

Brussels Forum

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Plenary #3: Bumpy Road Ahead: Transatlantic Energy Security at a Time of Global Turmoil

Dr. Ian Lesser: Jill, thank you very, very much for that. That was really terrific. We're going to move right into a discussion of energy security, which is obviously another very critical set of issues on the international agenda and we're very pleased to have Sylke Tempel with us, who is the Editor-in-Chief of International Politique and an old friend of GMF. But before we invite Sylke to come out and our panel, we're going to play a short video for you.

Video Clip: Significant developments for U.S. and European energy are taking place outside the Atlantic region. With regulatory, political and market uncertainties at play, the new global energy order could bring Transatlantic partners closer together or push them apart.

The low price of oil and shift in Chinese demand have changed the game. Europe and Asia now pay nearly the same price for natural gas, which could benefit Europe as it seeks to reduce dependence on Russian gas. U.S. companies, on the other hand, had planned to benefit from high Asian gas prices by building LNG export terminals. Will the low price of gas in Asia crush U.S. aspirations to make Europe the primary market for its gas exports? How will climate commitments made at COP21 affect energy markets? How will the availability of Iranian oil and gas affect global markets and Transatlantic relations? How can the United States and Europe stabilize and shape the future of energy?

Ms. Sylke Tempel: Well, hello, and good morning again, everybody. Welcome to the session on energy. And when we talk energy, of course you know that we talk about a magic triangle. And a magic triangle, of course, is that we have to have--oh, now the mic is on.

Thank you very much. Do you want me to repeat the first stuff?

Well, welcome everybody to the energy security panel. I'm happy you're here. And when we talk about energy, we know also that we talk about the magic triangle. And the magic triangle, of course, is we have to ensure close, especially emerging countries. Not only because it would be unfair and unacceptable to deny other countries in society the growth and the wealth that we enjoy, but also because non-growth, to put it that way, could lead to instability and that's certainly something that we do not look forward to, especially in a world that is unstable enough by different factors.

We, of course, have to also ensure energy security in the sense of a clever energy mix of different energies, but also diversification. Who are our suppliers? And here, of course, I talk as a German and a European. And then, the last, but not least, thing is, of course, climate change. So we have to have an

energy mix that also takes this into consideration where we have lower emissions and greener energies.

I'm very happy that, once again, we do have a remarkable panel lined up here. If I was in the music business, I would say the lineup is just marvelous. And I go from left to right because it's also the alphabetical order.

We have Fatih Birol here, who is a regular, I was about to say, at the GMF Brussels Forum, who's the Executive Director of the International Energy Agency. We have Claire Roumet, who is Director of Energy Cities, which is a really interesting NGO, right? And that is based on the idea of smart cities and how you can make them greener and smarter, and it's about--I was about to say the French with (inaudible) city relationships. So finding ways as to make cities greener.

We have Dev Sanyal, the Chief Executor of Alternative Energy and he's--I mean, I would have to read it here because you are responsible for so many

fields within BP from renewable to strategic, too, that I ask you, you all have the GMF app, please look up his CV on the app. And we also are very glad to have Elizabeth Sherwood Randall here, the Deputy Secretary of Energy, somebody who's been in the Europe business for quite a bit. I mean, you've been with the Obama administration almost from the beginning. You've been the director of European Affairs, International Security Council. Very happy to have you here.

Fatih, I would like to start with you. Give us a sketch about the most remarkable and most challenging developments in the energy sector these days. I mean, after all, two years ago, we probably would not have talked about low oil prices the way we do no.

Dr. Fatih Birol: Thank you very much and good morning to everybody and many thanks to GMF and also my friend, (inaudible) to invite me once again to this meeting.

Now, what is striking in the energy sector--almost striking there, isn't it, so everything is very

interesting, very noteworthy. But there are two things, perhaps, I would like to highlight. One, you mentioned the drop in oil prices. In fact, we're talking about oil, but it's not only oil. Natural gas prices are also very low and coal prices are also very low. All fossil fuel prices are very low. This is number one, perhaps the striking element.

Number two, the big drop in the cost of renewable energies. This was a very important to note. For solar, wind or, for example, efficient LED lighting, they are also dropping very strong. So a few words on the impact, perhaps lack of impact of lower oil prices. Some people ask, is that good news or bad news? And the answer is it depends on who you are.

Perhaps three important implications. One, very seriously, as the result of these prices, we are seeing a big decline in oil investments, 2014, 2015, '16. We have never seen, in the history of oil, two years in a row oil investments are declining. If there was a decline one year, the next year was again a rebound. So

this is very important in terms of what will happen in the next two, three years of time. This may then put a pressure in the markets in the next few years. This is number one implication.

Number two, the economies of the major oil exporting countries, and even smaller oil exporting countries are being seriously challenged. We talk always about--I'm sure you will talk about Russia, Saudi Arabia and the others, but there are some other countries which we don't talk and they are facing serious problems such as Nigeria, such as Venezuela, many countries, Azerbaijan, many countries are facing serious problems, number two. Number three implication, and perhaps I stop here, we are seeing a major penetration of renewable energies recently. Energy efficiency is going very strongly but lower fossil fuel prices, oil, gas and coal may complicate the transition to renewable energies and energy efficiency because it's very cheap.

The reason why we have seen major energy efficiency improvement in the last few years, one, countries are putting very strong policies, such as the U.S. government in terms of energy efficiency, such as the European countries, but at the same time, since the energy was expensive, people wanted to save it to keep the money in the pocket. But if the energy becomes cheap, the motivation of saving energy may be less pronounced so therefore lower fossil fuel prices may very complicate the energy efficiency move as well as renewable energy transition, slow it down even though renewables are getting cheaper, still. Coal is, perhaps in Asia, the cheapest source of energy and will stay so for a few years to come, especially given what is happening in China that the coal consumption is declining.

To sum up, two major, perhaps striking, developments in the energy sector. One, lower fossil fuel prices with implications on energy security, impact on the economies of energy exporters, but also

may well complicate the transition to clean energy technologies if the governments are not taking their job seriously if they are not--I will perhaps stop here.

Ms. Sylke Tempel: Fatih, thank you very much here. I just wanted to take up on one thing just for the record because Nik Gowing is sitting over here and the conference is called A World Beyond Disorder, but you mentioned something that we should basically put on the record in a much clearer way. You mentioned turmoil or troubles in oil exporting countries because of, you know, lesser demand, lower oil prices and you mentioned Nigeria, Angola and Venezuela. So probably, you know, I mean, thinking again in the terms of not the unthinkable, because it's out there already, but the unpalatable. This is something that we should keep on the radar, right? I mean, probable political turmoil in countries like that because basically the political agreement of these countries doesn't work that way anymore.

Dr. Fatih Birol: So I am not able to focus about the geopolitical developments, but what I can tell you is that many countries whose economies are 90, 95 percent relying on the oil/gas export revenues will have major economic difficulties, will have also challenges to make their people happy in terms of subsidies because the economy and this may well have implications beyond economy.

Ms. Sylke Tempel: Thanks.

Dr. Fatih Birol: Perhaps (inaudible).

Ms. Sylke Tempel: Now we've been joking there in the back room about BP still being called BP. Perhaps it should be called GG, Global Gas or BR, British Renewables. Why is it still called British Petroleum and does it still mean anything? Do we see the end of fossil fuel age?

Mr. Dev Sanyal: Well, Sylke, thank you. I'm not a branding expert so I don't think I'll comment on the marketing elements of the brand, but I think it is important to recognize that fossil fuel--

Ms. Sylke Tempel: Can somebody work on the mic for Dev because I guess we can't hear him right now. Can you try again?

Mr. Dev Sanyal: Can you hear me now? Is that better?

Ms. Sylke Tempel: No, but take the microphone in the meantime, yeah.

Mr. Dev Sanyal: Is that better?

Ms. Sylke Tempel: Much better.

Mr. Dev Sanyal: Great. As I said, I'm not sure I'm a branding expert. In fact, I know I'm not a branding expert so rather than talk about the brand, I'd rather talk about the primary business that you're in and the reality, of course--can you hear me now? The reality, of course, is that fossils do play and will play an important role as we move forward in terms of economic development and economic progress.

The fact of the matter is, and we don't often talk about it when we're sitting in western Europe and, indeed, in developed economies, there are still 1.2

billion people without access to energy and, by the way, 400 million of those people are from my country, where I'm from, India. And if you take a step back, what that means is that they don't enjoy the things that we enjoy in developed societies. So if you're a diabetic, you probably will die because you can't refrigerate your medicine, for example.

So there are some horrendous consequences of not having access to energy. I think energy and economic prosperity go hand-in-glove. The question I think we are faced with today is what kind of energy do we need to lubricate global development and in that context, I believe gas is going to play an incredibly important role.

What we have seen in the last few years is a growth of the gas business. As we look at the next five years, every eight weeks there will be an energy train commissioned so there's a lot gas available indeed. Our portfolio as BP is reflecting that. Today, we are sort of 50/50 oil and gas. Over the next 10 years, we'll

become more like 60/40 in favor of gas and I do believe the growth of gas is, I think, an important part of the narrative.

The reality, of course, is that you can't just sort of take one part of the menu. You got to look at the entire menu and the reality is that renewables will play an incredibly important role moving forward. In fact, we see, in the next 20 years, renewables growing faster than either oil or gas, but I think the big transition that we need to do, at this point in time, is how do we grow the gas economy at the expense of coal, giving the emission levels of gas are basically half of coal and how do we continue to invest in renewables that will obviously be an important part of the mix. But when you look at it from the numbers, a 1 percent growth of gas at the expense of coal has the same effect as a 10 percent growth in renewables so I don't think one should look at gas or renewables, it's gas and renewables to drive, if you will, the economic prosperity narrative.

Ms. Sylke Tempel: Which, from what I understand, pretty much ties us to geography, right? Because, I mean, there are certain gas fields and not-so-positive part of this is tying us to geography. We'll come to the shale gas revolution later. It also ties us to suppliers that are sometimes a bit difficult, Russia, Iran, you know, other countries. How do we deal with that, you know, when it comes to energy security? Do we see also a positive demand-supply chain here, you know, between a supplier and those who are the buyers or is it something that keeps us sort of in geopolitical troubles time and again? Because this is one thing that Europe tries to do right now, diversify its suppliers because supplies only from Russia for Europe is a bit difficult these days.

Mr. Dev Sanyal: My answer, Sylke, is that the narrative in past often was around things like peak oil around energy security. What we've seen in the--

Ms. Sylke Tempel: I think the mic again is not working.

Mr. Dev Sanyal: Is that better?

Ms. Sylke Tempel: Thanks.

Mr. Dev Sanyal: Okay. Let me try again. I feel like Frank Sinatra. I'll sing soon.

Ms. Sylke Tempel: That's not the worst, you know, that's a good one.

Mr. Dev Sanyal: Trust me, you don't want to hear my singing. When you sort of take a step back, I've been in the business for 27 years and when I started my career, the fashionable idea was peak oil. It is sort of as fashionable as the millennium bug, the idea that peak oil has essentially peaked. There's enough supply available.

The other sort of big concern was around energy security and what we have seen with some big shocks along the way, including, of course, Fukushima quite recently, but the traded markets actually do work. So I do believe one of the big developments in the last two decades, if you will, has been the nature of the traded markets, which has actually allowed for big exogenous

shocks to be dealt with so I don't believe the issue, frankly, is one of security or sufficiency. I think the bigger issue, as we move forward, is around sustainability, which one has to be thoughtful about in terms of one's choices.

Ms. Sylke Tempel: Thank you very much. Liz, I don't remember, two or three years ago here at the Forum we were still discussing whether and if the United States one day would sort of export liquid gas or gas, you know, that comes from the shale gas revolution, but I'm asking you the simple question again because this is a strategic decision, whether you would like to, A, export liquid gas, B, where to? Because this is, again, about infrastructure. Is it going to be an energy pivot to Asia? Then you would have to build terminals at the Pacific. Or would we also see a renewed transatlantic relationship in the energy sector? Where do we go?

The Hon. Dr. Elizabeth Sherwood Randall: Well, thanks, Sylke. First of all, good morning. I have so many friends here and it's a pleasure to be here and

thanks to the German Marshall Fund for hosting this incredibly important transatlantic dialogue every year, which brings us together around the issues that we must face as allies and partners.

To Sylke's question, so what's really changed in the global energy landscape is American abundance of supply of both oil and gas and that is a big difference that has happened over the course of the Obama administration. And as you noted, Sylke, we are now poised to become significant exporters of both oil and natural gas. We began export of natural gas just last month and we are also beginning to export oil.

So with respect to energy security, the most important point is that we need to have diversity of sources, that is our allies and partners need to have options for where they get their resources from, what the fuel mix is and what the pipeline routes are and the infrastructure that receives the resources. And so as you look at the decisions that have been made by European Union over the last few years and our coming

together in the G7 to set forth principles of energy security and Rome in 2014 in the spring following the beginning of the Ukraine crisis, what we've really focused on together is the importance of this diversification of routes of fuels and of suppliers and Europe needs principally, in order to guarantee its security, to enhance its infrastructure.

So critically, the question will be both on electricity and on gas, will you have the infrastructure that you need to get the resources that are coming onto the market to where it needs to be conveyed in Europe.

Ms. Sylke Tempel: Liz, obviously the question of infrastructure is also very important when it comes to renewables, but also--

The Hon. Dr. Elizabeth Sherwood Randall: Yeah.

Ms. Sylke Tempel: --for that, how important to you is the European Energy Union, which obviously is not a problem with Brussels, but rather with nation states? I mean--

The Hon. Dr. Elizabeth Sherwood Randall: European Energy Union's very important to us because Europe is our largest trading partner, our closest allies are here and we want to see Europe thrive and the energy union will create the context within which Europe can make the investments that it needs to make and the decisions it needs to make on a policy basis about this diversification that I'm describing and the investments that are prioritized in the Union, including on the integration of the Iberian peninsula to bring renewables to Europe, to the other states of Europe, bringing the Balkans--linking Balkan countries into the European grid, creating the integration of the Baltic states, which continue to have their grid facing east rather than west, and the southern corridor gas resources coming into Europe will be critical to Europe having that set of options that it needs from the fossil fuels to the renewables.

Ms. Sylke Tempel: Thanks.

Dr. Fatih Birol: May I just add something here?

Ms. Sylke Tempel: Sure.

Dr. Fatih Birol: I fully agree with Liz on this. I think it's excellent point, but your question is whether U.S. shale gas will come to Europe or not.

The Hon. Dr. Elizabeth Sherwood Randall: Fatih, this is an important point. Thank you.

Dr. Fatih Birol: This is a very important point that is underlined. But if I can come back to the discussion we had a few years ago, we said that U.S. shale oil revolution is a very good present for Europe and I go one step further following Liz's point. Even if there is no one BCM of export from U.S. to Europe, the fact that in case of a major export of gas to Europe was to increase the prices, your big neighbor here, or if the neighbor doesn't behave himself, the fact that there is a U.S. energy can come in a moment, the fact that there is an alternative there is very important (inaudible) present for Europe. We shouldn't forget it. It make the European importer's hands much stronger compared to a few years ago. There is an

alternative now. There is a U.S. energy that could come at reasonable prices to Europe, therefore it is important to highlight this very important new fact Europe has another potential importer of gas.

The Hon. Dr. Elizabeth Sherwood Randall: May I add one point--

Ms. Sylke Tempel: Absolutely.

The Hon. Dr. Elizabeth Sherwood Randall: --to Fatih. So, of course, the market determines where the LNG goes, but those who decide to build the infrastructure have more leverage. So if you look at what's happened with Lithuania and the creation of the Klaipeda LNG terminal, that gave Lithuania a leverage in its negotiations and it's begun to import and has had choices about where it gets its supply from.

Ms. Sylke Tempel: Thank you. Let's, for a moment, also turn to the issue of renewables. As a German, I can say that we've contributed to the global vocabulary quite a few words over the last two years. One is Putinversteh. We are not going to talk about this.

One is Willkommenskultur, which probably turns into bad mood (inaudible). And one is certainly (inaudible). And this is, interestingly enough, something that we don't talk too much about anymore.

Somebody, the other day, said to me, (inaudible) is a bit like building big trains, but forgetting to build the railways. So not everything has been working out really great with (inaudible). But, the general idea to turn more to renewables and renewables making their way successfully into the energy mix, is quite remarkable.

Now, here there is--you're working on an approach that is not part of this big geostrategic where do we have our pipelines, do we have leverage, you know. I mean, what is the geostrategic aspect of it? But you work more in a bottom-up approach and it is making cities smarter and greener.

General question, has (inaudible) been helpful or do we have to look at totally different approaches in order to get more renewables into the mix?

Ms. Claire Roumet: Well, I think (inaudible) is definitely the good approach and it's something that we are now trying to always sell to all the other countries. Why? Because it doesn't look at what it possible, and you are really right to say that basically it's putting the train before the railway. It's really deciding together on a national consensus of where do we want to go?

Whether it is possible or not is not the question. The question is where do we want to go? What is our joint ambition? And I think that's is what was interesting in the (inaudible) approach. And now, now we have--we see that, indeed, we couldn't imagine all the different developments, and all the technologies that were not valuable--when the (inaudible) debates started, almost nothing was possible. And today, we know that everything is possible or almost everything is possible.

It's just that we have not yet built on the infrastructure. And indeed, LNG is one way of the path,

because we need that transition. It can't happen to--we can't jump from one steps to the other. We really need to do the paths in between. And that's what we are now having to do as a story. The storyline of the paths. And that's the thing what we have not discussed.

But the point of having a joint ambition, which is a re-ambition on saying we will completely phase out all fossil and (inaudible) energy in our country, I think that's the right approach to set on the ambition. But Germany is not the only one. There is another--a lot of other countries that have done so. And now, I think the Paris Agreement is also saying basically the same thing. So it's--there is a basic agreement of saying that's where we want to go and now, let's look at the different pieces of the puzzles.

And LNG is a temporary piece of the puzzle, but it is a temporary one. It won't last forever, because soon, and sooner than what we expect--I think there is a very nice graphic that has been published this week by the New Economic Foundation. And it's a graph which

they call the peacock. Why? Because they've took all your reports for 20 years and they looked at how you thought that the renewable would be--doing investment in renewable would be in each of the years.

So, and like 20 years ago, you thought that the renewable investment was like that. And then 21 years ago, it would be like that. And it's always--it's going like that. And now that you have, of course, a peacock, because basically it means that in 2050, today we believe that we will have a renewable investment of--but it will always above. Renewable investment always have been above every, every forecast.

We are too cautious of our own future. And I think what is great in the energy vendor, and that's what also I think cities have really looked at, and how they can engage into the action that you don't have to look at what is possible. Because otherwise, you really limit yourself. What you need to have a look at is what is your ambitious? How ambitious do you want to be? And then you will get there. And today, all of the

technology is there to become completely out of fossil energy almost. The only thing that we need to do is how we do the transition. And how--and that we can decide with our transatlantic partners. I'm sure that Dev is not very happy to hear that we are going to go out--

Ms. Sylke Tempel: No, he said to say more less. Good. I just wanted to back to Liz for a moment, because, yeah, go ahead.

Mr. Dev Sanyal: --what has been said here, I would absolutely agree with. The reality is that we have to look at the transition pathway. And the fact of the matter is--

Ms. Sylke Tempel: We have to repeat this, because once again, we can't--I mean, I can hear you. Can you hear him? Okay, then, just go ahead. Just speak very loudly.

Mr. Dev Sanyal: All right. I'll speak very loudly. The point that I wanted to make is that the transition pathway is an incredibly important part of the narrative. In the past, there was, I'd say in the last

decade, an obsession with the end point. I think today, in this decade, we have a more intelligent debate about the means to the end and in that context, gas is very, very important.

The reality is, at some point in the future, the age of oil, the age of gas, will come to an end. It's a bit like the stone age. It didn't come to an end, because we ran out of stones, something else came along. But I think in the meanwhile, the--I think the challenge for policymakers, for companies like us, is how do we participate in that pathway?

How do we ensure that we continue to have an exposure to the liberal sector? BP, by the way, has the largest exposure to the liberal sector amongst the super-majors. But the gas narrative, I think, is going to be very important. Doesn't mean it's a narrative forever, but when we look at the next two to three or four decades, it is an important part of the overall mix.

Ms. Sylke Tempel: Mm-hmm. Liz, my impression is that not only do we talk about diversification of supplies and sources, but also diversification of approaches. And you can see, if I'm not mistaken, with the Paris Agreement, my reading was that we got away from a top-down rule-based approach to climate change to let--give different countries the possibility to find different ways to lower their emissions and to get greener overall, but guarantee them that they found out almost as long as we can agree on the goal. We trust them that they find out.

Then the second thing is also about, you know, green and renewable energies and technologies. What I find interesting after Paris was that for years, we've been branding China and the US as the big, big polluters. You know, I mean, the bad guys in the pollution/climate change business.

And all of a sudden, after Paris, it was China and US who sort of were the drivers of a politics against--tackling climate change. And I'm still wondering about

this, how did this come about? And is it just due also to different approaches to tackle climate change with different technologies, and different states within the US? And I'm not only thinking of California. I'm finding their own (inaudible) ways. Can you enlighten us on this a bit?

The Hon. Dr. Elizabeth Sherwood Randall: That's lots of questions. So, first, I just wanted to say, and back to Claire's point, in the last year, the capacity for the incorporation of renewables on the American grid has exceeded the capacity expansion for natural gas. This is extraordinary, that we have put more renewables onto our grid this year.

And so, there I would just point to the innovation that has made it possible for us to begin to deploy renewables. If you look at our solar industry, for example, it's generating jobs at a pace that exceeds most of the rest of our economy. And it's being deployed widely at utility scale. This is something we did not have in 2009 when President Obama came to

office. So we're looking at revolutionary change in our own energy mix. And that leads me to Paris and the importance of international cooperation.

So, there were 20 countries that stood up in Paris on the first day of the talks and said we're going to launch something called Mission Innovation because Paris has brought us to a certain point, but we have to get far beyond Paris, and that is to develop and deploy the technologies that will enable the clean energy revolution around the world.

And when Dev speaks about the mix, BP is involved in the full range of capability from fossil to renewables. There are many countries, as he noted, that are still on a development that will require that they use fossil fuels far into the future. So, we need technologies that enable them to do that in a way that will enable the planet to survive, and at the same time, we need to drive down the cost of renewables to be able to deploy them widely as well.

So 20 countries stood up and said, we will double our research and development in clean energy solutions over the course of the next five years to really advance this cause. And we identified private sector partners, led by Bill Gates, to match that commitment in the private sector to take the early technologies with patient private sector money and bring it to market. And that's really the critical piece to get us where we need to go over the coming years.

Ms. Sylke Tempel: Claire, I mean, do you have some experience with what city partnerships were, you know, this kind of partnerships, again, bring up this bottom-up approach. Can you tell us a bit more about that before we go for questions from the audience?

Ms. Claire Roumet: Indeed. It is fascinating, because it goes out to a pass, a pace or where today the change in cities where we see that everybody wants to be engaged, like in the smart city programs we have just launched a survey in our membership. And everybody wants to be part of it so it's--we just cannot even

cope with the appetite for innovation and for learning and how to do things.

So I think, yeah, there is a major transformation today. And these--and (inaudible) to just to come back and what is also interesting is because you set an ambition at German level, and now that is ambitions that they shared also at the global level. Then it allows this elevation to happen, because there has been a lot of support.

I always say that I think I am thanking the German taxpayer money because they have helped a major breakthrough in technology called innovation in the renewables because this is--because it has been supported for years. The price of renewable energy in Germany and in a number of two other countries, technological breakthrough have been possible that now are valuable for the entire world. And that, in a sense, that's also the price you want to take. And I think that's a great way to share wealth.

Ms. Sylke Tempel: Claire, as a German taxpayer, I'm of course very happy about your price and that I've been reminded of the way you're--

Ms. Claire Roumet: Yeah.

Ms. Sylke Tempel: --contributing so greatly to some success. But allow me a bit of a skeptical questions, one, I would like to also go into--put it to Dev. Renewables have been heavily subsidized in Germany and I'm not so very sure whether subsidies like that are really a sustainable path to make them, you know, market conformed, to make them [audio skip 01:45:43:03 - 01:45:47:21]. And I'd like to ask this question today. Is this really the real way to go forward or is the more important stuff that a highly sophisticated economy, export oriented economy basically had an energy open heart operation within (inaudible) and basically set aside politically. We can do it if we want to do it. It's more about the political will [audio skip 01:46:24.26 - 01:46:29:19]. But that we have to discuss more critically about the ways we get

there and that the German way, I'm sorry to say, might not be the way to happen.

Mr. Dev Sanyal: I think, Sylke, subsidies forever is a very bad prescription. There's no doubt about that. Ultimately, what you want are market forces working in a way that actually delivers the end point that you seek. If you look at the U.S., it's very instructive. This is a country that did not sign up for Kyoto, but emission levels in the U.S. went down to 1994 levels simply because due to, I think, a combination of factors, what I call above ground factors, around innovation, around technology, around entrepreneurship, around mineral rights, et cetera. The shale revolution, which may sound bombastic, but it is a revolution that was created that essentially allowed America to get into a very new phase in terms of emissions.

Now, I think the big question for the world is what happened to that coal that was being produced in America. Guess what happened? It got exiled to Europe.

And guess which country was allotted that coal? Germany. So I think one of the sort of, I think, lessons from America is how do you create market forces that ultimately allow for rational economic decisions in the area of renewables, for example in the wind business in North America, where we are a large participant? There is an investment tax credit and production tax credit regime. That has been very important in terms of lubricating the development that we have seen.

But frankly, what is happening in the wind business in America is that it's becoming a commercially competitive source of energy. So I think ultimately nation states need to create market mechanisms that drive ultimate commercial outcomes.

The Hon. Dr. Elizabeth Sherwood-Randall: And the same has been true in solar. So the early government incentives for deployment of solar have now led to widespread utility scale solar deployment in the United States and the market is supporting that.

Ms. Sylke Tempel: Thanks.

Dr. Fatih Birol: May I just say something?

Ms. Sylke Tempel: Please. Go ahead, yeah.

Dr. Fatih Birol: I mean, we talk about Europe, it is true. But the biggest renewal move is coming from China and I'm sorry to tell you that the numbers, when you look at the numbers today, the renewal energy investments in China are bigger than U.S. plus all European countries put together. Okay, China is number one in solar, hydro power and wind in terms of capacity. This is number one.

Number two, Europe has been years and years the champion of fighting against climate change. We are, to be very frank, almost two decades. But when you look at the numbers, which I think we should, last year, 2015, we have just announced a few days ago global CO2 emissions did not rise despite the global economic increase. So very good news.

And there are two countries, main countries, main drivers of this positive development. One is China.

Emissions declined in China. Second is the United States. In China, it is happening because coal goes down replaced by wind, hydro power and solar. In the United States, for two reasons, one, they imagine shale gas replacing coal big time. And second reason is first Obama Administration put a lot of efficiency standards for cars and trucks.

What about Europe, the champion of fighting against climate change? While the emissions declined in China and the United States, it did increase three important places in the world, in South Asia, Middle East and Europe. European emissions did increase last year. So we have to think about our policies very, very carefully and perhaps to finish up to link it to the COPE meeting. COPE was a success, the agreement, but the implementation is something else.

Before COPE, European carbon practices were nine euros per ton of CO₂. And after COPE, after the successful agreement, you would expect that prices will go up. No. It is now less than five euros per ton.

(Inaudible) to therefore, with the COPE, not everything is finished. Perhaps everything is starting now. We have to be very careful in Europe, continue to push the right sustainable energy policies and follow the good examples in China and the United States today.

Ms. Sylke Tempel: Thank you very much. And I believe that a year or two ago, we would not have heard that on climate change there would be the good example of China and U.S. One of the surprises that we get here. We have plenty of questions, one here in the first row, and then we go to the second. And don't worry, I'll turn around and we have (inaudible). So please go ahead sir, yeah. Mic, please, to the first row here. Thanks. Just have to run around the camera.

Mr. Doug Hengel: Hi, I'm Doug Hengel with the German Marshall Fund. A question to go back to oil maybe for Fatih. You mentioned at the beginning that investments in oil going down quite a bit. Some argue that it's a whole new oil market and prices are, you know, never going to go back up to where they were.

Others are concerned that we're setting ourselves up for increased dependence on the Middle East because other countries will get out of the business. And so are we setting ourselves up for a problem down the road with increased dependence on the Middle East and all that that might mean?

Ms. Sylke Tempel: Go ahead. Yeah, please.

Dr. Fatih Birol: Now, today, about 50 percent, half of the global oil exports go from Middle East. If the prices were to remain at these levels, \$40, let's say, for 10 more years, this 50 percent of reliance on Middle East will go up to 75 percent at least. So diverse reliance on Middle East will increase substantially if the prices were to remain at these low levels. Why? Very simple. It doesn't make sense, in many parts of the world, to produce oil at \$40 in Brazil, for example, in Africa, in shale oil in the United States. It makes only economic sense in Middle East and many colleagues here know much better than me.

The Middle East geopolitical station may not be fixed tomorrow. It would take a lot of time.

Ms. Sylke Tempel: That's the understatement of the year.

Dr. Fatih Birol: Exactly. A lot of time. So therefore., lower oil prices may well mean the geopolitics of Middle East and energy may be much stronger interwoven if the prices remain at these lower levels.

Ms. Sylke Tempel: Thank you. We have another question here in the second row. I'll have you on the list. I have a few more. Yeah, go ahead.

Mr. Jonathan Taylor: Jonathan Taylor, European Investment Bank. I apologize for bringing up this slightly delicate subject. Apart from Dev's passing reference to Fukushima, nobody's mentioned nuclear at all which continues to be a large part of the energy supply. So I'd just be interested to know what people think about the role in which nuclear may or may not continue to play, bearing in mind both our energy

security needs and our climate change objectives. Thank you.

Ms. Sylke Tempel: Shall we direct this question to Liz Sherwood?

The Hon. Dr. Elizabeth Sherwood-Randall: I'll start by saying certainly for us we view it as a very important part of the mix of clean energy resources that we need to be cultivating for the future. And for the first time in 30 years, we're building new nuclear power plants in the United States. We're also doing a lot of research on advanced nuclear and small modular nuclear reactors [audio skip 02:06:43:08 - 02:06:50:11]

Mr. James Manyika: --issue of permitting is a big one and infrastructure being built in the U.S., for example, getting wind from Kansas into the low pockets. So can you comment on what should be done to sort of open up the fields of building more infrastructure for expanding it to the skill solutions? Thank you.

Ms. Sylke Tempel: More here. I just want to give a fair chance to this part of the room to [audio skip 02:07:59:05 - 02:08:14:27]

The Hon. Dr. Elizabeth Sherwood-Randall: --with energy security, you need to take a long term view and indeed, right now, we're in a moment of abundance [audio skip 02:08:19:16 - 02:08:50:00] that would endanger us or someone in the International Energy Agency, which Fatih already--that we sought to establish [audio skip 02:08:57:27 - 02:08:58:24]

Dr. Fatih Birol: --something to show here. I mean, justly, I mean, it would be a grave mistake to link our attention to oil security to changes in the oil prices. The lowered oil prices we think--and I (inaudible) is not important. Oil prices go up and (inaudible) is very important. (Inaudible) is extremely important business. Europeans experienced it and Cairo experienced it. And when we look at the geopolitical situation today, many of the questions around it, what is happening today in Iraq, in Libya, Syria, the problems with Russia,

Ukraine? I think we should be thankful to those countries who have their oil securities in stock led by United States, Japan, and other countries.

Ms. Sylke Tempel: Thank you. Would you also give a quick sketch on the geopolitical implications or energy dependency on countries like Russia and Iran? Where are we here?

Dr. Fatih Birol: I mean, in terms of Russia, as I just mentioned, it is very important for Europe to diversify its energy imports. And I know that the energy union, the--if you imagine the (inaudible) is a German word. In the English language, there is another one. The side cast is today diversification and here, the diversification is very important. And once again, Europe trying to get oil and gas from some Caspian countries, from (inaudible) Turkmenistan. Plus U.S./Canadian governments coming in the picture. Making more use of them would be the best way to diversify the portfolio and reduce the reliance on one single strong exporter.

So therefore, it's very important. In terms of Iran, we still have to wait and see whether Iran will be able to attract substantial amount of investment for the (inaudible) is the expansion and technology access to help the reserves of something to produce out of them something else. And just to remind all of us one fact, geological fact. The Iranian geology of the fields are much more complex compared to many Gulf countries. It is a lot of sophisticated technology to get the oil out of the system. Of course, we expect that Iran can make, in the next few months, 5,600 barrels for additional production. But the biggest growth needs a lot of investment and technology to come in the country, which remains to be seen.

Ms. Sylke Tempel: Thank you. We have five minutes, more minutes left. So either we have to talk really, really fast or to take the question of this gentleman over [audio skip 02:13:13:01 - 02:13:17:12] I might have--I apologize already. I might have to skip further

questions, but [audio skip 02:13:23:00 - 02:13:26:29]
we'll see how we get there.

Ms. Claire Roumet: No, I will be very short because in the capacity of market, it's asked to be ready design and it's in the process now. And it's just, for me, it's the core of the energy union because it's how to redesign solidarity between member states when before we had national energy systems and that they have to be now completely decentralized so that the capacity market redesign has to be built onto the potential that you have at local level. That's the shortest I can do.

Ms. Sylke Tempel: Suggestion, you go ahead here. But I want you to also take two minutes times before we stop to take up one of Nik Gowing's questions that he had introduced yesterday. I know the energy market-- he's left, but he'll hear. The energy market is probably much more understandable because it's about infrastructure investing, et cetera. But I really would like you to think about, is there something out there

which might surprise us when it comes to energy markets or the energy sector? Is there something that we don't have under radar which could basically surprise us, put us in troubles, or whatever? It would be great if you could think of this, but now we go to this question. Theresa.

Ms. Theresa Fallon: Hello, Theresa Fallon, European Institute for Asian Studies. I would like to follow up in Dev Sanyal's comment about how fast nuclear is being built in China. Recently in Guangzhou, not one but two nuclear sites were shut down due to security concerns. And in China, so the Chinese government is shutting them down. So now we see Hinkley Point Project in the U.K., which is a joint project between Arriva and a Chinese state-owned enterprise with unproven designs are running into some problems. There have been many cost overruns in Europe, which I think you were referring to an over-budget and very late in schedules.

So how do we see future of nuclear in Europe and policymaking because with such low energy prices, have

we really calculated the real price of nuclear in Europe, which includes reprocessing spent nuclear fuel and also decommissioning aging nuclear plants. Thanks.

Ms. Sylke Tempel: Thanks. Pass it on to (inaudible).

Unidentified Male: Yeah, thank you. My question (inaudible) my question goes to Claire about this idea of energy democracy. And my experience is that the-- ironically, the acceptance of nuclear power plants rises if you come closer to the municipalities where they are located. And the reason is the power plants provide--

Ms. Sylke Tempel: Generates employment.

Male Audience Member: --the municipalities with jobs and taxes. And this is especially the concern or the problem with renewables, especially with grids because they are more or less jobless and tax-less. And I think you can raise the acceptance of it if you find a way to benefit--to make the people benefiting from

the infrastructures. And I just ask then whether they are--some ideas on that.

Ms. Sylke Tempel: Sharing the wealth (inaudible) so--and Theresa's question was addressed to--oh, Dev, okay. Clair and Dev and we have three minutes left (inaudible).

Ms. Claire Roumet: I would answer also, very shortly. I think that sharing the wealth, or at least having a conversation on who is getting the wealth of the infrastructure, of the energy produced. This is a key and this is what we have now to discuss to imagine the paths of the energy transition. There.

Ms. Sylke Tempel: Super short.

Mr. Dev Sanyal: A very short answer is essentially safeguards have to be created not just for nuclear but for any kind of energy. And social acceptance is going to be important. You only have to look at some of the tensions around arctic development, which will tell you that the social narrative, the security narrative will

remain very, very important as one looks at new options.

Ms. Sylke Tempel: Liz?

The Hon. Dr. Elizabeth Sherwood-Randall: I just want to answer your question about surprises. And we can think of all sorts of negative surprises, shocks. And we've talked about the importance of energy security and the actions that we need to take, collectively. But there's also a very positive potential and that is the revolutionary potential of the research and development that will be undertaken by our universities, our laboratories. The brains of the future who will be innovating to enable us to reach our goals on the climate front and power the people, as you described, Dev, hundreds of millions of people who need electricity for their lives.

So I actually am quite optimistic. I think there is so much out there to be discovered that will change our energy future and we all need to be contributing to

that and encouraging our young people to get strong STEM educations and go out and discover new things.

Ms. Sylke Tempel: Gosh, what can I say? At a conference where we talk about the world beyond disorder, we get such an optimistic approach, there is thinkable--something thinkable out there that could protect us from the surprises and from the bumps on the road in the energy sector and that's our own thinking and our imagination, creativity. Thank you so much for this discussion and thank you, audience, for all your questions. And I apologize to those who didn't have the time to ask their question. Thank you very much. Nik.

Mr. Nik Gowing: Thank you very much, Sylke. And don't go--thank you very much, Sylke. And thank you very much to the panel. We're just going to have a quick reflection, as we said we would at various points between now and tomorrow lunchtime with Robert, about whether we're moving to create some kind of continuum here, Robert, whether we really have defined the world beyond disorder. Is that the right title?

Mr. Robert D. Kaplan: I'm not so sure because I think we--Margaret MacMillan warned us to be against smugness but to assume that there is a world beyond disorder is itself sort of smug. Because first, we have to define what the disorder is, why it's arisen and where it's going.

First of all, where it's going. We've already seen and kind of factored in the collapse and weakening of small and medium-sized states in Africa and the middle east. But I think what we have to look forward to is the weakening of bigger states themselves, whether it's Nigeria or especially China and Russia, whose economies are in very troubled states, and whose internal situations are more and more complex.

And I think what's causing all this is, for the first time in history, we live in post-imperial moment. Remember, the Hapsburg and Ottoman Empires and Prussian Empires collapsed after World War I. After World War II, the British and French empires started to unravel slowly. After the Cold War, the Soviet Empire collapsed

and the United States is not the superpower that it was. So we're in a world beyond imperialism. And imperialism gave order to vast multi-ethnic swaths of the world. And imperialism may be bad but if not imperialism, what then? And what then is what we've been trying to do as a rules-based international order of organizations that replace imperialism, but it's unclear that it's working.

Mr. Nik Gowing: Last thought at this point before coffee. Do you think there's a mood here picking up what Margret MacMillan said yesterday of confronting the scale of disorder, of gripping the enormity of the new normal, however its defined.

Mr. Robert D. Kaplan: I think there is in this hall, in this audience. But again, the decisions are made by politicians who are loyal only to the publics who voted for them. So again, they know what they need to do, intellectually but they often have a hard time finding the political will to actually do it.

Mr. Nik Gowing: But do you sense a level of discomfort almost, that the realities are really quite difficult to cope with, Robert?

Mr. Robert D. Kaplan: Yes. And discomfort is the first step on the way to escaping smugness.

Mr. Nik Gowing: All right. Well, we'll be back before we have Donald Tusk this evening to give a further reflection. This is our view. Hopefully, it stimulates you to think beyond where we're at at the moment. So go and enjoy your coffee and back in about 25 minutes.