

Preface

The School of Political Science of the Università degli Studi di Firenze is pleased to present the first newsletter of its new course on the fields among energy, environment and international relations at European level.

The course "Energy, Environment and European Security" aims at presenting a comprehensive analysis of the issues of energy, environment and European policy from a strong multidisciplinary perspective, as this new course encompasses three different disciplines (Energy Economics, Environmental Economics and International History).

The course, entirely taught in English, is part of the postgraduate program in International Relations and European Studies.

Lecturers are Rossella Bardazzi, Maria Grazia Pazienza, and Alberto Tonini, associated professors at the School of Political Science. Being part of the Lifelong Learning Programme, the course has been awarded as a Jean Monnet Module by the European Union order to enlarge and deepen the field of European integration studies. This funding support is employed to finance both incoming professors (seminars and visiting professors from other countries) and short exchange periods for students interested in theses on energy issues (incoming and outgoing). This year the exchange program is organized with Novosibirsk University, Russia.

This newsletter is intended to stimulate the debate on energy issues and to promote the activities, which have been proposed during the entire course, to the international academic and non academic network.

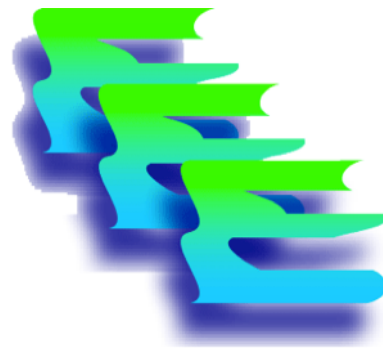
This first issue focuses on two interesting seminars organized during the first part of the course (March 2013), thanks to the contribution of Professor Matteo Verda (University of Pavia) and Professor Laura Castellucci (University of Tor Vergata).

Practical information and links close the newsletter.

Disclaimer

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Natural Gas and International Politics

Dr Matteo Verda, Pavia University - March 19th 2013

When oil started to increase during the '70s, European governments started to look for an alternative to oil, in economic terms and political ones. USSR was available to provide a substitute to the Middle Eastern oil. At that time, oil was used not only for transportation but also for power generation. USSR offered an alternative to diversify the supply of energy. When Italy and Germany started to look at the Soviet Union as supplier of energy, USSR was the enemy. The point was: Europe could diversify its importing basket but it would have relied on its enemy which would have been able to politically use such a dependency. The soviet gas was a very useful energy source for Europe in order to diversify and lighten the weight of Middle Eastern oil, but there was a political issue to solve. Italian and German governments needed to create political conditions with the Soviets without loosing the American support. Importing Soviet natural gas was harder and riskier than receiving Middle Eastern oil through tankers since the oil market did (and does) not need long-term investments contrary to the natural gas market, which required pipelines to deliver gas.

In fact, in order to build a pipeline over thousands miles long, it is necessary to invest billions of dollars and the construction of the track requires years. Thus, such an investment has a long-term perspective. As a consequence, before the construction of a similar infra-

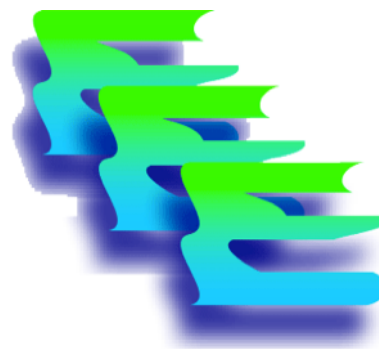


structure it is necessary to be sure on the reliability of the counterpart.

In the '70s, the question was: can we rely on Soviet Union and put so much money to build pipelines linking Siberian production to Europe? Thus, creating the trustful political and diplomatic context was the issue since after the decision of building a pipeline the two parts would have been bounded for years. As a consequence, the security of the importing countries would have been tied with the supplier partner and the latter would have been bounded with the served market.

Thus, in order to create a trustful context, a step-by-step process was made up. It started during the '60s and the beginning of the '70s when Italy and Germany established a partnership with USSR, exporting pipes and machineries in exchange for oil on a spot basis. This kind of





exchange created a process of consultation and hence trust between the parts. Consequently, a small pipeline was built from Czechoslovakia to Western Germany so as to deliver small amounts of natural gas which covered the 10% of the German gas demand at the time. After Germany, Austria was the second country reached by Soviet natural gas, followed by Italy and then France. During the second oil shock (1973) Soviet Union had offered a safer alternative to Western countries which had decided to start to depend more on USSR energy sources, mostly Italy and Germany. In that period, Soviet companies had needed to import machineries and technology from the European countries, starting to rely on imports of such goods even for the internal market. In fact, USSR had necessitated compression stations and pipes to deliver natural gas to its internal areas. Such a preceding framework permitted to build new pipelines which would have served the European markets for years.

After the USSR collapse, such a partnership was the most important heritage of the past for the relationship between Europe and Russian Federation. The political heritage of the Soviet period was useful in order to create a new generation of relationship between the two parts. Given that USSR had been a reliable partner for several years and given that the perspective of the supply of energy sources was pessimistic, at the beginning of the '90s, the question was: why not improve the relationship with Russia? So, the two parts started to think about new pipelines which would have been able to provide more natural gas to Europe and would have permitted the recovery of Russian economy. The political context during the '90s was even more complicated than in the '70s since Russia was risking default, which indeed

happened in 1998. Europe started to think how to tie Russian development to Western economies and how Europe could cooperate with Russia in order to have an area of security in the entire region. Thus, improving the relationship with Russian companies was the way to support the Russian transition from a partially-closed economy to an open one. The economic cooperation on natural gas was a good and effective way to reach such a goal.

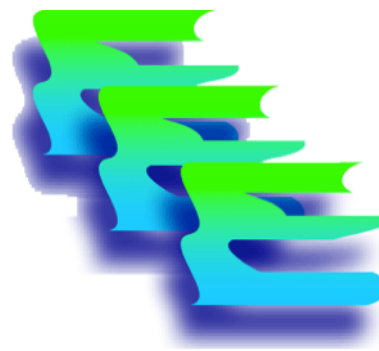
Those events demonstrate that economics and politics overlap in order to create the right context for cooperation.

Politics mattered and matters a lot also in the case of natural gas delivered by Northern African countries. When Italy started to think about Algerian gas, Algeria was still part of the French metropolitan territories. After the Algerian war, natural gas began to flow through Europe, mostly Italy. That happened since ENI supported the Algerian rebels. The support given by ENI was rewarded after the war through the construction of a pipeline which delivered, and delivers nowadays, natural gas to Italy and Europe.

Also in this case, economics and politics overlapped. When several billions of dollars are invested in infrastructures and machineries, having a political assurance is, in certain circumstances, necessary. A pipeline is basically an economic issue when the construction of it is made between two parts which are similar and have similar economic, social, legal, organisational and political systems. When the two partners have different systems, in order to provide a secure and stable investment a political agreement is more advisable.

Question: could LNG terminals be a useful way to stop ties with Russia, Algeria and so on?





Verda: nowadays, natural gas pipelines are providing 75% of supplying. Today, LNG is not a game changer due to its costs. When several billions of capital are invested in pipelines coming to Europe, companies have to use this way of transportation before using LNG. Moreover, pipelines create a regional market with incumbents which are interested in limiting the access of other companies and LNG would be limited by the incumbents in order to limit the access of new competitors. As a consequence, there is a regulatory issue, which has been taken into account by the European Union during these years and it is still under way. Furthermore, the widespread of LNG would open an out-and-out global market where Europe would have to “compete” also with Far Eastern countries which pay natural gas more than European ones. LNG could be a way to diversify provisions but such a diversification would be only within a specific energy source.

Question: what about the Azerbaijani case?

Verda: Azerbaijan is a possible source of diversification of supply and is the centre of attention of European Commission for the diversification of the Russian supply in order to reduce the European energy dependency from Russia. Azerbaijan is the main route between Turkmenistan, Kazakhstan and Europe since the other two options are Russia and Iran. After twenty years of bargain, Europe has started to realize that Caspian Sea is under the Russian sphere. However, Azerbaijan has started to offer its potential production, about 16 billion cubic meters per year, as an alternative to the Central Asian gas (Turkmenistan and Kazakhstan). Although Azerbaijan is not a game changer since Europe consumes 500 bcm per year of gas, it is a good way to diversify the supply. Thus,

Azerbaijan built a natural gas pipeline on the same route of the Baku-Tbilisi-Ceyhan crude oil pipeline to supply Turkish market. Azerbaijani gas will be delivered to Europe in the last years of this decade.

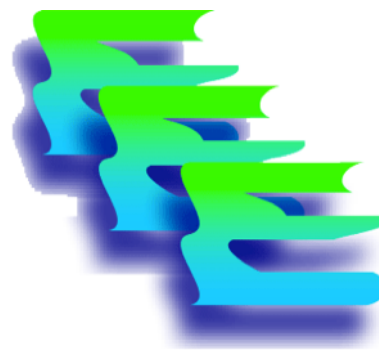
In order to provide Central Asian natural gas, there are still two projects: Nabucco West and Trans Adriatic Pipeline. The former would pass through the Balkans and arrive in Austria. The latter would cross Greece and Albania to arrive in Italy. There is a strong political clash between, one side, Italy and, on the other side, Germany and the European Commission. Also in this case there are economic factors and political ones that could affect the result of such an issue. However, Italy has a rigid market which could let make more money by natural gas sellers in respect to the Balkan markets.

At the political level, there are many negotiations about these projects in Bruxelles. The European Commission is in a difficult moment due to the different discussions as regards contrasting projects. The Commission has been strongly involved into Nabucco project, whereas Italy did not offer any support until last year.

Question: How much energy dependency is usable by a country to influence partners?

Verda: The threat is more in the contracts. It never happens an escalation up to the limit of the cut of supply. In case of tensions between two partners, the supplier could prefer to buy pipes and machineries from another country than from the partner in order to punish and damage him. Usually, we cannot say that there is a “mutual assured destruction” risk in the natural gas market but rather it is possible to argue that there exists a “tit-for-tat” strategy that is used to give or take concessions to the partner.





At the political level, the energy bargaining is characterised by a low level of conflict. More precisely, the energy bargaining is a political use of an economic aspect.

A remarkable political use of natural gas was made during the '90s by Russia in order to stop a Georgian offensive in the South Ossetia (at that time a *de facto* province of Georgia). Russia stopped the flow of natural gas in the middle of the winter and Tbilisi was obliged to reach a compromise with the rebels. Russia used gas instead of its army and that reached the object to stop the Georgian offensive. Russia was able to stop the supply of natural gas since there was no interdependence between the two countries but only a dependence of Georgia on Russian gas. However, it is quite unlikely that a similar case happens as regards Europe since the European market is crucial for Russia.

Question: Is it possible that Russia can supply its gas both to Europe and China?

Verda: For Russia, there would be no problem at all to supply both the markets but there are resources allocation and balance of power problems. As for the former, Russia does not have the needed resources to build pipelines for Europe and for China at the same time. With regard to the latter, China can diversify its provisions more than Europe may do. Finally, there is a rule of law problem. The crucial point is when a supplier starts to build an infrastructure to provide natural gas to its buyer; it is necessary to set the price before the construction. Given such a picture, investing in a "Chinese" pipeline is too risky for Gazprom. However, Russia has started to invest in Asian markets since that Gazprom has developed Sakhalin-2 project in order to supply Japan, South Korea and India with LNG. The three

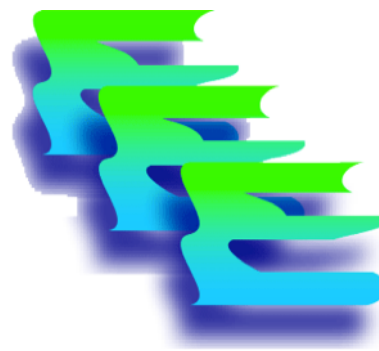
countries have rule of law, and if they do not buy natural gas Russia can sell it to someone else since LNG market is flexible.

Question: Is it possible that Russia and Azerbaijan can be affected by "Dutch disease"?

Verda: Russia was a good example of Dutch disease up to a certain point since in the '90s there were lots of investments in the energy sector, high share of energy sources in the export, and the industrial system was quite old and inefficient.

As regards Azerbaijan, Dutch disease was very likely but it was prevented by the creation of the Azerbaijani sovereign wealth fund (SOFAZ), which takes all the revenues of the natural gas sell and gives a certain amount of revenues to the Azerbaijani government. Whereas the other part is used to invest outside Azerbaijan. So, in this case Azerbaijan was affected only partially by Dutch disease.





The Economics of Nuclear Energy.

What is true and what is false in the Italian debate.

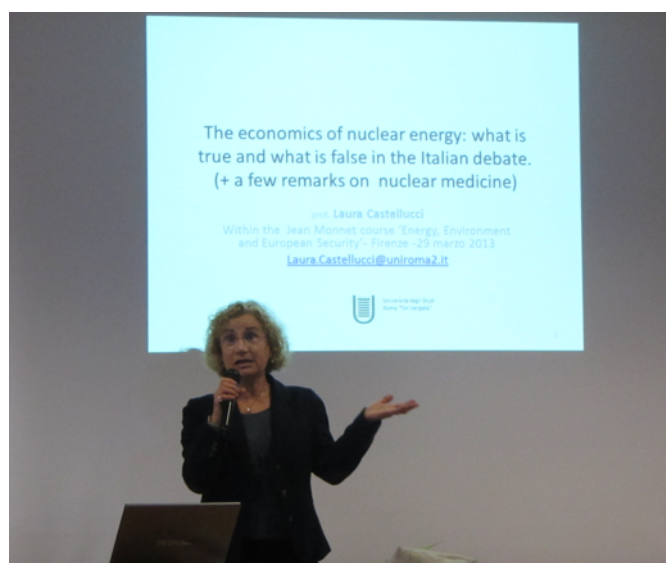
Prof. Castellucci, Università Tor Vergata, Rome - March 29th 2013

Debating about nuclear energy is challenging and tricky since it involves many aspects and personal values. However, it is necessary to have an unbiased view of the question in order to be conscious of the pros and cons of such an energy source. Comprehending some technical features of nuclear power plants is necessary in order to better understand the economic consequences of nuclear energy. In fact, being conscious of the type of nuclear reactor is essential so as to compare costs.

Usually, the most common arguments in favour of nuclear energy are (a) low marginal cost, (b) security of supply, (c) country independence, (d) the lower volatility of price and (e) “clean” energy. However, these are generally half-truths. As regards low marginal cost of nuclear energy, it could be true but nuclear power plants have high construction costs.

Regarding the security of supply, nowadays Western countries are facing a lower demand of energy compared to 2008 and the growth rate is decreasing. As a consequence, improving the capacity of energy production is not necessary. Other states such as China, India and other developing countries have a growing rate of demand of energy that can justify the construction of new nuclear plants, but this is not for OECD countries.

Concerning country independence, importing the fuel (uranium) is necessary to produce

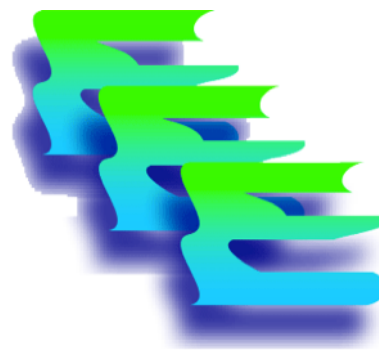


energy and, for example, France has to rely on uranium suppliers. Moreover, before putting the combustible into the reactor it is required a process of enrichment which necessitates capabilities and infrastructures. It is a problem of deciding where the independence starts: does it start off with the mining of uranium or the process of enrichment of it?

As regards the lower volatility of uranium price compared to oil and gas and the “clean energy” argument, the former is true whereas the latter is false.

Taking into account the Italian case, a strong argument in favour of nuclear energy in Italy is the lowering of kWh production costs and hence tariffs. According to Enel, with a new nuclear





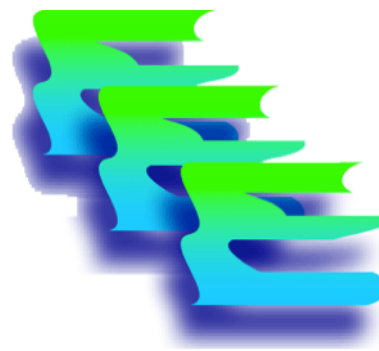
program Italy could lower the cost of production of one kWh by 20% respect to the actual costs. According to another estimation made by Clò (2010), the reduction could vary from 2% to 5%. However, the focus is on costs, not on tariffs. Transferring the reduction from costs to tariffs is another story. Taking into account the market structure is necessary in order to understand whether this switch can happen or not.

Nevertheless, there are other costs which are hard to evaluate and quantify: external costs. The European Commission has developed a common methodology to assess such costs which is called ExternE (External Costs of Energy). It has been used by the European Environmental Agency and it describes all stages in the energy chain, provides information on material, energy flows and environmental burdens, it allows estimation of health and environmental impacts and it provides a mechanism for estimating the costs of the impacts. Through the ExternE methodology, the European Environmental Agency (EEA) has produced and estimated average of external costs for electricity generation in the European Union divided by technologies. Nuclear power plants produce less externalities than other power plants in term of GHG emissions. However, in order to properly evaluate the cost of externalities, it is necessary to understand all the externalities that a specific energy source may produce. Hence, taking into account the externalities of a nuclear incident is mandatory but quite difficult. In fact, without the evaluation of such external costs, the comparison between two different technologies could be incomplete and unconvincing. Nevertheless, evaluating such a kind of externalities is not straightforward and there exist different approaches to the problem. Another key aspect is the construction cost.

Costs differ according to which source is taken. As stated by Enel, an EPR nuclear power plant of 1700 MW of power generation may cost between 3 and 3.5 billion of Euro. Other companies such as Moody's, E.On and Florida Power&Light give different figures, arguing that costs may be from two to three times higher than budgeted 3 billion. Another lesson comes from Olkiluoto. In 2001 the Finnish Parliament approved the construction of a 1600MW EPR nuclear power plant with a forecast of service equal to 60 years. In 2005 the construction began with a projected cost of 4 billion. Nowadays, the total costs have grown to 5 billion and a delay of three years and half is expected. Moreover, also Areva argues that the cost of a new reactor is today between six and eight billion of Euro. That demonstrates that construction costs are rising and budgeted costs are not sure and certain.

Another lesson comes from the USA where there exists a liberalised energy market. In the last 30 years no completely new nuclear plants have been built in the USA. That could be due to the liberalised market where private capital flows only in profitable projects. As stated also by MIT in 2003, nuclear power is much more costly than coal and gas even with a high gas price scenario. Moreover, the uncertainty about construction and operating costs and the regulation affects the investors' decisions. In 2009, Du-Parsons updated the 2003 MIT study, founding that costs of construction doubled. As a consequence, a long service life determines a low unit cost of production but requires a huge investment with a long-term perspective which discourages capital inflow. Furthermore, the high capital intensity and the difficulties in predicting both costs and time of construction entail a lot of delays and costs increases which prevent





investments to flow in. As a result, the structure of the energy market is affected.

In fact, a competitive market does not attract investments in nuclear power plant since huge investments and delayed returns make the sector very sensitive to the interest rate. Thus, as stated by OECD in *Nuclear Energy Today* (2011), a supportive public policy framework and appropriate financing models are necessary to build new nuclear plants. The governmental support to such power plants takes the risk of investment away from producers and put it on the taxpayer, entailing a less competitive market. In conclusion, it can be said that marginal costs are low only once the power plant has been constructed and put into operation. The price of nuclear energy is not sensitive to the variation of uranium price but that cannot guarantee the supply security (e.g. Fukushima accident). Moreover, nuclear energy is not a clean technology since it is GHG emissions free but its impacts on land, water, human and animal health are high. The main differences between nuclear energy and other combustible fuel plants are in the amount of investments needed and in the price of fuels. So, the low price of uranium is not pivotal since it covers about 16% of total costs only whereas investments cover 59% and operational and maintenance activities 25%.

As regards Italy, the demand for energy is lower compared to 2008 due to the economic crisis but also to more efficient ways of using energy. Projections for 2020 sketch a 370TWh of demand and a production from renewables up to 99TW. Probably, in 2020 Italy will have excess of power plants, entailing a capacity underutilisation, i.e. higher and increasing unit costs. Thus, it seems that more and new investments in power plants are not necessary

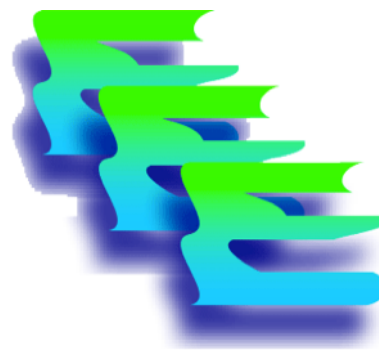
since other kinds of investment are needed by the Italian infrastructure, i.e. smart grids, which could let Italy increase its renewable sources and lower electrical leakages.

In order to proceed with the liberalisation of the Italian energy market, it is necessary to avoid the renaissance of nuclear energy which would reduce the still limited competition. Indeed, there are three ways of governmental support to producers that could affect the competition. The decree law 31 provides firms investing in nuclear power with financial and insurance protection against the risks of delay in the construction and operation of plant. Nuclear producers would have the priority in dispatching their energy to the grid and would have certainty about selling prices that would provide a protection against changes in the demand for electricity.

Finally, to the above-mentioned costs, other costs should be added: the risk of nuclear accidents and the cost of final storage of wastes. No country has yet resolved the problem of finding a proper location for the final disposal of nuclear wastes.

Given similar circumstances, in case of a renaissance of nuclear energy in Italy the energy market will be less competitive, entailing an unlikely reduction of costs and, hence, tariffs. Secondly, there will be no advantages in reverting to nuclear energy, implying no improvement for consumers.





Information and Links

School of Political Science

<http://www.scpol.unifi.it/> mettere quello nuovo

International Relation and European Studies

<http://www1.unifi.it/relazioni-internazionali-studi-europei/mdswitch.html>

Empowering Europe: Energy, Security and Environment web site.

<http://www.eu-ese.unifi.it/mdswitch.html>

Jean Monnet Pole, University of Florence

<http://www.unifi.it/vp-7361-cattedre-jean-monnet.html>

Other events in Tuscany: Festival of Europe

<http://www.festivaldeuropa.eu/en>

