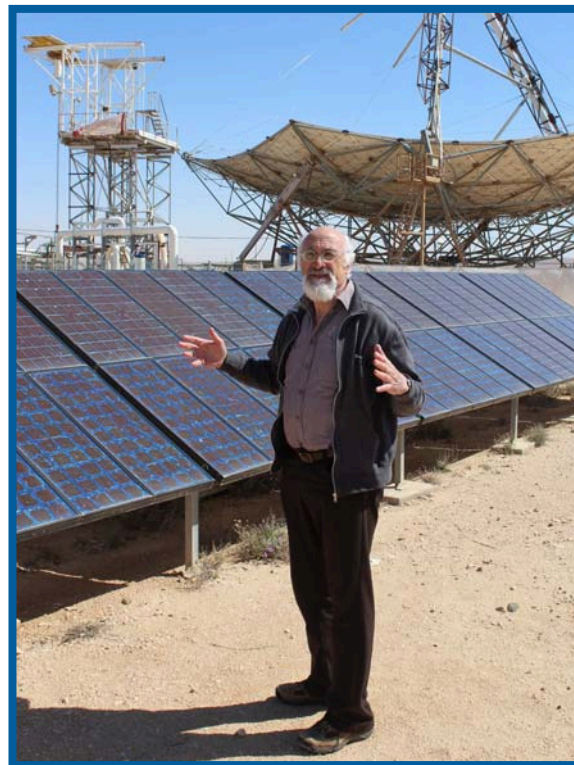


Energy Security in Europe and Israel



The Jacob Blaustein Institutes
for Desert Research



Ben-Gurion University
of the Negev



Konrad
Adenauer
Stiftung

50 YEARS OF WORLDWIDE COOPERATION

Foreword



*Konrad Adenauer and David Ben-Gurion in New York, 1960,
photo by REGIERUNGonline/Wundshammer*

Energy security has become a top priority for European and Israeli energy policies. This is why the Israel office of the Konrad-Adenauer-Stiftung decided to arrange a European-Israeli symposium on this subject in March 2012.

We are proud of having won the world famous Jacob Blaustein Institutes for Desert Research over to co-organizing and hosting this event. It brought together outstanding scholars, scientists, political

decision makers, business people, students and specialists from Europe and Israel, and it succeeded in advancing the exchange of knowledge and cooperation between our two regions in the field of energy security and energy strategies.

In this brochure, Professor David Faiman (Jacob Blaustein Institutes for Desert Research) and Severin Fischer (Stiftung Wissenschaft und Politik) recapitulate the results of our symposium from an Israeli and a European perspective. Europe and Israel are not only facing joint challenges; they also have an enormous joint potential for workable and sustainable solutions. The European Union has made major steps towards a Common Energy Policy in recent years, but, as Severin Fischer shows, many questions at the institutional as well as at the technological levels have to be answered yet. From David Faiman's summary of the presentations given at the symposium it becomes clear that Israel is among the most qualified partners one can wish for in the field of novel approaches to the issue of energy security. The country's need for a sophisticated energy strategy has been a major driving force in Israeli science and technology, research and development.

The Konrad-Adenauer-Stiftung has a strong stake in this subject. We are a German political foundation, combining national and global think tank work, civic education at home and exchange of ideas abroad. We are independent of, but associated with, the Christian Democratic Union of Germany, the party of Chancellor Angela Merkel who is a member of our board (and who was, by the way, Germany's Federal Environment Minister in the 1990's).

We have been active in international cooperation for half a century this year, and we are present all over the world with some 80 country offices. In the greater region of North Africa and the Middle East, the Stiftung is represented in capitals from Rabat to Ankara, and there is a very close cooperation between our offices in Jerusalem, Ramallah and Amman.

Dealing with the effects of climate change and negotiating international binding agreements has been on top of the German government's agenda for many years. Admittedly, Germany lost its bid three years ago to be allocated the headquarters



of the International Renewable Energy Agency (IRENA); at the end of a tough competition, Abu Dhabi won in June 2009 at IRENA's Sharm el Sheikh conference. However, it was more than a consolation prize that Germany was given IRENA's Innovation and Technology Centre which has been operative in Bonn since October last year. Its mission is to foster the use of renewable energy sources, including wind power, hydro-power and solar power.

There are at least four reasons why Germany has been strongly committed to the subject of the Sde Boker energy symposium:

- Environmental protection has been a major political issue in our country for more than 40 years. It has become a mainstream subject on the political agenda.
- The second reason has to do with our vital foreign and security policy interests. Like most Western countries, Germany is still too dependent on energy imports from unstable or potentially unstable countries and regions. This makes her susceptible to political blackmail. Furthermore, climate change itself has dangerously destabilizing effects. It increases poverty and misery, distributional conflicts, and migratory pressure – not least in Africa, our neighbouring continent.
- Thirdly, we believe that economic growth has to be decoupled from energy consumption. The German economy is in good shape right now, as is Israel's. But there is no reason to take the status quo for granted. In Germany, some 400 000 jobs are provided by the renewable energy sector. It is one of the most innovative sectors of our economy, and it is no doubt a driver of future growth.
- Last but not least, the Fukushima disaster has led the German government to phase out nuclear energy by 2022. This has been a highly popular decision, but it means that the goals the German government had previously set itself in terms of climate protection have to become even more ambitious.

As a foundation which bears the name of Konrad Adenauer, the first postwar Chancellor of the Federal Republic of Germany, we were particularly glad to be involved in an event that took place close to the final resting place of David Ben Gurion. Ben Gurion and Adenauer set the course for German-Israeli partnership and friendship. It has become an unparalleled success story, and we believe we were able to add a little, though significant, chapter to it by the symposium on energy security and energy strategies in Sde Boker.

Michael Mertes
Director
KAS Israel

Evelyn Gaiser
Project Manager
KAS Israel

Key Aspects of the BGU-KAS Energy Security Conference

Prof. David Faiman

On March 18th 2012, Ben-Gurion University's Blaustein Institutes for Desert Research hosted a symposium on the subject Energy Security for Europe and Israel, organized by the Israel office of the Konrad-Adenauer-Stiftung. The purpose of the symposium was to bring together European and Israeli energy specialists in order to compare their respective insights into ideas for reducing dependence on the world's ever-dwindling supplies of oil.

An overview of the European perspectives to energy security and the challenges they pose for policy was presented by Dr. Götz Reichert, of the Centrum für Europäische Politik.



Prof. David Faiman, Jacob Blaustein Institutes for Desert Research at Ben-Gurion University of the Negev, photo by Nadine Mensel

Reichert explained that at present, the 27 EU member states depend on imports of fossil fuels like coal, natural gas and crude oil for over 75% and that this trend is further increasing. He showed how, as a response to these challenges, in the past five years the EU has started developing a comprehensive energy policy which is targeting an extensive decarbonisation of the European energy system over the long term. For this purpose, the member states seek to diversify their energy imports, to create an EU-wide internal energy market, to promote renewable energies, to increase energy efficiency and to modernise their energy infrastructure.

Of related significance was the presentation of Severin Fischer, of the Stiftung Wissenschaft und Politik, on a unified European policy for renewable energies. Fischer concluded that renewables are without any doubt becoming one of the fundamentals of the European Electricity Supply System. According to the "EU Energy Roadmap 2050", renewables will, depending on the decarbonization scenario, contribute between 59-83% of electricity supply in the EU by 2050. However, the renewables policy in the EU still has the character of a framework rather than a guiding function. The debate on the framework beyond 2020 will be decisive for the question whether the EU will move toward an effective and cost-efficient energy system based on renewables.

The symposium was of particular value because, in spite of many problems common to both Europe and Israel, a number of specific experiences were discussed from which the other could learn. For example, on the one hand, it was possible to discuss some of Europe's experience with nuclear power plants and, as shown by Dr. Ari Rabl of Paris, non-negligible costs are to be expected in trying to phase this power source out. Such calculations should provide food for thought for a country, such as Israel, that has not yet decided whether to implement a nuclear power program. On the



other hand, in spite of Israel's abundant exposure to solar energy, non-negligible problems have long been experienced in trying to phase this power source in. Much of this experience could help in heading off comparable problems that are likely to arise in implementing Europe's DESERTEC project that was admirably outlined by its co-founder, Dr.-Ing. Ulrich Hueck.

Turning to the Israeli perspective, Dr. Shlomo Wald, Chief Scientist of the Ministry of Energy & Water, drew attention to the debate that is raging in Israel over what Israel should do about its recent discoveries of natural gas. In the Mediterranean Tamar and Leviathan basins 750 billion cubic meters of gas have already been found, and discoveries of 450 billion cubic meters more are expected.

On the one hand, to base all of Israel's future energy requirements upon it would create security problems of a new order of magnitude. For, as emphasized by Dr. Amit Mor, CEO of ECO Energy Ltd. and a frequent advisor to the government, the drilling platforms and the many kilometers of pipeline that will be needed to collect the gas and transfer it to the shore would constitute prime targets for terrorists. At the other extreme, as emphasized by Dr. Wald, to sell the gas on the world market would quickly deplete a resource that, in the long run, should significantly contribute to the country's energy security. Therefore some form of happy medium will be needed. Wald also indicated that in his opinion, nuclear energy is a less environmentally hostile technology for generating base load power than is the present burning of coal. However, the public is likely to prove hard to convince that this is a viable solution for Israel.

One intriguing alternative to nuclear, presented by Dr. Harold Vinegar, Chief Scientist of Israeli Energy Initiatives, and former Chief Scientist of Royal Dutch Shell, is to generate oil and gas from Israeli oil shale, by heating the oil shale in situ. According to Vinegar, Israel and Jordan have some of the richest global oil shale deposits: Israel has, conservatively, over 250 billion barrels of oil in oil shale. In situ conversion technology has been developed that enables the shale oil and gas to be produced from either vertical or horizontal wells drilled into the shale underground, with only a small surface footprint. Vinegar said that pipeline gas would be used to start heating the oil shale underground, after which the produced gas from the process would make it self-sustaining, with a high energy output to energy input ratio. All aspects of the in situ conversion technology have been demonstrated in oil shale in Colorado and in heavy oil in Alberta, according to Vinegar. Applying this technology here could provide Israel both energy security and energy independence.

A number of possible environmental concerns were voiced, particularly by Yael Cohen Paran, head of Israel Energy Forum, but Vinegar appeared to have answers for all. Nevertheless, in her own presentation, Paran emphasized that Israel could move a long way towards energy independence by cutting down on a needlessly large amount of waste. She emphasized several sectors in which such significant energy savings could be effected that it would defer the need to construct any



further power plants for a number of years: enough time to allow serious public debate on the relative efficacy of the various technological options.

One option that Dov Raviv, CEO of MST, has been advocating for a number of years, is that of solar power produced from large concentrator photovoltaic (CPV) systems. He showed a photograph of a single 50 kW unit that he built in Arad, which has been in continuous operation for more than two years. A field of 40,000 units of 25 kW each (MST's preferred rating for utility-scale systems) would occupy approximately 10 km² of desert and generate 1 Gigawatt of power. Raviv further claims that storage batteries would become available within three years that would enable such plants to be fully compatible with grid requirements.

One of the impressive features of Raviv's scheme – which, due to an unfortunate misunderstanding, he was not able to present in its entirety – is the novel manner he proposes for funding such projects. However, he very kindly agreed to allow his slides to be distributed among the conference attendees. In outline, Raviv's idea is to construct, each year, a solar plant production line of capacity 300 MW/y such that after 5 years the production capacity would reach 1,500 MW/y. Solar plants would be built each year at a size commensurate with the existing production capacity and income from their steadily increasing combined electricity production would eventually cover the debt created by the initial investment and the cost of new plants. According to Raviv's calculations, the maximum credit requirement would be US\$ 15B and all costs would be fully paid off by year 20. At that stage Israel would have 25 GW of installed solar capacity, constituting between 50 – 60 % of its total electrical needs.

Another aspect of Raviv's scheme is that the electricity tariff would be held at its present rate for the first seven years and, thereafter, would steadily decrease. The scheme would create 30,000 jobs being thus a benefit to the public, the economy, and energy security.

Raviv's company is one of several Israeli startups with revolutionary ideas, that have needed to look for funding from private investors and from overseas. This problem was addressed by Oded Distel of the Ministry of Industry, Trade and Labor. Distel presented a number of recently-introduced government instruments that are designed to encourage such startups. Time will tell as to how effective these instruments will turn out to be.

Finally, Professor David Faiman, of Ben-Gurion University's Blaustein Institutes for Desert Research, and host of the meeting, proposed a novel manner for funding the large-scale introduction of solar plants into Israel (and other countries too). Faiman first reviewed what Israel's projected electricity needs are likely to be, based on the trend of the past 20 years of production, and how much of it could be provided by the various renewable technologies that are currently available. He showed that if the country seriously intends to meet its stated goal of "10% renewables by 2020", Israel would need to install approximately 0.8 B kWh of new generating capacity each year until that time. Taking photovoltaics as a convenient and tangible technology, Faiman indicated that this would mean the construction of approximately 450 MW per



year. Such a figure is, of course, huge by world standards given that the largest PV plant currently in existence is less than one quarter of this size – and Israel would need to construct one such giant plant each year!

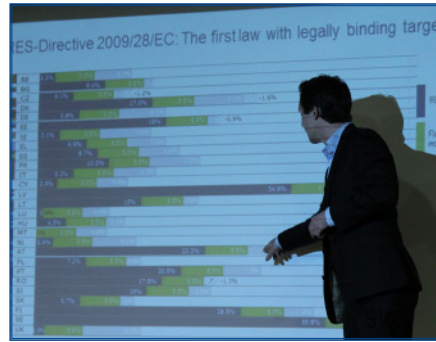
However, Faiman's novel approach to funding was to suggest that solar plants should be regarded as "public good" – like roads, schools, hospitals, etc. – and paid for out of taxes. Given that the present cost of a 450 MW PV plant would be approximately 900 M Euros, and that Israelis are currently consuming 60 B kWh per year, a tax of 1.5 Eurocents per kWh on electricity consumption would completely cover the cost of such a plant. Such a tax, if accompanied by an appropriate education program, could also be an instrument for effecting significant energy saving by the public.

The symposium was attended by an audience of about 70 people and took place on the university's Sde Boker campus in the Axel Springer auditorium of the Ben-Gurion Research Institute for the Study of Israel and Zionism. Symposium attendees were greeted on behalf of the Konrad-Adenauer-Stiftung by State Secretary (ret.) Michael Mertes, and on behalf of Ben-Gurion University by Prof. Pedro Berliner.

Energy Security in the European Union – Challenges and Policy Options

Severin Fischer

The European Union is the largest regional energy market in the world. With more than 500 million consumers and a highly energy dependent economy, Europe accounts for around one fifth of global energy demand. However, the domestic fossil energy reserves are depleting and external supplies are on the rise. Therefore energy security gains growing importance for policy-makers in the 27 EU member states. While the energy security challenges are well known, the policy options to tackle them are still under debate. The diverse energy market structures and the different national strategies pose a problem for a coherent energy concept in the EU. In addition to that, climate change and the need to reduce carbon intensity bring a second challenge into the game.



Dipl.-Pol. Severin Fischer, Stiftung Wissenschaft und Politik, Berlin, photo by Nadine Mensel

This paper analyses the challenges for energy security, the role of the European Union and several measures to tackle problems in a cost-efficient and sustainable way.

Energy Security in the EU: The challenge of import dependency

In 2009, the EU's import dependency has reached a new peak for some decades. With around 54% of gross inland consumption coming from countries outside the EU borders, Europe is the largest importer of energy in the world. Looking further into the details, the main challenge can be seen in the markets for oil and natural gas. While around 83.5% of all petroleum products have been imported, the share for natural gas is significantly lower at 64%. Except for Denmark and the Netherlands, all EU Member States are by today net importers in both sectors.

Import dependency might not be seen as a problem itself. A diversified import structure and a liquid global market without major constraints could certainly deliver a secure supply. However, reality looks different. In the oil sector, growing global demand and volatile price developments pose a serious threat to economic development. In addition, a fragile geopolitical environment (Libya, Syria, Iran) as well as accidents in oil producing countries (Nigeria, "Deep Water Horizon") put pressure on global oil markets. In contrast, the natural gas sector is still mainly a regional market with a high importance of mutual relationships between supplier and consumer countries, connected via pipeline systems. This again can lead to supply risks, resulting from political tensions either between supplier and consumer or between one of them and relevant transit countries.

In 2006 and 2009, supply disruptions between the EU and Russia have proven that this can become a critical issue for energy security, while having in mind that Russia



is still by far the largest energy exporter to the EU. However, the gas market has seen several important changes in the last couple of years. The growing importance of Liquefied Natural Gas (LNG) imports and the development of shale gas deposits, for example in the United States, offer new perspectives on security aspects related to natural gas.

It seems obvious that the European Union finds itself in a difficult situation. If energy consumption is going to increase, domestic reserves are depleting and the challenge of climate change is tackled, a whole set of new policy measures need to be introduced.

The EU's role in energy policy

Talking about genuine "European" energy challenges is to a certain extent misleading. The energy systems and the political strategies of the 27 member states are still diverse and incoherent. While, for example, Poland relies on a 95% share of coal in its electricity mix, France has built up nuclear power capacities that account for around 75% of electricity supply. Similarly, looking at the import structures, one can see that the Baltic States are nearly completely dependent on Russian gas imports, while neither Spain nor Portugal import Russian gas at all. Therefore, a closer look at what can be seen as a "European" challenge is necessary.

Energy Policy has, for the first time in history, become a part of the European Treaties with the entering into force of the Lisbon Treaty in 2009. Art. 194 of the treaty states that the EU, together with the member states, should develop a common energy policy guiding the EU towards a safe, sustainable and competitive energy market. Among other aspects, the support of energy efficiency, new and renewable energies and a secure energy supply are part of the objectives of such a EU energy policy.

Already before 2009, the EU's executive branch, the European Commission, has proposed several measures in the area of environmental policies and the construction of an internal market, which affected energy markets and energy policies in the member states. However, despite the new legal framework, the EU's role in energy policy is still limited due to another provision in the treaty. Art. 194.2 of the treaty gives the member states the right to decide on their national energy mix and the choice of different energy technologies. With this national prerogative, EU policy-making is significantly limited with respect to a coherent transformation of the European energy system.

Strategies and Policy Options

In 2007, the 27 heads of state and government in the European Council decided

for the first time on a coherent energy strategy with quantitative target in order to construct a so called “integrated energy and climate policy”. In the centre of this strategy one finds the 20-20-20-targets, focusing on a reduction of greenhouse gas emissions by 20% until 2020, increasing the share of renewable energies to 20% by 2020 and improving energy efficiency compared to business-as-usual scenarios by 20% until 2020. In addition, a set of policy measures were put on the table in order to improve energy security and climate protection in the coming years. While the strategy formulation seemed to be quite successful, the implementation of the measures is still on the way – with rather mixed results.

A. Solidarity and the Internal Market

The idea of constructing an internal market in the European Union is one of the founding ideas of European integration. With regard to energy, this idea has been on the agenda for many years, but implementation seems to be more difficult than in other sectors. The reasons behind that are manifold: network industries have been built nationally, energy industries have been organized by the state for many years, resulting in monopolistic or oligopolistic structures, and energy services are still perceived as public goods. Therefore, the liberalization and integration process in Europe’s internal market for electricity and natural gas took many years and is still far from being complete.

With the gas crisis in 2006 and 2009, the deficits in the internal market became obvious for the first time. When gas flows to Bulgaria and Slovakia were cut off or limited for several days, emergency deliveries could not be started because of the insufficient infrastructure. Although there was enough gas left in the market, the gas could not reach the regions where demand was high at that moment. Not only in the gas market, but also in the electricity sector, there is a direct connection between the integration of the internal market and improvements with regard to energy security. For example, a shut-down of one major generation capacity brings smaller states and regions in difficulties. The better the interconnection to other member states, the easier it is to cope with such kind of supply disruptions. This should also generate benefits with respect to a more efficient use of capacities in the power sector.

The idea of a physically integrated energy market lies at the heart of the EU Commission’s strategy for the coming years. The proposal to invest 9.1 billion Euros from the EU budget into gas and electricity grids over the period 2014 to 2020 is part of the Commission’s internal market program. However, the decision on financing will be taken by the member state governments in the coming years. Looking at the budgetary restrictions, there will be no easy solutions.

B. Energy Efficiency and Energy Saving

The cheapest, cleanest and most secure energy is the one you don’t use – a constantly repeated pledge by EU officials. Although all positive contributions of energy efficiency to the main objectives of the EU’s energy and climate policy are well known, results look rather meager so far. At the moment, the 2007 strategic aim to increase energy efficiency by 20% compared to business-as-usual until 2020 seems to be out of reach.



Notwithstanding the slow process, a whole set of measures have been introduced over the last couple of years. Starting with the introduction of the EU Emissions Trading Scheme in 2005 and its reform in 2009, emission performance standards in the transport sector or the eco-design directive, regulating the energy consumption of electric equipment, the policy instruments look promising. However, timely implementation and commitment by member states is still weak. Therefore energy consumption has remained constant over the last couple of years, but additional savings have not taken place so far.

With the proposal of a new Energy Efficiency Directive (EED) in 2011, the European Commission is now trying to fix the failures of the past by developing a coherent framework on EU level. The negotiations on the law are still ongoing, facing severe resistance from a majority of member states. An agreement between the ambitious European Parliament and the Council of Ministers will be a difficult task for the coming months. It is clear however, that without major improvements in the energy efficiency arena, import dependency is going to increase and climate objectives are harder to achieve.

C. Renewable Energies

The deployment of renewable energies has made remarkable progress in the EU over the last couple of years. The share of renewables in the electricity sector increased from 13.4% in 2001 to already 19.8% in 2010. With the decision to reach 20% renewable energies in overall primary energy consumption by 2020, the EU has set a clear target to reach.

In 2009 the European Parliament and the 27 Member States agreed on a new directive to boost the deployment of renewable energies. With a sector and technology neutral approach, but binding national renewable targets, a coherent framework has been set up. Based on natural potential and economic abilities, the national targets range from 10% in Malta to 49% in Sweden. Nevertheless it is up to the member states by which policy measures they are going to achieve their share.

Most member states are already using feed-in-tariffs or premium systems to support renewables; others have created certificate markets with fixed quotas. Cooperation mechanisms between member states are in place to compensate deficits in certain member states with over-achievements in other member states. Further coordination of support mechanisms is also possible within the legal framework of the directive.

The future challenge in the renewable sector can certainly be found in the area of infrastructure development and the optimization of capacity location in the EU. In the past, mainly front-runner countries, such as Denmark, Germany and Spain, have pushed the development of renewable energies in the market. However, looking at budgetary constraints and the shift of priorities, it will be difficult to keep up with the level of ambition in the future. Therefore, it will be even more important than before, to look at cost-efficiency and effectiveness of support instruments.

Energy Policy in the EU: The way forward

The EU's energy policy has made a couple of crucial steps forward in the recent past. With the EU energy strategy, formulated in 2007, and the new legal basis in the treaty of Lisbon, some of the major challenges have been addressed. Despite this progress, many open questions haven't been answered so far. The national dominance on questions related to the energy mix remains the main obstacle towards a coherent policy concept and reflects the diversity of national strategies in this respect. While France keeps pushing on its nuclear agenda, Germany tries to develop a nuclear free low-carbon energy system. So far, only the climate policy agenda and the idea of an internal market brings member states together, with the level of ambition on climate protection fading due to the limited success of international negotiations.

The challenge of energy security in the EU cannot be answered with one single solution. For a long time, there will be several concepts complementing one another. However, the integration of the internal market together with the implementation of solidarity mechanisms, the reduction of energy consumption and the increase of renewables will certainly be at the centre of a future common strategy in the EU.



Content


Page 1: Michael Mertes and Evelyn Gaiser: Foreword

Page 3: David Faiman: Key Aspects of the BGU-KAS Energy Security Conference

Page 7: Severin Fischer: Energy Security in the European Union

 **Editing**
Evelyn Gaiser

 **Photographs**
Nadine Mensel

 **Layout**
Graphos Print

Kontakt
evelyn.gaiser@kas.de

© Konrad-Adenauer-Stiftung
Lloyd George St. 6
P.O.B. 8348
Jerusalem 91082
Israel