

COMMENTARY 11

TED WOODLEY

Rewire the rollout – go underground to win energy standoff

The re-election of the Labor government has reconfirmed the transition to renewable energy and the 82 per cent target by 2030. But an integral component of that transition – the rollout of high-voltage transmission lines – is not going well.

Of the 10,000km to be completed by 2050, only a few hundred kilometres have been finished; community opposition has intensified and the regulatory approval process that Chris Bowen called not fit for purpose in 2022 has yet to be reformed.

Every transmission project is years late and way over budget. EnergyConnect has blown out six times from the initial estimate (\$700m to \$4.1bn); HumeLink by five times (\$1bn to \$4.9bn); Marinus Link by three times (\$3bn for two cables to \$4.8bn for one cable); and CopperString by eight times (\$1.8bn to \$13.9bn). Every year or so the estimated cost of every project has increased and the scheduled completion date delayed. Undoubtedly there will be further cost increases and delays.

Such eye-watering blowouts are partly explained by worldwide commodity price escalations, but the primary reason is woefully underestimated costs with impossible deadlines.

Transmission companies have an inherent incentive to submit lowball estimates, as once a project is approved by the Australian Energy Regulator it is never unapproved. The perverse outcome is transmission companies are rewarded with a regulated return based on whatever the final cost of the project turns out to be. So the higher the cost, the higher is the return for shareholders, usually foreign investors.

The AER has not held transmission companies accountable for their underestimates and flawed cost-benefit justifications and has passed on the extra billions of dollars to electricity consumers. They have yet to see the impacts on their bills, but transmission tariffs are set to multiply manifold in the coming years.

Another aspect of the rollout that is not going well is the ham-

fisted dealings of transmission companies with local communities and landowners.

The groundswell opposition to "hosting" overhead lines is becoming more strident.

There is no enthusiasm for massive 500-kilovolt transmission lines, with 75m towers, 26 suspended wires, a 70m to 100m wide easement, and access tracks blighting the landscape across hundreds of kilometres. Lecturing communities on the common good is just insulting. Transmission companies have failed to foster a social licence for their projects.

What should be done? Three suggestions. First, hold transmission companies to account for their estimates by requiring them to contribute to cost increases above the initial AER-approved budget. This will encourage genuine estimates in the first place.

Second, look at ways to scale back the extent and frenetic schedule of the transmission rollout to mitigate costs for consumers and social and environmental impacts. In particular, focus on locating renewable energy generation as close as possible to capital city load centres.

Also, make use of spare capacity on transmission (and distribution) networks and upgrade where possible on existing easements, augmented with batteries for fault response and storage of above-capacity energy flows.

Third, take a broader approach to the regulatory approval process rather than just selecting the project with the cheapest capital cost.

A broader approach would bring in technologies other than just high-voltage alternating current overhead lines, particularly high-voltage direct current underground cables. Astoundingly, minimal land-based HVDC transmission is proposed in the rollout, in contrast to overseas where long-distance underground cables are now commonplace and in some situations are mandated.

In 2002 Australia led the world with the longest HVDC underground cable, Murraylink, which is still in operation.

Australia now lags well behind other nations.

The stock excuse for rejecting HVDC is that it is too expensive. Yes, it can be dearer to install than HVAC, typically 1% to three times. But the capital cost gap narrows and can reverse when the broader long-term benefits of underground HVDC are considered.

Gaining social licence is so much easier and quicker (and cheaper).

There are negligible costs for arbitration or compulsory acquisition, lower costs for easements, compensation and vegetation maintenance, and no loss of property values.

As one farmer reacted when told of a proposed overhead line through his property, "go underground and I will dig the trench".

Importantly, underground HVDC has far less environmental impacts and much lower biodiversity offset costs (\$500m for HumeLink). Underground HVDC is more reliable, as it is unaffected by above-ground disturbances.

While underground HVDC will not be appropriate in every situation, there will be many instances where it is the better option after the broader long-term benefits are taken into account.

For example, by only considering capital cost comparisons, the NSW and federal governments allowed Snowy 2.0 to bulldoze a 140m wide easement through 9km of pristine subalpine bush in Kosciuszko National Park and Bago State Forest for two side-by-side double-circuit overhead lines. Surely this should have been an irrefutable instance for undergrounding.

As with overseas developments, consideration also needs to be given to the merits of establishing an HVDC backbone across the eastern states before an overhead HVAC-only network is entrenched.

Australia has embarked on the biggest extension of the overhead electricity transmission network to serve for the rest of the 21st century, but clearly it is not going well and changes are needed.

We need to prioritise renewable generation closer to load centres, upgrading existing transmission lines, making transmission companies accountable for project estimates, instituting a broader regulatory consideration of all costs and benefits, and genuinely considering the advantages of underground cables.

Ted Woodley is a former managing director of PowerNet, Gas Net, EnergyAustralia and China Light & Power Systems.

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Transgrid transmission lines running over rural properties. Picture: Ash Smith

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The re-election of the Labor government has reconfirmed the [transition to renewable energy](#) and the 82 per cent target by 2030. But an integral component of that transition – the rollout of high-voltage transmission lines – is not going well.

Of the 10,000km to be completed by 2050, only a few hundred kilometres have been finished; community opposition has intensified and the regulatory approval process that Chris Bowen called not fit for purpose in 2022 has yet to be reformed.

Every transmission project is years late and way over budget. EnergyConnect has blown out six times from the initial estimate (\$700m to \$4.1bn); [HumeLink](#) by five times (\$1bn to \$4.9bn); Marinus Link by three times (\$3bn for two cables to \$4.8bn for one cable); and CopperString by eight times (\$1.8bn to \$13.9bn). Every

year or so the estimated cost of every project has increased and the scheduled completion date delayed. Undoubtedly there will be further cost increases and delays.

Such [eye-watering blowouts](#) are partly explained by worldwide commodity price escalations, but the primary reason is woefully underestimated costs with impossible deadlines.

Transmission companies have an inherent incentive to submit lowball estimates, because once a project is approved by the Australian Energy Regulator, it is never unapproved. The perverse outcome is transmission companies are rewarded with a regulated return based on whatever the final cost of the project turns out to be. So the higher the cost, the higher the return for shareholders, usually foreign investors.

The AER has not held transmission companies accountable for their underestimates and flawed cost-benefit justifications and has passed on the extra billions of dollars to electricity consumers. They have yet to see the impacts on their bills, but transmission tariffs are set to multiply manyfold in the coming years.

Another aspect of the rollout that is not going well is the ham-fisted dealings of transmission companies with local communities and landowners, creating widespread resistance as well as delays and costs.

The groundswell opposition to “hosting” overhead lines is becoming more strident.

There is no enthusiasm for massive 500-kilovolt transmission lines, with 75m towers, 26 suspended wires, a 70-100m-wide easement, and access tracks blighting the landscape across hundreds of kilometres. Lecturing communities on the common good is just insulting. Transmission companies have failed to foster a social licence for their projects.

What should be done? Three suggestions. First, hold transmission companies to account for their estimates by requiring them to contribute to cost increases above the initial AER-approved budget. This will encourage genuine estimates in the first place.

Second, look at ways to scale back the extent and frenetic schedule of the transmission rollout to mitigate costs for consumers and social and environmental impacts. In particular, focus on locating renewable energy generation as close as

possible to capital city load centres, not hundreds of kilometres away, and thereby reduce the need for new transmission. Install more rooftop solar (residential and business) together with more wind (onshore and offshore) close to load centres, supplemented by battery firming.



The Snowy Hydro 2.0 project.

Also, make use of spare capacity on transmission (and distribution) networks and upgrade where possible on existing easements, augmented with batteries for fault response and storage of above-capacity energy flows.

Third, take a broader approach to the regulatory approval process rather than just selecting the project with the cheapest capital cost.

A broader approach would bring in technologies other than just high-voltage alternating current overhead lines, particularly high-voltage direct current underground cables. Astoundingly, minimal land-based HVDC transmission is proposed in the rollout, in contrast to overseas, where long-distance underground cables are commonplace and in some situations are mandated.

In 2002, Australia led the world with the longest HVDC underground cable, Murraylink, which is still in operation. Australia now lags well behind other nations.

The stock excuse for rejecting HVDC is that it is too expensive. Yes, it can be dearer to install than HVAC, typically one-and-a-half to three times. But the capital cost gap narrows and can reverse when the broader long-term benefits of underground HVDC are considered, together with the possibility of taking a shorter route or using existing easements and other infrastructure corridors. For example, the Syncline Community HVDC Cable Project proposes running for 100km in the median strip of the Calder Highway in Victoria.

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There are negligible costs for arbitration or compulsory acquisition, lower costs for easements, compensation and vegetation maintenance, and no loss of property values.

As one farmer said when told of a proposed overhead line through his property: “Go underground and I will dig the trench.”

Importantly, underground HVDC has far fewer environmental impacts and much lower biodiversity offset costs (\$500m for HumeLink). Underground HVDC is more reliable because it is unaffected by above-ground disturbances, such as lightning strikes, severe weather, bushfires, or accidental contact. There are fewer electrical losses (a significant saving over the life of the cable) and no corona buzz, or electric fields, or electrical interference. There is no risk of bushfire ignition and no access restrictions for firefighting. HVDC can provide system strength services in lieu of synchronous condensers that are needed for an HVAC-only network, costing billions.

While underground HVDC will not be appropriate in every situation, there will be many instances where it is the better option after the broader long-term benefits are taken into account.

For example, by only considering capital cost comparisons, the NSW and federal governments allowed Snowy 2.0 to bulldoze a 140m-wide easement through 9km of pristine subalpine bush in Kosciuszko National Park and Bago State Forest for two side-by-side double-circuit overhead lines. Surely this should have been an irrefutable instance for undergrounding, especially because it would have been in keeping with the rest of the project. These will be the first transmission lines to be constructed in an NSW national park for half a century.

As with overseas developments, consideration also needs to be given to the merits of establishing an HVDC backbone across the eastern states before an overhead

HVAC-only network is entrenched. Australia has embarked on the biggest extension of the overhead electricity transmission network to serve for the rest of the 21st century, but clearly it is not going well and changes are needed.

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<https://www.theaustralian.com.au/commentary/rewire-the-rollout-go-underground-to-win-energy-standoff/news-story/f1fa5124ee6e3bc819f28abc2208e979>