

Submission by



to the

Ministry of Transport

on the

Charging our future: discussion document

11 May 2023

Introduction

1. BusinessNZ Energy Council (BEC) welcomes the opportunity to provide feedback on the Ministry of Transport's (MOT) draft EV charging strategy document titled *Charging Our Future: a draft long-term electric vehicle charging strategy for Aotearoa New Zealand*.
2. The paper outlines a system-wide vision and five proposed long-term outcomes to support the roll-out of charging infrastructure in New Zealand. Each outcome is broken into several focus areas and possible actions to support the focus areas.
3. In response to this strategy, BEC outlines some of the barriers and challenges public charger providers and electricity distribution businesses (EDBs) face, and are likely to face, as the uptake of electric vehicles accelerates. This submission provides comments on some questions and topics raised by the MOT in its draft strategy, whilst offering additional matters to consider.

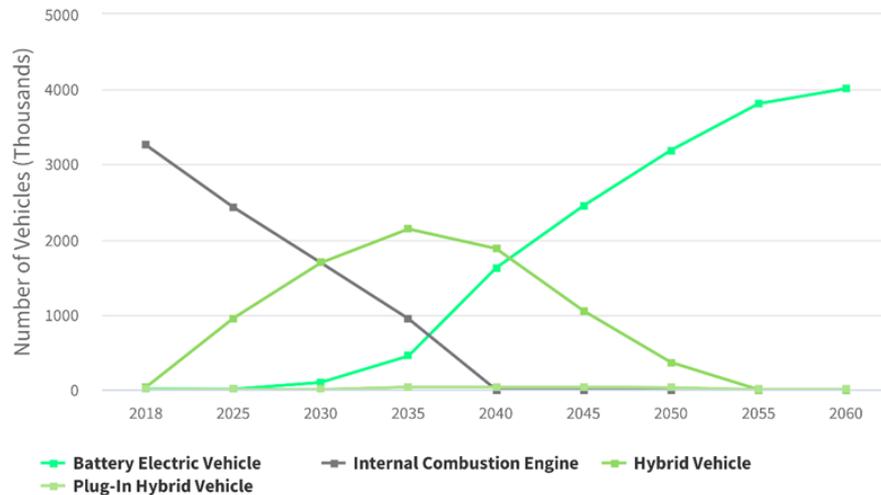
Growing demand

4. BEC supports the government's commitment to develop a system-wide electric vehicle (EV) charging strategy. Ideally, a strategy could lead to a more coordinated approach, between the public and private sector and ensure a smooth and lowest-cost deployment of public charging infrastructure as the uptake of EVs accelerates.
5. New Zealand has experienced significant growth in the uptake of both electric battery vehicles (BEVs) and plug-in hybrid vehicles (PHEVs) in recent years. In 2020, 3% of all new vehicle registrations were either BEVs or PHEVs. By 2022, this figure soared to 20%, slightly behind Europe at 23%.¹
6. On a total cost of ownership basis, EVs are likely to be cheaper on average than internal combustion engines by 2026.² If this does occur and motorists continue to witness price declines and repeated improvements in range and reliability, the uptake of EVs is likely to accelerate further. BEC's New Zealand specific model (TIMES-NZ)³ explores two possible future energy scenarios, Kea, where climate change is prioritised as the most pressing issue, and Tui, where climate change is one pressing issue among many. According to our modelling, the number of PHEVs is set to increase out to 2035, and the number of EVs is set to surge beyond 2035, both in Kea and Tui (see below in figure 1 & 2).
7. The speed of this uptake will be determined by many factors, including, but not limited to, the supply of earth minerals, the innovation of battery technology, global EV demand, New Zealand's accessibility to international EV vehicle markets and the full extent of PHEV adoption. The latter might be higher than current forecasts, especially as their prices are currently less compared to EVs. This could require less upgrades to network infrastructure and less demand for public charging infrastructure.
8. Another driver is that New Zealand is largely at the mercy of international technology. Many large vehicle manufactures are phasing out, or currently planning to phase out, the production of internal combustion engines (ICE) at varying timeframes by the early 2030s to 2040s. Several jurisdictions have implemented bans and targets by certain deadlines. International markets are changing, and so will New Zealand's vehicle market. Over time, vehicle imports are likely to contain additional EVs. Therefore, the regulatory environment must work in tandem with this demand to ensure EV charging providers can roll-out the public infrastructure they plan to accomplish.

¹ *Comparison of Electric Vehicle and Plug-In Hybrid markets-share in key global markets 2010 to 2022*, [Ministry of Transport](#), p1, (2022)

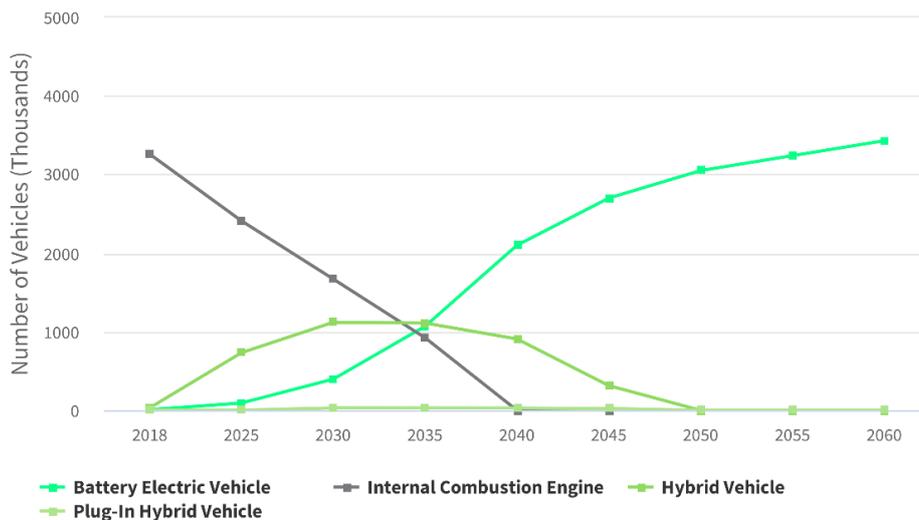
² *2023 Draft advice to inform the strategic direction of the Government's second emissions reduction plan*, Climate Change Commission (2023)

Figure 1: Number of vehicles (Tui)
Source: TIMES-NZ, Business NZ Energy Council



TIMES-NZ 2.0, Scenario: Tui

Figure 2: Number of vehicles (Kea)
Source: TIMES-NZ, BusinessNZ Energy Council



TIMES-NZ 2.0, Scenario: Kea

9. Another component influencing the uptake of EVs, identified in the strategy, is the extent of public EV charging infrastructure across New Zealand. Despite most charging occurring at home, close to 82% of the time according to EECA⁴, there remains a substantive need for public charging. As outlined in the strategy, motorists want assurance that charging is available once they leave home.
10. Over the past five years, EVs travel range has improved significantly, and it is likely to improve further with subsequent technological improvements. This has alleviated one barrier of EV adoption: 'range anxiety' – that EVs do not provide the comparable range a traditional internal combustion engine (ICE) does.
11. However, BEC is aware, from members working across the EV ecosystem, that adoption is constrained by 'network anxiety.' Some motorists are wary of purchasing an EV based on the lack

⁴ MOT, Charging Our Future: discussion document.

of public charging, as it heightens their concern of driving in an area without adequate charge and no possible means to recharge their vehicle.

12. Public charging infrastructure plays a similar role to petrol stations, with motorists having assurance that can refill their vehicle without being stranded. Comparatively, New Zealand has low public charging coverage once considering the total amount of light weight electric vehicles. According to the International Energy Agency (IEA), New Zealand has one public charging point for every 57 EVs.⁵ In Australia, there is one public charging point for every 20 EVs.⁶ The world average is one public charging point for every 9 EVs.⁷ The optimal ratio between the number of EVs and public charging points is difficult to quantify, due to the number of considerations already mentioned, most notably the rate of home charging. However, the need for public charging infrastructure remains. This is especially true for many households that lack a dedicated car park, which is estimated to be about 15% of total households.⁸ New Zealand's low coverage highlights the need for urgent action, and for the strategy to be implemented in a timely manner.
13. Yet despite this low public charging coverage, there are many entities, based internationally and domestically, that have an interest in, are planning to, and have started to develop public charging infrastructure in New Zealand. The pipeline of new charging points is large. They include companies like Jolt, Meridian, BP, Z, Hikortron and many more. Yet there are several barriers blocking the roll-out of charging infrastructure that these entities want to pursue.
14. **BEC believes removing or alleviating these barriers should be the focus of the strategy, enabling businesses and investors to roll-out EV charging infrastructure without large regulatory, process and cost constraints standing in the way. This will ensure the private sector does the heavy lifting and delivers the infrastructure.**
15. BEC notes that the strategy acknowledges that businesses will deliver most of this infrastructure, not the public sector. BEC agrees. On the flipside, beyond reducing these barriers, BEC believes the public sector is likely to have a more active role if there are certain cases of market failure. This role should include co-ordination with the private sector to identify where market failures reside, and what action would be appropriate after a rigorous analysis of the problem occurs.

Vision

16. BEC supports the strategy's vision. BEC notes the vision is structured around charging infrastructure. However, New Zealand's vehicle fleet transition is not only a matter of ensuring adequate charging infrastructure per se but also its impacts upon the distribution, transmission, and generation of electricity. BEC acknowledges that the strategy has rightly considered the system-wide consequences beyond charging infrastructure.

Targets

17. The strategy has proposed several targets. Firstly, having a journey charging hub every 150 to 200kms on main highways by 2028. Secondly, the strategy has set a target for urban areas with limited off-street parking (generally in Auckland and central Wellington) to have one public charger for every 20 to 40 EVs. Thirdly, all settlements with a population of 2000 or more should have public charging at municipal or community facilities by 2025.
18. Regular refueling opportunities make motorists feel at ease while they drive long distances, knowing they can refuel no matter the routes travelled. However, BEC would like to know how these targets were devised, why it is exactly every 150 to 200kms and why the year 2028 is crucial.

⁵ *Trends in charging infrastructure*, Global EV Outlook 2022, International Energy Agency (2022)

⁶ Ibid,

⁷ Ibid,

⁸ Ministry for the Environment, Reducing Barriers to Electric Vehicle Uptake; Tom Pullar-Strecker, 'On Street Parking Riskier Proposition If Electric Vehicles Take-Off', Stuff, 2016

19. The same goes for a target of one off-street parking charger for every 20 to 40 EVs and public charging at all settlements with a population of 2000 or more. These three targets do not mention whether they will be for DC or AC charging, how the ratio between EVs and chargers is calculated, what the number of charging points should be per facility, and why there should be public charging points for settlements with a population at or over 2000, compared to say 1,900. It is not clear what assumptions have been used to draft these targets. Not knowing these assumptions will make it difficult to observe when the targets are no longer relevant, due to evolving charging technology.
20. Targets should be based on a full assessment of where challenges reside, where demand is likely to take place and the economics of connecting and recouping costs. This assessment is best left to the private sector to determine how many chargers are connected, where they will reside and when they are connected.
21. The private sector has the expertise, skills, capacity, and capital to make these decisions efficiently to the benefit of consumers. Therefore, BEC believes EV charging targets are relatively arbitrary and do not reflect the most efficient, effective, and equitable way infrastructure can be rolled out across the country. As already noted, the focus of the strategy should be to reduce barriers that enable the private sector to do the heavy lifting.
22. To maintain or improve their competitive standing, many businesses are trying to better understand where demand for public chargers and private chargers will occur, both today and in the future. Where possible, businesses have reinvigorated their business plans and strategies to meet demand. However, more analysis around this problem and publicly available data is needed.
23. Among the many possible providers of public chargers, service station incumbents will play a crucial role in providing charging. Service station operators are well suited due to their experience in the market, their existing infrastructure located across hundreds of sites, and their expertise sourced internationally. BP now has three charging facilities and is planning to install 600 charging points across their sites. Targets will not be helpful in the pursuit of this outcome.

Institutional arrangements

24. The responsibility for EV charging sits across various entities, including the Electricity Authority, the Commerce Commission, the Energy Efficiency and Conservation Authority, the Ministry for Business, Innovation and Employment, and the Ministry of Transport. These entities have numerous competing demands requiring their attention. Their dispersed roles mean there is no direct point of responsibility for delivering the EV charging strategy, and the policies aimed at achieving the strategy. Furthermore, there is no mechanism that brings together the various entities and industry players in a formalised partnership to identify and address barriers to private and public EV charging. Under the current murky arrangement of responsibility, there is a risk that the required actions needed for delivering infrastructure, in a timely way, is delayed.
25. The annex of the strategy document outlines the possibility of creating a new government department or crown entity to be held responsible and administer the strategy. **BEC believes this is not the most appropriate solution. Creating a new department or entity would be time and cost intensive, while delaying efforts to alleviate barriers. Instead, BEC believes an interagency model would be sensible, bringing together relevant officials across these various public entities.** They would analyse problems and solutions, formulating the strategy's work programme and be held responsible for its delivery. The group would also be responsible for identifying and resolving any ongoing issues. This interagency model would ensure accountability without largely delaying implementation further.
26. **Crucially, BEC believes this interagency group should partner with the private sector by identifying problems and barriers, while cooperating to overcome these barriers where appropriate. This cooperation is vital. It ensures regulatory and policy changes**

align with the intention of EV charging providers, without creating additional and unforeseen barriers.

Outcome 1: Our national EV charging system is underpinned by affordable, reliable, secure, and safe power supply and infrastructure.

27. BEC strongly agrees with this outcome, and its focus area 1a of minimising stress on the network infrastructure. The TIMES-NZ model shows that electrification could double network capacity by 2050, if demand is not managed. The electrification of New Zealand's vehicle fleet plays a large role in increasing the need for additional network capacity. Many key network assets, like substations and sub-transmission cables, will need to be upgraded or replaced as the network becomes increasingly constrained over the next ten years. As a result, EDBs will require large increases in the capital expenditure they undertake. Total investments are estimated to be 30% higher in 2026-2030 compared to 2021-2025.⁹
28. BEC agrees with the strategy's emphasis on smart chargers alleviating some stress on network infrastructure. According to our modelling, under Tui, generation expands by 108% by 2060. In Kea generation increases by 95% over the same period. Tui assumes that charging technology is basic, with motorists using 'dumb' chargers. Kea assumes a steady shift towards smart technology.
29. Peak demand growth has grown in recent years. It has risen 2% on average, the equivalent of 138MW in both 2021 and 2022, while the top 10 largest peaks have occurred in the past two winters, despite these winters being the warmest on record.¹⁰ These chargers can be used dynamically, shifting charging to off peak hours. This flattens peak demand and reduces the need for additional network, transmission, and generation infrastructure to meet increasingly larger peaks – while at the same time, reducing the need for additional thermal peaking plants that will increase the system's overall costs.
30. Shifting to off-peak hours could help reduce the price consumers pay for electricity. Despite the higher upfront cost of a smart charger, they deliver net savings on average. Vector and Frontier Economics estimate that a single smart charger adds about \$300 in net value per annum through avoided costs across New Zealand's energy system.¹¹
31. Smart chargers, with open communication protocols, achieve this peak flattening. Furthermore, when an EV is registered to an ICP network operators can observe what is connected to the grid, where it is located, and its impacts on the grid. This will enable network operators to observe high EV concentration and demand impacts, mitigating the risk of damage upon low voltage networks.
32. They help the system operator to make better decisions when balancing supply and demand, providing the capability of modulating charging speed up and down, rather than just off and on, reducing the risk of a system overload, while ensuring the system operates within secure limits. Additionally, smart chargers protect most household mains that are usually 60amps. Modulating charging speed, when there is demand for heating and cooking appliances, reduces the risk of overloading household fuses and the need for additional wiring upgrades.
33. The strategy notes the current work done by EECA involving the possibility of mandating smart chargers for EV purchases. BEC's previous submission to *ECCA's Green Paper – improving the performance of electric vehicle chargers* outlines and explores the trade-offs of mandating smart chargers.¹²

⁹ *The future is electric*. Boston Consulting Group (2022)

¹⁰ Whakamana i Te Mauri Hiko - Monitoring Report, Transpower, March (2023)

¹¹ https://blobstatic.vector.co.nz/blob/vector/media/vector2021/vector_transitioning_to_lowemissions_climateresilient_future_submission.pdf

¹² BECs submission to EECA on improving the performance of electric vehicle chargers – green paper (2022)

Outcome 2: All users can safely access and use EV charging when and where it is needed.

34. Under focus area 2a, we understand the underlying desire for chargers in rental accommodation, multi-unit dwelling and social housing, and the possibility of a 'right to charge' provision. However, the costs of this aim must be carefully considered and analysed appropriately. Mostly notably, identifying who will bear the cost. Subsidies, and regulations by way of compulsion, can create unnecessary distortions and costs, while possibly meaning chargers are not placed in the most optimal locations, where they are not valued the most and meet demand.
35. On the flipside, BEC agrees that under focus areas 2b, accommodating for geographic variation in charging needs and energy supply, geographical barriers need to be addressed. Some connections are too expensive to make. The price of connection is beyond what they can recoup. This makes the project unable to stack-up, and it is therefore not initiated. This is especially true in cases of certain rural or small locations, and tourist destinations where populations can swell during holiday seasons. As already mentioned, the public sector could have a more active role in cases where the market won't provide these chargers. BEC also agrees that engagement with local councils needs to be consistent, with both its processes and planning. BEC recommends identifying these barriers and constraints that stop councils offering public car parks for charging points and addressing them accordingly.
36. On the matter of standardisation, BEC notes that EECA is exploring the standardisation of EV smart chargers. BEC's previous submission to EECA's *Green Paper* emphasised that standards should align with key jurisdictions where charging innovation and development is largely occurring, namely the United States, Europe, the United Kingdom, China, and Japan.¹³ The same goes for public charging infrastructure standards. New Zealand should observe the best practices of international jurisdictions before implementing standards. Nevertheless, BEC agrees that public charging must allow for many different electric vehicles to charge accordingly. Public providers readily acknowledge this need and respond to market preferences by providing multiple plug-points with different speeds.

Outcome 3: Aoteroa's EV charging system is underpinned by integrated planning and standards across multiple sectors.

37. BEC agrees with the focus areas under this outcome of improving standardisation and interoperability and optimising data capture and use. The strategy has outlined the importance of these considerations. Yet, as it stands, we question the need for focus area 3c, for regulatory changes to the housing and urban development sectors to encourage charge-ready infrastructure or installed charge points in new residential buildings.
38. BEC is opposed to a mandate that would require EV charging points in new residential buildings. A mandate would not only translate to higher building costs but also result in EV chargers that would not necessarily be used. This is not an efficient way to allocate scarce charging equipment. Consumers have many preferences. Some will purchase an EV, some will not. Some will choose to own a vehicle, some will not. A mandate disregards consumer preferences for a 'one-size, one-technology' fits all approach. The decision to purchase an EV, and subsequently purchase a charger, should reside solely with the consumer. If they value an EV charger, they will purchase one. A mandate is also contradictory to wider objectives, especially under the current context of inflationary pressures.

¹³ [BECs submission](#) to EECA on improving the performance of electric vehicle chargers – green paper (2022)

Outcome 4: Aoteroa's EV charging market functions effectively, can adapt and evolve over time, and is attractive to users, operators, and investors.

39. BEC strongly agrees with this outcome. BEC considers the acceleration of commercial investment to be one of the most important outcomes in the strategy, as noted in focus area 4a. Entities that want to connect public chargers to the grid face several challenges. As noted earlier, alleviating these barriers should be the overarching aim of this strategy.
40. Public charging providers face the challenge of high costs associated with connecting on electricity distribution lines. Depending on the EDBs' price structure, this can manifest itself as a first-mover disadvantage, as the first to install vehicle charging points may need to fund the upgrade of distribution lines. However, some EDBs only charge the cost of upstream impacts, such as capacity upgrades or reinforcement costs, on a user pays basis – that is, the new connector is only charged for the portion of the new capacity that they need themselves, regardless of whether their connection has catalysed an upgrade. This is determined through a system growth charge. Depending on the shape of this charge, which generally covers upstream network impacts which would not have been incurred 'but for' a new connection, this can ameliorate the impact of any 'first mover disadvantage'. However, these pricing structures vary across EDBs, and the costs of connecting a new public EV charger, which can have load equivalent to 50 houses, can be high regardless.
41. In addition to system growth costs, connecting parties are faced with the cost of a connection itself, or a 'capital contribution'. Passing through the cost of a new connection as a capital contribution plays a role in reducing the risk of asset stranding – whereby an asset may no longer add value, but which consumers continue to pay for through electricity bills. This is because the signal sent by cost reflectivity can support more efficient investment decisions. For instance, helping to avoid investment to connect an EV charger which may move site in the future – making that investment redundant or 'stranded.'
42. Capital contributions also can ensure that consumers will not be faced with the cost of a third party's commercial activities. If the cost of a connection is not passed through to the connecting party, as a capital contribution, then it is recovered through consumer's electricity bills. This effectively socialises the cost of a new investment across all consumers, whether they benefit from the new connection or not. This creates concerns about fairness, especially for the many consumers that don't own an EV and may never own an EV. And for the many businesses and industries who will face process heat conversions through electrification, and subsequently their own costs associated with network connection and upgrades. If capital contributions were to be reduced, a subsequent question would arise: who pays to bridge the gap to meet the capital costs for new EV charging connections?
43. Nevertheless, capital contribution policies vary significantly across New Zealand's 29 EDBs. For instance, some policies range from a connecting party paying the full upfront cost, to distributors sharing the cost, to a method of fixed chargers or formula driven cost calculations. There are different methodologies used to calculate capital contributions, with varying pros and cons, with different ownership structures to overcome.
44. Moreover, the application processes between the different EDBs also vary with different time frames for their completion. The delay of some applications weakens the prospect of connecting a charger and creates an opportunity cost if it turns out the connection will cost more than the charger will be able to recoup. This large inconsistency provides barriers to connecting in certain parts of the country. For instance, if a business wants to roll-out public charging infrastructure across its premises, they hold an incentive to build in areas with the cheapest upfront costs. However, this might not necessarily be the best location to connect to meet demand and provide motorists with the assurance that public charging provides. A more standardised process, with known and transparent costs would be beneficial.

45. BEC believes streamlining the approval process could be beneficial. This could reduce the overall cost of new infrastructure. Currently, the networks' funding is based on the Commerce Commission's five-yearly funding periods. This regime was designed in an environment with a steady state of demand growth, with funding that assumes demand growth is predictable over the period. However, the current regime could be under pressure as it does not factor in the sharp increases in network capacity that is needed for electrification. The uptake of EVs, and new generation, is uncertain, with the potential of unforeseen connections. Under this scenario, EDBs could be rewarded or punished for factors out of their control. Again, this regime of incentivising spending within certain limits has worked relatively well in the past, but as electrification accelerates, penalising EDBs for overspending disincentivises investments in increasing network capacity. Switching to a probabilistic, ahead-of-time investment approach could be beneficial, allowing EDBs to implement investments when they are needed in the future. The Commerce Commission, under its current IM review, could accommodate for a forward view of capacity investment. They could also provide greater consideration for network upgrades that result in decarbonization. Both examples are likely to enable more investment in network capacity.

Other additional actions could include:

- I. The Electricity Authority could consider a dedicated access regime. This could make applications easier through more consistent processes and timeframes. However, the EA has competing demands, with constrained time, and resources. The costs and benefits of delivering a dedicated access regime, by a certain date, should be weighed up appropriately.
- II. Capital contribution policies could be more consistent across multiple EDBs.
- III. More network information could be made available through better information disclosure, helping to identify key hot spots, where demand resides and where load is constrained. This will improve better decision making that ensures efficient investments, making sure chargers are connected in the right places.

Outcome 5: Our national EV charging system supports the transition to, and use of, low-emissions transport modes across the wider transport system.

46. BEC agrees that the national charging strategy must consider the role of other low-emissions transport modes. For instance, the role of heavy vehicle charging for buses, trucks, and light-weight trucks. Evidently, the need for this type of charging is less than light-weight vehicles. However, as the strategy document outlines, many businesses have, or are planning to, adopt a range of heavy electric vehicles. BEC agrees that researching the charging needs for heavy vehicles, planes, trains, and ships is important. And again, identifying the barriers that blockade the development of the necessary infrastructure is important. To achieve this aim, it is crucial that the institutional arrangements in charge of implementing this strategy are set correctly, as mentioned.

APPENDIX ONE – BACKGROUND INFORMATION ON THE BUSINESSNZ ENERGY COUNCIL

The BusinessNZ Energy Council (BEC) is a group of leading energy-sector business, government and research organisations taking a leading role in creating a sustainable, equitable and secure energy future.

BEC is a brand of BusinessNZ and represents the World Energy Council in New Zealand. Together with its members, BEC is shaping the energy agenda for New Zealand and globally.



BusinessNZ is New Zealand’s largest business advocacy body, representing:

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