Institute for
FUTURES STUDIES

José Alberto Hernández Ibarzábal

Energy policy and regulatory challenges in natural gas infrastructure and supply in the energy transition in Sweden

Arbetsrapport/Institutet för Framtidsstudier; 2009:9
ISSN:1652-120X
ISBN: 978-91-85619-48-1

José Alberto Hernández Ibarzábal

Energy policy and regulatory challenges in natural gas infrastructure and supply in the energy transition in Sweden

Arbetsrapport/Institutet för Framtidsstudier; 2009:9
Working Paper/Institute for Futures Studies; 2009:9

Stockholm 2009

About the author
José Alberto Hernández Ibarzábal is a PhD candidate for the University of Canberra (Public Sector Management Division of Business, Law and Information Sciences) and for the Universitat Pompeu Fabra (Department of Political and Social Sciences). He has done an 8-month research stance at the Institute for Futures Studies, Stockholm, as holder of a Swedish Institute scholarship.
e-mail: j.hernandez@student.canberra.edu.au

Summary: Energy policy and regulatory challenges in natural gas infrastructure and supply in the energy transition in Sweden
Sweden is undergoing a major energy transition in which the present regulatory, competition and energy decisions will determine future involvement in the "oil and gas game" after decades of successful implementation of non-fossil fuel dependence policies. Contrary to major energy policies implemented since the oil crisis of the 70's, higher natural gas investment in infrastructure – in particular regarding offshore pipelines – is not an outcome of a consented agreement between the government and private firms. The lack of clear governmental definition towards the time to phase out nuclear terminals, and how this source of energy would be replaced, is leading the country towards an energy bottleneck that could condition future energy supply, thus governance. Under these conditions, crucial decisions shall be taken in the near future regarding granting permissions to pipelines that connect to the Russian natural gas fields following an EU trend, to the Norwegian natural gas reserves on the trail of a Nordic energy path-dependence, or to both, sharing potential benefits and risks.

Acknowledgements
I would like to thank Dr. Joakim Palme for providing rich advice and supervision, Dr. Carles Ramió for his support and orientation and Dr. Roger Wettenhall for helping me with the editing of this paper. I thank all for their great human quality, an inspiration to write. I would also like to thank the staff at the Institute for Future Studies for sharing their expertise in the subject and The Swedish Institute (Svenska Institutet) and The National Council for Science and Technology of Mexico (CONACYT) for funding the investigation in Sweden and in Australia, respectively.

José Alberto Hernández Ibarzábal
Mars 2009

Institutet för Framtidsstuder/Institute for Futures Studies
Arbetsrapport/Working Paper 2009:9

José Alberto Hernández Ibarzábal

Energy policy and regulatory challenges in natural gas infrastructure and supply in the energy transition in Sweden

1. Introduction

Sweden has independent regulatory agencies,[1] increasing competition in its deregulated sectors (as electricity) and in the natural gas sector, a total fossil energy dependence (there is no production of natural gas, oil or coal) and historical judicial independence. These conditions favor private investment on infrastructure, but up to now private investment in natural gas infrastructure has been quite low, an outcome that could be partially explained because other sources aided by governmental support have the capacity to fulfill the actual energy needs.

Private investment in natural gas infrastructure without full support from the government would introduce changes in the traditional energy model, in which the government and private firms work together closely. Higher private investment in natural gas infrastructure and consumption would push forward towards the introduction of changes in the traditional Swedish Ownership Model, in which "the controlling ownership in firms is typically concentrated to one or two owners. Often, but not always, these owners are Swedish families" (Henrekson & Jakobsson 2003, 5). A more complex natural gas industry would certainly have Swedish and foreign owners, public and private owners, at its different levels. It will be particu-

larly interesting to follow the role of the municipalities in the new arrangements.

This paper will study energy policy and regulatory challenges in natural gas infrastructure and supply in the context of an energy transition in Sweden, emphasising on its current and historical Nordic energy links while considering the presence of diffusion mechanisms in the region.[2] The Swedish case was studied from October 2005, in which time apart from bibliographical and field research in Stockholm, Uppsala and Eskilstuna, different open-ended interviews were held. The research paid special attention to the exogenous influences driving change in the natural gas sector in Sweden. The results obtained raise more questions than answers regarding energy policy and regulation in natural gas infrastructure and supply, changing issues that could condition governance and redefine the relation with different Nordic, communitarian and European institutions in the near future.

The current energy transition in Sweden could be synthesized in the following way: the main energy source will be phased out, and renewable energy sources at this point cannot fill this gap themselves yet, and a more extended network and use of natural gas could reverse a path-dependence (Pierson 2000) of non-reliance in fossil fuels. As a result of the implementation of non-oil dependence policies, fossil fuels have been substituted in the residential and service sectors with nuclear and hydro energy and more recently, and in a lower degree, with renewable energy sources; in the heating market for residential and commercial buildings oil has been gradually replaced by district heating.

In 1970 the total oil use within the residential and the service sectors of Sweden was 118.6 TWh, in 1985 was 49.4 TWh and in 2005 was 15.9 TWh. In the same years, the final electricity use in these sectors was 21.9TWh in 1970, 61.9 TWh in 1985 and 71.6 in 2005 (Swedish Energy Agency 2006, 10-11). These figures reflect Sweden's reliance on electricity in the last decades, and also the way in which it has tried and to some extent managed to avoid dependence on fossil fuels in sectors other than transport.

As a result of a referendum conducted in 1980 all nuclear terminals should be phased out with no further construction; nuclear energy represented in 2006 30%, 210TWh out of 630 TWh, of the total energy supplied in the country (Swedish Energy Agency 2006, 6). The 1980 referendum required voters to choose between 3 ways for phasing out nuclear energy; the possibility to go further with the nuclear power program was not an option. The most voted decision was to continue with the operation of active and under construction plants until "the end of their normal operat-

ing lives (assumed to be 25 years). Parliament decided then to embargo further expansion of nuclear power and aim for decommissioning the 12 plants by 2010 if new energy sources were available realistically to replace them" (Nuclear Energy Association 2008).

Phasing out nuclear terminals means another energy source will replace nuclear energy, the second source of energy (after oil crude oil and oil products) nationwide. Natural gas is the most plausible source of energy to replace nuclear energy in electricity production, and right now is the paradigmatic moment in which different projects in natural gas infrastructure could be approved by the government in order to fulfill the future energy demand. For this to happen private companies would have to invest heavily in natural gas infrastructure, and their projects would have to comply with the EU and Sweden's competition regulations and environmental codes and with all the international treaties Sweden has signed.

2. Fossil fuels, renewable fuels or nuclear energy?

Following the oil crisis of the 70´s, Sweden decided to rely less on oil and more in their own and renewable fuels.[3] In this process, district heating played a fundamental role in replacing oil in the heating of buildings, and other fuels played a major role in replacing oil in district heating production.

"District heating is the generation and distribution of hot water in a pipeline system for the collective heating of commercial and residential buildings (Swedish Energy Agency 2005, 45)." The primary tendency in the energy input for district heating has been substituting oil for biofuels, waste heat, heat pumps and natural gas. In 1970, from a total energy input for district heating of 14.6 TWh, oil accounted for 14.3 TWh and biofuels accounted only for 0.3 TWh; in 1980 the former accounted for 30.9 TWh, the latter for 2.3 TWh and waste heat for 0.6 TWh of a total of 34.5 TWh; in 2006 oil accounted for 3.2 TWh, biofuels for 36.2 TWh, natural gas (including LPG) for 2.2 TWh, heat pumps for 5.6 TWh and waste heat for 4.6 TWh of a total energy input for district heating of 55.4 TWh (Swedish Energy Agency 2007b, 24-25).

In 1978, oil accounted for 60% of the heating market for residential and commercial buildings, whereas district heating represented around 10%; in 2003 the numbers had inverted and district heating accounted for 50% of the share of the market and oil for approximately 10%.

From 1970-2007, the development of heat pumps in district heating and natural gas and gasworks gas followed a similar path; the former started in 1980 and in 2006 accounted for 6 TWh of the total energy supply, whereas

the latter started in 1985 and in 2006 represented 11 TWh (Swedish Energy Agency 2007b, 11).

However, the major obstacle towards a higher natural gas use in Sweden since the last quarter of the 20th century has been nuclear power, its major competitor. The main player in the natural gas market in the period 1985-1995 was SwedeGas, which was controlled by the electric power industry (Agfors 1995, 227). This type of ownership pleads for more research focusing on the possible capture by the incumbent electricity firm – what could be catalogued as self or endogenous capture – that could have blocked a higher natural gas development in order to maintain its market profits.

Capture theory states that either regulation is supplied in response to the industry's demand for regulation or the regulatory agency comes to be controlled by the industry over time (Bernstein 1955). Stigler (1971) identified 4 types of policies an industry would like to influence: government subsidies to the industry, government-created barriers to (market) entry, policies that affect substitutes or complements to the industry and government's fixing price to prevent price competition (Laffont & Tirole 1994). This argumentation considers that regulation can sometimes benefit certain firms, i.e. by raising barriers to entry competitors (Coglianese et al 2004, 24).

On the other hand, natural gas was the fuel whose supply grew the most amongst oil, LPG, biofuels, coal, coke oven gas and blast furnace gas in the supply of fuel for electricity production in the period 1983-1993; it increased from 54 GWh to 962 GWh, respectively (Swedish Energy Agency 2007b, 20-21).

The future of natural gas supply and infrastructure is intrinsically related with competition, but is also a matter of governmental certainty and energy policy definition. The decision to phase out the nuclear reactors has been delayed repeatedly; a responsible decision considering there wasn't any other plausible source to replace nuclear energy, and it is still not clear which energy source will replace nuclear energy.

In the last two decades, energy policies have focused on setting a dateline for phasing out nuclear energy, while stopping the use of rivers for hydro power generation, fostering the use of biofuels, introducing higher taxation on coal and oil targeting the reduction of CO2 emissions through taxation and following EU emissions targets and directives towards more natural gas competition. These policies are guiding Sweden to an energy bottleneck that urgently needs a clearer decision about the moment in which nuclear terminals will be phased out.

In 2006, 46.4% of the electricity production came from nuclear energy (Swedish Energy Agency 2007b, 20), and in 2005 Sweden produced 8016 kWh per person from nuclear energy, whereas France produced 7201 kWh even though nuclear energy accounts for more than 75% of their electricity production (Idem, 22). This data reflects how heavily Sweden relies on nuclear energy, how difficult it will be to replace and also the importance of making the right choices regarding the new source/s and supplier/s.

Annual electricity consumption in Sweden is increasing yearly around 1%, and the current production exceeds the consumption by 30%, providing the government with an important margin of action. This energy surplus will disappear with the nuclear energy, which will be phased out sooner or later. The governmental approach to this dilemma has been to delay the decision perhaps waiting for new technologies to come or for more powerful renewable sources, but this behavior is now incompatible with securing the future energy supply and governance.

If nuclear power is phased out by 2020, natural gas is the most feasible energy for replacing it in electricity production, and this would need further network development, as well as private investment in infrastructure. If the reactors are phased out in 60 years, as foreseen by the Climate in Focus Scenario (Royal Swedish Academy of Engineering Sciences (IVA) 2003), nuclear energy would be replaced by new carbon-dioxide-free electricity production, and in this case natural gas could be used through CO2 sequestration.

Energy Foresight – Sweden in Europe (IVA 2003, 7) reminds us that "The traditional Swedish model of developing and building large technical systems has often seen close cooperation between Government and industry (e.g. Vattenfall and Asea, and Televerket and Ericsson)". This cooperation played a major role in the last three decades in determining nuclear energy as the main power generator, and has not encouraged a higher use of fossil fuels.

An electricity certificate system that started in May 2003 to promote electricity production from renewable sources and peat has the objective for 2016 to produce 17 TWh, relative to production from these sources in 2002. The Swedish Energy Agency and Svenska Kraftnät are responsible for the operation of this certificate system working towards a more environmentally friendly energy system that will be active until 2030. The way in which the system operates is based on close coordination between producers of renewable electricity and peat, electricity suppliers and the government (Swedish Energy Agency 2008b). Its production aims are plausible, even conservative, and alternative electricity production will ease the nuclear

transition. That is to say, the electricity certificate system could act as a complementary factor in the nuclear transition, but will not replace nuclear energy in the next decade.

A mechanism that the Swedish government applied since 1991 with the aim of encouraging the use of biofuels over fossil fuels was the implementation of a carbon dioxide tax, which is still in use. In 2003, the CO2 tax in Sweden was 14 times higher than in Germany, 4 times higher than in Norway and 2.5 times higher than in the Netherlands (IVA 2003, 12); this tax was too high to permit a competitive integration in the communitarian market. [4]

Unlike bunker oil and coal, natural gas was exempted from paying sulphur taxes in 2007 (Swedish Energy Agency 2007a). However, natural gas does pay energy and carbon dioxide taxes (excluding VAT), which accounted in 2005 for around 30% of the total price for industrial consumers and 50% for domestic consumers (Swedish Energy Agency 2005, 35). The tax system operates in accordance to communitarian directives, such as the Act Concerning Taxation of Energy that entered into force in 1994, and the EU Emissions Trading System, which foster the use of natural gas over coal and oil because it produces less CO2 emissions when is burnt. [5]

Reducing taxes on unemployment and increasing taxes on energy use and emissions in 2000, the Swedish government expected to raise up to SEK 30,000 million and to reduce emissions (Swedish Energy Agency 2004, 12). Though environmentally friendly, this energy tax raise constitutes another barrier towards developing a competitive natural gas market at the national and communitarian levels.

Natural gas has great potential in replacing nuclear power in electricity production, a process that could be done at different stages and periods of time. The report *Energy Foresight– Sweden in Europe* (IVA 2003) suggests that instead of replacing nuclear power definitively natural gas could also be used as a “temporal” bridge on the way to a solar and hydrogen society.

Different scenarios in *Energy Foresight – Sweden in Europe* (IVA 2003) foresee that hydrogen will play a fundamental role in the energy future after 2020. Sweden has more probabilities to achieve a hydrogen-driven society than countries with higher dependence of fossil fuels. And the less dependence in fossil fuels the higher these probabilities will maintain. But even in the case of a hydrogen-driven society a bigger natural gas network will be needed because natural gas could either act as a bridge towards hydrogen or be used in its production.

Energy Foresight – Sweden in Europe (IVA 2003) also predicts higher energy consumption in the transport sector, which relies on fossil fuels as its primary energy source. This fossil fuel dependence makes it more difficult to transition to a transportation system based on electricity, hybrid cars, hydrogen and solar energy. All these energy sources will increase its actual potential in the future, but for the moment it is too risky to consider that they will have enough capacity for replacing oil; it would be equivalent to considering that nuclear power could be replaced in the future with wind power because of technological improvements. The most plausible scenario is that other fossil fuels will play a major role in replacing oil in the next decades.

Energy scenarios that are not considered in *Energy Foresight – Sweden in Europe* (IVA 2003) are a process of energy re-regulation, a more decisive role of the society and a more passive role of the government in deciding the energy policies, much higher energy needs in the immediate future (i.e. in the case of the establishment of new industries and services), energy consumption changes in the pulp and paper industries and rocketing oil prices.

The residential and service sectors actually represent around 40% of the total use of energy, so apart from taxes, more media and information campaigns would help in the process of saving energy, an objective that both citizens and government share. Formulas that do not necessarily represent more taxes paid by the domestic consumers must be explored.

3. Natural gas: A Nordic tradition

Natural gas was first used in Sweden in 1985, since then its use has been growing at different paces and it may increase importantly in the next decades due to several undergoing changes in energy and natural gas at the national, Nordic, communitarian and European levels. Traditionally, this country has relied on the Nordic countries (mainly Norway and Denmark) to fulfill its energy needs, and it is most probable that new energy and natural gas suppliers will appear in this or the next decades. In the whole changing issue, the influence of the EU representatives and institutions together with its regulatory reforms constitute two specific exogenous influences redefining the equilibrium towards more competition and openness in the natural gas sector.

Sweden does not produce any natural gas, and all the gas that it consumes is imported from a pipeline coming from Denmark. In this sense, the more natural gas Sweden imports the less control it has in its own energy supply and the greater the dependency on foreign suppliers. These

are key elements to be considered for understanding why a bigger natural gas market and network has not been developed yet. It is possible that non-fossil dependence and energy sovereignty policies, in conjunction with the promotion of renewable sources of energy and an extended use of nuclear energy haven't encouraged the diversification of energy sources.

Refraining from a more extended natural gas network and use constitutes a very effective way to be protected from the continuous shocks in the rising oil prices, which depend on external shocks such as wars, invasions, regime changes, institutional crises, strikes, natural disasters, terrorist attacks, accidents, disruption of supply and social and political instability in countries and regions, among others. Thus, a remarkable outcome of the non-fossil fuel dependence policies together with policies promoting nuclear energy has been securing a safe energy supply.

Natural gas and oil prices are indexed and behave in a similar way; the Swedish policy to rely more on their own energy sources rather than in fossil fuels in general and natural gas in particular has secured higher protection to the continuous price variances than other countries without national fossil fuels resources (like most of the EU countries). Electricity production in Sweden is cheap and oil prices are mounting, two specific factors not favoring more natural gas consumption.

Murray (2005, 8) explained that "Sweden's current electricity supply is based on relatively high capital cost/low operating costing technologies (specifically hydroelectricity and nuclear power). [...] this makes it relatively immune to rising primary energy prices, because the fuels – water and uranium – represent a much lower percentage of the kilowatt hour cost than is the case for fossil fuels". Using primarily electricity instead of natural gas has also saved Sweden a lot of money; the price of a Brent crude oil barrel was 19.49 USD in the first semester of 2002, 59.66 USD in the last trimester of 2005 and 125 USD in the second trimester of 2008 (Bloomberg 2008).

The Swedish Energy Agency had the expectation in 2005 that greater competition in the natural gas sector would be translated into lower prices (Swedish Energy Agency 2005, 35), and in 2007 stated that "The underlying purpose of deregulation of the natural gas markets around the world has been to create the right conditions for effective utilization of resources, and thus keep down gas prices" (Swedish Energy Agency 2007a, 45). The evolution in the price of natural gas from 2005 to the second trimester of 2008, parallel to several deregulatory reforms worldwide, has been the contrary: more competition and deregulation in the natural gas market have been accompanied by higher prices. As long as the price of natural gas

is indexed to the price of crude oil, higher competition in the Swedish market or anywhere else cannot affect the latter. Nevertheless, a higher competition in the natural gas market has given more options to the clients and new growth perspectives to the industry. Competition has had a qualitative impact on the natural gas market in Sweden.

In the context of increasing investment in commodities in the stock markets, oil and natural gas prices are predicted to continue increasing. Furthermore, there is no insurance policy against the external shocks that have an impact on price variances. In this sense, Sweden has to consider if entering the "oil and natural gas game" will be part of the solution or part of the problem for its current energy transition. In the case that it is part of the solution, it is important to focus on the mechanisms that will connect its solid institutional background with the future natural gas supply.

Sweden has a 200-year tradition of bureaucracy built in semi-autonomous agencies (Gilardi 2003, 13) as well as very strong political constraints, a Parliamentary system with a highly consolidated independence of the judiciary, an autonomous energy regulator, total fossil energy dependence and increasing competition in the sector. Following the model *The Effect of Institutions on Public Policy and Sector Performance* (Berg 2001, 6),[6] these conditions favor private investment in infrastructure, and in conjunction with the ongoing energy transition could foster higher private investment in natural gas infrastructure in the years to come.

A more extensive natural gas network will lead towards more consumption, and will condition the role of natural gas in the energy future. The expansion of the current natural gas network depends on formal conditions such as the national and communitarian regulations and informal conditions such as political will, to an extent that is very difficult to determine from the academy. The capacity of the Swedish government and the regulatory agencies to determine a national energy future in the context of increasing EU regulations fostering competition needs further study.

Denmark, Norway and Sweden share a common energy history that includes gas, first introduced in Sweden through its municipalities. [7] The first pipes, transporting gas based on pit coal and cast iron, were built under the streets and used for street lighting. Gasworks were first built in Sweden in October 1818 by Gustaf Magnus, a professor of the Royal Academy of Science in Stockholm, who three decades later installed them in institutions, businesses and factories (Hyldoft 1995, 78).

The gasworks rapidly spread around the Nordic countries throughout the middle of the XIX century following a diffusion process. Two driving forces leading the process of building new gas networks in the Nordic cities

were the private companies and the municipalities, in that chronological order. Nordic countries were the paradigmatic case in Europe in which the municipalities owned and ran the gasworks. Still in 2005 the municipalities owned around 60% of Swedish district heating supplies; apart from Nova Naturgas and Dong, all gas companies belong to energy companies having other activities in the electricity and/or district heating in Sweden (Swedish Energy Agency 2005, 39). This double ownership could be part of what was described in p.5 as self or endogenous capture.

After an initial boom of gasworks, followed by the creation of national expertise, the lack of better technology and funding impeded the development of more extended regional and national networks; it is possible that these are still acting mechanisms.[8]

The period 1855-1870 went through a parallel boom in the construction of municipal gasworks in Copenhagen, Malmo, Schleswig, Stockholm, Gothenburg, Oslo and Helsingfors (Hyldoft 1995, 96). This process could be understood through the hypothesis tested by Jordana & Levi-Faur (2005), in which within sector transnational diffusion had more significant results than diffusion across sectors of the same country. Some exogenous obstacles for a Nordic natural gas network in the XX century were the First and Second World Wars, as well as the Cold War.[9] For example, Russia supplied Finland with gas since the 1950's and with natural gas since 1974, and this connection thwarted the integration of the latter in the Nordic energy market.[10]

Since the beginning of the XIX century, innovations in energy such as the use of gaslight were being studied separately in Denmark and Sweden. If from this time the Nordic countries would have constructed systematic cooperation mechanisms to create knowledge based on common energy needs they would have found a broader range of common solutions. On the other hand, private companies have repeatedly presented plans for a more extended natural gas network development in Sweden, and have frequently encountered political resistance at different levels.

The Nordic natural gas connection is still present in Sweden and there are important plans to expand and redefine it in the near future. Supply from the gas fields in offshore Jutland will decline in the next years, and a way to substitute the Danish natural gas supply with another Nordic supplier would be following the plans from energy companies to import LNG from Norway and get connected to its field reserves through a pipeline. Plans for building a natural gas pipeline connecting Sweden and Norway existed before 1990, but until now they have met the necessary conditions to start its construction.

One of the main projects in natural gas infrastructure is the construction of the Skanled gas pipeline, a gas transmission pipeline that would connect the Kårstö processing plan, located at the Norwegian West coast, with Sweden and Denmark. In the case that the project is approved by the Norwegian, Swedish and Danish authorities the construction would start in 2010, in parallel to the Nord Stream Pipeline**.** The intended route of the Skanled pipeline would be from Kårstö to Rafnes, in East Norway, to western Sweden and Denmark (Gassco & DNV 2007, 1).

The Skanled pipeline is led by Gassco, the Norwegian state operator that transports Norwegian gas to Europe and the UK worth more than USD 10 billion "through a 6,600-km network of pipelines" (Pipeline and Gas Journal 2006, 16-17), whereas Swedegas and Energynet.dk participate as partners (Gassco & DNV 2007, 4). Nowadays 11 users and 10 investors have signed letters of intent to participate in the pipeline or as shippers. [11] These companies initially reached an agreement with Gassco in which 7 of them would own 70% of the pipeline, and 9 of them would pay for the right for using the transportation system (Norwegian Ministry of Petroleum and Energy 2007).

Norway is, after Russia, the second largest natural gas supplier to the EU, and the Skanled pipeline seems to be the ideal way to substitute the Danish supply and to keep alive the Nordic energy connection. A shared energy history in the region and closeness between Norway and Sweden at different levels may represent higher security of supply and less risk of discretionary energy policies than in the case of getting connected to other sources.

In 2007, natural gas supply covered 30 Swedish municipalities and accounted for only 2% of the national energy use, while through the EU the comparable use was around 20% (Swedish Energy Agency 2007a, 44). One of the main reasons for this disparity is that its current natural gas network does not reach the whole country. In the following years gas transmission pipelines will reach Stockholm and other important areas, which will bring a boom in the natural gas consumption; i.e. the natural gas consumption in the above mentioned 30 municipalities is very close to the EU average.

Since the adoption in 1998 of the Gas Market Directive by the European Commission, Sweden has implemented legislation in the form of Natural Gas Acts towards participating in a single energy market. The natural gas market has become more competitive with each communitarian directive, which have always been followed by governmental Bills to Parliament and reflected in new Natural Gas Acts. As a result of the Natural Gas Directive (European Union 2003) approved in June 2003, the Parliament imple-

mented a Natural Gas Act in 2005 that introduced competitive elements in the market, such as the separation between trading activities and network activities in order to prevent cross-subsidisation (Swedish Energy Agency 2005, 7). Thanks to 2 different Natural Gas Acts, in July 2005 all non-domestic consumers were free to choose their suppliers and in July 2007 the natural gas market was fully deregulated.

Further directives from the Commission are expected to have a renewed repercussion in governmental Bills handled to the Parliament and to be translated into new Natural Gas Acts. In synthesis, the EU has been acting as an exogenous influence towards more competition in the Swedish natural gas market, which is still operated as a legal monopoly.

4. The natural gas market: Actors and future

The Swedish Energy Agency "was created in 1998 and works towards transforming the Swedish energy system into an ecological and economically sustainable system though guiding state capital towards the area of energy" (The Swedish Energy Agency 2008). In 2001, The Swedish Energy Agency created the Network Oil and Gas (2008), a forum that actively exchanges expertise about oil and gas.

The Energy Market Inspectorate was created in 2005 and is the regulatory body within the Swedish Energy Agency in charge of supervising that electricity, natural gas and district heating markets operate efficiently, and of monitoring the compliance with the Electricity and Natural Gas Acts. Another objective is assisting the consumers and a more integrated Nordic market in the natural gas sector. Thus, the Market Inspectorate acts on one hand towards additional Communitarian integration and on the other towards more Nordic and Baltic integration. These aims are defining Sweden's natural gas and energy future, and only then it will be clear how compatible these objectives are in practice.

The natural gas market has been gradually opened to competition after different EU Natural Gas Directives came into force; i.e. unbundling[12] was adopted in the Natural Gas Act that was legally binding in July 2005. The way in which unbundling was adopted is another example of how European Commission directives have led some of the natural gas reforms proposed by the government to Parliament.

As a result of the continuous reforms introduced in the natural gas sector, in the context of an energy transition, higher natural gas use is expected in the following years and decades. Some areas with the greatest potential are: transportation, industry, residential use, electricity production,[13] power-heating plants and district heating. In the latter, natural gas

and biogas could replace centrals operated with coal and biofuels, an issue that could generate tensions between the local producers of biofuels and the natural gas companies.

The first 8 years after the introduction of natural gas in 1985 resulted in an average growth of 1 TWh per year, and since 1993 to date the average growth of natural gas use has been around 0.1 TWh per year. When the time comes for natural gas to reach Stockholm, it will probably equal or increase its initial growth average. Higher natural gas demand will need supply from sources other than the Danish sector of the North Sea and new pipelines to be built.

The natural gas system is composed within Sweden of 3,000 kilometers of distributional pipelines and 540 kilometers of transmission pipelines, and its capacity exceeds its current use. The capacity of the system could be increased using compressors, and greater natural gas use is expected due to the demand from cogeneration plants in Gothenburg and Malmo (with planned start up in 2009), that in a full load could use approximately 8.5 TWh per year (Swedish Energy Agency 2005, 36). Swede Gas AB owns much of the trunk grid of the network, which extends from Trelleborg to Gothenburg; in 2004, Swede Gas sold its trading activities to Dong Natural Gas. The responsibility for the main branch in southern Sweden is with EON Gas Sweden AB, and the overall responsibility for the national gas market is with the state utility Svenska Kraftnät, which excludes the operation of the system and focuses only on "short-term maintenance of the balance between supply of natural gas to the national system and delivery of gas from it (Swedish Energy Agency 2007a, 44)".

In 2007, the Energy Market Inspectorate had received 3 applications for extension of the natural gas network; the first 2 are extensions from Gislaved/Gnosjö to Oxelösund via Jönköping and Boxholm. The concession for the extension via Jönköping is being prepared by the Cabinet Officers after it was approved by the Inspectorate. The other concession extension is for a transmission pipeline called The Baltic Gas Interconnector, which received permission from the government in 2004. The Baltic Gas Interconnector includes offshore and onshore sectors and will connect the natural gas networks of Sweden, Denmark and Germany. The participants are Verbundnetz Gas, Sjællandske Kraftværker and Norsk Hydro, E.ON Gas Sweden AB (Swedish Energy Agency 2007a).

In December 2007 the Swedish government received an application from Nord Stream "for a permit to lay two pipelines on the continental shelf and an application for a permit to construct and use a service platform in the Swedish Exclusive Economic Zone (Daoson & Bystedt 2008, 1)". The

applications were being processed under the Continental Shelf Act and the Swedish Exclusive Economic Zone Act, international conventions signed by Sweden and environmental codes and acts such as The Espoo Convention, the Swedish Exclusive Economic Zone Act, and the Swedish Environmental Code.

In February 2008 these applications were considered incomplete by the Swedish Ministry of the Environment and the Swedish Ministry of Enterprise, Energy and Communications; the main reasons were a lack of a general environmental assessment that takes into consideration the Espoo Convention,[14] and other environmental and international codes for the service platforms. The government also wanted to know the final result of ongoing or non-conclusive investigations (i.e. an investigation about the existence of World War II munitions in the route of the pipeline) before going forward with the project and needed alternative locations for the service platform and alternative routes for pipelines, in order to consider different environmental scenarios.

The Nord Stream pipeline is planned to be a 1220 km off-shore pipeline, and is a joint venture of OAO Gazprom, Wintershall AG/ BASF SE, E.ON Ruhrgas AG / E.ON AG and N.V. Nederlandse Gasunie. This 7.4 billion "TEN-E project of European interest"[15] will initially connect Russia and Germany through a pipeline built under the Baltic Sea. Planned offshoots will link the pipeline with Sweden after 2010. This off-shore natural gas pipeline project in conjunction with the Skanled pipeline project (discussed in previous chapters) will play a decisive role in the future of natural gas use in the participants countries and in the energy transition in Sweden.

One of the main advantages of the Nord Stream project is that it will travel directly through the Baltic Sea, avoiding transit through countries such as Ukraine, Belarus and Poland, which has raised tensions in the last years. The Nord Stream pipeline also represents higher security of supply from the Russian reserves. Less than 2% of the world gas reserves are in the EU, whose natural gas imports are expected to raise from 41% in 2005 to 75% in 2030 (Global Insight 2007). Relying on Russia and Norway is a way in which Sweden will be able to supply its future natural gas demand and avoid depending on the instable Middle East countries, as different communitarian countries do.

Russia is expected to supply more than 50% of the European gas demand after 2020, so much of the stability and governance of the EU will depend on their energy policies (James A. Baker III Institute for Public Policy 2005). A future higher energy dependence derived from a more extended use of natural gas in Sweden is conditioned by a context in which

the Russian government has frequently used natural gas supply as a geopolitical tool, and used institutions arbitrarily to regain control of its formerly privatized natural resources. In words of Larsson (2005, 3) "Russia also sees energy as a tool to avert geopolitical macroeconomic and other threats".

The Russian energy companies, such as LUKOIL, Rosneft and Gazprom, operate accordingly to the state's interests in the "oil and gas game" and in the past have acted as agents to impose pressure and achieve political and economic objectives within the Russian zone of influence, which increasingly extends throughout Europe.

Thus, being connected to the Russian natural gas network is also a way in which the EU – Sweden included – could suffer geopolitical pressures and discretionary energy policies. One way to assure higher certainty of non-discretionary actions from the Russian state companies is having the Energy Charter Treaty ratified by the Duma.

Investment in natural gas infrastructure is by definition a long-term investment that needs guarantees from both ends of the pipeline. Sweden is an ideal client due to its healthy economy and living standards, accountability from political institutions, independent regulators, compliance with the Natural Gas Directives and increasing competition in the natural gas sector, and Russia has the natural gas that Sweden could need in the future. But, how will Russia assure non-political interference in the natural gas supply in the short, middle and long terms?

Natural gas supply is closely linked to the political links and alliances between the supplier and consumer countries. This interaction could prove beneficial in some cases, i.e. increasing economic and political ties between Germany and Russia are favoring natural gas supply security and pipeline projects; or it could also be damaging, i.e. Russia's neighbors are aware that more integration with the European Union, independence from Russia or participating in NATO ventures could be reflected in their gas bill.

The close links between Germany and Russia are not free of conflict of interests, an issue that jeopardizes natural gas competition and energy policy accountability in the EU. A few days before the elections in Germany were celebrated the former German chancellor Gerhard Schroeder signed the initial agreement to build the Nord Stream pipeline between his country and Russia. On December 2005, approximately three months after loosing the elections and having resigned to his seat in Parliament, he accepted the post as chairman of the consortium, a decision that *de facto* legitimated Gazprom's political interference in the energy market.

Schroeder's participation in the Nord Stream pipeline first as a chancellor and then as a chairman, in the context of constant communitarian directives pushing towards more natural gas openness and competition at the national level, was a "collaborative, interactive form of mixing", and involved "an ability to achieve synergies between involved persons and organizations" (Wettenhall 2007, 5), which are specific conditions of a public-private partnership. This case invites further study considering that Nord Stream, a major European player as a big infrastructure investment project, could have "captured" the German government and different communitarian institutions.

Russia uses its natural gas and oil reserves, managed by their national energy companies, [16] to achieve its national interests. This mechanism is frequently applied in different degrees by different countries, depending on their energy policies, potential of their natural resources, strength of their institutions and state companies, independence of their regulators and internal and supranational counter balances among others. Russia is increasing its geopolitical influence in Europe due to their greater than ever natural gas supply and due to the tight control exercised over its national energy companies. Getting connected to the Nord Stream pipeline is a way in which Sweden will guarantee its future natural gas supply and will be closer to the EU, its competition policies, regulations and suppliers, but also to Russia's "oil and gas game".

5. Conclusions

This paper studies the link between the current energy transition, regulatory and energy policy and natural gas infrastructure and supply in Sweden. Analyzing the energy transition in relation to geopolitics, competition and governance, and connecting it to the conditions for future natural gas infrastructure and supply is the main innovative element of the research.

The analysis places special emphasis on the acting mechanisms operating between the national and communitarian regulatory frameworks with different energy sources and its implication for future governance due to security in energy supply.

Sweden used in 2007 more electricity than oil: the total final use per energy carrier for electricity was 132 TWh and for oil was 131 TWh (Swedish Energy Agency 2008a, 10), and nuclear energy accounted for 44.3% of this electricity. This data reflects the importance of phasing out nuclear terminals and helps to contextualize why this decision has been repetitively postponed and encounters resistance from industry and government.

Natural gas is environmentally friendly and has great potential towards replacing nuclear energy when the terminals are phased out; however, private investment in natural gas infrastructure followed by an exponential consumption could partly reverse a history of non-fossil fuel reliance and a traditional energy ownership model in which government and companies work closely together. As long as natural gas is not produced in the country, more natural gas supply/consumption would also represent higher dependence on foreign suppliers. Moreover, high taxation is still a barrier for the development of a truly competitive natural gas market.

Under the actual conditions characterized by volatility in oil/natural gas prices, continue utilization of nuclear energy seems to be the most cautious decision if accompanied by a constant renovation of the terminals that permits applying the new technology to make them as safe as possible.

Conversely, if terminals are slowly phased out and replaced gradually with natural gas, there would have to be special attention in designating the supplier; the energy surplus that nuclear energy provides represents valuable extra time to choose this supplier. In the context of a common energy history and strong Nordic links, Norway seems more reliable than Russia to be the next main natural gas supplier after a decline in the Danish reserves. In addition, non-discretionary binding guarantees have to be defined before permission is granted to the Nord Stream to operate in Sweden as a vaccine for future Russia's geopolitical pressure.

Notes

[1] Gilardi (2003, 13) discovered that competition, electricity, environment, financial markets, food, pharmaceuticals and telecoms regulated in Sweden through independent agencies present important variation in their level of autonomy.

[2] According to Jordana & Levi Faur (2005) diffusion mechanisms are related to a specific region, but act stronger between neighbor countries, or countries with a common history.

[3] As a result, Sweden had in 2005 the third lowest emissions rates of tones of CO2 per inhabitant in the OECD (OECD 2007).

[4] The Competitiveness Rankings (World Economic Forum 2003, 172) reported that tax rates and tax regulations, respectively, were the first 2 Most Problematic Factors for Doing Business in Sweden. On the other hand, Sweden ranked 9/102 in the category judicial independence, which represents an ideal condition for attracting private investment in natural gas infrastructure. Independence of the judiciary is essential for guaran-

teeing fairness in the appellate processes and ensuring credibility towards the international financial capital, which is the main source of natural gas investment in infrastructure.

[5] "For the same amount of energy released, carbon dioxide emissions from the combustion of natural gas are 40% less than from combustion of coal and 20% less than from oil combustion" (The Swedish Energy Agency 2005, 37).

[6] This model explains the impact of institutional conditions, regulatory governance and regulatory policies, amongst other factors, on private investment in infrastructure, and identifies the institutional actors involved in a complex process, the acting mechanisms and the causal direction.

[7] The debate between private or municipal participation in natural gas projects is still alive. Though, private companies are basic actors working towards more openness in the natural gas Swedish sector and the expansion of its network.

[8] "Mechanisms are frequently occurring and easily recognizable causal patterns that are triggered under generally unknown conditions or with indeterminate consequences. They allow us to explain but not to predict" (Elster 1998, 45).

[9] Agfors (1995, 223) identifies competition of oil and electricity in the decades after the Second World War as factors for closing the urban gas systems within Sweden.

[10] Russia still provides most of the natural gas used in Finland for domestic consumption, and it is expected to supply more than 50% of the European natural gas demand after 2020, so the stability of the continent will increasingly depend on its energy policies (James A. Baker III Institute for Public Policy 2005).

[11] The users that signed the letters of intention are Kerling (Hydro Polymers), Borealis, Yara, Statoil, E.ON Ruhrgas, Göteborg Energy, Preem Petroleum, Perstorp Oxo, SIGC (Swedish Industrial Gas Consortium), and the signing investors are Skagerack Energy, Östfold Energi, Hafslund, Agder Energy, E.ON Ruhrgas, Göteborg Energy, Swedegas, Preem Petroleum, Energinet.dk and PGNiG (Gassco & DNV 2007, 1).

[12] In Sweden, the separation of sales and transport of the natural gas required in 2004 that "the reports and accounts of the two activities must be separated" (Swedish Energy Agency 2004, 37).

[13] Due to the Act Concerning Taxation of Energy, natural gas used for electricity is free of tax (Swedish Energy Agency 2005, 35).

[14] "The Espoo (EIA) Convention sets out the obligations of Parties to assess the environmental impact of certain activities at an early stage of planning" (Convention on Environmental Impact Assessment 2008).
[15] According to the EU Trans-European Energy Networks legislation (European Union 2006, 2) "Appropriate priority for funding under Regulation (EC) No 2236/95 should be given to projects declared to be of European interest".
[16] "LUKOIL is number one in the world in terms of oil reserves, and number three in terms of total reserves [...] Rosneft is number one in the world amongst private companies in terms of reserves to production ratio (28 years)" (Poussenkova 2007, 88).

References

Agfors, G. 1995. 'The Missing Link, Attempts at Establishing a Nordic Gas Grid', in Hedin, M. & Kaijser, A. eds., *Nordic Energy Systems: Historical Perspectives and Current Issues*. Massachusetts: Science History Publications.

Berg, S. 2001. 'Infrastructure Regulation: Risk, Return and Performance', *Global Utilities*, 1, p. 3-10.

Bernstein, M. 1955. *Regulating Business by Independent Commission*. Princeton: Princeton University Press.

Bloomberg. 2008. *Energy Prices*. [Online]. Bloomberg. Available at: http://www.bloomberg.com/energy/ [accessed 5 January 2009].

Coglianese, C., Zeckhauser, R. & Parson, E. 2004. 'Seeking Truth for Power: Informational Strategy and Regulatory Policy Making', *Harvard Public Law Working Paper*, 101, p. 1-96.

Convention on Environmental Impact Assessment. 2008. *Convention on Environmental Impact Assessment in a Transboundary Context (Espoo, 1991) - the 'Espoo (EIA) Convention'*. [Online]. United Nations Economic Commission for Europe. Available at: http://www.unece.org/env/eia/eia.htm [accessed 5 January 2009].

Daoson, M. & Bystedt, E. 2008. *Request for a supplement to the application for a permit for a pipeline system under the Continental Shelf Act (1966:314) and the application for a permit to build and use a service platform under the Swedish Exclusive Economic Zone Act (1992:1140).* [Online]. Swedish Ministry of the Environment & Swedish Ministry of Enterprise, Energy and Communications. Available at: http://www.regeringen.se/content/1/c6/09/80/19/bf4d8ad6.pdf [accessed 5 January 2009].

Elster, J. 1998. A plea for mechanisms, in Hedström, P. & Swedberg, R., ed., *Social Mechanisms: An Analytical Approach to Social Theory*. Cambridge: Cambridge University Press, 45-73.

European Union. 2003. 'Directive 2003/55/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in natural gas and repealing Directive 98/30/EC', *Official Journal of the European Union,* L 176, p. 57-78.

European Union. 2006. 'Decision No 1364/2006/EC of the European Parliament and of the Council of 6 September 2006 laying down guidelines for trans-European energy networks and repealing Decision 96/391/EC and Decision No 1229/2003/EC', *Official Journal of the European Union,* L 262, p. 1-23.

Gassco & DNV. 2007. *Information concerning the planning of the Skanled gas pipeline*. [Online]. Energynet.dk. Available at: http://www.energinet.dk/NR/rdonlyres/E7D26121-FE5C-46C9-9DCB-7BE95E65CD38/0/TheSkanledgaspipelineprojectsummaryver_02_250607.pdf [accessed 5 January 2009].

James A. Baker III Institute for Public Policy of Rice University. 2005. Executive Summary. *The Geopolitics of Natural,* 29, p. 1-12. [Online]. Available at: http://www.rice.edu/energy/publications/PolicyReports/study_29.pdf [accessed 5 January 2009].

Gilardi, F. 2003. 'Delegation to Independent Regulatory Agencies in Western Europe: A Cross-Sectional Comparison', Paper, ECPR Workshop on Delegation in Contemporary Democracies.

Global Insight. 2007. *European Gas Supply and Demand Service, Review and Outlook to 2030*. [Online]. Global Insight Inc. Available at: http://www.globalinsight.com/gcpath/EuroGasSupply.pdf [accessed 5 January 2009].

Henrekson, M. & Jakobsson, U. 2003. 'The Swedish Model of Corporate Ownership and Control in Transition', *The Research Institute of Industrial Economics*, 593 , p.1-63.

Hyldoft, O. 1995. 'Making Gas, The Establishment of the Nordic Gas Systems, 1800-1870', in Hedin, M. & Kaijser, A. eds. (1995), *Nordic Energy Systems: Historical Perspectives and Current Issues.* Massachusetts: Science History Publications.

Jordana, J. & Levi Faur, D. 2005. 'Towards a Latin America Regulatory State? The Diffusion of Autonomous Regulatory Agencies across Countries and Sectors', *International Journal of Public Administration,* 29 (4-6), p. 335-366.

Laffont, J. & Tirole J. 1994. *A Theory of Incentives in Procurement and Regulation*. Cambridge and London: The MIT Press.

Larsson, R. 2005. *The European Dependence on Russian Energy*. [Online]. Network Oil and Gas (NOG). Available at: http://www.nog.se/files/NOG%20Ref_%20050913.pdf [accessed 5 January 2009].

Murray, J. 2005. The *Global Energy Perspective: reflections of the World Energy Council*. [Online]. Royal Swedish Academy of Engineering Sciences. Available at: http://www.iva.se/upload/Verksamhet/Projekt/Energiframsyn/Jan_StockholmMar05.doc [accessed 5 January 2009].

Network Oil and Gas. 2008. *About NOG*. [Online]. Network Oil and Gas. Available at: http://www.nog.se/page.asp?node=21 [accessed 5 January 2009].

Norwegian Ministry of Petroleum and Energy. 2007. *Pipeline project from Kårstø to Eastern Norway, Sweden and Denmark*. [Online]. Norwegian Ministry of Petroleum and Energy. Available at: http://www.regjeringen.no/en/dep/oed/Press-Center/Press-releases/2007/Pipeline-project-from-Karsto-to-Eastern-.html?id=446800 [accessed 5 January 2009].

Nuclear Energy Association. 2008. *Nuclear Energy in Sweden*. [Online]. Nuclear Energy Association. Available at: http://www.world-nuclear.org/info/inf42.html [accessed 5 January 2009].

OECD. 2007. OECD in Figures 2007. Paris: OECD.

Pierson, P. 2000. 'Increasing Returns, Path Dependence, and the Study of Politics', *American Political Science Review*, 94, p. 251-268.

Pipeline and Gas Journal. 2006. *Projects. Gassco Plans Gas Pipeline To Norway and Swede*n. [Online] Pipeline and Gas Journal. Available at: http://www.pipelineandgasjournal.com/PGJ/pgjarchive/Jan%2006/projects.pdf [accessed 5 January 2009].

Poussenkova, N. 2004. 'The Energy Dimension in Russian Global Strategy. From Rigs to Riches Oilmen vs. Financiers in the Russian Oil Sector', *James A. Baker III Institute for Public Policy of Rice University*, 6, p. 1-53.

Royal Swedish Academy of Engineering Sciences (IVA). 2003. *Energy Foresight – Sweden in Europe*, Report of the Project Steering Group. Stockholm: Royal Swedish Academy of Engineering Sciences (IVA).

Stigler, G. 1971. 'The Theory of Economic Regulation', *Bell Journal of Economics and Management Science*, 2, p. 3-21.

Swedish Energy Agency. 2004. *Energy in Sweden 2004*. Eskilstuna, Multi-tryck i Eskilstuna AB: Swedish Energy Agency.

Swedish Energy Agency. 2005. *The Swedish Energy Market. Theme: The Storm Gudrun*. Eskilstuna, Multitryck i Eskilstuna AB: Swedish Energy Agency.

Swedish Energy Agency. 2006. *Energy in Sweden 2006. Facts and Figures*. Eskilstuna, Multitryck i Eskilstuna AB: Swedish Energy Agency.

Swedish Energy Agency. 2007a. *Energy in Sweden 2007*. Eskilstuna, Multitryck i Eskilstuna AB: Swedish Energy Agency.

Swedish Energy Agency. 2007b. *Energy in Sweden 2007. Facts and Figures*. Eskilstuna, Multitryck i Eskilstuna AB: Swedish Energy Agency.

Swedish Energy Agency. 2008a. *Energy in Sweden 2008. Facts and Figures*. Eskilstuna, Multitryck i Eskilstuna AB: Swedish Energy Agency.

Swedish Energy Agency. 2008b. *The electricity certificate system, 2008*. Eskilstuna, Multitryck i Eskilstuna AB: Swedish Energy Agency.

Swedish Energy Agency. 2008c. *About Us*. [Online]. Swedish Energy Agency. Available at: http://www.swedishenergyagency.se/WEB/STEMEx01Eng.nsf/F_PreGen01?ReadForm&MenuSelect=7164E78CC77169B8C1256DE500361A83 [accessed 5 January 2009].

Wettenhall, R. 2007. 'ActewAGL: a genuine public-private partnership?' *International Journal of Public Sector M*anagement, Vol.20 (5), p. 392-414.

World Economic Forum. 2003. *Competitiveness Rankings*. [Online]. World Economic Forum. Available at: http://www.weforum.org/pdf/Gcr/GCR_2003_2004/sweden.pdf [accessed 5 January 2009].

Former Working Papers:

- **Arbetsrapport/Institutet för Framtidsstudier; 2000:1- 2006:13,** se www.framtidsstudier.se.

- **Arbetsrapport/Institutet för Framtidsstudier; 2007:1**
  Nahum, Ruth-Aïda, *Child Health and Family Income. Physical and Psychosocial Health.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2007:2**
  Nahum, Ruth-Aïda, *Labour Supply Response to Spousal Sickness Absence.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2007:3**
  Brännström, Lars, *Making their mark. Disentangling the Effects of Neighbourhood and School Environments on Educational Achievement.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2007:4**
  Lindh, Thomas & Urban Lundberg, *Predicaments in the futures of aging democracies.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2007:5**
  Ryan, Paul, *Has the youth labour market deteriorated in recent decades? Evidence from developed countries.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2007:6**
  Baroni, Elisa, *Pension Systems and Pension Reform in an Aging Society. An Introduction to Innthe Debate.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2007:7**
  Amcoff, Jan, *Regionförstoring – idé, mätproblem och framtidsutsikter*
- **Arbetsrapport/Institutet för Framtidsstudier; 2007:8**
  Johansson, Mats & Katarina Katz, *Wage differences between women and men in Sweden – the impact of skill mismatch*
- **Arbetsrapport/Institutet för Framtidsstudier; 2007:9**
  Alm, Susanne, *Det effektiva samhället eller det goda livet? Svenska framtidsstudier om arbetsliv och fritid från 1970- till 1990-tal.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2007:10**
  Sevilla, Jaypee, *Age structure and productivity growth*
- **Arbetsrapport/Institutet för Framtidsstudier; 2007:11**
  Sevilla, Jaypee, *Fertility and relative cohort size*
- **Arbetsrapport/Institutet för Framtidsstudier; 2007:12**
  Steedman, Hilary, *Adapting to Globalised Product and Labour Markets*
- **Arbetsrapport/Institutet för Framtidsstudier; 2007:13**
  Bäckman, Olof & Anders Nilsson, *Childhood Poverty and Labour Market Exclusion*
- **Arbetsrapport/Institutet för Framtidsstudier; 2007:14**
  Dahlgren, Göran & Margaret Whitehead, *Policies and strategies to promote social equity in health*
- **Arbetsrapport/Institutet för Framtidsstudier; 2008:1**
  Westholm, Erik & Cecilia Waldenström, *Kunskap om landsbygden. Dags för en ny agenda!*
- **Arbetsrapport/Institutet för Framtidsstudier; 2008:2**
  Gartell, Marie, Jans, Ann-Christin & Helena Persson, *The importance of education for the reallocation of labor. Evidence from Swedish linked employer-employee data 1986-2002*
- **Arbetsrapport/Institutet för Framtidsstudier; 2008:3**
  Strömblad, Per & Gunnar Myrberg, *Urban Inequality and Political Recruitment Networks.*
  Arbetsrapport/Institutet för Framtidsstudier; 2008:4
  Forsell, Charlotte, Hallberg, Daniel, Lindh, Thomas & Gustav Öberg, *Intergenerational public and private sector redistribution in Sweden 2003*
- **Arbetsrapport/Institutet för Framtidsstudier; 2008:5**
  Andersson, Jenny, *The Future Landscape*
- **Arbetsrapport/Institutet för Framtidsstudier; 2008:6**
  Alm, Susanne, *Social nedåtrörlighet mellan generationer*
- **Arbetsrapport/Institutet för Framtidsstudier; 2008:7**
  Stenlås, Niklas, *Technology, National Identity and the State: Rise and Decline of a Small State's Military-Industrial Complex*

- **Arbetsrapport/Institutet för Framtidsstudier; 2008:8**
  Larsson, Jakob, *Den öppna samordningsmetoden. EU:s samordningsmetod av medlemsländernas välfärdssystem*
- **Arbetsrapport/Institutet för Framtidsstudier; 2008:9**
  Bergmark, Åke & Olof Bäckman, *Socialbidragstagandets mönster – en studie av varaktighet och utträden under 2000-talet*
- **Arbetsrapport/Institutet för Framtidsstudier; 2008:9**
  Bergmark, Åke & Olof Bäckman, *Socialbidragstagandets mönster – en studie av varaktighet och utträden under 2000-talet*
- **Arbetsrapport/Institutet för Framtidsstudier; 2008:10**
  Kap, Hrvoje, *Education and citizenship in the knowledge society – towards the comparative study of national systems of education*
- **Arbetsrapport/Institutet för Framtidsstudier; 2008:11**
  Zamac, Jovan, Hallberg, Daniel & Thomas Lindh, *Low fertility and long run growth in an economy with a large public sector*
- **Arbetsrapport/Institutet för Framtidsstudier; 2008:12**
  Bäckman, Olof & Anders Nilsson, *Det andra utanförskapet? Om social exkludering på landsbygden*
- **Arbetsrapport/Institutet för Framtidsstudier; 2008:13**
  Korpi, Martin, *Migration and Wage Inequality. Economic Effects of Migration to and within Sweden, 1993-2003*
- **Arbetsrapport/Institutet för Framtidsstudier; 2008:14**
  Gartell, Marie, Jans, Ann-Christin & Helena Persson, *The importance of age for the reallocation of labor. Evidence from Swedish linked employer-employee data 1986-2002*
- **Arbetsrapport/Institutet för Framtidsstudier; 2008:15**
  Korpi, Martin, Clark, William A.V. & Bo Malmberg, T*he Urban Hierarchy and Domestic Migration. The Interaction of Internal Migration, Disposable Income and the Cost of Living, Sweden 1993-2002*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:1**
  Enström Öst, Cecilia, *The Effect of Parental Wealth on Tenure Choice. A study of family background and young adults housing situation*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:2**
  Gartell, Marie, *Unemployment and subsequent earnings for Swedish college graduates. A study of scarring effects*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:3**
  Bergman, Ann & Jan Ch Karlsson, *Från shopping till sanningsserum. En typologi över förutsägelser*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:4**
  Amcoff, Jan; Möller, Peter & Westholm, Erik, *När lanthandeln stänger. En studie av lanthandelns betydelse för flyttning in och ut och för människorna i byn*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:5**
  Lundqvist, Torbjörn, *The Emergence of Foresight Activities in Swedish Government Authorities*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:6**
  Thalberg, Sara, *Childbearing of students. The case of Sweden*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:7**
  Baroni, Elisa; Žamac, Jovan & Öberg, Gustav, *IFSIM Handbook*
- **Arbetsrapport/Institutet för Framtidsstudier; 2009:8**
  Lundqvist, Torbjörn, *Socialt kapital och karteller*

ISSN: 1652-120X
ISBN: 978-91-85619-48-1