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Remarks and Introduction:

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Featured Speaker:

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Panelists:

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P R O C E E D I N G S

MR. EBINGER: Good morning, ladies and gentlemen. I'm Charlie Ebinger, the director of the Energy Security Initiative here at Brookings within the Brookings Foreign Policy program.

We are delighted to co-host this event today with our colleagues from the Africa Growth Initiative, and we are particularly delighted and thankful that Dr. Birol and Ambassador Williams have made themselves available today to join us for this event.

What we are going to do this morning is I am going to introduce Ambassador Williams and Jonathan Elkind -- excuse me for not mentioning you initially. Then we will have Ambassador Williams' formal remarks, at which point Mr. Elkind will then come up and introduce Dr. Birol, and following Dr. Birol's presentation, we will have a group come up on stage for a moderated discussion.

Ambassador Williams is a career member of the Senior Foreign Service with the rank of Minister Counselor, and is currently Deputy Assistant Secretary in the Bureau of African Affairs at the State Department, with major responsibilities for West Africa and Africa economic policy issues.

She has a very distinguished career, having served as U.S. Ambassador to the Republic of Niger from 2010 to 2013, and she has also served as the Coordinator for Cuban Affairs in the Bureau for Western Hemispheres in the Department from 2007 to 2010, and she has also served as Acting Deputy Assistant Secretary for Western Hemispheric Affairs covering all of Central America, the Caribbean, and Cuba in 2010.

You have her biography in front of you, so I won't go through it all, but obviously, she has received a number of meritorious awards for distinguished service in a wide array of capacities at the State Department.

She is a proud native, her bio says, of Trenton, New Jersey. That seems

to be what New Jersey people do. (Laughter)

She holds a Master's of Science Degree in National Security Strategy from the National War College of the National Defense University in Washington, a Master's of Arts in Comparative Literature from the University of California, and she received her B.A. Degree cum laude in Black Literature of the Americas from Yale.

Before we call on her, let me also introduce Mr. Elkind. It is particularly nice to have Jon back at Brookings where, of course, he was before he joined the Department of Energy.

He currently serves as the Acting Assistant Secretary for the Office of International Affairs in DOE, and in the past served as the Principal Deputy Assistant Secretary for the Office of Policy and International Affairs between 2009 and 2013.

Prior to joining the Energy Department, he worked as a Senior Fellow at Brookings, focusing on energy security and foreign policy. He also had his own consulting firm and has served in a number of distinguished positions on the National Security Council.

Jon received a Master's of Business Degree from the University of Maryland, and he also has a Master's Degree in Soviet History from Columbia University, and a Bachelor's Degree from the University of Michigan.

Without further ado, I would like to welcome Ambassador Williams to the stage. (Applause)

AMBASSADOR WILLIAMS: Thank you, Charlie, and good morning, everyone. I'm delighted to be here. As Charlie says, he is going to give me time to give my formal remarks. My remarks really are going to point out a couple of factoids to give you a sense of what we are looking at in the State Department as we talk about energy in Africa.

Again, I'd like to thank you. I'd especially like to thank the IEA for its continued engagement with African countries on energy issues, and also congratulate you on this report for Africa's energy outlook.

The U.S. partnership with IEA and with Brookings in promoting global energy security, affordability and accessibility really is extremely important and has been very fruitful.

Many African countries have experienced strong economic growth in recent years. Increasing access to electricity on the Continent will help ensure that Africans are able to take full advantage of this growth, and to achieve meaningful economic and social development.

The African energy sector could bring a new balance to oil and gas markets. Almost 30 percent of global oil and gas discoveries made over the last five years have been in Sub-Saharan Africa.

The U.S./Africa Energy Ministerial, which was held in Addis Ababa in June, resulted in the collaborative agreement to develop a clear roadmap to catalyze sustainable energy development across the African Continent. The participating countries were committed to engaging the private sector and to promoting regional cooperation to advance clean and efficient energy deployment, and to explore effective business models in mini-grid development.

As our focus on energy infrastructure continues to develop and improve, the energy needs of vulnerable communities, including rural areas and women, should be considered. They have to be considered and integrated into country and regional energy strategies. Expanding energy access to women and others on the periphery is not only critical to increasing energy access but also to promoting economic growth. Thus, off grid and mini-grid solutions are critical to sustainable and equitable growth and

development on the African Continent.

Additionally, Africa experiences a significant disconnect between its vast resources and its capability to generate and distribute electricity. Financial, technical, and regulatory assistance is needed to bridge this gap.

It should be emphasized that only about one in three Africans - one in three - has access to electricity, and the total number of persons without access is increasing, not diminishing.

One of the ways the United States Government is responding to this is through our Power Africa Initiative, which I'm sure most of you have heard about. The Power Africa Initiative aims to add more than 30,000 megawatts of cleaner, more efficient electricity generation capacity, and to increase electricity access by 60 million connections to households and enterprises.

The U.S. Government is committed to Power Africa and to other energy engagements in Africa to increase private sector investment in the energy and power sector, to improve management of the region's resources, and to strengthen regional energy cooperation.

By collecting and disseminating this comprehensive look at the current state of energy use and access in Sub-Saharan Africa, the IEA has created a common reference point for all of us to use, from which plans, progress, and need can be gauged. Sound policy must be factually based.

U.S. economic and environmental sustainability agendas revolve around energy production and consumption. No single vision of the future is ever the right one, and no analysis can capture the full range of the opportunities.

However, the IEA's efforts have incorporated diverse perspectives from stakeholders around the world, the State Department included, who have interest in

Africa's growth and its success. We thank you for that, and I welcome this forum. Thank you. (Applause)

MR. ELKIND: Good morning, everybody. My name is Jonathan Elkind, and as Charlie has already noted, it's kind of a double pleasure for me to be here with you today, both to interrupt -- not to interrupt -- to introduce somebody whom I hold in the highest regard, Dr. Fatih Birol, from the International Energy Agency, but also simply to return to Brookings.

I think that the role of the International Energy Agency is well known to those of you in this audience. It helps its member countries by conducting high quality analysis, monitoring of energy markets and trends, and helping us as members chart our way and our path to the energy future that we need to find ourselves in.

In this context, Fatih Birol has played an exceptionally important role, not only as a Senior Economist at the IEA, but also as a thought leader both inside and outside of that institution.

Through his leadership of the World Energy Outlook, the flagship annual publication of IEA, IEA has developed an unrivaled voice identifying the signal characteristics and developments that we see in our global energy world, identifying and providing quantitative understanding of critical issues like the role of fossil fuel subsidies, the challenges around energy access, the opportunities that exist in key non-member partners, like Iraq, Russia, and in this current edition of the WEO, our African partners.

In addition to that, Fatih has built very strong relationships between the IEA and the international energy business community through the Energy Business Council. In many, many regards, he has provided a critical voice in our global energy architecture.

I particularly salute Fatih and his team for highlighting in this chapter, in

this series of chapters, that will appear in the upcoming World Energy Outlook, the diversity, the opportunity, and the challenges that exist in the African energy context.

This work also underscores the importance of our engaging with African partners, which I know is something that is close to Fatih's heart.

With that, it is my pleasure to introduce to you Dr. Fatih Birol. (Applause)

DR. BIROL: Very good morning, ladies and gentlemen. Thank you very much to Brookings for once again inviting the IEA here to share our views this time on Africa. Many thanks to Ambassador Williams to be present here and to tell us now and perhaps during the discussion the views and the engagement of the U.S. Government on African energy issues.

A great thanks to Jon Elkind. He's one of our guides about the global energy picture and who did provide support for this study, ranging from providing input in peer review and bringing us in contact with many important partners looking at Africa, one of them being the Power Africa Initiative with whom we worked very closely throughout this study.

We also worked very closely with the African Development Bank, African Union, African Energy Commission, several African governments, and this report is the product of a big team, about 40 people at the IEA, and I am very happy that today I have the privilege of having two of my colleagues with me today, Rebecca Gaghen, who is one of our senior managers, who is the head of our Communication, and Matt Frank, a distinguished member of the World Energy Outlook team.

Coming to our work, where are we today in terms of Sub-Saharan Africa? We did concentrate on Sub-Saharan Africa. The main reason being that North Africa and Sub-Saharan Africa have very different energy context, and therefore, we did concentrate on Sub-Saharan Africa.

Then you get the numbers. We always say Africa is under developed, growth is not expected. When you get the numbers, in the last ten years, the economic growth in Sub-Saharan Africa was about five percent per year, which is only second to Asia, but despite that, we see about 400 million people are under the extreme poverty line, which is $1.25 per day.

One of the major findings of our study, and I will try to refer to that in the next minutes to come, is that energy is absolutely critical for the economic and social development of the Continent. The region, Sub-Saharan Africa, consists of about 13 percent of the global population, and only four percent of the global energy use. Out of this four percent, half of it is biomass, namely wood, agricultural waste and animal waste, which has major consequences as I will elaborate on in the next few minutes.

There are many energy issues and challenges in the region, but if I have to pick one, it is the poor electricity infrastructure, and here, we have two problems, one of them we all acknowledge, which is access to electricity. The second one is in many cases, there is an electricity network but there are many outages. You don't know when the electricity comes, when it goes, how long, and this is a big uncertainty. The electricity infrastructure is the main impediment to growth.

The energy resource base is huge, both in terms of oil, gas and coal, fossil fuels, and at the same time renewable energies are huge and a potential.

The good news is that many countries, many governments, now realize that energy is a must if the economic growth efforts are to be successful. Here, there are resources, there is a lack of access to energy, the missing link is the investments for infrastructure, which is the main thread of our study.

When I say investments, again, one data point which I find interesting is that currently or in the last ten years average, of every $3 invested in the Sub-Saharan

African energy sector, out of $3, $2 are for the projects to export the African energy to consumers, oil, gas and coal to Europe, North America or Asia, $1 is for the investments to provide energy for the domestic people. So, $2 for the export projects, $1 for the domestic projects. This is something we think may need to change in the years to come.

In terms of the resources, future resources, oil and gas, as Madam Ambassador mentioned as one of our findings, in the last five years, about one-third of the new discoveries, oil and gas discoveries in the world, were in Sub-Saharan Africa. This is huge in terms of oil and gas in West Africa, East Africa, new discoveries, and coal also in Southern Africa. Huge resources.

The main resource is in renewables, hydropower, major resources, especially in Central Africa, and currently only ten percent of this potential is being exploited. It is a very, very low number, only ten percent.

If you look at the Horn of Africa, Kenya, South Africa, a substantial amount of onshore and offshore resources, but perhaps the big part of the renewable resources come from solar energy. There is no other Continent in the world where you have more than 320 days a year of strong solar radiation. We all know Germany is very strong in solar energy, but the amount of sunshine received throughout the Sahara and South Africa is several times higher than in Germany.

Oil, gas, coal, all types of renewables, very rich, but let's look at how much energy they use, and access to energy is rather poor. Today in Sub-Saharan Africa, only four or five countries can bring electricity to more than 50 percent of their population. All the rest, more than 40 countries, less than 50 percent of the population have access to electricity in Sub-Saharan Africa.

This is, of course, a major issue, and according to our statistics, more than 600 million people today have no access to electricity. This is definitely one of the

major issues that we dealt with in our work.

When we look at the future, we see that all the fuels used are growing, oil, for example, growing very strongly in the countries, mainly driven by two factors, one is increasing mobility, car ownership. Today, for example, in Nigeria, better developed compared to some other countries in terms of income, 30 persons out of 1,000 persons own a car. In the United States, it is more than 700 out of 1,000, and in Europe, more than 500 out of 1,000. With the increasing income levels, more cars mean more oil use.

Second is I mentioned the biomass use for cooking, more and more LPG will be used, therefore, strong growth of oil demand is an important factor. Coal is growing, but big growth in terms of fossil fuels comes from natural gas, and there are many ongoing projects and other planned projects. We see a lot of gas to power projects in East Africa and also in West Africa to provide gas to the markets.

All of them, ladies and gentlemen, is only half of the story, if not less than half, because the other half of the total energy use is biomass, with all its consequences. What is biomass? Mainly wood, agricultural waste, and animal waste for cooking. What is wrong with that? There are many things wrong but I can tell you one of them. Using this wood and agricultural waste and so on for cooking leads to respiratory diseases. This leads to pretty much deaths in Sub-Saharan Africa.

According to work we carried out with the World Health Organization, every year more than 600,000 people, especially women and children, die prematurely because of the pollution created by using biomass in primitive cook stoves. This is the second main reason for premature deaths in Sub-Saharan Africa right after AIDS and even malaria. Biomass is a major issue in terms of deaths, in terms of the cook stoves, and we have made some suggestions in our work.

Power, electricity. Today, if you look at the electricity system in Sub-

Saharan Africa, you see two rather unusual trends. The first trend is that the amount of oil --the amount of electricity generated from oil is high, highest after Middle East. What is wrong with that? Because economically, it is the least efficient way of generating electricity. This is one.

The second thing is the transmission and distribution losses are very, very high, about 20 percent, which is more than three times the global average.

This is the situation today. When we look at the future, first of all, the capacity of power plants are growing substantially, and our estimates show that the growth is about 300 gigabytes, which is what we expect, the growth coming from Latin America, for example. Brazil, Argentina, all of them, their growth in new capacity is more or less equal to what we expect from the growth in Sub-Saharan Africa.

Here we see the share of renewables growing substantially, mainly in the rural areas, and many upgrade solutions as they make economic sense, and hydropower is growing. The main growth areas in terms of power is renewables and natural gas.

This is very interesting because when you look at the history of the economic development of the U.S., Europe, China, their economic growth was mainly based on using a lot of coal for their economy to grow, income to rise, and in the case of Africa, we expected income would increase and energy would be brought to the markets, mainly a combination of renewables and natural gas.

Of course, different parts of Africa have different stories. When you look at West Africa, Nigeria, mainly gas using for power, and when you look at Central Africa, hydropower plays a very important role, followed by East, again, new discoveries means a lot of gas plus renewables coming there, and in Southern Africa, still coal plays an important role but less of an important role in the future than today. Renewables are growing there, too.

Climate change in Africa, an important topic as well. When you look at the climate change and look at who is responsible for what, you look at the cumulative emissions, how much, which country, which region, contributed to this problem of CO2 in the atmosphere.

When you look at the last 100 years or so, contribution of Sub-Saharan Africa to the climate problem was less than two percent, almost nothing. Despite this growth in energy we expect, in the year 2040, the contribution of Sub-Saharan Africa to the global CO2 emissions will be still less than three percent. Again, peanuts.

Climate change, if you look at the impacts of climate change, Sub-Saharan Africa is the number one region which will be affected more seriously from climate change impact, especially in terms of droughts, sea level rise, water stress and other things.

The droughts and water stress means major implications for the agriculture sector. Many people expect that as a result of the climate change, we may see some 50 percent decline in the agricultural output in Africa, if we cannot address the climate change. Therefore, if Africa doesn't have any contribution to climate change, perhaps the least contribution, but the most affected region in the world if we cannot stop it.

When we look at the oil and gas markets, we see that the oil production is still strong in the region. A couple of things. We think Angola, in terms of crude oil, is overtaking Nigeria as the top producer in the region, mainly because of the new projects seeing the light of the day, and there are several reasons that the Nigerian production is not going to grow as much as one would like to see.

Second issue here is there are new producers coming into the picture, such as Kenya, Uganda, very important countries with significant production growth. The

third important point is while the production stays more or less the same in the years to come, exports of Sub-Saharan Africa will decline mainly because the growing amount of domestic production will be consumed at home, as I mentioned for the cars, for the LPG, for other reasons.

More oil will be consumed at home, domestic demand will increase. As a result of that, the exports of Sub-Saharan Africa will decline but still will remain one of the main states of the global oil market.

In terms of natural gas, a very different picture, we expect Sub-Saharan Africa is going to increase its gas production substantially, mainly as a result of the new offshore discoveries in Mozambique and Tanzania, in addition to what we see in Nigeria and Angola, the production coming from those countries, and as such, emerges as an important LNG exporter.

I believe this will become more of an issue in the global markets to have a new exporter, diversification of the resources, is definitely very crucial.

Another advantage of Sub-Saharan Africa's gas contribution to the global markets is from the proximity point of view, many advantages when it comes to especially South Asia gas imports. As we all know, when it comes to LNG, the cost of transportation plays a crucial role in the total economics of LNG, and proximity here plays a very important role.

Therefore, we think Sub-Saharan Africa can play a significant role in terms of the global gas markets, while a growing share of gas will be used also at home for domestic consumption, mainly for generating electricity, but also for the industry as well.

The direction of the exports is changing as well. When we look at both oil and gas, we see that instead of Europe and North America, oil and gas will go more

and more to Asia. Demand is there. Proximity is closer. At the same time, especially for North America, there is not any more need for the quality of oil.

Investments. There is one number which made the entire report, which made me very happy to find out. It is the following: when you get electricity investments, remember, this is the nerve center of the entire story, electricity investments in the last ten years averaged about $6 billion per year, and during this study, we worked with many companies, many organizations, when you look at the projects which are financially committed for the next three years, what we see is the $6 billion jumps up to $25 billion per year. This is very, very good news.

There are many reasons behind it that perhaps we can discuss during the debate. This is very good news. This is the one-third/two-third story I mentioned at the beginning. We still need money, of course, to go to export projects in an increasing manner; we see that the domestic energy projects will get more attention.

Even in our central scenario, we see that these investments are not enough to address the energy challenges in Sub-Saharan Africa, for example, even with this growing investment trend, although we see in the next 25 years or so about one billion people will gain access to electricity, a very good number, there will be still in 2040 more than half a billion people without electricity in Sub-Saharan Africa.

In 2040, think about this, 25 years from now, in the world, in one of the Continents, half a billion people will still have no access to electricity. I think from an energy issue only, it is beyond that. It is an economic issue. It's a security issue. Maybe beyond those, this is a moral issue.

We thought what can be done in order to get better results than what we have today. We worked with the African governments, with the companies and others. First of all, as I said, our main conviction is energy is instrumental for the economic and

social development of Sub-Saharan Africa, and in order to address this challenge, we think there are three policy buttons to be pushed, and we put them in a context called "An African Century Case," how energy can play a positive role to make the 21st Century an African Century.

The first one is reform in the electricity sector. This is critical both in terms of getting investments, and some countries are doing a very good job here, for example, South Africa, to get investments, both the domestic private investors as well as international investors, establishing the rule of law.

As I said, a major problem in Africa is not on the building of power plants but making them run. Therefore, the skills, the skilled labor to accomplish the building is a key issue.

The second area is the deeper regional cooperation. In Africa, there are countries who have a substantial amount of natural gas resources or hydropower resources, but they themselves alone cannot find the finance to mobilize those investments.

Therefore, we have identified a few of them. If the countries around that resource base, it can be natural gas, hydropower, they can altogether find the money, make the project, and each gets returns, including the host country. Therefore, deeper regional cooperation is crucial for Sub-Saharan Africa, especially for hydro and natural gas resources.

Third and the final one is especially for the energy exporting countries, better management of their resources. I can give you one example which I believe is very telling. For example, Nigeria. Nigeria's population today is 170 million, and out of the 170 million, 93 million people have no access to electricity.

At the same time in Nigeria, in the Nigeria Delta, every day 150,000

barrels of oil is being stolen; 150,000 per day. Nobody knows where this oil goes. Many people know where the oil goes but nobody knows at the same time.

This can be, as we have highlighted in our report and made some suggestions, easily fixed, if taken seriously. If this is fixed, these 150,000 barrels per day means $5 million in revenues, which would be more than enough to bring electricity to all Nigerians. Just to show you how important it is to have a better revenue management here for the macroeconomics of the country and the well being of their population.

These are the three major policy button recommendations, which I believe and I saw and heard were welcomed by the African Union, African Development Bank, and many, many countries in Africa.

What happens if those three policy buttons are pushed? We will see a very different future for Sub-Saharan Africa. In terms of the effect on the economy, Sub-Saharan Africa gains one additional extra digit of growth, huge. The number of people who have no access to electricity decreases substantially, and as a result of better managed oil and gas investment framework, government oil and gas revenues increase also significantly.

This is therefore the way we suggest forward for the countries in Sub-Saharan Africa.

Dear colleagues, if I can try to put our thoughts together, first, we believe energy is the cornerstone and absolutely critical to address poverty and at the same time economic growth challenges that Africa has in front of itself. Here, I think the U.S. initiative, Power Africa, is a very important initiative with all its dimensions.

We believe improvements in the governance is critical, and I see that more and more countries in Sub-Saharan Africa understand the seriousness for themselves of having a more transparent energy market.

Third, biomass. Back to biomass again. Having more efficient cook stoves, going from the existing cook stoves to LPG, is extremely important for the health of the Sub-Saharan Africans for economic growth -- putting a lot of stress on the trees, the forests, and so on, and the stocks in Sub-Saharan Africa.

We think Sub-Saharan Africa will remain one of the mainstays of the global oil production and emerges as a new player in the global gas markets, providing more flexibility, diversification, and as such, enhances the energy security in the world.

Finally, we have suggested three important policy initiatives in political and energy in terms of different region cooperation and the governance issue. If those policy buttons are pushed, we believe looking at the resource bases of the Continent we may well see that the 21st Century can well become Century of Africa.

Thank you very much for your attention. Thank you. (Applause)

MR. EBINGER: We want this to be interactive with the audience, let me first introduce my colleague, Amadou Sy, who is a very distinguished person to have at Brookings. He is a Senior Fellow in the Africa Growth Initiative, and currently serves as a member of the Editorial Board of the Global Credit Review.

If you have an opportunity to look at your program, you will see that Amadou has had a very distinguished career at IMF in many different capacities, and obviously knows the African Continent extremely well. We are delighted to have him join us today and also be a co-host to this event.

While my colleagues are finished getting miked up, I'll just throw up a couple of questions. Fatih, have we gotten the development community on board with what you are proposing? As you well know, over the years, not to cast dispersions on this or that development agency, we have kind of had a see-saw back and forth sometimes where big hydro is good, big hydro is bad.

We have projections coming out of a lot of places that coal, and particularly at least the prospect when we look to a date like 2040, at least the prospect of perhaps some advances in some aspects in if not clean coal technology, at least much cleaner coal technology, and have we gotten the development community on board of what we should support, what we shouldn't support? I'd be interested in that.

Another question which may not be totally fair because your report did not touch on North Africa, and yet when you look at the contribution that Africa as a Continent, including North Africa, has made, I wonder if you factor in desertification, particularly whether those numbers wouldn't look somewhat different than they do simply focused only on Sub-Saharan Africa.

You don't have to answer those right now. We may get to them. That's just to throw out a couple of points.

DR. BIROL: If you wish, I can go to the first one; it's a very much debated issue. I think Africans should decide what they are going to use, not the development committee in Brussels, North Africa, Washington, or Tokyo. It should be up to Africans to decide what they want to use.

However, we should also say what is good and what is bad. Of course, coal is the dirtiest of fuel when it comes to carbon emissions. It would be very good if the coal used is done with clean coal technologies, but we have to be fair here. Even the current coal consumption in Sub-Saharan Africa is completely peanuts compared to other parts of the world.

If you want to look at coal consumption in the world, I think Africa should be the last Continent to look into. I think we have to be fair there.

In terms of the large hydropower, it is very important to make most of the large hydro in a sustained way, but if we look at today, the hydro potential in Central

Africa and the lack of access of people and losing their lives, losing being engaged to the economy because of lack of electricity, I think to say no to large hydro is not fair, I believe.

Let me give you one example. Today, one of the highest hydro potentials in the world is in the Democratic Republic of the Congo. In DRC, only ten percent of the population has access to electricity. Because of this or that reason to say no may not be very fair, I would say.

MR. EBINGER: Do either of you have points you want to make or questions you want to raise about the report?

AMBASSADOR WILLIAMS: I was just going to second actually what Fatih just said. I think what this report shows and what we have seen even in our own development experience is that all of the resources have to be used.

While the U.S. Government doesn't emphasize exploitation of coal, there are cases where it is obvious that is going to be something that is going to have to contribute, it is going to have to push forward the economic development and be the resource access.

What we have really tried to emphasize, yes, there is clean energy but also a diversification of energy resources.

MR. SY: If you remember, one of the maps Dr. Birol showed, coal is mostly relevant for South Africa and the southern part of the Continent. It's not really the case that all regions of Africa will be coal dependent.

MR. EBINGER: Question from the floor? You can either address it generally to the panel or to an individual, but please identify yourself and please ask a question.

QUESTION: My name is Lee (Inaudible) -- has been very bureaucratic

and very stymied, and this could be deployed quite readily. I guess my question with that background is what emphasis is there to help stimulate, I guess, I want to say entrepreneurship, and trying to get the smaller scale micro grids on line, which would augment those higher hydroelectric plants, like to get power generating now as opposed to 20 years from now when the dam is built.

AMBASSADOR WILLIAMS: If I can start. You have talked about two types of problems, one is focused on micro grids and the other is access to capital. Let's do the micro grids first. We agree with you 100 percent.

It was interesting when we first started talking about Power Africa and how to maximize access to electricity there was a lot of focus on the national grid and how could you improve that.

In actuality, when you look at a lot of the communities in Africa, you have your urban center where your government planners might want to create an industrial zone, but you don't have any industrialization yet. You have lots of population living in these segments doing agricultural work, living in quarters where you have to have micro grids, and maybe they will never be connected to the national grid, but you need some kind of source of power for those communities.

There is a component of our Power Africa Initiative that looks specifically at that, that says we have got to support the development of micro grids so that rural communities and particularly, as I mentioned earlier, women have access to energy, so yes.

Now, the financing question is a big one. What we discovered -- that is part of the reason why we have the initiative, to help put financial resources to projects, to help facilitate that process, but we also learned in the week that we had the African leader summit and the U.S.-Africa Business Forum, that a lot of boutique financing

companies' interest really don't have that much information about what is going on in Africa.

There was a lot more interest during that week about opportunities for investment in micro grids and in energy sources. We are trying to get the word out. We are working with the Business Council of International Understanding, the Corporate Council for Africa.

Penny Pritzker, our Secretary of Commerce, is really pushing in this country and in trade missions to Africa to expose our American investors to opportunities.

Yes, it's a challenge, but I do think as we start promoting more information about what is available; we are going to try to close that gap.

DR. BIROL: You must be really late to come to this meeting because it is what we see, and I think I showed that more than 50 percent growth in new generation comes from off grids and mini-grids. Why? Very simple, because it makes economic sense, first all. It is not because we like this, we don't like this. It does make economic sense compared to large scale projects.

MR. EBINGER: Amadou, did you want to add anything?
In the very back, we do have mikes.

MR. FREEMAN: Lawrence Freeman with Executive Intelligence Review Magazine. I found much of your information very useful but I would ask you about a different approach than the one we are pursuing. If you look at the BRICS Development in July and the creation of a new development bank dedicated for infrastructure investment, and yesterday you had the Asian Investment Infrastructure Bank created, isn't it more feasible that you are going to have government credit that is going to actually supply the energy needed?

The energy we are talking about is so minimal. If you look at Power

Africa, which I call “Powerless Africa,” 30,000 megawatts over six countries, I did a calculation, back of the envelope, 1,400 watts of what we consume, all of us in this room, so 1,400 watts for Nigeria is 250,000 megawatts. In Sub-Saharan Africa, it’s 1,600 gigawatts.

We are not going to do it this way. It will never be done by the private sector. South Africa is about to conclude a deal for six nuclear power plants from Russia for 10,000 megawatts, which you didn’t include.

I think for us to get the energy we need, you are correct, this is the key, all the other statistics are meaningless about economic growth, we need infrastructure. Governments have done it in this country, the United States, and around the world. China is an excellent example.

Don’t you think that is the better way to proceed than these small amounts of energy based on private investment?

DR. BIROL: I think definitely the government investment is number one. Nobody discusses that. In many cases, you also need private investors to compliment this. In some cases, government finances may not be enough to meet the demand in investment. If you compare it with Europe or the U.S. and other countries, it may look very small, but from those countries, it may be challenging.

Therefore, governments, yes. The main responsible should be government investments but in many cases, you need private investors to come to make the investments as well.

I don’t see that there is a need to exclude one or the other but the government is the one to provide energy to their citizens, the same way through their own financing, direct financing, or through creating conditions where the private sector comes and invests in a responsible way to provide electricity and other resources for the

population.

MS. YOUNG: My name is Li Young. I just wanted to mention that a lot of economic development, whether here or African, whether energy or water supply, I think a lot of misuse and abuse -- for the benefit of a few rather than the general public.

So, development of energy plus resolving the social issues. I don't want to say just opportunity for private. In private, you have a lot of wealth to develop that. We don't need subsidies or even tax credit. In a private/public partnership, not usually abuse, misuse. There is some kind of unjust mechanism to obstruct -- they don't want to hear about that.

I wonder if you can have a very constructive proposal and get rid of those, eliminate those obstructions or abuse so we can have a prosper for our general public for African people, and not just for a few investors. Let's be honest, in America, it's the same. We are now talking about one percent -- my basic emphasis, try to look ahead to eliminate or prevent those problems from occurring.

Can you do a really good proposal and be really preventive on all the problems?

DR. BIROL: If I understood your question correctly, let me give you one example. The investment of IOCs in the African countries, it is a good thing or bad thing. I think it depends on if first of all, investors go there and make a responsible way of investing in the projects, it is a very good thing for the population. They get the resources developed and have currency in terms of exporting their oil and gas resources, and they find employment.

This agreement between IOCs and the host countries should be made in a very fair way considering all the factors, the local population, the entire country, but also there is nothing wrong that the investor gets some fair return as a result of its actions. If it

is a business deal which brings benefits to both the local population, host country, and at the same time to the investors, I don't see anything wrong with that.

This should be done, of course, in a transparent way, and everybody could benefit from that.

MR. EBINGER: Amadou, I think you had a couple of questions you wanted to ask.

MR. SY: Yes. I have a question. One is about how Africa is getting integrated into the global economy. Africa is the third exporter of crude oil. We see, for example, with the oil boom in the U.S., Nigerian exports of oil to the U.S. are trickling down. We have seen the Libyan output disruption that Nigerian exports to Europe are increasing. We have seen, for example, Angola now exports half of its oil to China. Nigeria exports one-fourth of its oil to India.

It seems that Africa is getting -- if you look at investment and trade, more and more integrated to the world through Asia.

The question I have is how is it changing the dynamics? On the one hand, you have the price of oil, the demand for oil depends heavily on Asia, you have Asia as an engine of growth, so what can Africa really look forward to with this new trend?

DR. BIROL: Thank you, Amadou. I think there are two ways. First of all, in our report, it is very clear that we see a growing trait and maybe political access between Africa and Asia, so there are two ways there.

One, the African exports, oil and natural gas, will go more and more to Asia because the need is there. Second and more importantly, and I will say we should look into that, the investments coming in the African energy sector, China is by far number one compared to other countries. Chinese energy investments are several times

higher than those coming from the U.S. and Europe, both private and public investments, especially for the hydropower projects and also some oil and gas projects.

Of course, there is nothing wrong with that, bringing investment, if they are done within the international rules and regulations and in a fair trade way, but it is important to underline and to see that China is playing a crucial role in the energy sector, in Africa, and looking at the investments today, the projects, and it will increase significantly in the next years to come. There will definitely be some trade implications of that and perhaps implications beyond those.

MR. MASSIE: Thank you. Kevin Massie with Statoil, a company that has investments in East, West, and North Africa. The question of governance, Dr. Birol outlined as one of his key conclusions, that governance needs to be improved if this African energy century is to be realized.

My question is to Dr. Birol and Ambassador Williams. To what extent is the IEA and the American Government involved in helping to shape the governance regimes in these new comer African countries that have found resources in recent decades?

We know the story on the West Coast of Africa has not always been one of great governance outcomes. These new countries, the East African gas discoveries off Tanzania and Mozambique, the oil discoveries in Kenya and Uganda, to what extent are your respective organizations involved in helping the host countries to frame and develop their governance regimes?

AMBASSADOR WILLIAMS: That is a major part of our multifaceted energy effort in Africa, particularly with the Power Africa Initiative. Not only is the initiative to try to put together financial resources with projects, but also to provide technical expertise to the governments on regulatory regimes, on incentives for American

investment in the oil projects. It is a sustained ongoing conversation.

What I think has developed, particularly in the newer markets, is sort of a model by example. Everybody is familiar with what has happened in the past and the way things have evolved, let's say, on the Continent with the production and development of oil.

To have the incentive of more American investment and greater use of your profits and access to electricity for the people, we present other kinds of models. We have found that those discussions are very productive.

One of our strongest at this point Power of Africa countries is Ethiopia, which has its own sort of issues. They are certainly taking to heart all of the regulatory discussions that we have been having.

The way to do that really is to basically show what the possibilities are, what the incentives are, and to work hand in hand with the governments in technical training.

DR. BIROL: We are an organization of 29 OECD governments but we work very closely with the African governments. On this issue, we tried to share experiences we had in our own countries. For example, Norway is one of the examples that in a certain context we highlight to those countries.

MR. ELKIND: I would like to look at this question through two angles. One is that governance is a very generic term and at the end of the day, the natural resources are the property of whom? The property of the Africans who live on the land where the natural resources have been discovered.

I think the problem is typically you have this inverse correlation between natural resources and -- basically, if you pay tax, you would look at how your taxpayer money is being used. For natural resources, you have less of this pressure.

I think looking at the local stakeholders, the citizen society organizations, the political parties and so on, I think it is very important.

The other point I wanted to make is that I think it is useful -- actually, I want to commend really the team and Dr. Birol. This is a very rich document. I would like to focus more on the sector specific governance. It is one thing to talk about Democrat and so on, but there are certain sector specific governance issues.

For example, state owned enterprises, utilities, most of the power generation is owned by the government and it is exploited by state owned enterprises. Sometimes you have governance issues that are specific to that, grant seeking and so on.

Let me give you an example. Some countries, just because you have to import diesel to generate electricity, you can have a lot of -- because a small group of people benefit a lot from the import of diesel.

QUESTION: Thank you. I am from the South African Embassy. My question is directed more to Dr. Birol as well as the Ambassador. Thank you very much, first of all, for the presentation. It was very informative, very rich.

I just noted that there was not necessarily a reflection -- you spoke about regional integration and enhancing regional cooperation, but there was no reflection on Africa's efforts already, the governments of Africa's efforts to do just that. For example, as encapsulated in the program, infrastructure development in Africa.

I thought maybe you could just give the IEA's views on that. To the Ambassador, on the importance of hydropower and how transformative it can actually be, I think I would like to hear perhaps about Power Africa's views on whether these things and issues were taken into consideration when it formulated its strategy. Thanks.

AMBASSADOR WILLIAMS: The short answer to the second part of the

question is yes, Power Africa applies to all sorts of energy sources. It's a diversified program. That leads into your second. What we are looking at in the second phase as the Power Africa Initiative matures, and I must say matures quickly because we have had it for a year, we are looking at ways that we can maximize access, and we are talking about regional cooperation. We are talking about ways to have countries create projects that will go beyond their borders.

What is happening with regional integration, we have a Trade Africa Initiative, for example, that right now we are piloting in East Africa, to work on all of the impediments to trade within the East Africa region, whether they are tariffs or Customs protocols that differ, whether they are just bad road construction and/or lack of power access or communication, to have technical expertise that works with those governments to eliminate those kinds of barriers so that those countries can trade among themselves much more easily.

That will automatically increase revenues and GDP in that region. We recognize the importance of regional integration. We also recognize the significant impact that combined sort of power projects could generate.

Our MCC, Millennium Challenge Corporation, is also looking at ways to more creatively have projects that would cross borders, so we would be helping countries to work more quickly toward regional integration but also create a benefit through a power plant.

DR. BIROL: When it comes to some success stories, there are definitely success stories. I am sure you want to hear the success stories about South Africa. (Laughter) I can tell you three of them.

First, the electricity pool. This is a very important one, which brings the cost of electricity down and provides electricity to countries in the region. Second,

Tanzania, South Africa, the pipeline is a very good one. Third, South Africa is one of the very few countries which is able to provide a renewable energy scheme, and we see a lot of investment is coming into the picture, and lots of projects are being carried out as a result of this scheme. These are all very good steps.

Taking this opportunity to answer one question mentioned, the role of nuclear. We expect only in South Africa, we expect the realistic chance of nuclear power plants to be in Sub-Saharan Africa.

MR. EBINGER: One area we haven't really touched upon is the whole area of energy efficiency. With the rapid economic growth projected for Africa and urbanization, do you sense there is much interest in governments in putting in state-of-the-art building codes as they build their urban areas, since these things will be in their capital stock for many, many years?

DR. BIROL: Definitely, for the buildings and also for the transportation sector, for the cars. Some countries, some governments, are pushing that, but not at the level they should be. This is one of our suggestions. The same applies for the electricity sector. I mentioned the transmission distribution losses are huge.

If you fix that problem, you don't need to build so many power plants. This can be fixed easy, and because electricity prices are very, very high, today -- the Sub-Saharan Africa average electricity prices are higher than those in France, three times higher than China, because lots of electricity is being stolen because of lack of efficiency.

AMBASSADOR WILLIAMS: Also, at the Energy Ministerial that we held in Addis in June, one of the workshops and then in the general agreement that we reached was concentrated on energy efficiency, and there was agreement among the Energy Ministers who were there, and that did combine actually North African Energy

Ministers as well as all the rest of Sub-Saharan Africa.

One of the agreements was to share best practices on sustainable energy use, and that included practices from the U.S. There is more focus, and Energy Ministers actually have to be empowered by their own governments to be able to really effect the kinds of changes we were talking about and that they are talking about in their countries.

MR. ELKIND: There is actually a World Bank report on looking at infrastructure in Africa. Even before talking about really the funding, you have to deduct how much you can save by rehabilitation, better maintenance, better management, of what already exists. I think that is a very important issue.

MR. HILL: Terry Hill with the Passive House Institute. You brought up energy efficiency. My question is given the potential for solar in Africa, is anybody looking at the role direct energy might play here as opposed to alternating current, direct current versus alternating current? Could Africa be the start of the switch to direct current? Thanks.

MR. EBINGER: Why don't we take the second question and then the panelists can respond.

MR. OTTO: Thank you. Aloysius Otto from Africa Development Bank. I think your three points on buttons, as you put it, reform of the sector, integration, and managing resources, as the elements are to support the African Continent into the 21st Century, I was a little bit overwhelmed because the AU has a program for 2063.

The role energy will play in that program is absolutely -- I was also thinking of a number of initiatives that would be bold and catalytic to move the Continent forward as we are approaching the 21st Century, to remove the trigger, the sort of emphasis on energy that will really resonant and bring Africa -- if you talk about rivers, for

example, you have seven major rivers on the Continent, the Nile, Niger, Congo, Senegal, Orange, Limpopo, Zambezi.

Is there some thinking on how just using these rivers alone how we can really move the momentum on energy in the Continent in order to reap the benefits?

DR. BIROL: Perhaps I can give brief answers to both of them before my colleagues contribute. First of all, it is very clear that the very reason we focused on Africa this year is because we believe energy is critical for the economic development of the Continent.

In the absence of energy, I think in solving the energy problem, Africa's economy will be underdeveloped for many years to come. Only making more use of energy resources, bringing energy to the economy can unlock the potential.

I think it will be rather unrealistic from one day to the other, everything will change. I wish everything would change, but there are many, many impediments, and it is the reason why we have chosen three areas to push the policy buttons with all the governments going together.

To me, if throughout the year in Africa we discuss with the governments lots of missions, meetings and so on, if this is realized, this would be a very good dream for all of us who have a heart for Africa.

It is all there, but to make use of them is another thing, which requires some major political steps.

For direct solar, yes, we looked at it, even though currently it is not the mainstream interest of the investors, but one can well see use of direct current in Africa, given the geographical location, geographic size of the Continent.

MR. CHEUNG: Timothy Cheung from ClearView Energy Partners. Dr. Birol, you mentioned that Sub-Saharan Africa has been responsible for something like

two percent of GHGs in the last century. In that context, what do you think their role is heading into Lima and next year into Paris?

DR. BIROL: I think their role should be pushing the other countries to make a deal because they will be punished for something that they had no fault in. Therefore, I think if it is important that we have a deal in price next year for everybody, it is extremely important for Africa.

As I mentioned, today, one of the major problems in Africa, as we all know, is agricultural sector and food security. Food security will be in a major difficulty if we are not able to find a solution to climate change, and our reports show that Paris may well be our last chance, if we were to find a solution to the climate change problem. Otherwise, we have to see how we are going to adapt to a world which is different than now with all its negative implications, primarily on Africa.

DAN: Good morning. Dan. Micro and pico hydro is my question, history in Africa, small use, low cost, 24/7. You talked about major hydro. What about micro hydro as an option? Has it been looked at? Is it as big as it appears to be?

DR. BIROL: Exactly. When asked about the mini-grid solutions, there are three major implications there; it is solar, wind, and mini-hydro. There is a lot of potential there, many of them making substantial economic sense.

MS. GLEAVE: I'm Madeleine Gleave from the Center for Global Development. I have a question regarding the definition of "modern energy access" used in the modeling. I believe I understand the per capita kilowatt hours is about 100 kilowatt hours per person, and compared to the United States, we use over 1,300 per capita.

Looking forward into the future, how are you choosing and why are you choosing to define per capita consumption at that level? Looking forward into the types of policies and reforms that we are shooting for, does setting a per capita consumption at

such a low level that wouldn't really be enough to support large productive uses or a more modern lifestyle, do we run into the danger of sort of under shooting that?

DR. BIROL: I think in the under shooting or over shooting, definitely there is a risk on both sides. What we have assumed for the access is to meet the very basic needs here in the household. Of course, our aim is not only bringing energy access to households, but also providing energy for the industry or other productive purposes.

It is the very reason why we are saying in the absence of having energy access to African citizens, plus the industry, it would be impossible to see economic growth. It is the reason that throughout the time in our modeling work, we see an increasing level of the threshold for the minimum energy access, ranging from individual access to productive users. Productive users are definitely a key part of our assumption.

MR. SY: I think it is very interesting because if you look at this transformation agenda, if you look at Africa's growth right now, we haven't really followed the Asian growth model. We haven't been really having increased manufacturing and exports. Rather, the labor force has left agriculture, the rural area, to go to the services, which are less energy dependent.

There are lots of questions about is this sustainable, do we have to move to an Asian growth model, you know, are we really able to grow sustainably with such a huge share of services.

I think going forward, okay, let's build infrastructure, energy infrastructure, and they will come, or do we target certain sectors that we think are going to drive, to transform our economies.

MR. EBINGER: I apologize that we are out of time, given the interesting discussion we have had with our panelists. I want to thank Dr. Birol and Ambassador

Williams and Amadou for contributing, and thank you all very much for your questions and for coming. (Applause)

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