
From: Dominic Adams
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Here is the transcript with a few edits. Thanks.

Dom

[Dominic Adams](#)

REPORT ON PROCEEDINGS BEFORE

**SELECT COMMITTEE ON THE FEASIBILITY OF
UNDERGROUNDING THE TRANSMISSION
INFRASTRUCTURE FOR RENEWABLE ENERGY
PROJECTS**

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At Macquarie Room, Parliament House, Sydney on Friday 16 February 2024

The Committee met at 9:00 am

PRESENT

Ms Cate Faehrmann (Chair)
The Hon. Mark Buttigieg
The Hon. Susan Carter
The Hon. Wes Fang (Deputy Chair)
The Hon. Stephen Lawrence
The Hon. Emily Suvaal

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Mr DOMINIC ADAMS, General Manager – Networks, Energy Networks Australia, affirmed and examined

Mr RICARDO DA SILVA ALVAREZ, Network Development Business Manager, Iberdrola Australia, affirmed and examined

Mr NINO LALIC, General Manager Public Affairs, Iberdrola Australia, affirmed and examined

The CHAIR: Welcome to our next witnesses. Mr Adams, do you have a short opening statement to begin with?

DOMINIC ADAMS: I do, thank you. I'll get going. Thanks for the opportunity to be part of the inquiry. A bit about ENA—we represent Australia's electricity transmission and distribution and gas distribution networks. Our members provide more than 16 million electricity and gas connections to pretty much everyone in Australia. As an industry peak body, we don't really get involved on the ground in the business of doing transmission projects. Our staff won't go out into community town halls or be sitting opposite landholders to talk through these issues. What we do is we listen to our member organisations—our transmission businesses—we listen to communities and energy customers, and we try to navigate that path for industry to meet everyone's needs through what we think is pretty much the biggest challenge of our time: the decarbonisation challenge.

Over the last five or so years, community and social licence engagement issues, which have always been a very high priority for our members, have become a high priority for ENA. As a result, we've been involved increasingly in work to improve outcomes for communities and landholders—so engaging through the Energy Charter Better Practice Social Licence Guideline for transmission, engaging on the rule changes, and reviews around community and landholder engagement and social licence that have occurred at that national framework level. That really brings us to the issue of undergrounding. Communities and landholders are legitimately concerned with the impact of new transmission infrastructure. They're big, big projects and they are going to have real impacts on the land. There's disruption during construction. There are ongoing land use impacts and visual amenity—you're aware of all of the various categories and so on.

And it's not just the transmission infrastructure. These impacts are magnified. You've also got renewable developments that follow and go around these transmission infrastructure. So the engagement fatigue being felt in communities is genuine. At the same time, we've got other imperatives. We've got the State and Federal decarbonisation goals. In New South Wales, in particular, we've got coal-fired power stations reaching end of life. They're closing over the next decade; we have to replace them. And the national plan, the AEMO plan, says that that's best done with new renewables connected in, firmed by storage, interconnection and gas generation. At the same time, as well, people are doing it really tough on cost of living. That's a genuine concern. Energy prices form a part of that. They are a direct cost. They're also an indirect cost embedded in everything we buy, in products and services. It's a really difficult context; it's got many competing priorities.

Transmission developers and communities that they work in need to, in that context, sort out whether building above or below ground is the right way to go. The mere fact that we've got tons of transmission out there already—most of it, really, is above ground; some of it is below ground—means that there are going to be use cases where transmission is appropriate for each—above- and below-ground transmission is appropriate. I had transmission go below ground up the other end of my street a few years ago in Transgrid's Powering Sydney's Future Project, which was an underground project to meet the growing needs of Sydney. There are many factors that go into and influence whether above ground or below ground is the right choice for a particular project, for a particular circumstance. I won't go into the particular factors. I think Curtin University and Queensland university included a submission from a piece of work that one of our members helped fund as well. I'll skip over the brief summary of that.

But there are very different competing technical differences—as you've mentioned, as I was listening just before—in alternating current versus direct current technologies. There are cost implications, time-line implications. There are all sorts of different implications for the different technologies. In the mix as well, as you've noted, there are complex energy planning and regulatory assessment processes that work out what's the best project to do and how do we do the best project in the most cost-efficient way, and those are genuinely designed to make sure we're not building too much or paying too much to meet energy customers' needs as well. It's really complex stuff. Coincidentally, whenever we're in such a complex environment, it's rich ground for confusion and miscommunication. We're in the TikTok world where influencers have more cachet than energy companies or governments in communication.

It's a very hard environment to be working in as well. We need to be mindful of that. It's understandable then that when we go and talk to our transmission businesses—and this goes right up the chain to CEO level

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discussions—they're asking us to be more co-ordinated and to engage and to try and solve some of these problems. That's a recognition really that it's complex, there's information and expectation gaps between transmission developers and communities and that the only way we're going to solve that is through genuine collaboration and putting in the hard yards to do that.

Having that put on our agenda by our members, we looked around and sought for the right thorough, independent collaborative processes to try and achieve that outcome and we didn't want to reinvent the wheel. We asked the Energy Charter to take on this issue and they've done that quite quickly. They've got a project underway around evaluating transmission undergrounding and all things going well that will start producing some outcomes in the middle of this year. I think you have some details of that project as well in Energy Charter's submission, so I won't go into any real detail there. The only thing to draw attention to is it is a genuine co-designed project where we try and get the best research done and then get everyone, all the right stakeholders in a room, landholders, farmers groups as well as transmission developers to try and nut out what's the best way to work through this.

The CHAIR: Mr Adams, can I see how much you have in terms of a short opening statement, because you are eating into question time.

DOMINIC ADAMS: About a minute, less.

The CHAIR: Keep going, but I am giving you a time warning.

DOMINIC ADAMS: The only other thing to note is that really where we want to get to through that project is to have some defined expectations around when and how everyone will work together, come together and what the rules of the game are for making those decisions around whether a project should go above or below ground, and if we can get there then we've made big progress. I won't pre-empt the outcomes of that proposal because it's within the collaborative process to look at the research and work out what the best way forward is. I will leave it there.

NINO LALIC: I might make a short intro and then my colleague will continue for a little bit. Thank you to the Committee for the opportunity to provide evidence at the public hearing today. Iberdrola Australia has been operating in Australia for more than 20 years and around the country we have about 1½ gigawatts of renewables across the NEM. In particular, energy assets and interests in New South Wales include the 130 megawatt Bodangora Wind Farm east of Wellington; the 145 megawatt Flyers Creek Wind Farm south of Orange; the 48 megawatt Woodlawn Wind Farm east of Lake George near Canberra; the 140 megawatt Capital Wind Farm, also near Lake George; the 245 megawatt Avonlie Solar Farm near Narrandera; the Smithfield Open Cycle Gas Turbine; and the Wallgrove Grid Battery. We are already obviously operating in a lot of regional communities across New South Wales but globally we are part of the Iberdrola group, which has more than 60 gigawatts of generation in operation and 1.3 million kilometres of transmission.

We've been in the process of transitioning our business model for more than two decades with investments in renewable energy generation, transmission and distribution, battery and pump surge hydro and green hydrogen. Our business and our people are aware of both the opportunities and risks regional communities in particular face as part of the energy transition. In response, we believe in putting our stakeholder needs at the centre of our strategy. We are focused on ensuring the benefits created by the energy transition are fairly shared by the communities, business and individuals we work with. As part of our focus on our fair energy transition, we are committed to creating benefits for our communities and the environment, the First Nation communities of Australia and skilled employment in green and sustainable industries in the future.

RICARDO DA SILVA ALVAREZ: Thank you, Nino. I also would like to thank the Committee for the opportunity to provide evidence at the public hearing today. As my colleague was saying, we are a global utility recognised in different jurisdictions across Europe, UK, US and South America. I particularly come from the UK where I spent more than six years working for the rail related arm of Iberdrola for transmission and renewables. Currently, globally, Iberdrola operates one of the largest power systems, comprising 1.3 million kilometres of powerlines and more than 4,000 substations. This actually carries electricity to more than 34 million people around the globe. Our investment currently targets 40 per cent of the group organic investment. That is around €27 billion invested in transmission regulated and non-regulated businesses.

That's why I'm here today. Iberdrola Australia, particularly, is currently trying to roll out our TNSP capabilities in Australia to support the energy transition. We definitely agree with the statement on the need of building transmission infrastructure in New South Wales—not only in New South Wales but across the east coast—as the increase of connectivity and additional generation will be required to replace retiring coal-fired generation. This is something that we see not only for Australia but we have seen in other jurisdictions: the UK, the US and Spain.

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As for the NSW Electricity Infrastructure Roadmap, I think it's clear that new transmission and new generation will be required. The technology of this generation could be renewables, could be nuclear, subject to any debate that the industry actually runs. But whatever is rolled out, transmission will be necessary. I don't think this is going to be something that we will be able to avoid in the future. Transmission is necessary not only for Australia, but we see industry bodies in Europe and the United States regularly publishing reports targeting and identifying the need for significant new transmissions. On the Australian landscape, I think it's important to say that we are in a global landscape, sharing and competing not only on workforce but the supply chains, on the skill sets. That's important to consider in these debates.

As we've said, I think in the media I can see short-term alternatives being proposed, like an extension of coal closure and the use of natural gas peaking. But, as we've said, whatever it is that we deploy in the future—renewable generation, nuclear—will require transmission lines, significantly. I will say that it's not only for Australia that we see reports also being published about the importance of deploying and connecting new transmission in a timely manner. Particularly in Australia, we have seen reports—particularly from Nexa Advisory—that have modelled that any delays of two years on transmission rollout will translate to \$600 more on electricity bills over 15 years for customers. This increase to our customer energy bill increases approximately \$1,800 over the same period, with a transmission bill delayed for four years. We believe that the build and investment in transmission, while ensuring impacted communities are genuinely consulted, is the only way to deliver affordable and reliable energy transition for Australia.

The CHAIR: Thank you very much. We'll move to questions, starting with questions from the Opposition.

The Hon. WES FANG: Mr Adams, I wanted to start with you. Do you represent Transgrid, or Transgrid is a member of your organisation?

DOMINIC ADAMS: Yes, Transgrid is a member of our organisation.

The Hon. WES FANG: What about EnergyCo?

DOMINIC ADAMS: I don't think EnergyCo is a member. They may be an associate member or one of the different levels, but I don't think they're a full member.

The Hon. WES FANG: Okay. You've spoken about the work that you as an organisation are doing to improve the initial contact with communities, trying to better achieve outcomes in relation to the consultation process and the planning process and getting all the stakeholders in the room. Obviously, you said there's a study that's going on at the moment. Is that an admission that you believe that there is a failure at this present time in the way that that has occurred previously?

DOMINIC ADAMS: I don't think I would say that there has been a particular failure. I think the biggest issue is that we haven't done this in this environment before. The last time we rolled out major transmission investment was a long, long time ago when the rules of the game were very, very different. As I was talking about before, it's a really different environment that you are trying to work within, and it's challenging. Of course, the businesses will all be learning. For them, it's existential. If you have an imperative for these projects to go ahead, and to go ahead in a timely way to meet the needs of customers, you have the ultimate objective to obtain social licence and to do this right.

The Hon. WES FANG: Yes. You would be familiar with the HumeLink project, I assume.

DOMINIC ADAMS: Yes.

The Hon. WES FANG: Almost everyone is. You would be aware that the community's not inclined to support the proposal that Transgrid has brought forward with the overhead powerlines. You'd agree with that assumption?

DOMINIC ADAMS: I think that's quite a generalisation.

The Hon. WES FANG: It is.

DOMINIC ADAMS: I'm sure there are some parts of the community who are supportive; some parts that are not so supportive, but there's—

The Hon. WES FANG: Let me rephrase: The community where the powerline is due to be installed is generally unhappy with the consultation process and the outcome that is on the table at the moment. Would you agree with that assessment?

DOMINIC ADAMS: I think there have been pretty big challenges with the way that—

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The Hon. WES FANG: You're starting to lose your credibility with me because I think it's pretty clear—

The Hon. EMILY SUVAAL: Point of order—

The CHAIR: Order! I'm very aware of what the point of order is going to be. The witness said three words. If the member could allow the witness to at least get part of his answer out so we have an indication of where he is going, that would be appreciated.

The Hon. WES FANG: Okay.

The CHAIR: Mr Adams, if you could continue, please.

DOMINIC ADAMS: There are genuine concerns from communities about the scale of the impact of major transmission investment, as there are with any major infrastructure projects. We're in a very difficult operating environment where it's difficult to communicate and to engage within this environment. I think everyone's trying to do their best.

The Hon. WES FANG: We're looking at the HumeLink project, the way that the models have been presented to the community, the way that the community feedback has or has not been adopted, and the way that the proposal has changed in relation to that community feedback. Do you believe it has been acceptable to date that the community's views, the impact of landholders and community members for where HumeLink will be installed, have been taken into account when the assessment and reassessment of that project has occurred?

DOMINIC ADAMS: I think we're getting towards areas where, as I said in my introduction, we're the peak body so we don't deal with particular projects and we don't know exactly what's going on on the ground and the way the communications individually have been handled, so we're kind of departing from areas where I have expertise to give valuable evidence.

The Hon. WES FANG: Okay. In relation to the work that's occurring at the moment around the further assessment on how it can be done better and the project that you have in place to bring people together, what has driven that need? Is it the acknowledgement that these sorts of projects haven't been well accepted previously?

DOMINIC ADAMS: I think it's an acknowledgement that there's a gap between expectations and ability to understand and engage in processes—a gap between where the businesses are at and the communities are at, and it's a difficult environment in which to have shared discussions and reach a shared understanding. It's a recognition we need to do things in another way. We need to work together and it's only through that collaborative-type process that you're going to get there.

The Hon. WES FANG: As a peak body, once you have a process that this planning work that's currently underway will formulate, will it be a requirement that your member organisations implement that when they're moving forward with projects?

DOMINIC ADAMS: I think that's a matter for the Energy Charter itself. The Energy Charter is another organisation that has its own members, who are also our members as well, and I think that's all a matter to be worked through the project. The governance of how that works going forward should form part of the conversation that happens within that sort of collaborative consultation as to what's the right governance for this going forward. Should it be mandatory? Should it be voluntary? What's the oversight?

The Hon. WES FANG: Where you've got, say, Transgrid—who you've indicated is part of your organisation—if you were to mandate or implement that program, you've got the Transgrid projects where it may come into play but then EnergyCo isn't a part of it.

DOMINIC ADAMS: Let's distinguish between Energy Networks Australia and the Energy Charter, and EnergyCo is not a member of ours. I think they may be a member of the Energy Charter; I'm not 100 per cent sure. So let's clarify that.

The Hon. WES FANG: So then it's more that the Energy Charter is the body that will implement any of these assessments that come out of the work. Is that effectively how it's structured?

DOMINIC ADAMS: Yes, that's right. It's an Energy Charter project.

The Hon. WES FANG: What is the involvement that your organisation has then? Is it just feedback?

DOMINIC ADAMS: We're a part of the kind of collaborative group. We're also—

The Hon. WES FANG: In your opening statement you said that you asked for the work to occur.

DOMINIC ADAMS: Yes.

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The Hon. WES FANG: That you'd tasked—

DOMINIC ADAMS: If I said "tasked", that's probably the wrong word. We asked very nicely. No, I think it was a shared understanding from our members that undergrounding is a difficult discussion to have with communities. The Energy Charter were hearing the same thing from communities, from their members, and we reached a shared understanding that we need to do something here, so the Energy Charter decided to undertake a project.

The Hon. WES FANG: And the time frame expected is midyear?

DOMINIC ADAMS: Midyear this year, yes.

The Hon. WES FANG: But these projects that are currently underway will be grandfathered?

DOMINIC ADAMS: That's a matter for the project as to how that works out.

The CHAIR: Mr Adams, starting with you, why shouldn't energy companies pay for some of the costs of transmission? At the moment it's going to consumers. Do you think energy companies would be open to potentially sharing some of the financial costs?

DOMINIC ADAMS: By "energy companies", do you mean—

The CHAIR: Your members.

DOMINIC ADAMS: Our members, the transmission businesses?

The CHAIR: Yes.

DOMINIC ADAMS: Customers ultimately will always pay for the energy service that's provided. The aim is, over all, to make sure that energy is as affordable as possible. Customers pay for different parts of the supply chain in quite different ways. The network component of the bill, of what customers pay for, is paid by— the businesses invest and then the bill is paid for over many years by customers because they're large, critical infrastructure projects. It flows through the bill through to the retailer, and so all customers pay for all parts of the supply chain.

The CHAIR: Yes, they do. I could keep going on that, but in limited time I want to turn to Iberdrola. I note in your submission that you talk about the potential for bushfires and possible extreme weather events to impact energy transmission infrastructure. In other countries, are we seeing more decisions being made that take into consideration the impacts of potential extreme weather events on energy transmission infrastructure? Is that happening in other countries? For example, should we build overhead or underground here, or shift it over here because of the potential impact of something that could happen in 2025, in terms of extreme weather events? Is that happening? Are you aware of that?

RICARDO DA SILVA ALVAREZ: I would say there are clear technical specifications and processes when assessing routine and overhead lines on undergrounding. Sometimes those are industry wide or company specific. I can say that, in recent times, the effects of climate change and the impacts of climate change are being considered for changing and, perhaps, improving and futureproofing their specifications. But transmission is a long game. It takes time to implement these new additions to the specifications and best practice. I would say, in our experience, I cannot remind myself of any particular areas in which we have changed the design or the scoping or the routing based on extreme events. We have certain specifications that have been shared for some time. Although they may be incurring assessment, I don't think we have drastically changed all that in the last few years.

The CHAIR: Mr Adams, from your experience, do you know whether that's happening as well, or is this outside your knowledge area? Do you know whether the potential—let's call it climate-proofing or futureproofing our infrastructure. Is that happening in the assessment of, for example, what the best options are in terms of this transmission infrastructure? Is it factored in? Because I'm not seeing that it is, and none of the companies that have come to either the previous inquiry or this one are really talking about it, which is extraordinary, considering that this infrastructure has to be in place in 2045-2050. Heaven help us with what we're going to see with extreme weather events in that time. Is it happening?

DOMINIC ADAMS: I think the businesses are really alive to the fact that we are in a really evolving climate. There are more heatwaves, more often. There are stronger winds, and a lot of work is being done around the resilience of the grid at both the high voltage transmission level and the low-voltage distribution level. For specifics, I think you might be able to ask Transgrid who are up later.

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The CHAIR: Yes, thank you. I do intend to do that. I want to talk about the Energy Charter. You've got the guidelines in place now, and I see that the Energy Charter was first started—was it a couple of years ago? Is it a voluntary guideline?

DOMINIC ADAMS: It is voluntary, yes. There's the charter itself and then there's the Better Practice Social Licence Guideline for transmission, which I think came in mid last year.

The CHAIR: Do you see there being a substantial change as a result of that Energy Charter, once that was developed, with the behaviour or engagement of your members with the community, for example? Are you seeing tangible benefits as a result of having that in place?

DOMINIC ADAMS: I draw you back to my earlier comment that I don't see and witness those discussions that our members have on the ground and the way that they engage on particular projects with communities and landholders. But what I have seen is a real increasing of the maturity of the discussion at that level of coordination between our members and their collaboration with landholder groups and the like.

The CHAIR: The Iberdrola witnesses are aware—I'm sure you are—of the recent rule change at the Federal level that will now require community engagement from companies. You're aware of that. How will that change your practice and the practice of other companies in terms of engaging with communities early? Is that a positive sign? Will we see tangible differences?

RICARDO DA SILVA ALVAREZ: It is a positive sign and is also consistent with what we see in other jurisdictions. This is an indication of an evolution and maturity of our regulatory framework. Definitely, community engagement and stakeholder consultation need to be brought forward to timely deliver these projects. This needs to happen at the very early stages of any development in order to keep all of the communities and key stakeholders in the loop in their routing assessment, and the sooner the better. Right now, our perception is that this is being brought up at the moment, in which their project should be thinking about their delivery strategy and how this is going to be rolled out. Bringing that forward will allow people to have their say and create this environment of maturity of discussion and arguments, alongside the route assessment. It's not about companies imposing what route. Nobody in this industry wants to impose anything on anybody, but bringing the discussion forward will allow people to bring new options and create a comprehensive outcome.

The CHAIR: Can I get both of your views around what seems to be the way that, say, HumeLink, for example, has been undertaken. The community seems to have been told that there's no other option but overhead and we're going to completely dismiss undergrounding anywhere. I think it has frustrated people because it seems that, in some ways, it's an ideological push as opposed to an evidence-based push. That has been my problem. I totally support renewable energy coming on as fast as we can make it. I think a lot of the evidence seems to have been that we need to discredit undergrounding as much as we can and we're going to throw all of the evidence on to this Committee to do that, which raises people's suspicions. Can it be done better? Surely it could be hybrid sometimes, with undergrounding being okay in some areas—for example, high environmental impact or other things. Is there a case to be put that we should be saying to the community, "Yes, we will give more consideration, in some circumstances, to undergrounding because we hear you and, in some cases, it's beneficial"? Do you think we should be doing that? I will go to Iberdrola, and then maybe Mr Adams—

RICARDO DA SILVA ALVAREZ: As I said to the previous question, this should be part of the early engagement of any transmission project. These kinds of option assessments should be brought to communities sooner rather than later. I think part of the frustration, as you're saying, is due to the fact that they feel that they are being rushed into taking these decisions. Bringing all of this up-front and creating best practice through industry bodies and consistency not just across New South Wales but also across Australia in the way that we approach communities for this project is necessary. The frustration, from our point of view, is also reflective of the fact that this is new. We have gone decades without building transmission, and companies went from delivery companies to operation and maintenance companies. And now they are going back to delivery and these practices need to be reviewed again. It's understandable. We understand that it creates frustration, but it's part of the transition.

The CHAIR: Mr Adams, do you have anything to say to that?

DOMINIC ADAMS: Not much to add. I'd support Ricardo's statement. But also genuine, early engagement that is collaborative and listens to customer and community concerns is probably the way to go.

The Hon. EMILY SUVAAL: Thank you all for appearing today. I will start with a question to you, Mr Adams. In your opening remarks I think you said that electricity prices are embedded in everything we buy. I wondered if I could explore that a bit more. We've talked about, and we heard evidence about, the increasing

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cost of bills associated with delays. I invite you to expand more on that and how a delay could actually impact costs on other things, particularly in the context of the cost-of-living crisis that we are in.

DOMINIC ADAMS: I think we saw it flow through with the most recent cost-of-living crisis. It started with what was going on in Ukraine and it started with gas shortages, and that pushed up wholesale prices domestically here with our gas markets that are linked internationally. And that flows through to everything—the cost of steel and the cost of all sorts of goods and services. It's not just your energy bill that goes up; everything goes up.

The Hon. EMILY SUVAAL: The groceries would go up; insurance would go up.

DOMINIC ADAMS: Energy is one of the core planks of our whole economy. You need efficient access to capital, efficient access to people and skills, and efficient access to energy. It's one of the core planks upon which our whole economy is built, so it's really important to get it right for our competitiveness as a country and as a State.

The Hon. EMILY SUVAAL: I might turn now to Iberdrola, if I can. I wanted to ask you a couple of questions based on your experience with renewable energy and transmission projects. What are some of the workforce constraints on undergrounding transmission lines, would you say?

RICARDO DA SILVA ALVAREZ: I think we mentioned in our submission the limitations—well, the workforce-specific issues of undergrounding. I wouldn't say only on the construction side of things but also on the design and procurement. For example, the cables that we use for undergrounding are going to be completely different and bespoke. We currently see very constrained supply chains for undergrounding cables. HVDC cables are also used for undergrounding. There are less than a handful of companies out there able to provide these solutions. So when we will engage or try to design this, we really need to be offering a very good framework and project to these companies to get their engagement and be able to commit to the timescales and the costs and design constraints.

For example, when we talk about overhead lines, we always talk about linies and that the pool for linies worldwide is quite limited as well. When we engage contractors, we always ask about where they are getting their linies. Of course, having local linies is massively strategically important. But for undergrounding, it's a completely different set of experience and expertise. In Australia we have a limitation on linies for overhead lines. For undergrounding, it's going to be even more so because of, I would say, the limited experience in the country of rolling out undergrounding. Again, going back to the point, it's not only about workforce and construction workforce but also on procurement and suppliers. It's something to consider when it comes to undergrounding, and HVDC as well.

The Hon. EMILY SUVAAL: So, again, more variables that could factor into delays and costs and all of those things.

RICARDO DA SILVA ALVAREZ: Yes, exactly.

The Hon. EMILY SUVAAL: What are the health and safety risks associated with the building of trenches and placing transmission lines underground?

RICARDO DA SILVA ALVAREZ: It's important to say that when you underground cables the cables produce a lot of heat. Therefore, actually, the transfer capacity of those cables will vary depending on the length and the layout of the cables. So when you underground the cables, you need to provide any specific set of materials on top of the cables to allow the heat to disperse. Therefore, it's not that when you are underground you can just put that terrain to use again once you've finished the building. No, you need to protect that area to the extent of perhaps sometimes even making it sterile for any other activities—for farming, even grazing. So that needs to be protected to ensure that that area is not exposed to changes in the environment, it's not exposed to stress of different activities on top of it.

Perhaps they're not directly related to health and safety but it's a consideration for how these projects get immersed into communities in those particular areas. In regard to health and safety, I think even for some of the cases of undergrounding, we need to provide fencing around the undergrounding routes to ensure that nobody is exposed to not only the heat but also the electromagnetic fields that these lines could produce. So it's pretty dependent and it's subject to the design and subject to the cost but there are specific conditions that are completely different to overhead lines in regard to health and safety.

The Hon. EMILY SUVAAL: And the environmental impacts of the undergrounding of lines?

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RICARDO DA SILVA ALVAREZ: The environmental impacts, yes, definitely. When you start digging up trenches, you need to produce a completely different set-up of reports and understanding of your technical conditions and the environment on the area. Soil is important, so it's not that any area can be a host for undergrounding cables and routes. Again, it's a completely different set of approaches. In fact, the routing, when we do routing, because of the regulatory framework we operate, we always start with the principle of, it's going to be an overhead line and then when it's constrained, we consider undergrounding but undergrounding is a last resort based on costs. When we do that undergrounding assessment, it's likely that the route will change because of the soil conditions and the environmental conditions, so it's not like for like, and that also will impact the overall project itself.

The Hon. MARK BUTTIGIEG: Can I just ask you to clarify that evidence? The default position is overhead.

RICARDO DA SILVA ALVAREZ: We have routing specifics for the UK that we use which is based on the regulatory framework for the UK, and of course that is based on less cost for consumer. The default position for designing our routing is always overhead.

The Hon. MARK BUTTIGIEG: And that is because, over your experience of putting these transmission networks in—I've forgotten how many kilometres you said you did—inevitably, overhead turns out to be the best cost-benefit but there may be situations where you have a bespoke solution for underground.

RICARDO DA SILVA ALVAREZ: That's correct, yes.

The Hon. EMILY SUVAAL: Mr Adam⁷, your submission notes that undergrounding can cost between four and 20 times more than overhead. That's a big range. Do you have any comments to make about the reasons for that?

DOMINIC ADAMS: I'm not an expert on the costs. It's just really a reflection of the literature. I'd point to the Curtin University and University of Queensland study that showed basically that range, and there is a whole bunch of local factors that go into that, whether that is topography, geology—it's really project-specific as to why that range is so broad. That's the best of my understanding.

The CHAIR: Thank you so much for appearing today, providing your submissions and giving evidence. The secretariat will be in touch if we have any questions for you.

(The witnesses withdrew.)

(Luncheon adjournment)