Transcript of the Business Day Nedbank Green Energy Dialogue
November 7 2013

Hilary Joffe: Welcome to the Business Day Renewable Energy Dialogue, a conversation between high-powered people on issues that really matter to SA. I am Hilary Joffe and with me is a very high-powered panel of people from the energy industry, from government, the private sector and academia. We're hoping the issues will be freely and frankly discussed, because renewable energy is something which arouses great excitement in some and great caution in others, so we hope that the debate will be spiky, pointed and interesting.
Director-general, I'd like to start by asking you why we need renewable energy at all, firstly, but also what the process is – can you give us the flavour of the process by which you have brought all these new private sector producers into the industry to produce wind and solar power for us?

Nelisiwe Magubane: Let me take you back to 2009 when the idea of reducing our emissions was first mooted by the president of the country. You'll recall he made a commitment in Copenhagen that as one of the biggest polluters in the world we needed to change the way we do things. As you are aware, almost 98% of our energy, electricity in particular, was generated from coal. So we then did a planning process – the now well-known Integrated Resource Plan (IRP). The plan had to make a number of assumptions – the biggest that we were going to reduce emissions. It was our considered view that renewable energy would play a significant role in ensuring that we cut emissions.
After it was approved by Cabinet on March 25 2011, we started implementing the plan almost immediately. We concentrated mainly on the renewable energy programme because in the Integrated Resource Plan it's very clear what kind of power is going to be needed and when – which year.
I must confess that at first it did have challenges. You'll recall that we started by having what was called a REFIT (renewable energy feed-in tariff) at the time, which was done by the National Electricity Regulator of SA.
However, when we then did our own due diligence and realised we would be acting outside the law. Therefore, we had to look at the best way to execute the programme and also look at the best way it could attract investment, while also making sure we try to keep our electricity costs as low as possible. Therefore, between ourselves and the Treasury, we agreed that we were going to embark on a PPP – a public-private partnership – and we already had a feasibility study that showed there would be value for money for government.
Together with the National Treasury, we agreed we needed transactional advisers as we were new to this. The rest is history.

Hilary Joffe: It is quite an interesting history which must have been quite challenging. There's been a lot of talk of public-private partnerships, but in the last year there's been actually very little from the government in the way of public-private partnership. So this must have been quite a big challenge to work out how you do bring the private sector into the energy industry, which has largely been public-owned forever.

Nelisiwe Magubane: Absolutely, and one of the lessons we learnt very early was the issue of creating certainty. In other words, we had to make sure we had very clear electricity regulation for acquiring new generation capacity. Those regulations were published for public comment and they were commented on quite extensively. By the time we finalised them we had a very good idea of what was expected of the department.
What we also needed to do was to make sure that the risk-sharing mechanism was given to the person who could actually handle the risk. As government officials we decided up front we were not in the business of construction, so we're not taking that risk. We also indicated that, as technocrats, we're not in the business of banking, so we are staying out of that risk. We looked at the risk that we can manage and that was the basis of the agreements that were crafted by some of the most esteemed lawyers in the country.

Hilary Joffe: You've now just completed three rounds of going out to identify private sector producers who could come into the industry. What would you count as the biggest achievement of that process so far?

Nelisiwe Magubane: The biggest achievement is that the projects are not only being constructed ahead of schedule, but most of them have experienced few challenges. Most construction sites come with their own challenges: strikes, delays … all kinds of challenges.
We have seen some community members raising some challenges with the developers and the developers have had the maturity to handle most of those problems.
When construction started, we were probably receiving complaints almost daily, but that has subsided now, we're beginning to see progress. The communities are beginning to see the benefits, which for us from a service-delivery point of view, is quite positive. That's basically what we're about – service delivery.
But we are also beginning to see manufacturing capacity being developed locally, because there is more certainty on the programme, and more faith in it. That's significant. That has been the most exciting between window one and window three – it's also local economic development.
That local economic development has moved from a minimum of about 20% (local content) up to about 53%. It tells us that projects like this programme are going to yield local economic development. We have also seen quite a number of jobs being created.
Naturally you create a lot of jobs during construction and they taper down later on but there are no less than 25,000 people on site, as we speak, on the programme.

Hilary Joffe: Mike Peo, there's been huge interest from the banks, I know, in this programme. What's the attraction?

Michael Peo: Banks, generally, have been very supportive of the whole PPP programme from probably 2002-2003 when we legislated for public-private partnerships, but there has been a lack of deal flow.
Three things bring banks into the equation.
One, there was a very well thought out process in terms of how this procurement would happen, so what the director-general has just spoken about, from the inception of bringing in a massive team of advisors – I don't think we've ever seen that number of technical, legal, insurance, modelling type specialists assembled to evaluate a programme.
All the right things were done at the outset to give people confidence that all the issues had been properly thought through, that we wouldn't find ourselves in a situation where in particular developers would spend an incredible amount of money developing projects only to be told later 'we're cancelling the programme because we forgot to consider one aspect of public policy' or anything else.
Second, there's obviously a good economic return for the banks. Banks are there to make money, so the economic return is balanced against the risks of the programme. With the orderliness of the programme and the government support and the Eskom support these deals have been immanently bankable, so there have been very few projects where developers have been unable to secure financing on what I believe are still very good market returns.
Third, from Nedbank's perspective, we really do believe in projects that are sustainable, that have long-term developmental effect. So this is not just an investment in something transient. We are probably the largest bank lender into long-term infrastructure projects in SA. So we live with the deals for 20 years, whatever the funding terms are – anywhere from say, 15 to 20 years, we're involved in the project.
To us the social upliftment, the job creation, the localisation – they're all fundamentally important parts and Nedbank has signed up to that. So when we present to our board it's not just a pure mathematical calculation, it's 'what are we really doing, what are we building in the country?' and I think the bank does believe in that.

Hilary Joffe: Anton Eberhard, the banks are earning very good returns on these projects – is that a good or a bad thing for the country? Are we, as a country, carrying the cost of banks making huge profits on these projects and is that a good thing?

Anton Eberhard: Mike (Peo) said an important thing –returns are balanced against risk, and probably that balance is appropriate in these projects. But I'd point to prices, and the price outcomes.
That's what consumers are interested in. We've seen remarkable price reductions over the two years, over the three rounds. The figures for PV, that's photovoltaics, solar photovoltaics – they have come down 68% between round one and round three and are now sitting below a rand!, The cheapest is 88c/kWh. Wind energy has dropped 42% over three rounds and is sitting on an average of 74c/kWh.
In fact the cheapest project was from Mark (Tanton) sitting over there – Red Cap, with 66c/kWh. Now that's approaching grid parity, in fact below grid parity...

Hilary Joffe: Explain that, Anton.

Anton Eberhard: Well, it's certainly cheaper than consumers are paying on their electricity bills, but I think a fair comparison because this is grid connected. Does it compete with new generation options for Eskom? Certainly it does.
All the estimates for Medupi and Kusile are substantially more than that. Of course, wind and coal are not entirely comparable...

Hilary Joffe: What sort of proportion of the time can we expect the wind to blow?

Anton Eberhard: We don't know what, on average, this will mean. This is important research and important modelling that needs to be done. But the projects are spread around SA, certainly a proportion of wind would be base load, but there will be some variability. So the issue of appropriate generation mix, is also relevant.
Almost certainly we would need to balance wind with gas – gas power can be ramped up and down very easily and so it complements wind well.

Hilary Joffe: I want to come back to that question: what sort of energy mix do we need? But I have to ask Mark, why is your project so cheap and why are the others not equally cheap?

Mark Tanton: There are various reasons the project is such good value for – we started with a very good wind resource...

Hilary Joffe: Which is where?

Mark Tanton: It's in the Eastern Cape, south of Port Elizabeth. It surrounds the proposed nuclear power plant at Thyspunt -- one of the most consistently high-wind areas in SA.
So we started with a good resource. That is going to bring the tariff down. We then found amazing partners in Enel Green Power, an Italian utility. They had a very competitive cost of capital, they were willing to go so far as to finance 40% of the project ownership – it's owned by the local community.
They were supported by Mike (Peo)and his team at Nedbank. One more important point – it was all done on balance sheet. So Nedbank gave a loan to the community which was backed by Enel, but at the end of the day it wasn't a project-finance deal – and if you don't do a project-finance deal, you can bring the cost of the transaction down quite significantly. So it was a combination of all of that.

Hilary Joffe: So you're saying that you've done this in a very different way to a lot of other projects? The way you've done it, if that's giving us a cheaper price and more ownership by the community by the sound of it – is this something which others could or should do?

Mark Tanton: I don't want to sound like a politician when I answer this, but you have to take a step back. As was pointed out by Nellie (Magubane), and then Anton (Eberhard), we've had three rounds of procurement, but done in two years. We have projects under construction now but we don't have megawatts, we don't have electrons going into the grid, so from a bank perspective it's understandable that the commercial lenders are saying 'we haven't seen what the real risks are'.
With all due respect to commercial lenders in SA, they've had limited experience with these kinds of projects. So they can't start pricing in efficiencies and a learning curve, and that's understood.

When you do it off balance sheet and you are a utility, by the very definition of being a utility you know how to run, construct and maintain and operate a power plant. You are very aware of what the risks are so when you price those risks in it's easier to price it in than a lender sitting here in Sandton, who's also looking at a portfolio of risks.
It's a good model to get a cheaper price. Is it a sustainable model? Probably not, because as a utility, you run out of liquidity at a certain point. The banks are clearly central for providing liquidity to the market.
What I think is very good is it's hopefully given commercial lenders a wake-up call that they should be more competitive and there are people out there with balance sheets who can do it on their own without support from banks, so there should be this commercial tension to your question of 'have banks made too much money?'
Up until round three it was quite cosy for banks in SA. Round three changed that – Nedbank was very innovative in getting in on all the Enel deals. But there were some losers in round three that were big winners in round one. Overall it's good for the market because we hope to see some competition now.

Hilary Joffe: The foreign investors who've come into the market – Mark (Tanton) talks about Enel – and some other big foreign players who will bring a lot of foreign investment, and in some cases they have, perhaps, made it more commercially viable to do these projects. Is that a pure undiluted good for SA? Or should we ask whether these are players we want in the market? Do we have enough local versus foreign, what is the balance right?

Johan van den Berg: To some extent that answer resides in government. It's a policy question ultimately, so I can only answer it from the perspective of the industry
Up to this point, where we are now, the foreign involvement in SA has been extremely useful for us. If we just go back to how this all started, we really took a long time to get renewable energy up in SA.
Wind power, we stumbled from zero to 10MW in 10 years – despite many people trying. And then for that period where we had indications that this was going to happen, there was a big international interest suddenly and we got sophisticated people – with experience and money coming into SA – wanting to be here and do business.
So when the model changed, those people were still here and they've enabled us to learn from lessons learned elsewhere and not make the same mistakes over again. So now we're maybe at a logical conclusion of that process where, as you've said, really large players have come in and the third bidding round, the winners were concentrated in quite a small circle.
Whether that's good or bad is something that we can debate for a long time, but from the perspective of the industry, we'd like to see low prices and simultaneously we'd like to see a nice diversified group of people being involved in this and many of them being South Africans. Ultimately up to this point, if you take it over the three rounds, we're doing OK but we wouldn't necessarily just want to perpetuate what happened in the third round, or further rounds coming...

Hilary Joffe: Brian what's your take on this process of bringing private sector producers in, bringing more renewable energy in – are we going in the right direction? Could this be a model for developing the industry in future?

Brian Statham: The success of these three rounds has been incredibly important for SA Incorporated, as it's established our credibility in the international community – not only in the renewable fraternity – it's established our credibility as a country that can handle major projects, engage foreign investors and do it in a sensible and rational and – most importantly, and the director-general alluded to it, in a way that gives investors the certainty they need in order to do these investments.
So the spinoffs from this programme are going to extend way beyond simply the renewable energy sector in SA.
But we've also heard notes of caution. We haven't yet got any projects actually delivering the megawatts…

Hilary Joffe: Not one megawatt yet?

Brian Statham: Not yet. So the risk…

Hilary Joffe: We have the first seller…

Brian Statham: Slightly yes… we don't really know what the performance is going to be, whether the assumptions, the technical assumptions that have been made in terms of the load factors in the plant are going to be validated, we don't yet know what the impact on the national grid is going to be with having renewables on here and what not.
So there are still a number of unknowns and that's something we need to be aware of and we need to be alert to.
The experience that we're now getting from Europe particularly is that you have to be careful about putting all your eggs in one basket. So we are going to need to maintain an energy mix. Renewables will be important, but we should not throw opportunities for gas, nuclear and coal out of the window. We need a balanced portfolio – what's an ideal mix today is only predicated on our state of knowledge today, and our state of knowledge tomorrow might be quite different.
So you always have to have that ability to be flexible and robust against whatever scenarios might come at you in the future.

Hilary Joffe: Director-general, if we look at what the economics of the energy industry might be in 10 years' time, if we're going to look back at this process and at the prices that have come out of it and at the kind of players that we've brought in, are we going to say "this is really brilliant" or might we say "gosh, it was really expensive, actually"?

Nelisiwe Magubane: I cannot agree more with what Brian (Statham) has said with regards to an appropriate energy mix. Definitely if you look at window three today, we are beginning to think "oh, my goodness, window 1 was pretty expensive".
Maybe we should have waited a little longer so that we could get the benefit of the price. But, having said that, the benefit of the price is a mixture of certainty because what happens is that people price what they don't know.
If we've got one big unknown, you're going to say "I'm not so sure what I'm going to get out of this". So you are likely to push your price higher to make sure that you cover that. So it would be very difficult to predict 10 years from now if we didn't go through this process, what would have happened.
But my sense is that in 10 years, renewable energy is going to be a lot cheaper. The technologies are going to be more advanced, and just like any other technology, we're going to see smaller programmes and projects, more distributed across SA. We might see significant changes in that, but I don't believe we can say that what we have done was inappropriate.

Hilary Joffe: What do you think Anton, where are we going to be in 10 years' time? Are we going to say "we've got too much renewable energy … too little renewable energy"?

Anton Eberhard: The update to the IRP will clarify quite a lot of this. Quite a lot of things have changed since the first IRP was published in 2010-11. The obvious thing is that demand has stayed practically flat over the last five years.
And even if we assume quite aggressive growth going forward, we certainly need less power and in the next five, six, seven years we're bringing on massive new capacity in Medupi and Kusile. But looking forward and looking at some of the updates that are likely, we will still need a renewable in the mix and there will still be a need for constant procurement going forward and a number of us have alluded to the issue of certainty.
This will be very important for the industry, we need predictable amounts that will be procured each year, so that we can develop a local industry.
To add to what Brian said earlier about the international significance of this programme. Over 20 years sub-Saharan Africa attracted a total of 50 IPPs worth about $10bn. SA has gone from almost zero IPPs …to 46 projects that have been concluded.
With round three it will be 64 projects, more than $10bn invested in a period of two to three years. So this really is an extraordinary accomplishment. It's an accomplishment firstly in that we've shown that the private sector is interested in investing in infrastructure and energy. We now know the private sector is very interested, and we know it can actually do very complex public-procurement exercises.

I would guess this is the biggest and the most complex public-procurement exercise that we've accomplished. Director-general Nellie (Magubane) alluded to it earlier, probably one of the most significant decisions in the beginning, was to invest very, very heavily in good transaction advice.
We spent a lot, but we got the best advice and as a result we had a very good programme, a very well designed programme, good documentation, very clear, transparent, robust evaluation criteria. What I think is very significant is that in 47 projects so far, I'm not aware that any of them have challenged any of the awards that have been made. Maybe Nellie (Magubane) knows something behind the scenes, but not publicly and again that's a remarkable achievement.
So Brian is right, this is a programme that we can build on, not just for renewables, also for other energy sources. You will know the minister has made determinations for procuring more coal, more gas, more hydro and we hope that we can build on this experience to achieve good competitive outcomes as well.

Hilary Joffe: From the point of view of the banks, Mike (Peo), is this the kind of thing you would do more of? What have been the flaws in the process? What have been the good things about the process? What do investors feel about it and financiers specifically?

Michael Peo: I think that almost without exception, the process has been extremely good. The timelines that have been kept to, have created certainty, we have sat through some incredibly tough times. We've closed the second round deals as the rand devalued by 30%, and yet none of the projects really failed or none of the projects failed at that point in time.
So there is a finite capacity to how much banks can ultimately lend to the sector because we have just five commercial banks in SA and we have two development finance institutions. To date we've almost seen zero investment by foreign banks directly into the projects, because they are constrained by the very long tenure's of the lending.
We're lending between 15 and 17 years and also because they often do not have rand lines. You might have a bank like Deutsche Bank doesn't have sufficient rand lines to be able to lend 15 years of money in this country.
So somewhere down the line the banks run out of money, but really what's happening is the confidence that's been gained has led to the institutional investors – the Old Mutuals, the Future Growths, the Momentums, the Liberty Lifes of this world coming to the party and saying, here we see a massive opportunity, we haven't been able to get our minds around construction risk in investing in projects in the past, but we're very happy for the banks to just intermediate which should be our natural role … develop the projects, take the risk through the construction period, once power has been delivered into the grid sell those down, refinance the projects at cheaper pricing and pass them into the institutional asset market which is almost infinite.
So two things are happening, we're seeing that piece of investment and also as the European investors have come into the market, European EPCs, Bonds, so the European banks – the international banks in fact – are now saying, is there opportunity that we're missing. So as we move into the additional procurement pieces on coal IPPs and nuclear, gas, etcetera, I think the size is going to dictate that we're going to see an incredible amount of foreign investment into the country and that is good.

Hilary Joffe: Last quick question before we take a break, Johan how far can we go with this, how many wind plants can the country accommodate – really – and afford?
Johan van den Berg: The IRP talks about approximately 9,000 MW of wind power in the country, let's assume that's about 3,000 towers … 3,000 turbines. We think that's easily achievable and it depends how we structure our grid and our economy and our ambitions are larger and we think we can do more with wind.
I'd like to just maybe return to something that was said around how we will look at this in 10 years. The global production capacity in wind power is in the order of about 85GW per year, that's because there was a huge boom in wind in the last 10 years. When the global economic crisis struck, the demand fell to about 45GW per year, which means that we are at an historical point that will probably never be repeated, where this huge over capacity in the global manufacturing of wind and other renewable technologies and in 10 years we'll look back and we'll say: "Weren't we clever to do it just at that particular window in time when things were at their historical low". And if we're really clever, we will continue to do that now and we will say, well wind for instance is now the cheapest bulk source of electricity and let's just put in as much of it as we can, as quickly as we can.

Hilary Joffe: Gosh, I hope you're right…Mark (Tanton) what has been the most annoying thing about the process? If there was one thing you would critique, what would that be?

Mark Tanton: The annoying bit was in the beginning – Nellie (Magubane) alluded to it – that industry wants certainty. So we had a feed-in tariff – we all got very excited about the feed-in tariff and then it changed to what was then termed a rebid. That's what we're in now.
Industry – I in particular – fought that very hard. A feed-in tariff gives certainty. In hindsight, I was very wrong. The bidding process is perfect. Nellie (Magubane) said earlier that round one was very expensive. Round one was expensive as the government had never signed a power purchase agreement. The banks had never banked one of these big deals. The costs of just getting these projects to bid, when you're talking in the order of R20m-R30m. Post post-bid to close, you can double that, and you don't know you're actually going to close.
So it was a huge risk. Because it's a bidding process, we now have market forces at play. So the first round there were a mixture of pioneers, those who got in lucky, whatever it was. Second round, international utilities started coming in, local investors started getting excited and there was then competition. So we're now at a point where there is extreme competition.
Someone said earlier, can we sustain these expensive renewables... and no one is listening – wind is 74c – that's cheaper than coal!
The question is, which Johan (van den Berg) asked earlier, what does government want to achieve with the programme? If government wants to achieve lots of small South African-owned IPPs, it is not doing that. The government has set up a process which is competitive and the nature of competition is the best man or best person wins. If the government wants lots of small IPPs, they need to reconsider the programme. If it wants South-African based IPPs they must reconsider.
But then again, as an industry you fight the policy and once the policy is there, you need to work with it. So my view is it's a very good programme.

Hilary Joffe: Brian (Statham) what does this mean for your average electricity consumer? What are we gaining here, or are we just paying more for the benefit of cleaner power? Does this solve our problems of not having enough power?

Brian Statham: Well it gives you two benefits. One is a feel-good thing … we're doing the right thing. Now some people put no value on that, others a lot. Second, it's giving us credibility. The whole programme is making people come to the country as investors and developers.
So that's good for the country and what Mark (Tanton) has just said is that the reduction in prices between round one and round three, has not been because of technology change. It's been because risk pricing has come down dramatically.
But, for the average consumer, they're going to be sitting looking at these wind farms and they're going to say: "what difference has it made? I'm still sitting without electricity in my home in a rural community". That's the next extension … I'm wondering whether there is not an opportunity to take this model further… Is there not a way to get bidders to come in and do rural energification, and to start helping us with that issue.
Only when we get rural energification, can we really deal with issues of health, education and economic sustainability. When all is said and done, we need to remember that in sub-Saharan Africa only about 15% of the population have access to commercial energy forms. World Energy Council studies show that by 2050 … there will still be 500-million people in sub-Saharan Africa without energy.
That's a horrific statistic!

Hilary Joffe: Director-general, is this a feel-good thing for the greens, or is it doing anything to extend access to electricity to all the people who don't have it?

Nelisiwe Magubane: It's more than a feel-good exercise. We are going to see … a difference in our emissions profile. And it will challenge us on how we operate our grid when it comes to dealing with renewable energy.
To follow on from what Brian (Statham) has just said regarding rural energisation, it's a fact we need to improve rural energisation. One of the benefits we expect from this process is lower prices – particularly for off-grid solutions such as solar panels. We have just completed a strategy where we have taken to the

Cabinet to say if we expect every household to have grid extension, we are not going to be able to achieve universal access.
In fact it's going to take us another 30 years, so what we therefore need to do is make sure that people have access to modern forms of energy. We're looking now to increasing the size of the panel for the households in order to gain more service out of that.
We are saying in that strategy that the minimum service you need as a human being is heating, refrigeration, lighting and entertainment. What we need ask – other than heating – can we provide the rest of the services? This is where industry comes in, and – basically – that is where we are now.
With our new strategy, we can reach universal access by 2025. Each and every South African will have access to that. In fact what Brian (Statham) is saying is very true: the sub-Saharan statistic is 25% when you include SA. Once you exclude SA, it goes back to 15%. SA has at least got 85% access now.
We're also experimenting with minigrid systems – we say we have a population here, let's provide them with their own legal minigrid so that these people have access to services. So my opening gambit was that out of this programme, we are not simply looking at the sale of electricity, but we're also looking at other benefits including localisation, cheaper off-grid solutions.

Hilary Joffe: Is that feasible Mark (Tanton)?

Mark Tanton: No, going back to your comment, is it a nice feel-good. If you park for a second, these are renewables, just look at those large infrastructure projects that generate electricity. Compare apples with apples. We have two new coal-fired power stations, then we have 46 odd IPPs... comparing apples with apples the two coal stations are already a burden on the country's shoulders.
If there is a delay, if there's a budget change, we shoulder that. The 47 plus the new 17 – delays, budget increase, there's a set power purchase agreement. You don't go and beg Eskom or Department of Energy to change it. So the risk lies in these IPPs, all on the private sector's side, so that's the first thing.

Hilary Joffe: We do pay the cost of their carrying the risk if you like, through tariffs, ultimately...

Mark Tanton: Yes, but only once you've constructed. You didn't take any of the construction or execution risk.

Michael Peo: But the tariff is now capped in any event, the developer doesn't have the ability to come back and say sorry we've had labour trouble and we're months behind...

Mark Tanton: Our welding was bad – so give us extra time and money. So that's the first point. The second point is – sure, we haven't seen all the electrons in the grid – but we have seen that they are happening on time and on budget.
But if you go back to my earlier analogy, forget about it being green, you're just comparing IPPs, many – they're small with what's happening now in terms of new generation I don't know how that conversation even starts, is this about a feel-good. This is just the fundamentals for the country...

Anton Eberhard: Let me add on there because what few people anticipated was what the price would be. In your question, you already made the assumption we'll be paying more. Will we?
On wind energy, we'll be paying less than the marginal costs of other big generation options like coal and nuclear, so in effect wind energy is constraining the extent to which general electricity prices will increase in the future. That's a feel-good for the consumer, but it's a very concrete and real thing.
Then of course we're forgetting the other major benefit is capping our carbon emissions and this is an extraordinary achievement as well. For a country that relies more than 90% on coal, to say that we will peak and plateau some time in 2022, 2023, 2024 ... that is an extraordinary accomplishment.
Now IRP says that the carbon intensity of our electricity production will reduce by a third. About 1kg of CO_2 gets emitted for every kilowatt hour at the moment. That will reduce to 0.6kg or 0.64kg … by 2030. Other than Botswana, no country depends on coal as much as we do for electricity production. That's an extraordinary accomplishment. Again, it's revolutionary if you think five years ago, in our perspectives, the future was always going to be just coal.

Nelisiwe Magubane: One of the issues, by the way, that we're not dealing with is the issue of carbon tax. Maybe coal at this point might sound cheaper. But immediately then you start looking at the carbon tax and where it's pegged, then we're talking a different ball game altogether.
Carbon-intensive energy solutions in future are going to be expensive. It might either be indirect tax – where we get penalised per carbon unit that we emit, or with the carbon tax itself. These issues need to be considered when we start talking about the energy mix that is "correct" for the country.

Hilary Joffe: Then why not go nuclear, which at least we know generates all the time once you switch it on, whereas we don't know yet how much we'll get out of wind or solar?

Nelisiwe Magubane: That is part of the solution, of course...

Johan van den Berg: Can I respond just because I have a sense the subject will change soon? What do we have to do to change the question: is it worth paying more for "feel good", and how do we get people to stop asking that question? The facts are in front of us.
The best estimates we have for Medupi Power are R1.05/kWh.

Mark Tanton: And that's with no carbon tax...

Johan van den Berg: No carbon tax, nothing, no externality. So the University of Pretoria says the external cost of Medupi is 90c/kWh minimum. You can disagree with that, but that's the figure out there, R1.05/kWh.
New wind 66c/kWh, so there's a huge saving and the best estimate that we have without the externalities is just around three will save the country R15bn over 20 years. So why are we not managing to communicate that? That's a good question.

Hilary Joffe: Is there not too much of a debate about the price in any event? Admittedly, from a consumer's point of view, but if you're looking at the options: nuclear, renewable, gas – which we haven't talked about which may or may not be cheaper. If you're looking... what should the future mix of energy be? What would be most cost effective for the country?

Anton Eberhard: The beauty of the … programme is that we know what the price is because these are transparent contracts between willing buyers and willing sellers. They're fixed for the next 20 years with some inflation indexing. The beauty also about nuclear is that we now know what the actual cost of nuclear is because the latest contract has been published by the UK government.
It's a 35 year contract on Hinkley Point that's been signed with EDF (Electricité de France) who are using Areva and the Chinese's contract and co-financiers. It's certainly one of the options we would consider in SA. That contract was published at R1.50/kWh for a 35-year period at an investment cost of US$7,900/kW installed – right on the outer range.
Some say that does represent nuclear costs globally. The Chinese apparently are building much more cheaply...

Nelisiwe Magubane: Yes, it's $3,200...

Anton Eberhard: But the interesting thing about the UK one is that it's a transparent contract that's actually been published and it's very different to get actual costs of nuclear elsewhere in a transparent way. So if we...

Nelisiwe Magubane: No, prof, that is not correct. The Russians are also doing a contract with Turkey and that is transparent...

Anton Eberhard: At what price?

Nelisiwe Magubane: I'm not sure what the price is, but that is transparent.

Hilary Joffe: Why shouldn't we go all renewables, turning the question on its head? What are limits on us, if wind is as attractive as you say, why can't we just get all the new energy we need from wind power or solar power?

Johan van den Berg: Let's just go well into the future. Obviously, we get there in strides and we don't get there tomorrow. But nobody here has mentioned climate change once. I was just saying to Anton in the break that if you go to the energy forecasts done by supposed experts internationally, they look at world population growth and conclude demand will follow world population growth.
And then you have other people saying, well environmentally we can put so much CO2 into the atmosphere and then civilisation ceases to exist. Now which one of those two are you going to be following? We're following the former...

Hilary Joffe: But either nuclear or renewables will do it for you. Or cleaner coal.

Johan van den Berg: So, if you buy into the fact that there are environmental constraints then you will get to the point where you will have very low-carbon or zero-carbon technologies in the long run and therefore we're going to have to build as much renewable as we can.
I'm not saying that's 100% of the grid... But the other thing we should keep in mind is 20 years ago, none of us had a cell phone. It's very usual to us now. The storage time in our batteries is probably three-, four- or five-times better. So to look at the grid today and the state of the grid and to say that in 20 years it will still be exactly the same and the ability of the grid to incorporate renewable energy will be the same as in 2013 – that's just not realistic.
We have to expect that there'll be very considerable improvements in our storage capacity and our ability to evacuate power to store it in battery cars and so forth.

Hilary Joffe: Brian (Statham) why can't we do it all by renewables, if they are that good?

Brian Statham: The World Energy Council scenarios published at the World Energy Congress in Korea a month ago show that we are not going to achieve the carbon targets that are predicated on current technologies. There has to be a major breakthrough in terms of energy storage to stabilise renewables systems, and if you don't have carbon sequestration and storage, you're also not going to meet the carbon 450 parts per million targets.
That's absolutely clear in all the scenarios that have come out of the energy council work. The other thing that has come out of that work … is that the idea that renewables will replace all new capacity is a myth and will not happen.
Technologies are improving for the recovery of oil, for shale gas and various other unconventionals and things we don't even know about at the moment, people will still revert to using those technologies as well. So to dream that we're going to have renewables as part of... as 100% of the future energy mix is a utopian dream at this time...

Mark Tanton: And it's pragmatic that we think about a diverse energy mix. But you ask the right question: "What's the appropriate complement to renewables?" So renewables are variable, the complement to renewables is definitely not nuclear. Nuclear has been run, as base load is constant. Gas is the obvious complement to renewables and this is in our mix now. And we'll see I'm sure in the IRP update, more space for gas that would complement renewables in a good way.

Hilary Joffe: Mike (Peo) would finance be one of the constraints to this, is there the capacity in the system to actually fund all these projects?

Michael Peo: The capacity is there but just not in the current shape or form. So as Johan (van den Berg) has said what we will see over the next 20 years, so most of the banks are actually looking at IRP 2010 and saying what will be procured over the next period. We're now talking into the trillions of rand worth of investment.
When we talk nuclear, nuclear just estimates maybe 9GW probably $300m-$400m – the coal fired IPP is another R300bn. So the numbers we're talking about are infinite. But the issue is that comes along with

economic growth, so as the economic growth picks up, bank capital increases. As bank capital increases, so we can allocate a bigger allocation to the sector.
Each year it's an incremental increase. A lot of what Brian (Statham) said, as the international communities become more comfortable with the fact that this is an investment destination, so the international banks will follow their customers, they come along and they do what Mark requested which was they bring innovation plus they force down pricing.
So it really is evolutionary. The issue is that we cannot stumble, we need to keep moving in a forward direction. So as we announce additional programmes around whether it's nuclear – nuclear has been on the cards for four years ... it's been on the cards for 20 years but really has picked up quite incrementally since IRP was published.
The messaging we need to send out is that we will procure properly and efficiently with due process, and on a well thought out basis. So renewables keep on running. I can't comment on whether it's the right mix at this point in time. It's probably appropriate, and there's no reason to stop it from getting bigger. But again when we talked about whether this was the right pricing, a big factor we ignored was that, in the current three rounds, economic development has been 30% of the evaluation criteria. So if you really wanted the cheapest power in the world you'd only bid it on price. But the government has set a certain other agenda, so 66 or 64 projects to date, that means there are communities in 64 small towns in SA that suddenly have – I think Mark would talk much better to the actual on-the-ground implications for what it's going to mean in the lives of people – there are schools, there are clinics that are going to get built, jobs that are being created.
That comes at a cost, but that's got to be factored in because of the multiplier effect for those people who then have jobs, getting out into the supermarkets, spending the money. It flows back into the economy, we collect more taxes, etc. So the banks then start to lend those individuals money -- give them credit cards. There's a massive multiplier effect that comes about through this.
So I'm not being critical of Medupi and Kusile, but given that they are state procurements at this point in time, they will hire vast numbers of people to construct, those people almost dissipate the minute the programme is complete. There's also an operational workforce, but they are two communities. Here we have 64 communities that are really benefitting and then obviously some projects are concentrated in certain areas.

Hilary Joffe: Maybe even projects themselves which are smallish and spread?

Mark Tanton: It goes to your original question of shouldn't it all be renewables. The question should be, should we not have a level playing field first, and on that basis decide what our energy mix is. There are technical constraints, so you can't just power the whole SA with wind or with solar. It would be stupid to suggest that. But we have to get to the point where the playing field is level. If you take what Mike (Peo) was talking about, and I'm using our example because it's the one I know, Nedbank gave a loan to a local community, assisted by the utility that the community owns 40% of. It's a R2.3bn project. That community over the next 20 years gets more than R1bn for building schools, hospitals … and most importantly the economic development, and enterprise development.

Hilary Joffe: Do they get electricity?

Mark Tanton: This community happens to be electrified and its right next to where they'd like to build Thyspunt so if that happens, it will be more electrified at night. The question shouldn't be: "Should it be all renewables?" It should be: "What should government policy be?" And: "What do we want?" So, if you want low carbon, we want local ownership, we want lots of jobs, then make it a level playing field for all of us...

Johan van den Berg: But Mark just say what must happen to make it...

Mark Tanton: Thanks for putting me on the spot. It's also a dream to think it would ever be level. We have a country with a utility that is very good at what it does. We've had issues over the last decade … some of that due to planning. But we have a very good monopolistic utility. I'm not saying that overnight we go to IPPs and then let's just bid. The government does need some certainty and can rely on the likes of Eskom to build some power stations.

I question whether we should be building them as big. Evidence shows – and Anton has written a very good paper on this – that's not the right route. But when we start getting to the planning point, that's where I want to see the level playing field.
I want to see those people in those dark rooms who are using these models, comparing apples with apples, and considering what the government wants to achieve. You want job creation, localisation, low carbon... An important question to ask Mike (Peo) is, and I never advocate attacking other technologies and this is not meant to be an attack on nuclear, but will Nedbank be financing the next nuclear power station?

Michael Peo: Yes we will... To us the controversy in nuclear is a debate, it will take up a panel discussion like this 20 days or whatever come to a conclusion. But, fundamentally, because it's in the IRP mix. The economic development of SA is fundamentally important to us as a bank and this is not a moralistic story. You don't make money if the country does not evolve and businesses aren't created because you can't build a new factory because there's no power in the mix... we go out of business. So the economic imperative is that whatever the demand side of the power need is, the government takes the decision as to how to procure that to supply that demand. If it's part of the mix, we need to support it...

Mark Tanton: But you will support it with a guarantee from the government because Hinkley – show me the private banks that are involved. It's all about guarantees from government...

Hilary Joffe: Let me let government in at this point...

Nelisiwe Magubane: You're being unfair because if there was no government guarantee there wouldn't be any of these projects.

Mark Tanton: No but it's when you get your guarantees. We have to risk all that capital and then we get a power purchase agreement. If I'm building a nuclear power station, I need that guaranteed up front. So take what Enel has done, all on their balance sheet and they rely on your amazing sovereign guarantee. So I give you full credit for that. But when does it happen...

Michael Peo: Talk to your issue of levelling the playing fields because the fundamental issue that I think you're putting on the table is with private sector involvement in the procurement process, the risk transfer happens at a point where you buy all of that. You spend a lot of time developing a project to be one of 93 bidders.
You might lose all of your investment capital because government only awards 17 projects in that particular round... But you're prepared to take that chance because you think, overall, you've got a chance and it's been fairly well mitigated. The subtle difference is that on the day that you are guaranteed a price, you carry all the operational risk whereas when government has procured traditionally through a state-owned enterprise like Eskom.
It's never ending because once you're committed you cannot guarantee the South African consumer a tariff upfront because it's project managed and, therefore, it could start off at R60bn to procure and we end up with say R180bn to finally procure.
That makes it far more difficult for private sectors to take the risk, because the procurement dynamics are completely different. The one is we've made a decision to procure base load, the other is to procure IPPs but we pushed all of the risk onto the IPPs. I do, however, think that both parties are capable of pricing both of those. It is factored… When you decide to do it, you're factoring your economic return around the fact that you've got a good chance of winning. And when you do win, it pays reasonably handsomely.
But the renewable piece is definitely going to be part of the mix. The subtle difference is that we've set up such an amazing programme which should not run out of steam because now everybody has got this worked out. We can get to the 9,600 GW, actually its 9,600 plus 9,600 if I recall. But the shift should be if you exclude nuclear, I think, we get to nonconventional base load comprising 42% of the mix.

Anton Eberhard: 2030

Hilary Joffe: And are you going to lose the momentum or have you got plans to do more?

Nelisiwe Magubane: What we have been driven up by is the demand. What SA needs to achieve economic development, and it is our considered view from the plan that we have to look at all those options including climate change imperatives, but also the price and other instruments that we're putting in like – carbon tax – to try and mitigate against emissions.
So for us it's to be able to say, what is going to provide us with the cheapest solution, taking into consideration these other inputs that we are looking at. What we foresee now is that we foresee a situation where we are going to proceed with execution of the plan. We have started working on a plan but will have to proceed with the execution of the plan, but what we also need to ensure is that the tariff trajectory doesn't provide shocks to the system.
In other words, say we had to ask Eskom to go and build almost immediately, say coal three, what we have calculated is that will obviously have a certain effect on the tariff, yet if we are able to increase that tariff gradually, and by making sure that private sector takes that risk, it's one of the issues that we have explored. We have no intention of reducing the momentum, but some of the work obviously has to be done by Eskom.

Anton Eberhard: The other area that we need continuity is in local manufacturing and this is... and we talked about what areas can be approved. We should be seeing better co-ordination between National Treasury, the Department of Energy and the Department of Trade and Industry. Trade and industry is passionate about growing local production. A number of companies have set up PV (photovoltaic) panel assembly plants, but in this latest round, out of the six PV projects, four have gone to an Italian company that will probably import panels from Italy and the local PV manufacturers are now deeply concerned about the sustainability of the operations. The Department of Energy is very aware of this, I know and hopefully in subsequent awards there can be some amelioration of that to keep these businesses going.

Nelisiwe Magubane: The Italian companies, in our view have made a specific commitment in terms of local procurement, and we intend holding them to that. In fact in terms of the figures that we have, they have committed up to 53% in some cases on local content. In our view we have to ensure that gets done, that procurement gets done in this country. Yes I'm also aware they've mentioned issues around that since their cost of capital is a bit lower, hence they had an … advantage, but the bottom line is we expect them to commit. Not just to commit but also to make sure that they make good of their promises, of what they've put down as the local content.

Mark Tanton: That's where Department of Energy needs to be congratulated. As far as I understand it this is the first large-scale PPP programme where you are required to report on a quarterly basis. If you do not meet what you promised in your bid, you start losing points, and ultimately you can lose your PPA.

Anton Eberhard: But let's acknowledge that this is going to be very demanding to monitor. I think we understand that there are many ways that they can game the system. People have been talking about transfer pricing of bringing in very low-cost panels, selling them below price to a local subsidiary and then the mark-up of the local subsidiary is counted as part of the localisation. So there are ways they can game. All strength to Department of Energy as you try to monitor these issues.

Nelisiwe Magubane: Thank you for letting us know about that...

Michael Peo: A massive risk mitigator is the fact that this has been done on a PPP process which puts the risk back on the banks. So the banks are sitting there with then as technical advisors, scrutinising the performance of those contracts because if the penalties roll up and you risk the PPA, the banks are a risk. So you've actually got two sets of eyes on this, you've got the morality of the developer himself plus the banks are looking to say we could lose money... to me the major bug bear is we should be procuring massively more in the PPP space rather than less, because it brings extra diligence. We've proved now it reduces tariffs, it brings all the right things, the job creation, the socio-economic development, etcetera, at good pricing and there's diligence in the process... on time, in price, all the risk sitting with the private party.

Hilary Joffe: Going back to Brian, is this a model which we should be replicating in the rest of the energy industry for other energy projects, and more than that for other industries? Is this kind of procurement PPP model something which we should be looking at for the rest of the country?

Brian Statham: I totally support that. It's been a great model, it's a way of all the players coming together and contributing and the point that Mike (Peo) has made. We're all investing in SA and we all have an interest in SA developing as a country and then the region's development. It can work in the energy sector, but it doesn't only have to be in renewables. It could be on the base-load coal, it could be on nuclear … It can be extended into schooling, it can be extended into healthcare, into so many other areas that you can work on this basis.

Hilary Joffe: We have just a few minutes left so I'm going to give each of you a 30 second chance to sum up what is the potential for renewable energy industry SA, what happens next.

Johan van den Berg: We're very confident we can supply what the IRP asks us to do, we have ambitions to go far beyond that, but it's an unfolding picture. We can see as time goes on what the ultimate ceiling is. But for the next five to 10 years we can build quickly and we can build on time and on budget and at our risk, at very low prices.

Anton Eberhard: The renewable industry globally and in SA is increasingly competitive. We've seen prices come down as volumes go up and that will continue and that's in stark contrast to more conventional technologies where the price of coal is going up and the price of nuclear is going up.

Michael Peo: I think the whole programme has been unbelievably successful and has been a massive catalyst for foreign investment into SA. It would be a great learning for the government to be able to roll this out to other departs like transport. And I think to Mark Tanton's point, the banks get more innovative and creative as the competition is there, so all round, the pricing is coming down and it's getting better for the country.

Nelisiwe Magubane: I firmly believe the programme has yielded what the government has expected, and I'm also of the view that with the help of the private sector and, of course, Eskom we are going to see some more of these kinds of projects.

Brian Statham: Renewables are an important part of the energy mix, but we should be careful that we don't move from all our eggs in the coal basket to try and think we'll have all our eggs in the renewable basket. Diversity and spreading the risk is what counts, and that's what has been the success of this renewables programme. They've spread the risk over many players.

Mark Tanton: I agree with the diversification, but let's all remember that we're talking about renewables as a drop in the ocean compared to the rest of our generation right now. So let's debate whether we should carry on when renewables is around 40, we're not there yet.
What we have to get there is something that comes on line very quickly and is large scale generation. You can build them within two years, you have certainty on price, and we've now just shown that you have a price that is definitely competitive on Eskom's pricing today and there's no doubt it beats future pricing. So why shouldn't we just do more of it?

Hilary Joffe: Thank you very much for all of you for joining us. I think we have ranged far and wide – well beyond the subject of renewables. But it has been robust and free and frank debate.