CLEAN ENERGY SOLUTIONS CENTER
ASSISTING COUNTRIES WITH CLEAN ENERGY POLICY

Designing Successful Renewable Energy Targets in Africa: Key Principles and Insights

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Webinar Panelists

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Stephanie Bechler Hello everyone. I'm Stephanie Bechler with the National Renewable Energy Laboratory and welcome to today's webinar which is hosted by the Clean Energy Solution Center in partnership with E3 Analytics. Today's webinar is focused on designing successful renewable energy targets in Africa, key principles and insights. One important note of mention before we begin our presentation is that the Clean Energy Solution Center does not endorse or recommend specific products or services. Information provided in this webinar is featured in the Solution Center's Resource Library as one of many best practice resources reviewed and selected by technical experts.

Before we begin I'll go over some of the webinar features. For audio we have two options. You might either listen through your computer or over the telephone. If you choose to listen through your computer, please select the mic and speakers option in the audio pane. Doing so will eliminate the possibility of any feedback or echo.

If you choose to dial in by phone, please select the telephone option and a box to the right will display the telephone number and the audio pen you should use to dial in. If anyone has technical difficulties with the webinar you may contact the GoToWebinar's helpdesk at 888-259-3826 for assistance. If you would like to ask a question during the webinar and we encourage that you do, we ask you to use the questions pane where you can type that in. If you are having difficulty viewing the webinar materials through the portal, you can find PVF copies of the presentations at cleanenergysolutions.org/training and you may follow along as our speakers present. Also on an audio recording and the presentations will be posted to the Solution Center training page within a few weeks and they'll be added to the Solution Center's You

Tube channel where you can find other informative webinars as well as video interviews with thought leaders on clean energy policy topics.

Today's webinar agenda is centered around the presentation from our guest panelist, Toby Couture. Toby has been kind enough to join us to focus on what policy makers and regulators across Africa can do to design more effective targets as they seek to scale up the share of renewable energy in the mix and attract private investment drawing on examples from within Africa as well as from around the world. Before Toby begins his presentation we'll provide a short overview of the Clean Energy Solution Center initiative and then following the presentation we'll have a question and answer session where Toby will address questions submitted by the audience. Then we will have some closing remarks and a brief survey.

This slide provides a bit of background in terms of how the Solution Center came to be. The Solution Center is one of 13 initiatives of the Clean Energy Ministerial that was launched in April of 2011 and is primarily led by Australia, the United States and other CEM partners. The outcomes of this unique initiative include support of developing countries and emerging economies through enhancement of resources on policies relating to energy access, no cost expert policy assistance and peer to peer learning and training tools such as the webinar you are attending today.

The Solution Center has four primary goals. It serves as a clearing house of clean energy policy resources. It also serves to share best policy practices, data and analysis, tools specific to clean energy policies and programs. The Solution Center delivers dynamic services that enable expert assistance, learning and peer to peer sharing of experiences. Lastly, the Center fosters dialogue on emerging policy issues and innovation around the globe. Our primary audience is energy policy makers and analysis from governments and technical organizations and countries but we strive to engage with the public sector, NGOs and civil society.

A marquee feature of the Solution Center provides a no cost expert policy assistance program known as Ask-An-Expert. The Ask-An-Expert program has established a broad team of over 30 experts from around the globe who are available to provide remote policy advice and analysis to all countries at no cost. For example, in the area of sustainable energy policy design and laws we are very pleased to have Chad Laurent, who is a senior consultant and general counsel with the Meister Consultants Group, Inc. He serves as one of our experts.

If you have a need for policy assistance and sustainable energy policy design or any other clean energy sector we encourage you to use this valuable service. Again, the assistance is provided free of charge and if you have any questions for our experts, please submit it through our simple online form at cleanenergysolution.org/expert. We also invite you to spread the word about this service to those in your networks and organizations.

Now I'd like to provide a brief introduction for today's panelist. Toby Couture is the founder and director of E3 Analytics, an international renewable energy

consultancy based in Berlin, Germany. He works on a wide range of topics in renewable energy including policy and regulatory analysis, market research, strategy consulting and finance. He's worked extensively with policy makers and regulators on renewable energy strategy and has advised over 30 national governments around the world. With that introduction I would like to welcome Toby to the webinar.

Toby Couture

Thanks. Thanks Stephanie. All right. Thanks everyone for joining today. The topic for today's webinar is designing successful renewable energy targets in Africa. I'm going to try to break the presentation down essentially into two different components. So if we're lucky I'll try to keep the first half of the presentation roughly for the actual presentation and then save the second half or the second 45 minutes for question and answer period. So without further ado let me dive in.

So first, I'll start off with a brief summary of the presentation. Second, provide an introduction. The second aspect we'll look at the functions of targets. So what are the different roles that targets play? The third part will look specifically at how to design targets and I'll outline seven core principles for how to make targets successful in Africa. I'll conclude with some brief concluding remarks.

So a brief summary. Renewable energy targets have been adopted in over 160 countries worldwide. There are 54 countries in total in Africa of which 42 currently have registered renewable energy targets either in the form of specific policy or strategy announcements, renewable energy action plans or integrated resource plans that have targets bundled within them. But ultimately, if you look across the map both of Africa and around the world the actually number of countries that have targets isn't ultimately as important as the underpinning structure, the policies and regulations and administrative structures that support those targets in practice.

So if you look around the world, actually many renewable energy targets are having very little or even no impact on renewable energy growth, investment or deployment. So this is what I've started to call paper targets. There's an expression in English that refers to paper tigers and I think in this context it's really important to distinguish between substantive renewable energy targets that are actually making a difference in the market by mobilizing finance, by leading to project deployment and those that are just there on paper. That's a distinction I'll pick up again on through the presentation.

This map comes from a recent report that I helped co-author with staff at IRINA last year that provided the first global overview of renewable energy targets. This provides the global map of targets as of mid-2015. So you can see the spread is quite wide. Most of the world, as I mentioned—over 160 countries have some form of target and the number continues to grow.

In order to be successful, targets need to rely on a host of complementary policies. In other words, a target in and of itself is not an implementation policy. It provides the objectives but fundamentally there's a need for

complementary policies in order to get that target to lead to concrete investments in a given market. So I've listed a few of these here.

For example, clear power purchase agreements, some form of currency protection. You can see this in the case of Ghana currently with its IPP program. Credit support for various off taker agreements. So in order to improve the overall credit standing of the particular financing arrangements in place. So you can find this currently in Uganda under the Get Fit Program that's currently underway.

Another form of policy support is—or policy—sort of implementation related policy is providing explicit compensation or an explicit regulatory framework for curtailment or undelivered power. You can see this in the most recent rounds of the renewable energy IPP program in South Africa that's been launched a couple of years ago and has proven to be quite successful.

Another component is inflation indexation in the power purchase agreement contracts. So some of these things are essential in order to help implement the actual target, in order to get investment to happen in the first place and in order to establish some of the administrative permitting and group connection related procedures that are necessary in order to attract that investment. So at a—taking a step back, as I mentioned at the outset a renewable energy target itself is not going to suddenly make an un-investable market investable but they do remain important in anchoring the overall policy and regulatory framework and in providing the long term signal to stakeholders.

In a related sense, targets can also help put countries on the map by helping signal that there is opportunity, that there is potential for project related investment in a given country. For many countries in Africa that haven't benefitted or haven't been able to tap into foreign direct investment a target can be an important way to help draw attention and potentially attract finance to some of those investments. So now let's dive in.

There are currently many African countries that have adopted various forms of RE targets. As I mentioned, we have integrated resource plans that have targets bundled within them. There are also energy master plans that provide or include some form or renewable energy target and there are also regional initiatives, for example, in the ECOWAS region with ECREEE that have been successful in creating regional templates for renewable energy targets across the region. Perhaps the most sort of far-reaching initiative to try to push these targets forward had been the recent SE for All process to try to get some of these different countries from across Africa to adopt concrete agendas and to start implementing the kinds of policies and regulations necessary to scale up in the years ahead.

One fact that becomes clear from looking across the landscape and looking across the various tenders that have taken place in different markets not only in Africa but also around the world is that renewables are increasingly cost competitive. Investors and lenders are increasingly looking at Africa's renewable energy sector for potential investment opportunities. On the one hand I think it would be fair to say that there's quite a bit of hope and

optimism about the prospects but at the same time there's a big of a cautious undertone to a lot of the discussions, trying to see how bankable the individual markets are, what kinds of risks might derail investments in the years ahead.

I think there's particularly recently with the most—many currencies across Africa having depreciated significantly in value there's much greater attention on in particular the currency related indexation provisions of our purchase agreements in order to protect against some of those macroeconomic shocks that are taking place. So there is going to be increasing interest on the one hand but I think also with that interest comes much greater scrutiny, scrutiny of specifics of the policies and regulations, scrutiny of the very—the intricacies of the power purchase agreements and that scrutiny is likely to bring over time to help improve the overall strength and bankability of the frameworks in the years ahead.

Currently the IEA is estimating an increase of somewhere around 80 gigawatts of new non-hydro renewable capacity in sub-Saharan Africa alone by 2040. If you follow the IEA's forecast in renewable energy in other areas over the years globally they've consistently been conservative on their forecast and there's a good chance that this forecast for Africa may well also prove to be conservative. So there's a prospect of a very significant pipeline of projects coming online in the years ahead and part of that is driven by the spread of targets across the continent.

So here's the current status, excluding South Africa. This is just for the Sub-Saharan segment. You can see that interestingly as of 2015 the geothermal actually represents about two gigawatts or about over 50 percent of the total capacity in the pipeline with another share of roughly 30 percent from solar and 20 percent from wind power. That's primarily concentrated in the northeastern part of—and eastern parts of Africa. That is likely to change in the years ahead as the geothermal resources are tapped and as wind and solar in particular continue to scale up.

If you look at it on a country basis you can see that three countries dominate the market. Ethiopia, Kenya and Ghana currently represent over 90 percent of the total renewable energy projects in the pipeline. Again, this is likely to change in the years ahead as markets like Nigeria in particular start to scale up. But this provides a bit of a snapshot of where we are today.

It's important not to think of targets in isolation. Targets are always just one component of the overall landscape, of the overall framework, conditions for renewable energy finance. Investing in renewable energy projects in Africa, especially in Sub-Saharan Africa faces numerous challenges. There's higher political and regulatory risk in many cases, higher sovereign credit risk. We've seen this with a couple downgrades that have either been looted or implemented recently. Higher off-taker risk. So that ultimately refers to the utility that's buying the power and what financial health—how is the financial health of that utility and how sovereign are they to meet their long term off-take agreements and obligations.

There's also a shortage of long term capital. It's very difficult in many parts of Africa to find, for example, debt tenured for longer than seven or eight years. In some cases, it's difficult to find it for five years. So local banks have been very hesitant to offer long term finance and that has increased reliance on international financial institutions and in particular international development finance.

There's also importantly a lack of liquid currency markets. In a lot of cases this has really limited the ability to finance in local currency at all. If there isn't a sufficiently liquid currency market with the ability to buy and trade currency in different time intervals, it's very difficult to get local currency denominated finance to happen at scale. It can work for small projects, maybe up to 100 kilowatts or a few hundred kilowatts even into the low megawatts but it's very difficult to mobilize for significant transactions. So in the 50 to 100 megawatt range. That's an ongoing challenge in a number of markets across Africa.

As I pointed out a few moments ago, there's also greater exposure to economic shocks especially foreign exchange risk and inflation risk. We've seen that particularly in South Africa and Nigeria recently though the problem's fairly widespread across Sub-Saharan Africa in particular. So this puts a broader emphasis on de-risking. UNDP has been doing some terrific work on de-risking in recently years. I included here one report at the bottom that they've done on Tunisia looking at de-risking in nine months in the Tunisian context. I think there's really growing need for more discussion on systematic de-risking both on a public side as well as on the sort of investment side. Ultimately, renewable energy targets can be seen as part of that—can be seen as one of many de-risking measures.

So now, shifting to the function of RE targets. The first I had listed here is ultimately attracting investment. For many governments across Africa if not most governments the priority is trying to mobilize foreign direct investment into the economy. In order to do that, establishing a target can help send a signal to investors, can help put a country on the map in getting that initial pipeline of projects or project applications either for heat and terra policies in the country or auctions for tendering policies that are launched. So targets are sort of—can be seen in some ways as a bit of a primer to prime the market and get things going or at least increase the tension on the potential opportunities for investment.

Targets also provide a clear signal of political commitment, that there is a strategy in place and that renewables are going to be part of that and that at some level that sign of political commitment is in and of itself important. Depending on how credible that commitment is it can actually play an important role in—particularly for lenders who are looking at the long term viability of different infrastructure investments in a given market. So a legal—a target that's enshrined in law helps provide that clear sign of political commitment that can be instrumental in mobilizing finance.

As I pointed out briefly, targets can also be seen as a de-risking measure. They can reduce a number of key investment risks. They can help immobilize

and they can help to anchor a range of policies and facilitate long term planning. So if you're, for example, operating within the utility in a given country, when the government establishes a long term renewable energy target it can help the utility better undertake its own planning and its own— organize its own priorities in relation to electricity sector master plans. So if there's a renewable energy target in place that can directly impact the way long term planning is conducted. It can force new technologies or new options onto the table that may not have been considered before and it can drive a more balanced consideration of the actual cost competitiveness of different technologies.

A decade ago the argument was much more difficult to make when both wind and solar were considerable more expensive, particularly solar. But as the cost of renewable energy have come down it's increasingly important for regulators, policy makers as well as utilities to conduct that kind of benchmarking analysis to look at what the cost competitiveness of different technologies are in their long term planning. A renewable energy target can be one way to force that onto the agenda and in the process help ensure that rate pairs are ultimately supplied with the most cost effective hour possible.

In many cases, what we're seeing is that solar in particular is starting to become in many markets the most cost competitive solution for near term power supply. In contrast to large hydro or even geothermal projects which can take anywhere from five to ten years in planning and construction, large scale solar PV projects can be brought online in less than a year. In some cases, as little as six months with the right regulatory and permitting processes in place. So in light of the need for more reliable power supply in many parts of Africa and in light of the need for continued scale up in the power sector and particularly in investment, renewable energy targets can actually be seen as a way to also accelerate the scale of electrification and energy access.

Targets can also be used to drive a range of different policy reforms at the same time. So a target doesn't stand alone. It can help drive the establishment of grid codes. We've seen this in case of certain west [audio skips] Cape Verde and Ghana come to mind. It can help [audio skips] _____ around electricity restructuring particularly on bundling the generation side so that there can be more competition on the generation side. This can be seen in the establishment, for example, with West African Power Pool or the East African Power Pool where the long term view is ultimately greater competition between generators and a more liberalized market. Part of writing renewable energy projects or renewable energy targets can be seen as supporting that so far as they allow new actors, new investors, new IPPs to enter the market and participate.

In the most recently initiatives in West Africa, renewable energy targets have been coupled with energy efficiency targets. So we've seen the adoption of these national renewable energy action plans and national energy efficiency action plans. Both of them can be seen as critical parts of energy strategy for many countries, if not all countries across Africa in the years ahead. So you

can see that the targets can help or can be implemented in conjunction with a range of paralleled policy efforts including energy efficiency.

In many cases, targets are also [audio skips] relation to or in conjunction with either heat and “terras” as we've seen recently ongoing in Uganda or auctions as we see for example in the case of South Africa and Zambia and Senegal. So there is a—targets can help set that frame and then complementary policies like fits or auctions can help actually [audio skips] the market and help turn those targets into specific, investable projects. But as I pointed out briefly a few moments ago, in order for targets to do those various functions, rich those functions they have to be seen to be credible. As was seen in many cases and as we continue to see in many countries around the world, targets don't necessarily mean a rapid scale up investment. There's a whole lot of things that need to happen between in order to ensure that [audio skips] _____ targets can [audio skips] investments in the market.

As was pointed out in the IRINA report that I mentioned at the outset, renewable energy targets deriving only [audio skips] _____ _____ and to be fragile. So if there isn't sort of a broader base of staves and actors supporting the adoption and implementation of targets the targets may not be credible and therefore may not have very much effect on tracking investment or even on Sigmund. So it's really important that the targets themselves are seen to be credible and part of what this presentation about is to try to outline some of the ways in which countries, particularly in Africa were in need for investment in the power sector is so significant, some of the ways in which those targets can be made more credible.

So part three. This is broken down into seven different principles. I'll try to go through these one by one. Most targets around the world remain aspirational. That's just another way of saying non-binding or sort of voluntary. They're not in many cases backed by effective policies and in most cases they're not legally binding.

So you might ask, "Well what's the point then of a target that's not binding? Then it's just the political statement without any implementation." This is what I've come to refer to as paper targets. Paper targets are one of the most problematic aspects of the renewable energy landscape today. There are many countries that have very ambitious targets on paper that are failing to follow through on those. I think that—on the one hand, that delegitimizes or discredits to some degree the important role that targets can play but it's also a sign of political failure, the inability to follow through on specific policies and laws that have been either proposed or adopted in the past.

National utilities in many governments in many cases are often perceived to block progress towards achieving renewable energy targets or even block the implementation of the targets to begin with. Sometimes this is maybe—this can be argued to be intentional. In other cases, it's just due to inertia or inaction on the part of utilities. Sometimes doing nothing is actually in itself doing something in so far as it fails to create the on ramps, fails to create the kinds of conditions necessary for new projects to connect to the grid and to participate.

So the first key principle is to move away from paper targets and make target binding with clear consequences for failing to achieve them. I'll outline later in the presentation a few ways in which some of the—in which targets can be made more binding, what kinds of consequences could be implemented or can or have been implemented in other jurisdictions around the world to try to increase the credibility and binding that's if you will of targets.

You can see from this spectrum which developed in the IRINA report on setting renewable energy targets last year that targets can be broken down into four different categories, basically along a spectrum. On the one hand, they're sort of political announcements or general vision statements. These are often embodied either in a press release or a white paper that outlines an intention to adopt maybe 20 percent renewables or 30 percent renewables in the energy or electricity mix. But many of those political announcements are just that. They're not supported by specific policies. They're not supported by specific regulations and they often don't lead to any meaningful transformation in the energy mix.

The second part of this spectrum is where those vision statements are translated into actual strategies. This might be integrated resource plans or electricity master plans. But again, if you look across Africa for anyone who's worked with regulators and policy makers across Africa the follow through on master plans is often incomplete. Many of the aspects of many of the elements of the master plans simply don't get adopted or don't get implemented. They're in the document so you can go back and find the master plan that outlined all these terrific things that were going to be done but the actual follow through is often not there. That comes down to whether the targets or whether the goals outlined are actually binding or not or whether they're just voluntary and aspirational.

The third one is where these energy strategies become converted into actual action plans and we see this currently taking place in West Africa where some of the—where the 15 ECOWAS member states, for example, are in conjunction with ECREEE and a range of other partners are starting to adopt the various components of their national renewable energy action plans. You can see in the action plans a much greater level of detail, a clear focus on policies and implementation and even the introduction recently of what's been called the investment prospect that actually outlines a set of investable projects that can be tabled in order to attract investment in the country, in the power sector or in the energy sector more broadly.

So we can see throughout each of these that there's an increasing degree of specificity, measurability but also a bindingness. How binding are they? In the fourth and final part of this spectrum is where we find legally binding renewable energy targets. Those are typically enshrined in law and they come with clear penalties for non-compliance. The penalties can take, as I pointed out, a range of different forms.

In some cases, the penalties involved—for example in the case of the U.S., utilities that don't comply may have their allowed return on investment, their sort of regulated return on investment brought down a notch or they may face

actual cash penalties for each day that they are short of reaching the target in a year or it may even involve specific penalty for each megawatt hour or gigawatt hour shortfall from a target in a given year. Those penalties can help encourage the utilities that are responsible for meeting them to comply.

Another approach that can be used in relation to making targets more binding is actually to make management responsible, to make management accountable for meeting the targets. So if there is a credible threat that a utility executive, for example, will lose their job, will be replaced if they fail to meet the regulations or meet the targets set out. Then you can start to create the right incentives to ensure that the utility takes—the utility management itself takes the target seriously and takes specific measures to make sure that it's met on time.

So ultimately there are various ways of enforcing compliance. There are various compliance cultures to encouraging renewable energy targets to be met or targets of any kind to be met but fundamentally it comes down to creating the right incentives to ensure that the progress is being made and to ensure that there's consequences for falling short or for dropping the ball. I think that's really at the heart of this discussion.

The second point. There's a recent book that introduces the distinction, I think quite a powerful distinction and one that we'll likely still be discussing decades hence between inclusive and extractive institutions. Inclusive institutions foster participation and feedback from different actors, different entities, different parties in society. They ensure a level playing field so that anybody can participate and they help introduce the right kinds of incentives to ensure that the economy can develop more effectively with less corruption and less preferential treatment.

That's in contrast to extractive institutions that are seen to monopolize or control power, essentially centralize that power and often contribute to far higher shares of corruption that ultimately don't contribute to the economic prosperity of the country. Asa _____ Robinson in their book lay out a whole range of different examples from across Africa, from across Asia, from across even the Americas and Europe or where different institutions have failed in being sufficiently inclusive and what consequences that has had. I think there's a lot of important lessons in there both for policy makers in general in Africa but also for anyone working in development. So the second key principle is institutions matter.

Renewable energy targets are likely to be achieved far more quickly and efficiently when the institutions that govern them are accountable and have clear rules and procedures that apply evenly to all participants and when those rules themselves are relatively—and procedures are relatively transparent. So at the heart of this is making sure that not only is a target in place but that the target is accompanied by a set of policies and procedures that ensure a level playing field.

The third point is that in order to monitor progress it's necessary to have the baseline. So as was seen in the climate, the various climate targets going back

to Kyoto, governments adopted a baseline year and this baseline year differs depending on the country. It differs yet again with the agreement recently announced in Paris in December. But fundamentally establishing a baseline and gathering the core baseline data is critical.

This is accompanied or needs to be accompanied by some form or regular reporting. Typically, at least in the renewable energy sector as well as in the climate sector this is done with some form of annual progress report. So having clear baseline data that says where we are today and annual reports that update over time. A key part of this and a key reason for this principle is on the one hand transparency but on other is to help keep everyone's eyes on the ball. If there isn't that kind of regular reporting, it's very easy for either the policy makers or regulators within the country of the citizens or the various businesses even operating within the country to just lose sight or lose track to what's actually going on and to not focus. So one of the functions of an annual report is that it helps maintain both the public pressure but also it helps keep people focused on the objective.

The fourth principle relates to accountability. In many countries, and this isn't just in Africa but in many countries around the world there's little or very—or even no capacity in place to monitor and report on that progress. In many cases there are few or no institutions that are responsible for publishing annual reports. In some cases, it's just voluntarily left up to the regulator and the regulator often has multiple different priorities and may be short staffed, may have too many responsibilities, may have other training or capacity building that takes priority.

In many cases that kind of annual credible reporting simply doesn't get done. Now there's been a lot of work done on this by and in conjunction with international donors. I think that's certainly one positive area where more effort is needed to ensure that there is this annual reporting and data gathering going on.

On the one hand, this kind of progress monitoring fosters greater accountability because you can actually point when a given jurisdiction has fallen short, but it also helps promote public awareness because the annual report can be covered in the media. By being covered in the media can be discussed more widely and can help individual, for example, business groups to put more pressure on the government to step it up or to improve their policies or regulations. So in that sense, progress report isn't only useful for investors or for civil society. It's also really important for the government itself so that it knows when improvements are needed or so that it can identify actually what needs to be improved in order to get the market growing in a way that's consistent with the targets established.

So the fifth principle relates to how specific and precise the targets are. There have been many debates around the world around the precise definition of the target and what the various law makers or regulators meant when they wrote energy or electricity or the share of in the law or the regulations that established the target. In some cases, the target is defined specifically in absolute terms, so in a specific number of gigawatt hours that has to be

generated or percentage-based, a specific percentage of total energy consumption or total electricity consumption.

But there's also further nuances. It can be important to distinguish between whether it's referring to final energy consumption or primary energy consumption. Also whether it relates to electricity or energy more broadly. In many cases, the laws are simply set out and referred to energy when really what's meant is electricity. Some of those nuances may not seem that important on the surface but when it comes down to the actual legal or regulatory intent it can become critical.

A further distinction is between whether it's on final electricity or energy output or sales. So in other words, does this monitor the number of gigawatt hours produced by wind and solar and hydro and biomass projects and geothermal projects across the country or does it refer to the actual share of renewable energy in final electricity sales that reach end users, reach customer? Again, that can seem like a fairly abstract nuance but it actually can have a very significant impact on the total magnitude of the target. So in some cases, is the target is set just at the power plant, the bus bar level and just in terms of output the target maybe 20 percent or even 30 percent smaller than it would be if it were on final electricity sales due to losses in the distribution and transmission system.

So the trend certainly in the U.S. and increasingly in Europe is for the targets themselves to be set as a percentage of final electricity sales or actual consumption in the market rather than on just output. That's, again, partly because of the desire, the need for more regulatory and legal certainty. So the more binding the targets become the more important these kinds of provisions become.

A related point is that instead of rather than having a simple long term target set out for 2030 or even 2040 as is often the case, it can be very helpful both for the government as well as for investors for a target to be broken down into interim steps or into incrementals steps either on an annual basis, every 3 years or ever 5 years so that there's some greater degree of resolution in the target itself. I think that can be really important and you can see this in, for example, U.S. RPSs that even the long term target is broken down into a series of individual annual targets. That helps, again, improve clarity, improve the overall planning certainty but it also helps in making the target itself more robust and fundamentally more credible. So the fifth principle is making targets precise and clear as well as staged, more stepped over time.

The sixth. The sixth principle relates to the grid and the associated infrastructure. We've seen in a number of countries in recent years the development of renewable energy project moving well ahead of the development of transmission and capacity. Not only is that embarrassing but it's also unnecessary, sort of what's called an unforced error in sports. If you're in a position where the planning procedure should have been in place, could have been place to ensure that transmission capacity was there permitting the projects before the capacity is being built is not a good idea

because the projects need far less time to be developed than the transmission capacity.

So if we're talking about large scale, particularly large scale projects, having a clear set of protocols, a clear planning process for transmission expansion including its own financing and both equity and debt related financing provisions in place then it's going to be very hard to reach the target on time. These large projects need certainty over the ability to export their power into the system. This implies whether it's in wind projects in Kenya or geothermal projects in Ethiopia or solar projects in Cape Verde or wind projects in Cape Verde for that matter. Fundamentally there needs to be access to the grid and the gird needs to be there and be sufficiently reliable to accommodate that power.

Curtailment has already emerged as a huge issue in both European and U.S. power markets. I would venture that it's going to be and going to remain one of the most important aspects of insuring bankability in Africa in the years ahead for new projects being built. Part of that relates to broader issues around the liability of the grid. If the grid isn't sufficiently reliable and the power can't be delivered what does that mean for either the achievement of the target—is the target actually still met if that power is curtailed—and what does it mean in terms of the actual end user and the share of the actual energy mix or the actual power system mix in the system? So ensuring that the infrastructure is there and that the ongoing improvements are made in both transmission and distribution infrastructure are a key part of successful implementation and achievement of renewable energy targets. So the sixth key principle, don't forget about the grid.

The seventh and final principle is and centers around stakeholder engagement. Targets that are imposed without stakeholder engagement often lack legitimacy and often don't get very good uptake. We've seen several positive examples of stakeholder consultations in recent years and I think there's some great literature, great examples and great websites from these various regulators and agencies on how they went about their public consultations on the targets and I cited a few here. Morocco, South Africa and some countries in the ECOWAS region come to mind though there are certainly others. Another good example would be Tunisia.

Fundamentally, stakeholder consultations are critical to build that legitimacy, in crew the credibility of the target and ensure that there is mobilization taking place to achieve it. So all of this is part of a deeper process that needs to build up over time. Part of creating that build up involves engaging with stakeholders.

So concluding remarks. Be firm on the vision but flexible on the details. I think fundamentally it doesn't matter what the precise number either of countries that have targets or of the target number itself whether it's 30 percent or 40 percent or in the case of Cape Verde 100 percent what matters is the underlying institutional environment that supports that achievement of those targets. In many cases, we've seen the actual details of the target themselves change.

So in South Africa's integrated resource plan from 2011-12 there was virtually no mention of solar. Solar was not included in explicitly with its own capacity target in the integrated resource plan. Then during the public consultations, it was brought to the attention of both regulators and the decision makers that solar should be included not only because technological diversity has its advantages but also because solar was actually increasingly cost competitive in South Africa. When they went back to the drawing board and evaluated the cost, South Africa significantly increased the amount of capacity allocated—allocating a few gigawatts of capacity to PV projects instead of the zero that had been allotted in the previous IRP.

So the file, ultimately the details of the targets are likely to change as technology costs change but also as the greater awareness of resources and availability and of—which projects are more investable or which projects have the most motivated backers becomes clear. As that happens there needs to be a process in place for the target itself to be adapted or adjusted over time. So the target itself, the overall objective of de-carbonization or transitioning to more local, renewable sources in the power mix can remain but ultimately the details of how that particular target is reached can change and often should change as new information comes to light. So with that, I'll open it up to questions.

Stephanie Bechler Great. Thank you so much Toby. Our first question here is, "Given the countries' different legal and regulatory history, how can countries make targets more binding and what kind of penalties could they implement?"

Toby Couture Huh. I think in _____ countries it's going to be hard to establish the kind of penalty architecture that you have in the United States, for example, where there's a long tradition of public utility commissions regulating the utilities either publicly owned or privately owned within the state. Without that kind of regulatory tradition, it may be necessary for decision makers to be a bit more creative or to adopt different means of ensuring that the targets are met. So in many cases in Africa, it may not be viable to introduce penalties partly because those penalties—if the utility can just pass on the costs of those penalties onto rate payers then the government takes the political heat for that.

So if the government levies significant fines on the stake, for example in Tunisia which is the utility responsible for the majority of the power mix in Tunisia then in all likelihood they would just pass that cost onto rate payers rather than get materially impacting their operations or their profitability. So a simple penalty actually may not work in the way that it might in other traditions where the penalty can be levied more or it can be restricted or ring-fenced more specifically on shareholders. So in those kinds of environments, the more effective or one of the more effective ways of approaching the problem of penalties or of compliance might be to, as I pointed out, from the threat of someone losing their position, losing their job over the failure to achieve their target.

If managers actually believe, manager of utilities actually believe that their job is on the line and that reaching this target is a matter of national importance, national energy security, national economic development,

national economic diversification, if the target is taken sufficiently seriously and there's a credible threat that they could lose their job for failing to meet it that's likely to help significantly in focusing people's attention. That may be another—sort of an alternative and potentially more politically popular way of encouraging utilities to meet the targets than the kind of penalties levied in certain cases in the U.S. for example. So ultimately, as I pointed out briefly, this comes down to a question of different compliance cultures or enforcement cultures. It really—it's important not to sort of copy and paste what has worked, for example, in North America or elsewhere into Africa. I think local solutions are best. I've suggested one potential avenue. That's certainly not the only one.

Stephanie Bechler Great. Speaking of targets, in your experience are the targets simply focused on utility scaled project or do they extend to off grid strategies such as mini grids or SHS?

Toby Couture Yeah. So we actually—there have been many countries across Africa that have targets for both utility and off grid and even in some cases mini grid projects with specific numbers, specific either percentage numbers or capacity numbers attached. So one example that comes to mind is Rwanda. In Rwanda there are national targets for the sort of ITP market segment, solar home systems as well as for mini grid, sort of renewable hybrid mini grids. I think that's a great template because ultimately just focusing on the ITP market is probably too narrow. A lot of the future power needs, future electrification needs are concentrated in remote and sort of peri-urban or non-urban areas. Encouraging investment in those kinds of projects, setting targets for those kinds of projects I think can certainly help bring more attention to them and help them get the financing they need.

Stephanie Bechler Thank you. Another question that came in is asking for some clarification on the principle two, dealing with inclusive versus extractive institutions. Could you just expand on that a little bit?

Toby Couture Sure. So the book itself is called Why Nations Fail. It looks at—it uses that distinction as a way to understand the economic development and prosperity of nations. So it looks at—for example, focused on one case of extractive institutions perhaps the most famous or most notorious is the institution of slavery where the direct extraction of human labor was done in order to enrich a very small segment of society.

The same happens in many cases in the mining or mineral sector today where a very valuable resource is extracted in order to benefit a very, very few and in order to protect the power of the very few within society. This has happened over centuries and millennia as they detail not only in Africa but also in jurisdictions around the world including U.K. and many parts of Asia. Those kinds of power structures are what they characterize as extractive in that they are based on extracting the value or extracting some form of value or wealth from one subset of society in order to benefit a few.

Inclusive institutions are the kind that allow broad participation in economic activity and that aren't based fundamentally on extraction but are based more

on sort of distributed wealth creation. That would be creating fair rules for small business development rather than having one national entity responsible, for example, for all charcoal production or all electricity production in the case of energy. So inclusive institutions are about creating the kinds of environments that allow or that establish a level playing field, that allow multiple different actors to share power and to participate in economic growth and prosperity. The argument is that at the core what defines successful prosperous nations from less successful ones is the extent to which their institutions are inclusive.

I think in the—I've picked up on this in the discussion around targets and in particular in focusing on Africa because I think the fundamental insight is quite a powerful one and is one that is useful for the power sector. If you look at the example of Germany and the four utilities that previously dominated the power sector, with the introduction of both ambitious renewable energy targets but also the [audio skips] _____ _____ in Germany you saw a very rapid diversification of the energy supplied system where there are now over 1.2 million individual solar producers in contrast to the four entities that used to own virtually all generation across the country. So through that diversification you have a sharing of power, both in the figurative sense as well as in the literal sense in that more individuals and businesses can participate in the power system, in the electricity system, in the energy system more broadly. That has powerful effects.

In Germany and in many other countries, the ability to participate not only increases the political legitimacy of the targets or the objectives it also increases the ability of individuals in the country to prosper or to benefit from that and have more disposable income that they can then reinvest and support future economic growth and diversification. So there's very much what the two authors refer to as a virtuous circle or virtuous cycle that takes root when the institutions are fundamentally inclusive. I'm sure you can find online a great summaries of the book and they've no doubt published articles in range of different platforms summarizing the key points. But I think the message carries important insights for both renewable energy targets and strategy but also for Africa in particular.

Stephanie Bechler Great. Our next question is about stakeholders and just who are the different types of stakeholders to be engaged that you mentioned in principle seven to make successful renewable energy targets? The second part of that is which factors made Morocco, South Africa good examples of stakeholder engagement?

Toby Couture So some of the key stakeholders obviously utility or utilities needs to be at the table. Targets are unlikely to be adopted if they don't have buy in from the key actors. This has been one problem in many countries. If the largest utilities are part of the discussion they don't feel included in the discussion, they tend to drag their feet at every chance they get because they haven't been consulted and they feel that it goes against their existing long term planning. So they're obviously perhaps the most pivotal and the most obvious. But there

are also some other less obvious ones. Anyone operating or responsible for the power grid needs to be involved.

I mentioned briefly the West African Power Pool as well as the Eastern African—some of the new agencies and emerging around that certainly need to be part of the discussion. Investors that have expressed interest need to be part of that discussion. Citizens obviously need to be part of any discussion around these topics and making forums and conferences available to citizens and to business owners can be a really important way of building some of that momentum and public awareness and public credibility.

Another important set of groups is obviously the business associations. There are a range of different business associations that often are vocal on a range of different issues. Having them involved can also be important in helping mobilize more investment. There may be companies in the country that aren't currently interested or currently investing in renewable energy that actually have quite strong balance sheets and that may be a very good candidate for investing in the power system or in power system infrastructure or generation that haven't been involved before.

So there may be a way to get some of those actors involved. On that note, it also can be other parallel sectors like the telecommunication sector or the hotel sector where there's significant potential for both distributed as well as larger scale renewable energy investments to take place. So in engaging broadly is critical.

One final group relates to some of the different agencies that are already involved in many countries, international agencies whether the African Development Bank, the IFC and World Bank, UNFUNDP and some of the European agencies, GI Zed. I think having some of those key partners at the table can be really important both in the awareness side and creating a more important signal and helping spread that signal to other potential investors but it can also help support some of the training needs that merge. So in order to achieve a target it may be necessary to significantly improve grid integration protocols, for example, and way the renewable energy is actually integrated into the system.

That can involve a host of different technical changes both in the system architecture but also in the procedures, the institutional procedures around the way power is dispatched. For some of that it can be very helpful to have targeted training support. So having some of those agencies and entities at the table can be important and not just for the traditional reasons of providing co-financing but also for training and capacity building.

To the second question around Morocco and South Africa, I'll just focus briefly on South Africa. They underwent a range of stakeholder sessions both to identify things like sort of geographic side of the equation. So where in South Africa can or are the best renewable energy sources found? Where is the land rights regime clearest where, for example, large wind farms or large solar projects could be built? It's difficult to imagine how that land—these

land based questions could be clarified without direct stakeholder engagement with both public authorities and land owners that are affected by this.

So South Africa underwent a broad process both sort of on the resource assessment side but also on the kind of land rights and land access side in order to clarify some of those questions and help identify where a series of zones were renewable energy projects can be most effectively or most efficiently built. So that was all coordinated with the help of different agencies but sort of championed or quarterbacked by the government. That's just one example. There are many that could be pointed to but those are your—that's one in particular that comes to mind.

Stephanie Bechler Great. Thank you. Our next question is dealing with extremely rural areas and poverty. How can we engage governments, donors and private sector to prioritize targets around energy poverty at an extreme level?

Toby Couture If the International Energy Agency is to be believed, for every $1.00 of power sector investment in energy access that's made it translates into a $15.00 benefit or $15.00 impact on GDP. So if countries across Africa really start taking energy access seriously, not just as a sort of a form of noblesse oblige from the authorities that sit in the capital but as an actual economic development strategy I think the potential is tremendous for rural regions across Africa to lead the way. I think it does take a deeper appreciation of some of the direct and indirect benefits of both electrification of energy access in particular but also just of renewable energy in general in these regions.

If that isn't appreciated or if that isn't fully understood by the decision makers, it's unlike to get the kind of priority that it perhaps deserves. So if you can get key decision makers to really grasp, really understand the significant economic multipliers and positive benefits that come from positive economic benefits that come from improved electrification it necessarily need to be seen as a—just a negative or a sort of cost item on the government's balance sheet or a cost item specifically in their government planning. It can be seen as a direct investment in their future economic growth and prosperity. I think that's where the discussion on electrification, on energy access needs to go. I think it's not just about trying to find new business models or [audio skips] _____ _____ financing that can scale up though that's obviously at the heart of this challenge.

In order for that sector to get the attention it needs decision makes need to more fully appreciate the extent of those multipliers and how positive improving energy access ultimately is for the economy. I think that's one way to get electrification targets directly within either the renewable energy targets or within the master plans. On the other hand, I think it may be fair to say that it may not be necessary to have a target for every village or for every sector and sub-sector. I think in the off grid space the economics are already leading the way. It is already more economic to power villages and communities and households with solar PV than it is with diesel even at today's oil prices.

So in many of these areas the economics are already overwhelmingly in favor of a renewable energy pathway. So the need for specific renewable energy targets in the traditional sense may become less and less important because renewables are actually the cheapest way to do it. What then becomes more important is the business models and the provisions around how this is financed and how the tariff structures are designed and, "How can you make those tariffs affordable to end users?" Even if it's cheaper than diesel it doesn't mean that it's affordable for communities to have the level of power use that they might have in the city.

So there needs to be power supply in remote areas is by definition more expensive. That needs to be reflected ultimately in the kinds of systems and the kinds of tariff structures that are established. So I hope that answers the question.

Stephanie Bechler Great. Thank you. We have one last question before we head into closing remarks. Based on your experience working on renewable energy projects in Africa which source of renewable energy do you think has so far been the most successful on the continent?

Toby Couture Huh. I mean in absolute terms if you define renewable energy broadly biomass takes the cake. Biomass represents by far by which—by that I means wood or dung related for cooking purposes—represents in many countries over 90 percent of the total energy mix. It is the overwhelming largest contributor to the energy, to the overall energy mix in many cases. So broadly speaking I think you could say biomass takes the cake at least for now. But the more important question is looking forward what's more likely?

I think while broadly the Sub-Saharan Africa has tremendous potential in geothermal, has tremendous potential in hydro and also has quite robust wind resources in certain regions I think in the long term the future is solar. I think the majority of power mix in 100 years in Africa will be solar. I don't think there's any technology that's as scalable and as cost effective particularly given the existing composition of the African power system. I mean if you—building transmissions often and is increasingly the most expensive part of electrification. It's not the generation side. As PV and wind get cheaper and particularly PV that ratio is going to get worse and worse. It's going to get more and more in favor of distributed approaches.

So it may not make sense to build 20 gigawatt hydro dams or even 2 gigawatt geothermal plants when you have to transport that power over hundreds if not thousands of kilometers. Because when you take that combined investment the centralized pathway may be far more expensive than a decentralized one. So in terms of following that logic, then the future is increasingly to what can be most easily decentralized. While wind is decentralized to a degree you're still talking about minimum project sizes typically of sort of 10 megawatts and above whereas PV can be scaled down to the peak of scale.

So in light of that flexibility, in light of that scalability and just in light of the fact that solar is the most widespread, most sort of equitably distributed energy resource across Africa it's likely to be the defining technology in

boosting access and in achieving renewable energy targets in the years ahead. Even if that's not the case in many energy targets or many energy strategies today I think it increasingly will be and increasingly should be if economics dictate.

Stephanie Bechler Thank you. Well those are all the questions that we've received. If anyone else would like to submit another question you can enter it in the question pane on the tool bar and we can always send them after the webinar. Toby, would you like to add any closing remarks before we continue on to the survey?

Toby Couture Sure. I guess one closing thought. I think at the heart of this, renewable energy targets are just—they're framing. They aren't what goes inside. They are important at certain setting the stage but fundamentally a lot of work needs to be done in what goes inside that target.

What are the specific if not the majority of the work is based on what goes inside that target? How is it structured? What kinds of policies are used to achieve it? What are the administrative procedures that are in place? What kinds of agencies have what kinds of responsibilities over making what kinds of decisions within the jurisdiction to achieve the target? I mean that's really where the most important work remains to be done.

So I think from a media standpoint often a lot of attention is placed on the magnitude of the target. Is it 20 percent or is it 30 percent or is it 50 percent? From at least in my experience I think the number if far less important than the institutional underpinnings. I think any—particularly in the light of the ongoing NREEBs and NEEBs and the SE for All processes are going on across Africa I think it's really—the attention needs to be on those institutional underpinnings. Trying to get the procedures in place right so that the right investability can be established but also so that some of the key risks can be addressed and can be de-risked in the process. So I'll leave it at that.

Stephanie Bechler Thank you so much. Now we would like to send out a brief survey to the attendees. The first question that we have for you is, "The webinar content provided me with useful information and insight." Please select on the screen if you strongly agree, agree, not sure, disagree or strongly disagree. Great. Thank you.

Our next question is, "The webinar's presenters were effective." Thank you very much. "Overall, the webinar met my expectations." Thank you. Our fourth question is, "Do you anticipate using the information presented in this webinar directly in your work and/or organization?" Finally, "Do you anticipate applying the information presented to develop or provide policies or programs in your country of focus?" Thank you so much. That is our last question.

On behalf of the Clean Energy Solution Center I'd like to extend a thank you to Toby Couture for attending our webinar today. We've had a terrific audience and we very much appreciate your time. I invite all of our attendees to check the Solution Center website if you would like to view the slides and

listen to a recording of today's presentation as well as any previously held webinars. Additionally, you will find information on upcoming webinars and other training events.

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