle the waste from the plants. In order to produce nuclear power it is necessary to have uranium. That is why Nyheterna's journalists Fredrik Loberg and Mattias Rubin went to Canada.

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## The most secretive phase



## THE ORIGIN OF NUCLEAR POWER

Many people and countries are very much worried that Iran, North Korea and

terrorists has got the knowledge of uranium enrichment.

At the same time uranium enrichment is a absolutely necessary process for

the production of electricity in Oskarshamn nuclear power plant.

This fourth and last reportage is also about the growing uranium cooperation between

Oskarshamn and Russia.

**From the year** of 2011 there is not any longer a law in Sweden stopping a fourth

nuclear reactor in Oskarshamn.

When nuclear power is growing in the world more enriched uranium need to be produced.

This means an even bigger need for more controls to prevent the knowledge of nuclear

weapons production may spread further.

- It is wrong in so many ways to let this industry growing, Udo Buchholtz says.

He is leading the protests in one of the European towns where the uranium, which is

being sent to

Oskarshamn nuclear power plant, become enriched.

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**In three reportage** in the beginning of 2010 from different parts of Canada Nyheterna has

wrote about the start of the very long global journey for the uranium, from mine to electricity production in Oskarshamn nuclear power.

Now it is time to focus on the fourth stop for the uranium on its way to Oskarshamn.

The enrichment.

The most secret process.

We are therefore travelling to Almelo, 1 190 kilometres from Oskarshamn.

A city with more than 70 000 inhabitants in the east part of the Netherlands.

Uranium to be used in Oskarshamn nuclear power plant is enriched in Almelo. Here we meet Jan Hammink. His parents ran a farm in Almelo until 1970. Then, the same year when Oskarshamn got its first reactor, it was decided that a plant for uranium enrichment should be built on the land where

Hammink family lived. The family got compensated with a new house. At this time,

when Jan was 17-18 years old, he was protesting against the nuclear power.

- It was the flower-power era, you know, Jan Hammink says.

For six weeks young people from Almelo had an office in one of the farming

buildings, where the protests where organized.

- It was the first resistance group against nuclear power here in Almelo, Jan Hammink says.

40 years later, in 2010, we are sitting in Jan Hamminks quiet, secure living room, talking while we hear the October rain from outside. Jan tells us that he liked the hippie period. He laugh a lot and explains that he is happy now also, but that he has changed. Now he thinks that the enrichment activities is good.

- I don't know how we would have managed here in Almelo without this industry.



*Because nuclear power plants needs more enriched uranium the enrichment facility in Gronau is growing.*

*Foto: Fredrik Loberg*



*The worst thing about the enrichment is all transports of rest products, Udo Buchholtz says.*

*Foto: Fredrik Loberg*



*Enrichment is good for Almelo, Jan Hammink says.*

*Foto: Fredrik Loberg*



*Per de Rijke working for Wise in Amsterdam.*

*Foto: Fredrik Loberg*

- Over a thousand people are employed thanks to the company, Urenco.  
- Yes, I believe that this business is safe. I trust it.

Jan Hammink shows us a few months old video, from the funeral of his own father, Lucas. This very special day Urenco relieved tough security restrictions and opened the gates to the enrichment area so the funeral procession could pass through Lucas Hamminks' old farmland.

Jan Hammink thinks Urenco, which for a long time has enriched almost all the uranium to the Oskarshamn nuclear power plant, is a good company.

A responsible company.

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**At the same time** the industry we are talking about, just a few hundred metres away from where we are sitting, perhaps is the most controversial industry at all. It has to do with nuclear weapons. Enrichment technology can both be used to produce nuclear fuel for reactors and to produce nuclear weapons. And the enrichment plant on the old ground earlier owned by the Hamminks in Almelo, two blocks away from us, has a special place in world history of nuclear weapons. Abdul Qadeer Khan worked here in the 1970s. He managed to get secret knowledge of enrichment, and some years later initiated a program for nuclear industry and nuclear weapons in Pakistan, which started a long nuclear weapon arm race against India. Khan is also suspected to have played a central role in proliferation of enrichment know-how to Libya, North Korea and Iran. In the Netherlands two of his partners were sentenced to prison and heavy fines.

Scientists with close ties to Abdul Qadeer Khan has also been arrested in Pakistan for suspected links with the talibans, while Khan has been in house arrest for years in Pakistan.

- This is just one example of the impossibility to draw a clear distinction between civilian nuclear and nuclear military use, Per de Rijke says, working at the internationally-oriented anti-nuclear organization Wise in Amsterdam in the Netherlands.

- When knowledge of the enrichment technology is spreading, when we use even more of this technology, then there is a higher risk that the knowledge of making nuclear weapons also will be spread.

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**Urenco runs** the enrichment in Almelo. Oskarshamn nuclear power plant company, OKG, has bought enriched uranium from Urenco for a long time.

- I would say that about 80 percent of our uranium enrichment comes from Urenco,

Alexander Lindqvist says. He is responsible for the supply of uranium to Oskarshamn nuclear power plants.

OKG has during the years got much of its enriched uranium from the Urenco plant in Capenhurst, England. The last years a larger part of the uranium than before instead have passed the Urenco enrichment facilities in either Almelo in the Netherlands or Gronau in Germany.

OKG also now have entered a new period of getting more uranium from Russia. For example OKG and other companies in Europe have for many years bought so-called re-enriched uranium from Russia.

Rest products from the uranium enrichment in Europe, depleted uranium, has been upgraded in Russia on behalf of OKG. Alexander Lindqvist from OKG says this is a good way to reduce waste from the enrichment process.

- I think the re-enrichment is a good thing, Alexander Lindqvist says.

These transports with enormous amounts of radioactive materials to Russia has made the



*The enrichment facility in Almelo has a long story.*

*Foto: Fredrik Loberg*



*An important thing for Vladimir Putin is to create an international enrichment center in Angarsk in Siberia.*

*Foto: Alexei Druzhinin/Scanpix*



*In this facility in Lingen fuel elements will be made for nuclear reactors in Oskarshamn. It is owned by nuclear giant Areva.*

*Foto: Fredrik Loberg*



*Hans Buitenweg thinks the nuclear industry has bought peoples minds in Almelo.*

*Foto: Fredrik Loberg*

environmental movement in Europe mobilize perhaps more than ever. Udo Buchholtz leads the protests in Gronau, where one of the enrichment plants working for OKG is located. Every Sunday he and several others walking together around the high fence that surrounds the enrichment plant, to protest. Nyheterna meet him right there, outside the gates with many surveilling cameras, and all national flags symbolizing how international nuclear industry is. Udo Buchholtz thinks the biggest problem with the industry is the waste or the rest products, thousands of containers with depleted uranium.

- There is no disposal of uranium waste from the facility. And the transports from here for example to Russia is worst of all, Udo Buchholtz says.

- And what if something happens during these transports!

The protests against the transports from Gronau and Almelo have been very dramatic.

One of Udos friends repeatedly climbed on the top of the trains which transported a large number of containers of depleted uranium towards the port of Rotterdam for further travel to Saint Petersburg.

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**Hundreds of thousands tonnes uranium** rest products has been transported from European enrichment facilities to Russia in recent years. In a Greenpeace report December 2005 Swedish OKG and Vattenfall was identified as two of the European companies guilty to what environmental groups described as dumping of uranium waste in Russia, for example Novouralsk, Seversk and Zelenogorsk. According to journalists who made the documentary Nuclear power nightmare on French-German TV-channel ARTE, it is only about ten percent of the French uranium shipped to Russia, which will return to France possible to enrich again. Everything else is left in Russia.

Part of this depleted uranium from Europe, also from Germany, have been transported all the way to Angarsk. It is in Siberia, ninety kilometers from the world's oldest and deepest lake, Lake Baikal and eight time zones from Sweden. Marina Rikhvanova lives and works in Angarsk. 2008 she was receiver of one of the most prestigious environment awards, The Goldman Environmental Prize. Marina Rikhvanova don't like what is happening in Angarsk. Because almost all uranium arriving from the enrichment facilities in Europe can't be reused in Angarsk, Marina Rikhvanova believe that it is dumping of hazardous radioactive waste in Russia.

- I think this transportation for "re-enrichment" is in fact radioactive and toxic waste transportation, Marina Rikhvanova says.

- Also any way of producing uranium hexafluoride produces huge amounts of radioactive and toxic wastes. This waste should be stored over hundreds of years, Marina Rikhvanova says.

The transportations between Europe and Russia recently has stopped. But there are those who believe they will start again, no matter what Marina Rikhvanova says. Alexander Lindqvist from OKG is one of them.

- Yes, and I hope so, Alexander Lindqvist says.

He thinks it is good if the depleted uranium can be used, for example for medical purposes.

- Yes, and Russia is in the front line right now in terms of nuclear technology, Alexander Lindqvist says.

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**Russia has high ambitions** in Marina Rikhvanovas hometown. Prime Minister Vladimir Putin is about to create a unique international enrichment center in Angarsk, approved by the International Atomic Energy Agency, IAEA. But Marina Rikhvanova says the facility very close to the center of Angarsk absolutely not can handle the residents' demands for security.

- If a severe earthquake were to happen, the facility would be destroyed and the inhabitants of the town would have to be evacuated, if they were to survive.

- Radioactive and toxic wastes is stored on the site of the center, inside a town. This is illegal, Marina Rikhvanova says.

She works for the local environmental organization Baikal Wave, saying many inhabitants in Angarsk is in opposition to the enrichment center.

- We have got more than 300 letters from Angarsk people where they ask us to help them to defend their rights.

Already in 2006, at a G8 summit in St Petersburg, Vladimir Putin announced the plans of an international enrichment center and one of the main purpose: to prevent countries like Iran from continue their enrichment plans, and at the same time provide countries like Iran enriched uranium

for nuclear reactors. Iran has not stopped its enrichment program, in spite of very strong reactions from abroad. Many countries are very worried that Iran will start producing weapons for mass destructions, nuclear weapons. This kind of weapons for example U.S., Russia, England and France have had for centuries. For example England, Germany and the Netherlands also are allowed by UN to enrich uranium, for example to Oskarshamn.

David Albright, safety expert and former weapons inspector at the Institute for Science and International Security in Washington DC, criticizes the double assessment of various countries. He thinks the problems about the connection between nuclear energy and nuclear weapons has not been resolved. Former head of the IAEA, Nobel Prize Mohamed El-Baradei have said that if nothing will be done to stop the spread of nuclear technology the world will soon have 30 countries that can quickly develop the capacity to produce nuclear weapons. Vitaly Fedchenko on Peace Research Institute, SIPRI in Stockholm saying about the same. The only way to diminish the risk of spreading civilian nuclear power to military applications would be to eliminate the use of nuclear power, Vitaly Fedchenko says. Hans Blix and his commission against weapons for mass destruction recently presented 59 proposals to the UN on how the circulation of nuclear weapons would be stopped in a world with more nuclear power. One of the proposals is to nominate a few "nuclear fuel cycle states", where enrichment and reprocessing of uranium is made and carefully monitored, and that each country will get its nuclear fuel from these states.

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**Sweden have plans** for expand nuclear power. During 2011 one of the reactors in Oskarshamn will increase its capacity significantly. And because Sweden from this year now longer having a law stopping new reactors there is plans for a fourth reactor in Oskarshamn to replace the first one build 1970. Then it takes even more enriched uranium. The man outside the gates in Gronau, Udo Buchholtz, don't like this. He has already seen the enrichment facility in his city grown enough.

- This facility has capacity for expansion, and if there will be more nuclear power plants it will obviously be so, Udo Buchholtz says.

There are big protests in Germany against enrichment, nuclear power and dumping waste from nuclear power plants. On the dutch side, in Almelo only about 40 kilometres west of Gronau it is not really like that. Just like Jan Hammink the absolute majority of the people have a positive attitude to the industry. Hans Buitenweg has the Green Party's only seat in Almelo parish council. He feels lonely.

- In the past we could be 45 000 people demonstrating against enrichment. Now it is almost just me opposing this industry, Hans Buitenweg says. He accuses people in Almelo to be bribed.

- There are hardly no events or activities that are not sponsored by Urenco. Even when the city library should be rebuilt and get new furniture the company showed up putting money in, Hans Buitenweg says.

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**Nyheterna continues** to Lingen, about 50 kilometres north of Gronau in Germany. The uranium's fifth and last stop on its long global journey before arriving to Oskarshamn is going to be inside the heavily guarded entrance we have in front of us. Here in Lingen the enriched uranium will be transformed to fuel elements – the end product of the uranium chain before the production of electricity in nuclear power plants.

OKG has for many years got fuel elements from Westinghouse in Västerås in Sweden. This is not a activity without problems. 2010 it was known about hundred workers had a little to high exposure of industrial uranium in their bodies. An inspection made of Swedish radiation authorities showed also that Westinghouse staff didn't follow all instructions because of working in a high tempo, and the plant has during 2010 been under special supervision because of this.

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**The fuel production** in Lingen is runned by french nuclear giant Areva. OKG has decided to have closer partnership with Areva in the future. Areva will not only supply OKG with fuel elements, but also be responsible for the entire uranium supply chain to the reactor number 2 over the next four years. One of the reasons are Areva considered to have particularly good contacts with Russia. From which mines the russian processed uranium comes from is not always easy to know. But what is clear is that Areva for many years have lay its hands on the growing uranium market in Africa.

- For uranium companies it is easy to be in Africa, where environmental laws hardly exists, and in

Africa authorities are often corrupt and in a bad situation for negotiations, Fleur Scheele says. She works at Wise in Amsterdam, just returned from a conference in Tanzania, together with representatives from NGO:s in 20 African countries, where uranium mining is going on or is planned. Areva is the largest uranium company in Africa.

Especially Areva's 42 years of uranium mining in France's former colony, Niger, military dictatorship and one of the world's poorest and hottest countries, has been very controversial for a long time. Just like in Canada the mining is going on in areas where indigenous people live. Local NGOs claim that Areva had done nothing to help people out of poverty, but simply taking the profits from mining and leaves devastated and radioactive soil behind. In recent years Areva has started several development projects, but the conflict between the military regime, regional rebels and the uranium industries has had serious consequences. For example the local gerilla kidnapped seven miners in september 2010.

- Mining companies create jobs in African countries, and what I understand the companies gives acceptable wages. But in African countries the companies don't have the same pressure to behave.

- There is a risk that environmental problems and health effects will be huge, Fleur Scheele says.

In another part of Holland, in the enrichment city Almelo, the former nuclear opponent Jan Hammink has a different view. He thinks nuclear power is absolutely safe enough, and he wonders what Almelo would have been without it.

- It would have been even higher unemployment here, Jan Hammink says.

The growing company in his city supplying Oskarshamn with enriched uranium also thinks the industry stands for something very positive. The company's motto is "enriching the future" and writes:

"Nuclear power is increasingly seen as the number one commercial choice for a sustainable energy supply, free from the uncertainty and inherent environmental dangers of the diminishing fossil-based fuel alternatives. Urenco is proud to play its part and strongly believes that nuclear energy is the only viable option to meet the world's growing demand for electricity."

**Fredrik Loberg**

[fredrik.loberg@ostran.se](mailto:fredrik.loberg@ostran.se)