Nordic Energy Solutions to Global Challenges

The Nordic Prime Ministers' Initiatives ' Nordic Solutions to Global Challenges' towards the UN 2030 Agenda of Sustainable Development Goals

Innovations from the North for Ethiopian Growth and Transition

Radisson Blu Hotel, Addis Ababa

31 October 2019

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Welcoming by Jens Skov-Spilling, Head of Cooperation at the Danish Embassy, Ethiopia

He gave a brief background on the history of the process. It started out as a Nordic Prime Minister's Initiative to share green growth solutions with the aim of supporting development ambitions in the Eastern African region. He emphasized that the Nordic countries have, over the years, built an integrated system of renewable energy – making it affordable and uninterrupted. The experience can be exported abroad to this region as the energy mix between the two regions is remarkably similar with the potential of ensuring affordability and uninterrupted supply much needed in the East African sub-region.

As per the programme, he invited two speakers to give opening remarks: Excellencies Ms. Unnur Orradóttir Ramette, Ambassador of Iceland, and Ms. Helena Airaksinen, Ambassador of Finland followed by a key note speech by Excellency Frehiwot Woldehanna (PhD), State Minister of Water, Irrigation and Electricity.

Introduction to the Seminar and Nordic Solutions to Global Challenges by Ambassador H.E Helena Airaksinen, Ambassador of Finland

Your Excellency State Minister Frehiwot, Excellencies, Ladies and Gentlemen,

Good morning to all of you!

On behalf of the Nordic embassies, it is my great pleasure to welcome you all to Addis Ababa and today´s seminar: *Nordic Solutions to Ethiopian Green Growth and Energy Transition.*

This seminar is just one example of the Nordic cooperation here in Ethiopia and as such a reflection of the close cooperation between our countries in general. Indeed, the cooperation between the Nordic countries is the world's oldest regional partnership. The Nordic Council was set up in 1952, and shortly after, the Nordic Passport Union and Nordic Labour Market were introduced. That was the beginning of a close cooperation in many fields.
Our shared values and cooperation help make our region one of the most innovative and competitive in the world. In the Nordic region, we have shown time after time that we are stronger together, whether it would be promoting gender equality, social welfare, inclusivity, innovation and research, digitalization, arts and culture, or indeed, energy cooperation and sustainable development.

Ladies and Gentlemen,
This year, the Nordic leaders have pledged to become the most sustainable region in the world by 2030. Furthermore, the new Government of Finland pledged just half a year ago, that Finland is to be a carbon neutral welfare state by 2035. The other Nordic countries have similar targets.

We all know what a serious challenge climate change is, as are other environmental threats such as pollution, loss of biodiversity, deforestation and water scarcity. The

Nordic countries are determined to lead the way in order to find solutions for the future. Sustainability is the key, and that is why the Nordic countries have launched their Vision 2030 with the aim of becoming the most sustainable and integrated region in the world. Energy is a good example of this: clean energy solutions are essential for reducing carbon emissions. At the same time, energy availability enables economic growth and social welfare. As always, cooperation between different stakeholders and even between countries is important.

In the Nordic countries, we have been cooperating in the energy sector for a long time; in 1980, the Nordic energy ministers held their first meeting and since then, the cooperation has been going strong, as shown by the common Nordic electricity market, for example. My colleague Unnur Orradóttir Ramette, Ambassador of Iceland, will now briefly introduce the Nordic energy solutions and the Nordic offering in the energy sector.

On behalf of the Nordic embassies, I want to thank you all for coming to this event and I wish you all a most rewarding day!

Opening Remarks by Ambassador H.E. Ms Unnur Orradottir Ramette, Ambassador of Iceland, Ladies and Gentlemen, Excellencies

My name is Unnur Orradottir Ramette and I am the Icelandic ambassador to Ethiopia. I am based in Kampala, Uganda. On this occasion I want - on behalf of the Nordic embassies – to congratulate the Ethiopian Prime Minister HE Abiy Ahmed with the nomination of the Nobel Peace Prize 2019.

Globally, 1,4 billion persons do not have access to modern energy. Energy access is a key enabler for economic growth, lowered greenhouse gas emissions, improved health and better opportunities (education/employment/participation) for women and children. Only 35 percent of residents in Africa have access to everyday electricity and the prospect of expanding the established electricity network is challenging.

The Paris Agreement and the Nationally Determined Contributions (NDC) stresses the importance of increasing the already impressive growth in renewable energy deployment to exceed the 2-degree target. Nordic countries have promised to deliver on the UN Goal number 7 of realising "Affordable and Clean Energy for All" both in the Nordics and globally.

It is my firm belief that the goal of affordable and clean energy for all is interlinked with most - if not all – of the other UN Sustainable Development Goals to be achieved by 2030. Energy is a key enabler:
Ending energy poverty and increased the deployment of renewables will secure clean air, new jobs, warm schools, light up hospitals, clean buses, pumped water and better yields of nutritious food. Improving these conditions is also a means of securing and promoting peace.

Nordic Energy Solutions is an integrated part of Nordic Solutions to Global Challenges - an initiative by the Nordic prime ministers. The Nordic Region promotes sustainability

and progress toward the UN Sustainability Goals, sharing knowledge of three themes: Nordic Green, the Nordic Gender Effect and Nordic Food & Welfare. The purpose is to promote Nordic solutions and innovations, that address some of the most pressing global issues. The Prime Ministers want to share knowledge of six flagship projects on the themes Nordic Green, the Nordic Gender Effect and Nordic Food & Welfare. By mobilizing policy experts, researchers, private-sector players as well as Nordic embassies, export councils and international stakeholders, the flagship projects respond to the increased global interest in Nordic sustainability policies and products.

Nordic Energy Solutions seeks to share Nordic energy models and know-how with regional energy markets in different parts of the world and assist in the design of renewable energy systems and attractive markets. The ambition is to disseminate Nordic solutions, improve access to renewable energy and at the same time boost export opportunities and competitiveness of Nordic companies within the renewable energy sector. It is our firm belief that the Nordic energy system with its substantial share of renewables in the electricity system could inspire other countries through capacity building, meeting local needs and finally, to promote Nordic companies offering renewable energy systems and services.

The Nordic countries offer a thriving cluster of energy system producers (solar, wind, hydro, geothermal and biomass) with an ambition to increase their activities in developing countries. Finally, the Nordic countries have extensive experience in project finance, strong institutional investors (e.g. Pension funds) dedicated to renewable energy investments. We also have a family of Nordic finance institutions Nordic Development Fund, Nordic Environmental Facility Corporation and Nordic Investment Bank extending their geographical scope and portfolio.

Nordic companies are pursuing to export their technology and competence. Political and financial risk can pose major hurdles for the exporting companies. Robust governance structures and market access for new energy companies are essential. The Nordic electricity system did not happen overnight. 100 years of experience in cooperation on an

extensive cross-border grid system strengthening energy security and a world-class electricity market design and regulatory frameworks. This cooperation is based on mutual trust and valuing interdependence rather that insisting on energy independence. Similarly, the emerging transnational energy market – East African Power Pool – will only succeed if infrastructure and peaceful relations between nations can be developed.

Ethiopia is well endowed with renewable energy resources and can become a regional powerhouse in trading and exchanging clean energy. Incidentally, the Nordic energy mix overlaps nicely with that of Ethiopia. Abundant hydropower resources, excellent conditions for wind and solar energy, access to biomass and on top of all, geothermal energy. Coming from Iceland, it gives me pride

Today we will be presented with several examples of successful projects and approaches both from Nordic and Ethiopian companies as well as Nordic government entities. Nevertheless, many Nordic companies are held back due to financial and/or political uncertainties. It is our hope that this seminar will pave the way for additional investments that can secure affordable and clean energy for the people of Ethiopia.

Key note speech: by Frehiwot Woldehanna (PhD), Minister of Water, Irrigation, and Electricity of Ethiopia

Excellencies**,** distinguished guests, ladies, and gentlemen;

It is an honor and a pleasure to give an opening remark for this timely seminar organized by the Nordic countries on behalf of the Ministry of Water, Irrigation, and Energy of the Federal Democratic Republic of Ethiopia. This event builds on the very successful seminar on Nordic Solutions for Business Development that was held here just over a year ago. It seeks ways to accelerate the green energy transition in Ethiopia. It also builds on technical issues such as power production planning and energy trading – an event organized by the Nordic Energy Research and several other important bilateral partners. This demonstrates a mutual commitment and strong partnership, a partnership that Ethiopia is highly appreciative of. A couple of months ago, Denmark and Ethiopia led the energy transition track at the United Nations Climate Action Summit in New York. We, as a country and as a continent, shared the view that a fundamental transformation of the energy sector is needed for securing a green and more sustainable world. Renewable energy will be vital for achieving the sustainable development goal of ensuring access to affordable, reliable, sustainable, and modern energy for all. The summit was actually an opportunity for both Denmark and Ethiopia to demonstrate our commitment to mobilize global action, in particular for the people in the poorest and most vulnerable countries.

With the exception of Finland, all the Nordics doubled their contribution to the Green Climate Fund and supported a new climate investment platform initiative that aims to catalyze investment in energy projects in developing countries such as Ethiopia. Synergies with the Nordic financing instruments and funding schemes for Ethiopia, such as the African Enterprise Challenge Fund, should be closely considered. The pathways to the energy transition are well documented. There is an impressive trend of dramatic cost reduction for clean energy technologies. On the other hand, the Nordics are leading on how these energy technologies can be integrated efficiently in the market, ensuring high

level of security of energy supply. These encouraging trends provide an opportunity for Ethiopia to leapfrog past the fossil fuel and towards renewables.

Distinguished guests, ladies and gentlemen, taking advantage of the abundance of renewable energy resources such as hydro, geothermal, solar and wind with corresponding competitive prices is highly, fully aligned with Ethiopia's development objectives. Our nationally determined contributions to the UNFCCC process are based on the climate resilient green economic strategy. The national green growth strategy seeks to place Ethiopia in the category of upper middle-income countries by 2025, entirely based on renewable energy resources. Ethiopia will become the Green Economy Forum front-runner in Africa. Industrial parks and emerging businesses will be fueled by low carbon sources, as the country aspires to become a regional power hub to supply reliable energy to the region - neighboring countries and beyond.

Meanwhile, we have launched the national electrification program seeking light to all Ethiopians by 2025 from the current access rate of 73 percent of the national grid and eleven percent off-grid. The program strongly supports socio economic growth and human development. Achieving universal access to electricity has rightly been devoted to the Sustainable Development Goals. For instance, by reducing the health impact on women and children, by replacing inefficient cooking fuels, powering productive industries in rural areas and modernizing agriculture, creating new jobs and furthering employment.

Distinguished guests, ladies and gentlemen,

Ultimately, the success of introducing more renewable energy will depend on the technologies being competitive. Ethiopia has, through the adoption of the Public Private Partnership Proclamation initiated in 2017, a fundamental shift in the many large scale infrastructure projects such as in IT. Historically, public sector finance has been the sole investment vehicle for the development of our power sector. Today we have set in motion a series of actions towards transforming the regulatory framework to involve the private

sector. The Icelandic firm – Reykjavik Geothermal – is engaged in the first step and projects with independent power producers. Our approach has also paved the way for record breaking low prices on resembling solar resources in the eastern regions of the country. The Danish Energy Agency is providing institutional support in the preparation of wind tenders by sharing experiences on road level wind measurements, as well as legal framework and tender management. Whilst the first fully competitive wind tender is not yet announced, it is near its finalization stage. The project is generously supported by the Danida Business Finance and will be important in bridging an important gap, that of providing the feasibility and competitiveness of wind energy projects in Ethiopia.

Distinguished guests, ladies and gentlemen, introducing new power generation plants with solar and wind technologies helps diversify the energy mix, which has been affected by more frequent droughts due to climate change. Such droughts pose a strategic threat to energy security as hydropower supplies more than 90 percent of electricity in the country today. The penetration of wind and solar is negligible, but studies show that it will be possible to rapidly expand up to three point six gigawatt and five point three gigawatts for wind and solar by 2017. This will be a cost-efficient and a line aligned well with the objectives of Ethiopian climate resilient green economic strategy. It will also support its best ambition to become a regional exporter of energy, while at the same time ensuring high standards of energy supply and improving system reliability and resilience. However, the challenge of introducing such variable technologies is that they require a back up generation, and in general, energy storage poses a challenge. But luckily, we are using reserves of hydroelectric power plants as large battery banks are needed for storage to unlock the door for expansion of the integration of energies. We are looking to Nordic solutions. A Danish transmission system operator manages a system with almost 50 percent variable resource and its experts are working very closely with their counterparts at the Ethiopian Electric Power to share experiences on innovative strategies in control and operation of power plants.

Distinguished guests, ladies and gentlemen, I'm glad to see the social and economic benefits of renewable energy projects for the society at large are on the agenda to

disseminate. Too often these issues are neglected or treated as an afterthought. Ensuring public acceptance and creating local and regional benefits must be on top of potential developers right from the very beginning of any given project, not just in terms of ensuring fair compensation to affected households, but through out the development process to take advantage of existing infrastructure and create additional value. For instance, local communities should be involved to discuss new uses before construction of infrastructures for housing to the workers, access roads must be provided to local farmers and maintain the local people to support job creation. Projects, which depend on massive reserves, are affecting the levels of livelihood of thousands of local inhabitants. However, regardless of technology, we should never forget that the most important benefit, first and foremost has to be that renewable energy projects must provide affected people access to clean, reliable and affordable electricity. Today, a range of Nordic solutions that can support Ethiopia's ambition to deploy substantial amounts of renewable energy for sustainable growth and access to energy for all will be presented and discussed. I look forward to learning ways for efficiently coordinating our hydro resources with new generation sources such as geothermal and wind. I appreciate the interest from the private companies here today seeking to explore possibilities for collaboration. There is tremendous opportunity for economic development and spinoff job creation in the development of the energy sector. Finally, I would like to thank the organizers of today's seminar. With this brief remark, I declare that the seminar of Nordic Solutions is officially open and I hope it will be a fruitful event, an input for further collaboration.

Thank you very much for your attention!

Nordic Collaboration linking corporations and start-ups to tackle development challenges – by Tapio Peltonen, Founder, EEX Global

We have a huge collective challenge. But the issue is how to do the action part. Technology will not solve it on its own. We need to be fast through entrepreneurial people that go out of their boxes. I am an entrepreneur with a philosophy of social capital, and a focus on people. Innovation techs may offer solutions but people should do it. People must learn, collaborate, and lead. I offer some lenses on how to do it.

1. **Leadership** – entrepreneurial leadership is a down to earth concept and not a fancy big term. Entrepreneurial leadership is necessary for any person and any organization to adapt successfully to today's complex and dynamic world as articulated by Risto siilasmaa, who was entrepreneur and chairman of Nokia. He listed what the qualities are. The first one is accountability – the feeling of being answerable though there may be no assigned superiors to you. You have a whole list of responsibilities but you should be in a position to do more that what is expected of you. And in the way you discharge your obligations, you should be able to affect and infect others.
2. **Learning** – entrepreneurial learning involves daily learning that includes unlearning, relearning, co-learning, and meta-learning. We know that startups won't save the world. They are very, very small compared to the challenges they need to face. We need the big companies. So our recipe to save the world is to combine the entrepreneurial spirit existing in small start-ups with the big companies. At our company we do human experiment. We bring big guys to the entrepreneurs to learn entrepreneurship. On their turn, the big guys will help the small start-ups to grow bigger. In start-ups learning is not fun, it is what they need to do. A startup is not a real company; it is rather 'an exploration party' as articulated by Steve Blank. It is a wonderful place to learn. You learn and act or else you die in start-ups.
3. **Collaboration** – we as enterpreneurs have very little resources. This requires us to collaborate. Since our mission is to learn, we need to learn very fast and accurately. This is why we need others. We know that we don't know. We know

that there is something we need to learn. There are a couple of things about collaboration. First, it is important to understand your own future. Even in big companies leaders don't know their future options. Secondly, understand other's businesses. This entails empathy – trying to understand the issue from the perspective of the other person. Thirdly, trust and work with the right people. To get into action in collaboration you need the right people and trust so that the others will listen to you – this is what is known as social capital. We do have plenty of this in the Nordic countries.

In conclusion, we need to do new stuff, and need to test it through. We need to know how to support. We need entrepreneurial leaders in all organizations. We need to be allowed to fail. Combine big organizations and entrepreneurial learning - we will have optimal results.

Session 1: Panel discussion on Nordic technologies and knowledge transfer

Panelists**:**

- Antti Malve, Fortum Ltd, Knolwege transfer as a stepping-stone towards privatization of energy sector
- Conny Wahlberg, ABB Ltd, Power Grids for the future
- Atsede Gualu, SINTEF, Grid interconnections and markets – bringing Nordic solutions to East-Africa Power Pool

Moderator**:** Tapio Peltonen, Founder, EEX Global

Ethiopia's rapid growth and transition towards a middle-income economy requires enormous efforts from the country and partners. Energy, being an enabler of economic growth and increased living standards, will have a central role in this transition. Recent

reforms in Ethiopia like privatization and new interconnections of energy grids with neighboring countries will require new type of knowledge and experiences.

For Nordic companies Ethiopia represents a huge opportunity. In this panel discussion, Nordic partners shared their experiences from technology innovations, knowledge transformation models, outsourced operation and management, and interconnected energy markets to promote mutual development, growth and business

Questions and Answers: Session One

1. You highlighted the importance of education – so the question is what should be done interms of knowledge transfer?

   - I would say that as in most other sectors capacity building is very important, but should be coupled with hands on experience. The financial mechanism available in the Nordic institutions should be employed to fund research in the educational institutions so that it will boost the capacity of students and university instructors.

   - What we saw today is the fact that it is difficult to recruit technical competence in some part of the world. We need to address the attractiveness of technology to address some of the challenges we see. This is a crucial factor for technology deployment. We need to attract young innovators – not only in the information technology sector – but also in the power sector. It I a challenge as well as a joint responsibility from all of us.

   - From our experience at Fortum, it was very easy to entice Finish educators to educate youngsters and vocational students in Rwanda. We have to have ways of attracting the digital world into this sector.

2. You all mentioned data and smartness. Is the smartness we need here the same as that required in the North?

   - Yes – though the power systems have different characteristics. But it all boils down to the quality of data that is required to operate the system in the most efficient way.
   - Yes, I would say, in theory the requirement is all the same. The smartness we need in the North is more on the demand size as optimization of the generation side has been done through the market through technology improvement. But here we don't have the infrastructure. We hardly have the work ethic and the way we

are doing it here is in the most inefficient way. So there is a lot of room to improve data on the operational side.

- Smartness is needed everywhere and is not a localized requirement. I would like to reiterate the story of our transmission experience in Germany, which shows that we have the same challenges as you have here. Germany has built generated power in the North where the industrial part is in the South. So power generated in the North needed to be transmitted to the South. So it meant that power should be transmitted via Poland, but Poland did not have sufficient transmission lines in that area. And when it has happened Poland did not have free capacity on their transmission line to take up in excess of the capacity. So there still needs a lot to do to bring the smartness to the data requirements.

3. To [Atsede Gualu] – you are in a unique position as an Ethiopian who has lived for 10 years in Norway and have come back. Given this reality, how do we make the collaboration between these very different societies and far away places?

    - There is a lot of knowledge and experience in the Nordic region. And the challenges that we are facing here in Ethiopia and elsewhere in the East African region is something they have overcome a long time ago. It is important to establish platforms like this to bring in partnerships, companies, and opportunities. It is also important to bring equitable type of partnership where both parties can benefit. One way of doing this is while designing projects and programmes, put emphasis where both fair type of responsibilities and benefits are distributed. This will lead to a successful project because it is possible to create customized types of solutions that is best adapted to our local conditions.

- End of Session One –

Session 2: Nordic partnerships in energy sector development

Examples of on-going public and private Nordic activities in the Ethiopian energy sector.

Panelists**:**

- Jón Örn Jónsson, Country Manager, **Reykjavik Geothermal**
- Accelerating wind power generation in Ethiopia, Nikolaj Svensson, Senior Energy Advisor, **MoWIE**
- Mark Claessen, Country Manager, **Voith**
- Violet Moronge, Project and Asset Manager, **Empower**

Moderator**:** Fanney Frisbæk, Senior Advisor, **Nordic Energy Research**

Introductory remarks to the session by the Moderator

The Nordic countries have one of the most integrated and modern electricity systems in the world with over 30 years of experience in cross-border energy cooperation providing outstanding energy security. The Nordic electricity market has been vital in raising the renewables share of the Nordic energy mix to close to 70%, compared to the global average of 24%, and the Nordic countries have ambitions to raising this number even further in the coming 10-20 years.

Solutions provided by Nordic expertise and companies have been essential in this achievement, and have through the years identified technology and business models that have enhanced this progress, but also disqualified outdated and counterproductive approaches and business models.

The Nordics are committed to working towards Global Sustainability Goal 7, “Ensuring access to affordable, reliable, sustainable and modern energy for all”, both within the Nordics but also globally. We hope, that by sharing our experience and solutions with

Ethiopia, we can help facilitate the already impressive progress and ambitious energy and climate plans of the Ethiopian government.
This session will present some examples of how the Nordics aim to pool their support to the energy sector in Ethiopia, and of on-going public and private Nordic activities in the Ethiopian energy sector.

So without further ado, I would like to invite to the stage - Mr. **Stephan Schønemann** Under-Secretary for Global Development & Cooperation at the Danish Ministry of Foreign Affairs, and Danish ambassador to Ethiopia in 2012-15

Keynote Speech: Mr Stephen Schonemann, Understanding of state for development policy, Ministry of Foreign Affairs, Denmark

We are witnessing economic growth in Ethiopia from the time I was here a while back serving as the Ambassador of Denmark based in Addis. In Denmark we have set a reduction target of 70 percent by 2030 and become neutral in 2050. Denmark cannot reach such a target alone. No country, no city can go it alone. Local leadership and engagement is important to achieve the SDGs. That is why we are here. We need to work together. As key partners in "sustainable energy for all" we garnered private sector, civil society, government etc. for a global action. We should see SDGs as living targets for all of us. But we are all far away in meeting these, in different ways. But we can collectively over come this challenge. That is why the Nordic countries mobilized the Nordic solutions for global challenges.

Scaling up selected Nordic solutions can cut global emissions by more than 4 Giga tons by 2030. And this is by just using existing solutions - wind power, energy efficiency etc. The task ahead is clear. We have to act together in time. It is surprising how the Nordic resources mirror that of Ethiopian. We need to make sure that green transition will not lead to inequality but to sustainable solution, supported by job creation. This is why we need to develop cooperation not to repeat past challenges and learn from Nordic countries on how they overcame these challenges. I hope this session will throw light on these and other questions that this audience may have. Thank you for your kind attention!

Opening presentation by panelists

Jón Örn Jónsson, Country Manager, Reykjavik Geothermal

Reykjavik Geothermal is a geothermal development and financing professionals company, founded on long-standing Icelandic expertise in harnessing high temperature geothermal power at utility scale. Reykjavik Geothermal has been working in Ethiopia for the last 10 years developing Corbetti and Tulu Moye fields and has recently

completed surface studies at Abaya. If Ethiopia wants to become middle income by 2025 all partners has to gather around in support of this ambition in energy development and other sectors. Since we started in 2011 with Reykjavik, we made an agreement with a local company called Rift Valley – a company with massive concession but with limited knowhow. We were fortunate enough to partner with them and bring decades of experience to move the project forward. We then embarked on exploration at Corbetti. That is when we understood the huge geothermal resource Ethiopia has at its disposal - probably the largest in the world. There are challenges interms of currency restrictions, as well as challenges of a first starter in the geothermal realm. We did not know the road ahead of us. We just had the aim of developing the project and were willing to face challenges as they come by. Of course we have been lucky with our shareholders. They are with us all the way through and supporting us in this venture.

Mr. Nikolaj Svensson, Energy Advisor on behalf of Danida seconded to the Ministry of Water, Irrigation and Electricity of the Federal Democratic Republic of Ethiopia.

The Danish-Ethiopian strategic sector cooperation and partnership programme "Accelerating Wind Power Generation in Ethiopia" has been active since 2017 and supports capacity building of the Ethiopian energy sector to a gradual transition to increased volumes of wind energy. The implementation of the programme is administered in cooperation between the Royal Danish Embassy in Addis Ababa, the Danish Energy Agency, Energinet.dk, the World Bank and relevant Ethiopian counterparts.

Mr. Mark Claessen, Country Manager, Voith

Voith is a global provider of technology and industrial services in energy, among other sectors, and in Voith Hydro in Norway they focus on rehabilitation and upgrading existing, as well as new hydro turbines for small and medium-sized power stations.

For more than 80 years, Voith has successfully accompanied the construction and modernisation of hydropower plants on the African continent. About 25 percent of the currently installed turbine capacity in Africa has been supplied by Voith.

Mrs Violet Moronge – Project and Asset Manager – Empower New Energy

Empower New Energy is an impact fund managing company investing in small and medium-scale renewable energy projects, mainly in solar PVs and small hydro. Their goal is to cover the gap that traditionally exists in attaining finance for local projects and smaller investments. Empower recently secured 8 million USD to fund small renewable energy projects in Ethiopia and other African states.

Questions & Answers: Session Two

1. Would you please tell us about your experience in the energy market in Ethiopia? And what advice would you give to new companies that are entering into the Ethiopian market with their solutions?
    - A quick advice for new entrants into the energy market in Ethiopia is – "the time is now!" If you want to be part of the growth unfolding in this nation "the time to come is now!" Since a decade ago that we first set our foot here, there has been enormous changes the landscape of investing in Ethiopia has enormously changed. Of course the traffic is getting worse by the day – but in some way, that is prosperity in one picture, I would say. So I encourage all the Nordic partners that they should come now if they want to be early starters in this journey. Like in any country, there are complexities too with in the bureaucracy. It is always complicated when you don't know the rules and are unable to plan ahead and perform things. Processing and getting through residence and work permits may take weeks and sometimes present in person before the bureaucrats. It may not be too easy. But this is not very uncommon even in the Nordic countries. Despite the challenges the time is ripe now.
    - The potential in Ethiopia and what is happening is mind-boggling. It would be naïve to think to come here and process your licenses with in 24 hours and so on. It is not like that. The challenges can be managed but plan for the long term and you need to adjust to the changes. Come here with open eyes – this is my advice to the new entrants into the market. You can learn a lot by visiting people who are already here and avoid repeating the same mistakes they went through.

2. I am an Impact investor in emerging markets in East Africa and South East Asia. Can you say something on the off-grid markets? There are 12 million households to be electrified by 2025 according to the latest National Electricity Plan. How does the Nordic solution chip in to address this?
    - [**Empower**] from our perspective, we are actively looking to partner with those that work in the region on mini-grids – to explore the potential and act. Our space is limited ranging between 0.25 -10 MWs and we have an East African base. We

are also exploring the potentials to build mini-grids to power some 10 Universities in Kenya. We are keen on expanding this learning through local partners and companies working in East Africa.

- [**MoWIE**] from our experience of working in Ethiopia we have witnessed the disconnect between the ambitious goals of the Growth and Transformation Plan and identifying cost effective ways of reaching the targets; and designing scenarios and models while ensuring ownership by all. Developing resources in partnership can bring in solution to the off-grid. We can bring in Nordic solutions to build capacity of meeting the gaps between the ambition and what is happening on the ground. We expect the private sector ready to engage.
- [**Voith**] – in other countries we do small hydros and mini hydros. The challenges we see in Ethiopia with regard to this is affordability. Since the grid is cheap, the switch to the off-grid is not attractive and even the local people will not feel that they are fairly treated. I think the particular situation in Ethiopia presents a unique tariff challenge. So the question is how do you go from this aspiration to implementable projects.
- [**Reykjavik Geothermal**] – geothermal is an efficient off-grid resource. If you consider the massive producers in the flower industry in Ethiopia and other production companies located on top of the rift valley – none of them are yet exploiting the geothermal energy directly. I think there is an opportunity there. If 1 to 10 MW of geothermal energy is allowed to be sold directly to producers and those producers will be willing to pay substantially higher for that energy, it will relieve them from total dependence on diesel generators. We know that these producers are paying a combination of the grid tariff and the reserve diesel generated electricity. This will be a move towards off-grid with identified producers.

3. We have been working in our project of Prime Ministers Initiative of Nordic Energy Solutions; we tried to identify the real and relevant needs in Ethiopia in order to be as helpful as possible. So as a person politically embedded here in Ethiopia could you

[Nicolaj] tell us how this message could be communicated and that the right solutions are provided to the most pressing needs?

- [Nicolaj, Senior Energy Advisor, MoWIE] there is a tremendous interest from the donor community to engage in the development of Ethiopia. Sometimes that space is a bit crowded. We are extremely aware of the comparative advantages from the Nordic countries. In realization of this, from the Danish side, we have taken leadership in donor coordination in the energy sector and, together with the EU, we brought pertinent partners such as the World Bank, Power Africa, DFID etc to come and engage in some core coordination areas. We also have a strong engagement from the government and utility side. The fact that energy resource correlation between Ethiopia and the Nordic countries mirror eases this process.

4. Coming from Iceland, I understand the difficulty of managing a small company with limited budget but with huge impacts. How do you engage in projects that are closer to the people and enhance the social impact of these projects?
   - [Empower] One of the key benefits of smaller projects is to offer clean and affordable energy in communities that greatly need it. The money they would have used to buy diesel and kerosene for their energy source and lighting can be diverted to renewable energy projects. We also create job opportunities as we directly work with the communities through recruiting local, technical expertise. This is a social benefit we offer to the people.

5. Following the establishment of the power plants in the geothermal sector, what kind of Nordic solution do you bring to ensure its sustainability? What kind of technology do you think will be appropriate for this?
   - [**Reykjavik Geothermal**] we are always engaging the stakeholders and discuss with them. We want to ensure that the local people will own the projects. We are always asked the same questions: How will the resettlement process takes place? What will be the impact? Will the people have better roads? Will clinics be built etc.? The only sustainable way to leave these projects for future management by the people will of course be to train the local people, and enhance their capacity.

We are not going to fly experts back and forth. A large number of employed people by the project are local people. The technical aspect of the knowledge we are binging in is quite known. The modality of undertaking the explorations follows internationally recognized principles. There are no known turbine manufacturers in Ethiopia. We thus have to bring in state of the art developers so that the infrastructures we build are top of the line. This is to showcase best approaches to Eastern African countries.

- End of Session Two –

Session 3: Nordic finance instruments and funding schemes for Ethiopia

What Nordic financial instruments and funding schemes exist in Ethiopia for the energy sector and what are the criteria for qualification?

Panelists:

- Helena Teppana, Finnfund
- Abubakar Lewano, Senior Investment Manager, Norfund
- Peter Hallbom, SwedFund
- Tina Kollerup Hansen, Investment Director and Team Lead, Danida Business Finance

Moderator: Mehraz Rafat, Senior Adviser, NORAD

Opening statements by Panelists: a summary

- [SwedFund] – This is a Swedish government private sector fund. We try to make sustainable projects around the world with special focus on sub-Saharan Africa. The fund has quite a bit of history in Ethiopia with three portfolio investments - Addis Cardiac Hospital, a Textile Factory in Mekelle and the hotel we are gathered in - Radison Blu. Particularly the investment in the textile sector is interesting for the discussion today. Textile is central in Ethiopia's development planning. We know that the project in Mekelle is into challenges due to problems of power supply. Thus we are eager to finance the right energy projects. Elsewhere in African countries, we work with companies offering off-grid solutions. We invested in Husk Power Systems in Tanzania and India that make use of biomass as energy source. I am a true believer in the potentials of these projects. But the smaller ones – that focus on reaching out to local people are equally important for me. We look to bankable projects that are commercially viable and we give equity and loan.

- [Norfund] – it is a 3 billion-investment fund working in East Africa among other regions. One sector we involve in is financial institutions, agri-businesses, and clean energy. The key sector in clean energy is hydro, solar and wind power. However we did not do anything on clean energy in Ethiopia thus far while we invested in agriculture in some regions in Ethiopia. We understand that clean energy is a sustainable resource and electricity is in short supply. We are ready to do energy investment in Ethiopia.

- **[**Finnfund] – we have not been investing a lot. But in Ethiopia, we made two investments – to an agri-business called Ethio-chicken and the financial mechanism known as M-Birr. The country is very interesting for us and we want to invest in the power sector as well. Elsewhere, our first investment in clean-tech was in Cape Verde on a large commercial wind farm. We are also shareholders from Turkana Wind Power project in Kenya. We have looked into off-grid solutions and have invested in geothermal in Kenya as well. It will be great to engage in power development in Ethiopia.

- [Danida Business Finance] **-** we invest in equity and to a lesser extent on loans. We have concessional financing in public infrastructure by providing subsidies. We agreed to finance a wind farm in Ethiopia. We are providing grants and subsidies at the same time.

Questions & Answers: Session Three

1. From your opening remarks we understand that all of you represent governments. Based on what you have seen in Ethiopia so far, to what extent do you think it is possible to find project that would stand on their own given the risk return scenario, and can be financed purely with private money/ private capital? Or to what extent over the coming five years do we expect blended financing schemes where donors would come in with first loss risk facility, or coming with a subsidy to the investors? Can each of you give quick reflections?

    - [SwedFund] We are happy to hear from all the renewable energy resource developers – as we would like to do all of these resources – solar, wind, hydro etc. We are always keen to work with the right people - both local and international companies – and review them on a case-by-case basis. SwedFund sees blended financing as something that is needed but also with caution. If it is introduced in the wrong way, it will be perceived as "the normal way". It has a potential to distort the private sector. So it needs to be done with utmost care both from the point of view of whosoever is providing it but also from the angle of those that are accepting it. If we can make the project as bankable as possible on its own without donor financing – that is the way forward.
    - [Norfund**]** – we see lots of opportunities on the energy sector in Ethiopia, and look for local partners. We expect projects that are profitable, where the risk-profit matrix is ok for us. We have already invested on **Empower** – on off grid solutions – so we are already familiar with the sector. We have platform companies on solar energy and wind energy, and through them, can quickly quick roll into business.
2. Based on the applications received from Ethiopia, have you considered for the blended option where you have included a guarantee facility, or subsidy that would be attractive for the private investor to go into?
    - [Norfund] We have seen from these applications that they are not quickly bankable. These applicants need to do something before hand. For that purpose we have arranged for something we call Project Development Facility where we

can help commercialize them. Through this Facility, we then enter into debt or equity. As I said, these projects are largely not bankable at sight but through that facility we can take them to the next level.

- FinnFund– financial viability obviously depends on the Tariff structure. I don't like the tendency where we are going today with tendering Power Purchase Agreements (PPAs) as project developers have to lower Tariffs to win the tender. This would mean that they are not bankable on their own without blended financing, meaning that donors have to come back to the market. We were already doing bankable but very high Tariffs in African countries. We did not need donor support, the tariffs were not subsidized, and the project developers were very happy. The Internal Rate of Return of these projects has not been awfully high – of course it has been high enough to attract people. Now we are trying to bring in the donors to the market. Of course it is fantastic to lower the tariffs but will the benefits go to the end users? This is very difficult for us, as we don't have sources to participate in blended finance. But my question for this approach is - are we going in a sustainable way if we do that? In this regard, tendering out (PPAs) will not lead to optimal results, as only those that have access to donor fund will outcompete others that lack it. So it will not require your technical competence but the network that you have to leverage donor financing. And the margins are so low, for instance, you need to have 0% blended finance into your commercially priced debt to participate. I don't have a solution for this.
- [Experience from Danske Bank] – the only reason we were able to attract a certain project implementer is because we gave them a 95% guarantee from the government (Danske Bank). So they take 5% risk. How to do blended fund is not yet a refined knowledge to us. It is a difficult field as you may end up distorting the market and disrupt the long-term structure. There is a need to have the donors to support the private sector. It should be tailored to fill a hole in the market after identifying it. Now the development banks (for instance, World Bank and the Asian Development Bank) are offering their blended finance windows, which they called “private sector development window” – where the basic hypothesis is the inability to get commercial finance.

3. Since you are development finance institutions, what type of energy projects are attractive for you? Or where should the emphasis be and where is the need in Ethiopia? (For instance considering a category of small off-grid solutions where you can directly get paid back by the customers; or medium-sized and large scale projects).

   - [SwedFund] – it is needed everywhere as the country has different needs and different cluster of consumers. The challenge for the government is to make sure everyone in Addis Ababa has power. On the other hand, the challenge for Addis is the reliability of supply. But the big question is how to reach those far away from the cities and how should this be presented to investors and developers. The consumer far away is not ideal for a power company. It demands a huge cost to connect them and give them access. As DFIs we need to give these consumers access. Then we need to make sure that the grid is more resilient and embraces the new renewable that is generated, and that the right mechanisms should be in place. So solar home system countries and off grid solution need to come to this country. DFIs are somewhere between grant and commercial – more closer to commercial. We invested in Delight, and Husk Power Systems (in Tanzania and India) – this is where we go in equity and make them more sustainable and streamline their processes. We provide technical support in educating their customers on how to use solar home systems so that it will not remain a stranded asset for the companies. SwedFund is very keen to go with the right developer with the right instrument and diversify our risk.
   - [Norfund] – the infrastructure around the large-scale projects should be right and takes up plenty of resources. We think having off-grid solutions are fit to fill in the lag between building these large infrastructures and power is supplied. But the challenge of the off-grid is scalability. We have partnered with Delight and invested in Empower so that they could take off.

- [FinnFund] – Household sector power generation is difficult and requires much cash. The poor people cannot afford in the rural areas – where we evidenced in Guatemala that the company had to collect its assets from each household as they could not pay. In South East Asia, they had problems of maintaining the solar panels, which has been handed out without after donation services. They did not want to hear about solar panels anymore. That was a while ago but it is extremely important to consider this. This is where we need donors as the risks are too high and the returns on investment are so low. So we need blended finance to assist in this. But the poor deserve to get power and this type of finance is important.

4. Before we go to the other panelists, is there any investor that took some risk? Who can share experience?
    - [ChangeCom] – we have invested in two solar home systems in Kenya and one in Ethiopia. We have not seen much development in Ethiopia. This is a long-term journey and we have to be patient. A while ago we were trying to establish some market in some regions but DFIs came and destroyed the market.
    - [Empower] – with Norfund the way we work is we work on the smaller scale, less than 10 MW but if it is more than that scale we don't cross over. Blended financing definitely depends on the markets. For mini-grids it has to be full-equity or debt.
    - [Danida Business Finance] – the best we could achieve is if we blend the finance we offer – concessional financing with commercial investment so that they combine without distorting the market and to increase impact where it is needed.
5. [Perspectives Climate Change**]** – when you consider potential projects, are emission reductions or climate adaptation benefits factored in as a measure/ or parameter for evaluation?
    - [Moderator] Of course renewable energies are known for their emission reduction benefits.
6. [Nicolaj from MoWIE] –when dealing with finance in Africa's infrastructure, how do you perceive the role of China and the gulf states as a source of funding as opposed to the classical donors.

7. [Local private sector] – I have heard that Ethiopia is an interesting market. Some of you have invested in Delight and Husk Power – but they don't exist in Ethiopia. The issue is not about the developer of the solutions. But there are legal restrictions that we have to consider. For instance, multinational companies cannot operate in the energy distribution sector (as providers of off-grid solutions) and also a limitation for the multinationals to participate in the financial sector. This is the major bottleneck for the international equity investors in Ethiopian energy markets. You need also to think of building the capacity of local private sectors so that the big international companies could be attracted.
    - [Moderator] One adjustment to what you said is that foreign financial institutions cannot participate in Ethiopia as lenders of money but they can involve in equity financing. There is also this new leasing law where international companies can participate in the credit scheme. So these are possibilities where DFIs could also look at.
    - [SwedFund] True, China is taking a big role in financing and contracting projects. The financial viability and sustainability on the social and environmental side are important for SwedFund. Other developers from EU and the west – has at the core of it a focus on sustainability – both on the environment and social side. Many projects built by the Chinese lack capacity building component, and empowerment of the people. We ensure that there is as much local component as possible to drive the projects once the project period is over.
    - [Norfund] We know that China deals with governments, we look at commercial enterprises – that is our difference. We follow IFC sustainability principles. We brand the energy projects as clean and hence we cater for sustainable resources that are cognizant of climate concerns. At Norfund we are predominantly equity investors, but we also do debt financing. We give some other financiers to be a lead in debt and we then follow.
    - [Finnfund] – on climate change - when we take projects to our board, we take how much emission mitigation is expected from that project, and we do annual reporting. It is a very important aspect for us. We also check other impacts such

as employment, occupational safety, and health in our project portfolio. We don't co-finance with Chinese financiers.

- [Danida Business Finance] – I agree with what is said about the difference between our investments and those that are financed by Chinese financiers. We want to make sure that the projects are sustainable and have as high an impact as possible.

- End of Session Three –

Session 4: Nordic Energy Solutions for Society at large

A panel discussion on *Rapid development might result in social and economic costs both in urban and rural areas. In this session we discuss about Nordic solutions for climate friendly energy solutions and reflect these to practices and realities in Ethiopia.*

Panelists:

- Svend Soyland, Senior Adviser, **Nordic Energy Research,**
- Belaynesh Birru Aragaw, Director, Environment & Climate Change, **MoWIE,**
- Wakessa Tesema, Manager, Environmental Protection and Control, **Ethiopian Electric Power (EEP)**

Ylva Gilbert, Gaia Consulting Oy, moderated this session. She introduced the session by underscoring the importance of partnerships in tackling current day global challenges. She outlined what a framework and typology for multi-stakeholder partnership could look like with specific examples of how these could be achieved in the energy sector. A snapshot of the power point presentation is annexed to this report. Ylva introduced the panelists for this session by advancing a question that the panelists could reflect on.

We all know that energy availability and competitiveness is a basic requirement for industry. Likewise, increased access is and uninterrupted supply of energy is a target for the Ethiopian government. But we see lots of problems in quality and quantity of supply of this useful resource. How could the government overcome such a challenge?

- [MoWIE] with in our Ministry we review and approve Environmental and Social Impact Assessment reports related to water, irrigation, and energy. When we do this, affected people should be addressed properly including their safety, resettlement, and compensation. The energy base in Ethiopia is hydropower, which is largely affected by climate change. That is why we aspire to diversify our energy resources. In the context of the Industrial Parks we consider all aspects

of resources - water, energy etc. We look forward to partake from your experience on energy efficiency and access.

- [EEP] – regarding social acceptance, hydropower needs big areas of land and many people are affected interms of their livelihood. There is a massive impact on institutions and land-based assets. Relatively the impact of solar and wind power is considered lower than hydropower and communities seem to accept these projects as environment friendly. Engaging local community to work in a project is a requirement by us. Solar energy seem to require land areas that are largely deserted, so there is no much negative impact to the livelihood of communities. These projects give some other benefits to the communities such as building access roads, digging water wells, clinics etc. In Adama wind for instance, we saw that the local farmers consider the project as their own and did not feel much about the negative impacts.

- [Nordic Energy Research] – it is quite interesting to see that wind and solar energy resources are accepted more than hydro and other energy resources. However, Ethiopia has an extremely ambitious target in trying to provide energy access to all with in a decade or so. This is quite challenging. Developing a brownfield in Finland has taken many years. But in Ethiopia there is an ambition to build industrial parks with in just a few years. On top of that you want to ensure the utilization of the waste of one to be a basis or input for another. This presents a remarkable challenge.

- [MoWIE] Yes, the industrial parks we want to build are Greenfield. But we want to learn from you on how you managed your solid waste and liquid waste. We want to understand the type of technology that can optimally be used in such circumstances.

Questions and Answers: Session Four

1. [Moderator] On land use and technological issues and on how to optimally use them – is there a mechanism already in place on efficiency or do we need to work further on the regulatory environment? The question is for Wakessa of EEP.
    - [EEA & MoWIE] to handle the issue on community concerns we try to relate national policies with the standards of the World Bank and try to do fill gaps. We set up grievance procedures and committees that would handle conflict situations. We have a land use regulation. In order to use land for industrial purposes, compensation has to be given for the assets above the land and assign another plot equivalent to the one taken for such public purposes. To work on community land, the community should directly or indirectly be involved in that project. This would ensure ownership of the project by the community.
2. We want to hear from industries in the audience – what is your experience in Ethiopia? Can anyone give us examples?
    - [Geothermal Operator at Corbetti/ Ethiopia] – one has to understand that Ethiopia needs clean energy that can sustain industrial development, but we have to understand that the country needs jobs, more jobs to ensure sustainability of your projects. Apart from the project, we have been giving much thinking into this issue of sustainability, creating jobs for the local communities. We have used IFC standards and our own standards to develop our projects. The geothermal laws in Ethiopia are more complex, restrictive, and complicated compared to any countries we have worked in. The regulations and restrictions are just too much. That is something to be thought of by the regulators going forward.
3. What type of steps should one take to ease up the cumbersome regulations such that the route to energy transition would be easy in Ethiopia?
    - [Nordic Energy Research] – there are competent people that can provide service in these areas. My advice for businesses is to see long-term predictability and build trust. Let us focus for a few systemic targets than all the SDG targets as a government. Should we put in place industrial parks where there is energy or at places where employment is highly needed.

- [MoWIE] – we have complex regulations. But we need to revisit these and compare it with the laws of other countries and make adjustments accordingly. We need support on technology, capacity building, finance, and occupational safety and health issues.

4. [Private sector] – My question is to Belaynesh of MoWIE: what do you have in place for the private sector that seeks to engage in industrial parks in the provision of micro-grid power supply so that the energy system will be uninterrupted?
   - [Belaynesh of MoWIE] - for private sector investment in renewable energy we have a PPP and we are working on that. The energy authority has to approve the energy project owned by the private sector and that need to pass through the ESIA requirement. There are approval processes that need to be complied with in order to implement projects. But first the location where the investment is going to be implemented has to be identified.

5. [Nordic Energy Research] we would like to know more about the PPP Ethiopia developed in 2017. If you can provide some more information, the private sector would be happy to listen
   - [EEP] – we are preparing impact assessment documents and disclosure documents. The private sector needs to look into those documents and try to comply with it. Regarding land policy, Ethiopia is preparing a new expropriation policy. That draft is not yet completed but there needs to be compliance with that as the livelihood of the community is so much in focus on the new document under preparation.

- End of Session Four –

Final Session – Closing remarks

1. Statement by H.E. Ms. Merete Lundemo, Ambassador of Norway

Both reflected that it was very interesting to hear about the ambitious development objectives of the Ethiopian actors. The commitment for sustainable global action on energy for all and national actions to provide clean, affordable energy and the commitment to work with the countries in the region, and to make the East African power pool efficient and accessible were highlighted today. This session helped to indicate the best practices. One learning is the PPP, which is the most valuable instrument for the flow of green energy investments. From the point of view of the Nordic countries experiences generation, transmission and distribution has increased dynamism in the sector and the consumers benefiting from them. One aspect is digitizing the energy system. Norway has a digital strategy that is part of the cooperation we envisaged under this programme where Ethiopia is the foremost partner.

Green public procurement is also the other learning. It is a recent phenomenon but we are pushing towards that. The social dimension is another aspect where the consumers and local communities can bring in their influence. Clean energy also brings empowerment women and girls through lessening the time required for energy sourcing. We have learned about the Nordic institutions and institutional facilities. There are instruments to make development finance institutions engage in the purpose. We envisage guarantees for green energy. Ethiopia is one of the partner countries we are looking to. Investors want to make long-term commitments to come to this region – and my last message is that the time is now.

2. Closing Statement by H.E. Mr. Torbjörn Pettersson, Ambassador of Sweden

We have offered so many technological solutions, however we have to be cognizant of what our Ethiopian colleagues have laid out. Thus, in Ethiopia's development pattern poverty reduction is a key. Ethiopia is extremely poor, and access to the poor is hence of paramount importance. To contribute to national development we don't only need to focus on our technology and solutions but to focus on the needs of the poor. There is a requirement for access to clean, accessible energy by the poor. If you look at the real investments there is a huge focus on industrial parks and big hydro projects. But we need to reflect back on the jobs they would create – it only accounts only for 2 percent of the jobs in Ethiopia. We are quite in a formidable transition in politics but also in economy. The mindset in macro-economy and the productive sector is very much traditional command economy– led by the state. That is what brought the 8 to 10 percent growth. The government is now about to change this pattern, and that has to change. The private sector is an extremely politicized private sector – something that Ethiopia needs to address is this tendency of living in a box outside the reality of the global economy. We need to address that.