



## The So What from BCG Podcast

# To Save the Planet, Move Fast and Clean Things

Maurice Berns

**GEORGIE FROST:** An \$18 trillion investment gap stands between us and meeting the 2030 global climate goals. The incorporation of renewable and other low-carbon sources of energy needs to happen three times faster than previous fuel transitions. Business and policymakers must come together because current levels of capital spending are not aligning with any of our climate targets. So how can we fill the gap?

I'm Georgie Frost, and this is The So What from BCG.

**MAURICE BERNs:** Treating it as a society-wide problem needs to take place. We need to price externalities, close that green premium gap so that consumers see the real price of energy and then change their behavior and it becomes more of a demand-led transition.

**GEORGIE:** Today I'm talking to Maurice Berns, chair of BCG's Center for Energy Impact.

**MAURICE:** A lot of people don't realize that we are not going through our first energy transition. As a matter of fact, we've gone through many energy transitions. And it is helpful, I think, to put a little bit of context around this. So when we transitioned to coal and we transitioned to oil, we took a lot of time. We took four or five decades to get there.

And even when we got to the maximum share, we were talking 35 or 55%. Today we are at about a 12% penetration of renewables, of low-carbon energy and we need to get to 78% and we need to do that in 25 years. So we need to go a lot faster and a lot deeper in terms of our transition. That is really a call to action because we're moving way too slowly.

**GEORGIE:** Which leads me on nicely to my next, which is: Where is the world in reaching the 2030 climate goals and what are those goals? How much faster are we talking here?

**MAURICE:** Yeah, so it's a really good question. I mean, I think to put this into context, we have the IEA scenarios which show what are needed to get to net zero, and also chart out where we would be with the announced policies today. And a lot of people use those as planning scenarios and to get an understanding of what we need to get done. And the bad news on this is that we're not doing very well.

So we had a look at what's needed in terms of capital spending to get us to our goals. And if you look at the required capital through 2030, you need about \$37 trillion of spending. It's a lot of money. Now, there is some good news here, which is that we did a bottom-up build. We looked at 280 companies out there, the biggest companies, and we found that they have earmarked or planned for about 19 trillion in investment in the energy transition.

So that's good. However, there's an \$18 trillion gap. That's a massive spending gap through to 2030, particularly when you consider that many companies, most companies, plan five years out. They announce their targets, they convey them to the street, they plan against them, and we're pretty much nearing 2024 at this point in time. So that planning horizon matters and we're 18 trillion short. So right now we're not doing what we need to. We're doing about half of what we need to.

**GEORGIE:** Yeah, 18 trillion sounds pretty significant. Spending on what though? Are you talking both business and government spend? Where's the origin of this money? Where does it need to go?

**MAURICE:** Yeah, well, I mean the money needs to come from everywhere, so to speak. So it's not just businesses, it is government as well. It will rely on private sector, rely on public sector. And if you look at what the breakdown is in terms of where the money needs to be spent and where



the gaps are, a very large part of it is actually end use.

People think quite heavily about the generating capacity, the low-carbon capacity that we need. But actually where we also need to spend a lot is end use, end use includes things to make it very simple like electric vehicles. There's a very big amount of capital spending needed there. Or it includes an industry transitioning to usage such as electric arc furnaces, things that will consume energy, allow us to electrify and consume energy in a more efficient way. Or once hydrogen comes to the forefront, we'll need to actually transition, the end uses there.

So the largest part of the gap is in end uses. There's also a very large gap in the grid infrastructure that we need. So roughly, roughly we need to spend just as much in upgrading and building out our electricity transmission distribution grids as we do in installing wind and solar. So low-carbon and power generation. And that's something that a lot of people miss too. So there's gaps everywhere, but those are some of the biggest ones.

**GEORGIE:** Forgive me just listening to you, Maurice, when you said that the previous transitions took decades, it doesn't seem very far away 2030, and yet some of the technology that would be most efficient has probably not even been thought up yet. Is it not a bit too fast to spend this much money on technology that could be well obsolete and maybe not tested to be the most efficient? You smile like you've never been asked that before. Of course you have.

**MAURICE:** Let me pick apart your question into a few parts, right? First off, the goal of getting to 70%, for example, penetration renewables, that's through to 2050. So it's not that we have to do all this by 2030 first off, we have a bit more time so to speak.

But then as I look at what we need to get done, there is some good news in this and I'm going to come on to this technology point you raised. The truth of the matter is that to get us to net zero is not a technical challenge. It's not that we don't have that technology in place. Basically there's five levers that get you where you need to go, technologies that exist.

The first one is around energy efficiency, and this is a lever that we need to pull pretty hard and can get us 20 to 25% of the way there. That means consuming less energy on the one hand, it means installing things like modern appliances, insulating our buildings much better, a lot of them feel like Swiss cheese actually, when you go to some countries, installing smart meters, people get better signals around how much their demands are actually costing them. And changing behaviors in demands. That's one really big lever and that's almost technology-agnostic. You can do whatever you want.

Other levers, I maybe not go through them all right now, but electrifying end usage gets us another 20% of the way there. That's both in homes, things like heat pumps, and in industries like electric arc furnaces. Decarbonizing the power supply is the third one. That's solar and wind, basically installing low carbon energy. And then the remainder can be done through the harder to abate sectors. We use lower carbon fuels. That's things like hydrogen, which I referenced a minute ago.

And then finally, the things we really can't abate using direct air capture and other offsets to remove the carbon from the air. So the point is, it's not a technical challenge. We can get there. However, the problem is we don't necessarily have the policies, the business cases and the capabilities to get there.

**GEORGIE:** Well, let's go into those a little bit more detail. I'm not going to go with policies first. The business case, why is that not there?

**MAURICE:** Well, look, in some cases we do see a strong business case. If you look at levelized cost of producing energy for onshore wind and onshore solar in many, many geographies, that's in the money. That is not just competitive, but actually often the lowest producing source of low carbon energy versus even traditional energy.

So that exists. However, when you start getting into some of the other technologies like offshore wind is a good example. Some of the other pieces around attacking the hard to abate sectors, the business cases don't exist yet. I don't want to take it to policy too quickly, but policy does play a very



important role as well as thinking about how we mitigate the risks that are present.

Because take the example of offshore wind. We'll use that as an example. There's a whole ecosystem of pieces of the chain that need to be developed to make offshore wind a reality. And so we'll take the North Sea as an example. Recently we had The North Sea Summit where we had nine state leaders together talking about these very issues with businesses, with the CEOs that need to make it happen.

And you need to have the offshore wind installed, which is itself just a massive task. The target is getting to another additional 100 gigawatts by 2030. You then need to have all of the grid, offshore grid, installed so we can actually get that power to shore. You then need to have all of the grid capacity onshore to take it to where it needs to go. And you have to have all of the end uses converted appropriately, if we're going to go into some things like hydrogen for example.

In addition to that, in order to build all of that, you need the supply chains to make that a reality. All of the OEMs that really need to enable this and those supply chains include rare earth minerals. They include manufacturing capacity. It doesn't necessarily sit in Europe. We'd like more of it too, oh, by the way, but it doesn't. And then it gets into geopolitical risks. You start adding all of this up, you get to a risk profile, which can be quite high. So that makes business cases challenging.

**GEORGIE:** What arguments should you be putting to me or you as a CEO of a big business then to say, "Look, this is worth it." With all of these risks that you talk about with the policies that aren't implemented, aren't adequate at the moment. Can it happen on its own?

**MAURICE:** Well, look, it's a really good question. And as a matter of fact, it was kind of the theme of our North Sea Summit where were nine roundtables and ten CEOs at each with one policy maker. President von der Leyen was there and President Macron and the CEOs did have a chance to say, "Hey, what do we need from you?"

So what did we hear? I had the privilege of being at President von der Leyen's table and helping to facilitate that. And there were a few things that

came out. One is eliminating what we call this green premium. In the end, we see that a lot of the green or low-carbon energy is more costly to consumers, both industries and to private consumers as well households, than some of the more traditional energy.

But that's not because in a sense that a whole systems perspective, it's more costly. It's because we're not pricing in the externality of carbon emissions and the impact that has on our planet. So we need to find a way to close that green premium and make it reflect what the externalities actually include. So that's things like carbon pricing or incentives or things that policymakers can provide to make that reality.

So that's one. Two, whilst it's helpful to have a target for 2050 or even 2030, industry tends to plan year by year. Supply chains tend to plan year by year. And to get that massive coordination that I mentioned earlier between different parts in the value chain, of production of transmission and grid, of off-take capacity of end use, to get that all coordinated and working at the same pace, it could be really helpful if we could get granular.

So let's translate those targets and I'll use the EU again as an example, into beyond a, all right, hey, here's 2015, here's 2030, what does that mean year by year? And let's commit to it. Let's commit to it as industry, let's commit to it as policy makers. Let's commit to it as all the supply chain, the OEMs, so that we can then plan against it. So that's another one.

Another piece, the amount of planning and permitting. I'm not saying we don't do planning and permitting. Of course you need to do it appropriately, but it takes two to three times longer than it really could if we could fast track things. Many jurisdictions have EU-wide, so European-commission-level, planning, permitting, and then member state and then local.

And there's still a lot of nimbyism out there. It's very similar in the US and you've got the federal targets, but you've got state implementation and then you go down a level and it gets really tricky and complicated. And all along the way, it's very easy to slow things down through the courts and through litigation and it happens.



So this is not easy, none of this is easy actually. But getting that planning and permitting time down is the third piece. And then there's another enabler, which is a little more technical, but actually super important, and that's around our electricity and power markets. Today's electricity and power markets, for the most part liberal markets, were designed a few decades ago. And they were designed with a marginal dispatch system in place and they were fit-for-purpose when they were designed.

Today, you see in particular, renewable capacity driving... When the wind is blowing and the sun is shining, the marginal cost of generating electricity is actually really low. In some cases even zero. And our electricity markets today don't account for that. And so they need to be redesigned into ways that do account and do drive the right investment.

**GEORGIE:** How would you do that? How would you redesign the energy markets?

**MAURICE:** Well, that's the trillion-dollar question or the \$18 trillion question.

**GEORGIE:** Yeah.

**MAURICE:** No, look, so I don't have all the answers, but I would point us towards probably a few things, right? One, I would point us towards is a little bit more holistic network design. And the UK is looking at this pretty hard as a matter of fact, which is taking our supply and our demand and thinking more carefully about how we locate it closer together as opposed to just allowing it to organically develop. And you could get there in a number of ways. You could have put in place a zonal or even nodal pricing, which means you work in a system where actually you benefit from being closer to the source of production.

So there's one piece around designing your system a bit better. That's a longer term thing. There's another piece about the prices settle and the way you get investment signals in there. So there's two parts to that. There's one, what do you and I pay as a consumer or what does industry pay? And if it's just done around marginal pricing and 60, 70% of the time we're pricing off renewables, that goes way down, and it's very difficult to remunerate investments there.

In addition, you're going to see, we did a lot of analysis around this and we found that as the amount of renewables in a systems increases, you get a lot more price volatility, sometimes quite extreme. Sometimes you could argue that's actually good because producers benefit from volatility. But actually as a consumer, volatility is tricky to deal with because you've got to pay high prices in one moment and low prices in another. And what if in one three month period there's not a lot of sun or wind, and then it just throws the economics into disarray. So we've got to find a way to smooth that volatility in the system as well.

So there's this thing about pricing there. And then the second part of that market design around the pricing system is around driving investments. In fairness, there are some good tools that are out there right now, but probably need to continue to evolve things like CFDs, contract for differences, or PPAs power purchase agreements, where you can lock-in in the longer term, the corridor of price that you will have as a producer.

Now, there are some challenges there when you're in a high inflationary environment or when you see higher interest rates because the price you're going to get for your power has been indexed, or you see a fixed price there, but your costs have sometimes not been.

So we've seen recently the UK wind auction attracted a grand total of zero bidders. That was in the press a lot. Some big players out there have recently slowed down or even stopped some of their wind projects, for example in the US. And that's mostly been linked to the fact that their costs have gone up tremendously whilst their output prices and the pieces they've been guaranteed through PPAs and CFDs have not.

So there's a mismatch there that we need to fix. So that's the second-biggest thing, is redesigning the pricing mechanisms and how we guarantee prices out there. And then there's a third bit, which is around demand response. So demand response basically means that users, consumers, and industry, and even homes, will choose to reduce their consumption when you see higher prices for energy.

In many of our electricity systems, that mechanism either doesn't exist or is not rapidly



implemented enough or has not been appropriately priced. So there's a lot of opportunity for demand response. There's a lot of...more and more devices being connected to the home, whether it be electric vehicles, heat pumps, batteries.

One estimate shows that if those devices in 2030, the ones that are installed, for example in the UK, were all charging in the middle of the day, we'd need about twice the production capacity that we would otherwise. So smoothing that and incentivizing consumers to charge and use those devices much more in non-peak hours, usually at night, could get you a long way there too. So those are three things that I think would greatly help on the market design.

**GEORGIE:** Zooming out a little bit. We focused on policy, policy makers, we focused on business. You've mentioned there about consumers. But consumer pressure is often what drives the first two elements. But do you get a sense that at the moment, perhaps with cost of living, the current economic environment, that the drive, particularly among consumers, is slightly waning? We're seeing billions being pulled out of ESG funds, governments slightly row back on target. Is that a concern?

**MAURICE:** Well, so the simple answer is yes, of course it's a concern of if we lose public support for the energy transition, we're in a very, very bad spot. So it's a concern in that sense.

I think though that anytime we've gone through any transition, you have stops and starts and you have times we're making great progress and times we're making less progress. That's just how it goes. And right now, yeah, economically, we have a cost of living crisis, we're seeing inflation, and people start thinking more and more about the end of the month versus the end of the world, right? That's a reality.

Now that said, when people have the right facts in front of them and they know what they can do to take action, it helps. This is where I think business leaders and policymakers and all of us who sit in positions where people could hear us, need to have a bolder vision, and that bolder vision needs to be backed up by the fact that there's an understanding around the challenges that we're

facing and what role we all have to play, right? I go back to this demand response challenge right now.

The demand response challenge, if you get that right, it actually reduces consumer costs and it reduces overall system costs. So once we can understand that changing your behavior a little bit doesn't increase your costs, it actually decreases them. That's quite helpful. Another thing that can be quite helpful is people understand that the investments we're making now, they might increase short-term costs a bit, but in the midterm it's going to pay off.

So people have talked about the energy trilemma, which is that we need to have affordable energy, we need to have sustainable energy, and we need to have secure energy. And that's tricky because when you do one, it tends to put the other in jeopardy. And we've seen that recently with the geopolitical tensions that have really stressed the security of our energy.

But what you find is that when you invest in the energy transition, low-carbon energy, it can benefit all three. It can in a sense, almost break the trade-offs there. So I'll come back to the North Sea. I keep using the North Sea, but that's in our backyard here. If you install one gigawatt of wind power in the North Sea, that's a lot of power.

What can it do for you? Well, it can actually reduce your cost by \$4 to \$500 million annually. It could replace about ten LNG carriers, which... Sorry, LNG comes from difficult places. Sometimes hotspots, just means that you're a little bit less secure. So that's generated in the backyard, so to speak. So that's more secure. And importantly, can reduce our carbon footprint significantly by three to four million tons of CO<sub>2</sub>.

**GEORGIE:** So Maurice, it sounds to me like trying to persuade a 20-year-old to save for their retirement when they go, "but we've got all of these other costs we need to pay for." Yes, but it'll pay dividends in your future. But that figure of, you don't have to put 18 trillion, although it would be lovely to put 18 trillion aside in your twenties and see how that grows by the time you reach retirement age, but that figure is quite daunting.





So we've zoomed out. Let's zoom in then on individual companies, individual CEOs, that business case, what can businesses be doing? What should they be doing to help this? If you're not involved in creating the technology of the future, what can just an average business and not just the big legacy companies here, how can smaller companies that are starting out, they're looking to grow, how can they make this integral to their business model?

**MAURICE:** Yeah, no, it's a really good question, Georgie. I mean, you zoomed in, I'm going to zoom out for a second. We talk a lot about Scope 1, 2, and 3 emissions, and I do think it's helpful to talk about that here for a moment. So Scope 1 and 2 emissions basically are what a company creates on their own. So if somebody has a factory that emits carbon in its production processes, or if you are a producer of oil and gas and in that process you emit carbon, those are Scope 1 and 2 emissions.

Scope 3, of course is what is created through end use. And if you're an oil producer, then somebody that burns gasoline or petrol, I have to say in Europe, or diesel in their engines, that's a Scope 3. So just to orient to some terms. And Scope 1 and 2 emissions are pretty much wholly in the control of companies.

And so as a starting point, I would say great progress because many companies have committed to Scope 1 and 2 targets. The first thing is let's just attack those Scope 1 and 2 emissions. And the levers are clear as I already talked about. We know what we need to do to get there. So the first challenge is tapping Scope 1 and 2.

And maybe I'll actually break it out slightly further. We talk a lot about CO<sub>2</sub>, but methane emissions are even worse. By some accounts, they're 80 times worse on a per ton basis. So we've got Scope 1 and 2, which companies need to tackle, and they set targets and they need to go after it. And then as we think about Scope 3, this is trickier because Scope 3 depends on a lot of things, and it depends along action on the value chain. But Scope 3 has two flavors to it too.

Scope 3 is all those emissions I talked about that you and I, if you're still driving a internal

combustion vehicle, Georgie, I don't know if you are, but if you're still driving one, then you're burning those and you're Scope 3. But companies also have Scope 3 emissions in their supply chains. I would argue at least that is a little bit more in control. Now, we again can always debate this.

But I would say that this is an area, and many companies are doing this, this is an area though, where you could start holding your supply chain to account, start measuring it, even just asking them. And once you start getting supply chain actors, suppliers of goods and services who can demonstrate they're making more progress, you as a company can then start prioritizing that a little bit more and buying from them. So you start driving action through the supply chain as well. So those are some things I think companies can do, should do, many are doing, but probably not everybody yet.

**GEORGIE:** No. But as a society then, is there a blueprint that we can follow?

**MAURICE:** The difference that we're seeing or we have seen in these other transitions is they were mostly demand-led. What I mean by demand-led is that the new source of energy, when oil came around, it was actually more efficient and more effective than the previous sources.

Where we are right now in the end of transition to low carbon sources to renewables is that it's still a lot more supply-led. And by supply-led, I mean we're trying to swap out the generating sources that we have today. In some cases for generating sources that are more costly or above all, we're trying to wind down generating sources that still have a very long operational and economic life in them. A coal plant, for example.

Now, as I said before, the reason it's that way is because we're not pricing all of the externalities that carbon emissions, the impact it has on our planet. So this is where I think treating it as a society-wide problem needs to take place. We need to price externalities, close that green premium gap so that consumers see the real price of energy. And then change their behavior and it becomes more of a demand-led transition because we're looking to get those sources of energy that can produce the power, the energy



that we need at a lower cost, all in. And provide the security, provide the affordability that we need.

And so that's the blueprint, if you will. And then there's a lot of levers, what policy makers do, what end users need to do. I mean, I talked earlier about the fact that 25% of the challenge can be driven by more efficiency. And the simple little things that consumers could do. When Europe introduced all the A, B, C, D, E, F ratings on appliances and efficiency, it did change behavior and people did look at it differently. There's a lot of opportunity for other geographies to follow suit.

So I'm not trying to say that's going to be the only thing that moves the needle, but I do think that everybody has a role to play. It's why I say it's an all of society challenge. And the more we realize that we can't just point to big companies and say, "Hey, you should do your part." Well, okay, yeah, they should, absolutely. But we all need to play a role here and that's what we need to focus on.

**GEORGIE:** Maurice, thank you so much. And thank you for listening. We'd love to know your thoughts. To get in contact, leave us a message out [thesowhat@bcg.com](mailto:thesowhat@bcg.com). And if you like this podcast, why not hit subscribe and leave a rating wherever you found us? It helps other people find us too.