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India-led electric two-wheeler transitions in the global South

Aditya Ramji[1], Minal Chandra[1], Lewis Fulton[1]

[1]*India ZEV Research Centre, Institute of Transportation Studies, University of California Davis, 1605 Tilia Street, Davis, USA 95616, adiramji@ucdavis.edu*

Executive Summary

Various countries in the global south have a large share of two-wheelers that serve mobility needs. Many have announced ambitions for vehicle electrification in their climate commitments such as Nepal and Chile, both of whom are major export markets for Indian two-wheelers. As these countries transition, it will require a reorientation of EV manufacturing strategy in India, to maintain export competitiveness and emerge as a strategic leader in EV supply chains globally by 2030. This paper aims to analyse the potential EV sales required in major two-wheeler export markets for India, like Nepal and Chile. The electric two-wheeler demand of Nepal and Chile are forecasted based on their announced EV targets and pledges for year 2030. Further, different scenarios are evaluated to estimate the potential for India's electric two-wheeler exports and India's role in driving clean road transport transitions in the global South.

Keywords: electric vehicle (EV), market development, two-wheel vehicle, ZEV (zero emission vehicle), sustainability

1 Introduction

Global EV sales in 2022 captured about 15% of total new LDV sales, with EV sales increasing by 55% in 2022 over 2021 [1]. Continued policy support in form of subsidies, incentives, and pledges for graded phasing out of ICE vehicles have strengthened the pace of EV transitions [2]. While the focus has been on LDVs globally, many countries in the global south have a large share of two and three-wheelers that serve mobility needs.

The global market for electric two-wheelers has been growing rapidly in recent years, driven by factors such as increasing urbanization, rising fuel prices, and growing concerns about air pollution and climate change. The global two-wheeler market was valued at $121 billion in 2022 and is projected to grow to $200 billion by 2030 [1]. Asia Pacific is the largest market for electric two-wheelers, accounting for around 90% of global sales. China is the largest market (~20 million annual two-wheeler sales), followed by India (~15 million annual two-wheeler sales) and other Southeast Asian countries such as Vietnam, Indonesia, and Thailand.

Emerging markets are seeing among the fastest motorization rates in the past decade: 60% in South America, 35% in Africa and 140% in Asia [OICA], and therefore, it is expected to continue driving two-wheeler sales growth. At the same time, various emerging economies have recently announced ambitions for 100% vehicle electrification as part of their revised climate ambitions at COP27. For example, Chile has legislated to

impose 100% phase-out of ICE sales by 2035 [3], Indonesia has set a target of 2.5 million EVs by 2030 [4] with a large share coming from electrification of two-wheelers, while Nepal has set a target of 90% electrification of two-wheelers by 2030 [5].

Given the smaller battery sizes and the less complex engineering requirements for electrification of two-wheelers, they offer a clear opportunity for decarbonization in the road transport sector globally, and more importantly, in the global south. The viability of electrification in this segment is further supported through the electrification trends in emerging markets, for example, in 2021, China achieved about 50% of new electric two-wheeler sales, Vietnam achieved about 8% while India was at 2%, and developing Asia was around 1% [1]. In 2022, India's two-wheeler electrification doubled in 2022 to reach 4% of new sales [6].

The market is also growing in regions such as Europe and North America, where electric scooters, mopeds and e-bikes are increasingly being used for urban transportation as they offer a convenient and cost-effective alternative to traditional gasoline-powered vehicles. As the global two-wheeler market has grown rapidly, various countries have emerged as major exporters. Total global two-wheeler exports in 2021 were about 48 million units, with a value of USD 40.4 billion [7]. As in Table 1, electric two-wheeler exports have gone from 21% to 33% of global two-wheeler exports in value terms from 2018 to 2021.

Table 1: Global exports of two-wheelers

	2021	**2020**	**2019**	**2018**
Total 2W Exports				
Units (mn)	48.1	42.6	34.3	29.0
Value ($ mn)	40440	30533	29032	27712
Electric 2W Exports				
Units (mn)	29.9	24.9	18.8	14.8
Value ($ mn)	13247	9753	7626	5839
% e-2W Exports				
Units	62%	58%	55%	51%
Value	33%	32%	26%	21%
Annual Growth (Value)				
Total 2W Exports	32%	5%	5%	
e-2W Exports	36%	28%	31%	

China is the largest producer, consumer, and exporter of two-wheelers in the world. With competitive advantage in battery technology and significant share of EV supply chains, it remains the largest producer and exporter of electric two-wheelers, exporting over 22 million units worth USD 5 billion in 2021 (Fig. 1), accounting for around 50% of global exports in electric two-wheelers. Taiwan, is the other major exporter of electric two-wheelers (USD 1.5 billion in 2021), producing and exporting electric scooters and motorcycles, with most exports going to Europe and Southeast Asia [7].

Europe (Fig. 1) has emerged as another major producer and exporter of electric two-wheelers, led by Germany and Netherlands (each with a 12% share of global electric two-wheeler exports in 2021) in Western Europe. Other European countries that are exporters of electric two-wheelers include Austria, Hungary, Bulgaria and Czechia [7].

In the global South, apart from China, India is the second largest exporter of two-wheelers (with a share of 4% of total two-wheeler exports in 2021), while globally, India is the world's second largest domestic market for two-wheelers. This gives India a unique opportunity to leverage its domestic market scale and automotive manufacturing competitiveness to produce electric two-wheelers at scale not just for its domestic market, but also for exports, improving its strategic positioning in global EV trade value chains. Currently, India's exports of electric two wheelers stand at 0.03% in 2021 [7].

This paper aims to analyse the potential for India to export electric two-wheelers to strategic markets, and more importantly, to maintain its export competitiveness. The export potential assessment is based on existing

two-wheeler export markets for India and new market opportunities, especially, among those countries that have set ambitions for electric vehicles including two-wheelers.

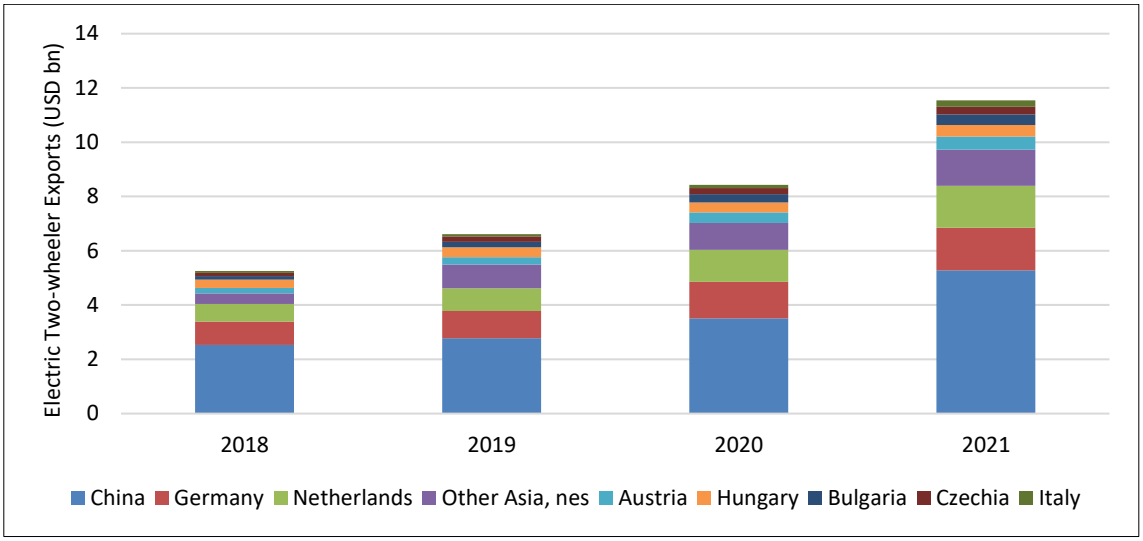

Figure 1: Top 10 exporters of electric two-wheelers by value (USD bn) (Data Source: UN COMTRADE)

2 Data and Methodology

In this paper, the data has largely been sourced from the UN COMTRADE database and the Ministry of Commerce and Industry, Government of India, for trade related statistics in terms of two-wheeler exports. The trade HS codes analysed included 8711 at the four digit-level, that maps two-wheeler trade, and 871160 at the six-digit level that maps electric two-wheelers. Data was accurately available upto 2021, and hence the analysis reflects the period 2018 – 2021.

As a first step, we map India's two-wheeler exports and identify the top twenty countries by region. We then analyse the share of India in these countries' total two-wheeler imports, followed by a mapping of electric two-wheeler imports by these countries. This presents a better understanding of India's strategic trade advantage in the export market for two-wheelers. We then map the key countries that are of competition to India in the two-wheeler exports to the major countries of India's interest.

Finally, we take the case of two countries, Nepal and Chile, to showcase examples of how India can build scale for its electric two-wheeler manufacturing and enhance industry competitiveness. We also explore scenarios for India to emerge as the leading exporter of electric two-wheelers in the global South.

3 India's Two-wheeler exports

India exports two-wheelers to major countries in the global South, among others including Austria, USA, Germany, and Japan (Fig. 2). India's total two-wheeler exports reached ~USD 3 billion in 2021, growing at 8.7% CAGR between 2015-2021.

a) Africa: Among the top 20 importers of Indian two-wheelers, Africa contributes about 29% of the share. It includes Nigeria (~ USD 450 mn), Kenya (~ USD 100 mn), Democratic Republic of Congo (~USD 100 mn) and Uganda (~ USD 90 mn).
b) South and Central America: Latin America is another key market for Indian two-wheeler exports, contributing about 21% of the export share. It includes Colombia (~ USD 300 mn), Peru (~ USD 48 mn), and Argentina (~ USD 60 mn).
c) South and South-east Asia: Countries like Bangladesh (~ USD 110 mn), Nepal (~ USD 250 mn) and Philippines (~ USD 150 mn) are among the largest importers of Indian two-wheelers in the region.
d) North America: Both the USA and Mexico are key importers of two-wheelers from India, with Mexico contributing about 6% share of Indian two-wheeler exports, while the US contributes about 1% of export share.

e) Europe: Countries including Austria and Germany are other major importers of Indian two-wheelers, with the two countries contributing about $125 million in 2021-22.

India's two-wheeler exports are predominantly internal combustion engine (ICE) vehicles, while electric two-wheelers are a negligible part of the export portfolio. But at the same time, many of the key export markets of India are already importing electric two-wheelers. As in Table 2, India is among the largest import source of two-wheelers for many countries like Nigeria (63%), Kenya (69%), Uganda (85%), Nepal (98%), Bangladesh (95%), and so on. More importantly, many of these countries have begun to import significant shares of electric two-wheelers, for example, about 14% of Colombia's two-wheeler imports were electric, in Austria it was 48%, 17% in Chile, and about 4-5% in Peru and Argentina, but with no imports from India.

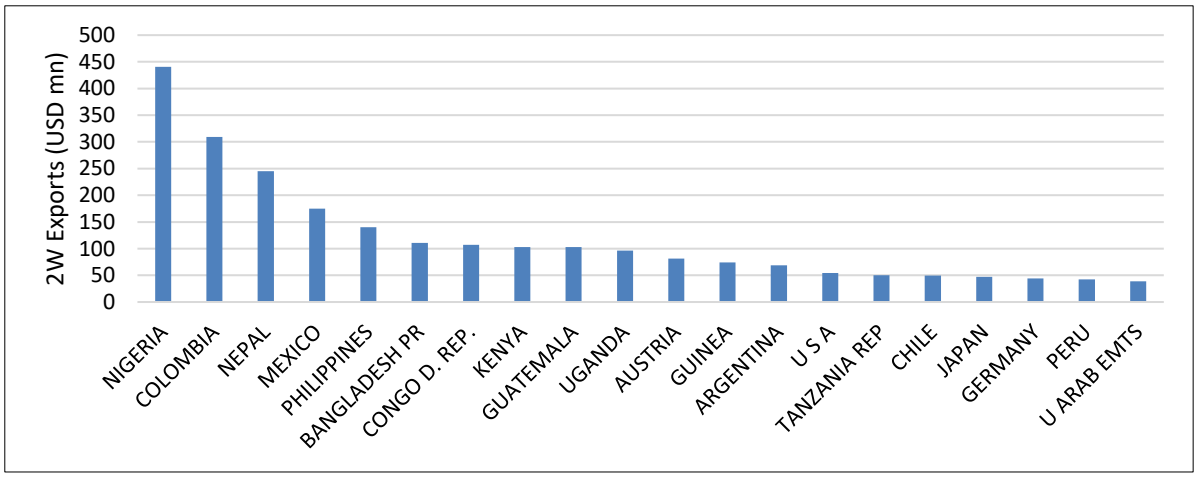

Figure 2: India 2W exports in 2021-22

Table 2: India's two-wheeler export partners and global shares (Source: UN COMTRADE)

Region	Country	Share of India's 2W exports	Share of India in total 2W imports	Share of e-2W imports in total 2W imports	Share of e-2W imports from India
Africa	Nigeria	14%	63%	0.0%	-
South America	Colombia	11%	10%	13.9%	-
Asia	Nepal	9%	98%	0.8%	33%
North America	Mexico	6%	20%	2.6%	-
Asia	Philippines	5%	9%	0.3%	36%
Africa	Kenya	4%	69%	0.1%	3%
Asia	Bangladesh	4%	95%	0.0%	-
Central America	Guatemala	4%	42%	0.3%	-
Africa	Dem. Rep. of the Congo	4%	42%	0.0%	-
Africa	Uganda	3%	85%	0.0%	-
Europe	Austria	3%	11%	48.4%	0.02%
Africa	Guinea	3%	48%	0.0%	-
South America	Peru	2%	16%	4.0%	-
South America	Argentina	2%	15%	4.5%	-
South America	Chile	2%	20%	16.8%	-
Africa	Tanzania	2%	40%	0.2%	-
North America	USA	1%	1%	34.5%	0.002%
Europe	Germany	1%	1%	60.9%	0.03%
Asia	Japan	1%	4%	22.8%	0.06%
Central America	Honduras	1%	26%	0.3%	-

Key focus markets where India stands at risk with increasing electric two-wheeler imports include Colombia, Mexico, Austria, Peru, Argentina, Chile, USA, Germany, and Japan. As these countries transition to EVs, it

will require a reorientation in EV manufacturing strategy in India, if it is to maintain its export competitiveness in this segment. It also offers India an opportunity to emerge as a strategic leader in ZEV supply chains globally in the next decade. India has announced a Production Linked Incentive (PLI) Scheme for EV manufacturing with incentives worth USD 3.5 billion to promote domestic manufacturing and exports. At the same time, India has increased purchase incentives for electric two-wheelers to spur the domestic market to leverage scale.

4 Where are India's key markets importing electric two-wheelers from?

As seen in Table 2, key Indian export markets are importing electric two-wheelers, with limited or no role of India in the value chain. Table 3 provides a summary of India's competition in global trade, as India's key export markets continue to import increasing share of electric two-wheelers.

Table 3: Key competition for electric two-wheeler exports from India (Source: UN COMTRADE)

	Key 2W export markets for India	**Key importing countries for e-2Ws**
1	Germany	Taiwan, Netherlands, Hungary, Bulgaria, Switzerland, Czechia, Vietnam, China, Romania, Poland, Belgium
2	USA	China, Taiwan, Vietnam, Germany, Cambodia, Netherlands, Thailand, Indonesia, Spain, Malaysia, Austria, Italy, Cambodia
3	Austria	Germany, China, Netherlands, Belgium, Bulgaria, Taiwan, Czechia, Switzerland, Italy, Spain, Italy, Hungary, Poland
4	Chile	China, Taiwan, Germany, Spain, Portugal, Italy, USA, Netherlands, Austria
5	Colombia	China, Taiwan, Germany, Austria
6	Peru	China, Hong Kong SAR, Mexico, USA, South Korea, Panama
7	Mexico	China, Taiwan, USA
8	Argentina	China, Taiwan, Germany, South Korea

The German market for electric two-wheelers has been growing steadily in recent years, driven by the increasing demand for eco-friendly and sustainable transportation options (Fig. 3). Germany has been importing electric two-wheelers from various countries around the world, including China, Taiwan, Japan, and some European countries. Between 2018 to 2022, German imports of electric two-wheelers almost doubled to USD 2.2 billion.

The USA imports electric two wheelers from China, Taiwan, Europe and other Southeast Asian nations like Vietnam, Cambodia, Indonesia, among others. The US electric two-wheeler imports have quadrupled between 2018 and 2022, reaching about USD 2 billion in 2022 (Fig. 3).

Of countries that are importing electric two-wheelers but also have significant share of imports of two-wheelers from India, few countries make for interesting cases. Colombia, which has about 10% two-wheeler imports from India (Fig. 3b), is importing about 14% of electric two-wheelers of the total two-wheeler imports (Fig. 3a). Mexico, which imports about 20% of its total two-wheeler imports from India (Fig. 4), also imports about 3% electric two-wheelers of its total two-wheeler imports (Fig. 3).

Nepal and Philippines make an interesting case, wherein India contributes over a third of their electric two-wheeler imports. It should be noted that while Nepal predominantly depends on India for any two-wheeler imports, Philippines only imports about 9% of its total two-wheeler imports from India.

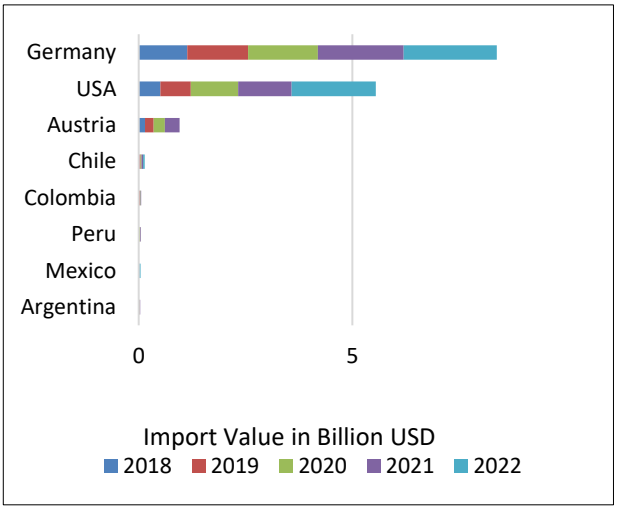

Figure 3: Total e-2W import trends in key Indian markets

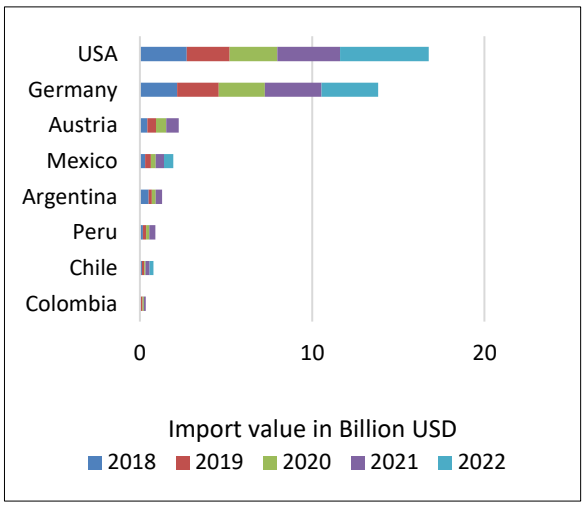

Figure 4: Total 2W import trend in key Indian markets

5 India-led electric two-wheeler transitions in the global South

5.1 Powering Nepal's electrification ambition

The country of Nepal, which is a landlocked Himalayan country shares an open border with India that allows for the free movement of people and goods between the two countries. While Nepal depends almost entirely on India for its two-wheeler imports, interestingly, Nepal forms about a third of India's minimal electric two-wheeler exports as well (Table 2).

In its Nationally Determined Contribution to the Paris Agreement [5], Nepal has set a target of achieving 90% electric two-wheeler sales by 2030, from a target of 25% electric two-wheeler sale by 2025. Since Nepal predominantly imports its two-wheelers, this target can be seen as applying to the share of two-wheeler imports in 2025 and 2030. Currently, Nepal imports about 1% of its two-wheelers as electric (Table 2).

We explore two scenarios where in Nepal achieves its 25% electric two-wheeler target by 2030 (conservative scenario) or a more aggressive scenario wherein Nepal achieves its intended 90% electric two-wheeler target in 2030 (Fig. 5). We estimate the total two-wheeler imports based on historical CAGR (corrected for Covid trends) and estimate the 2030 imports with a 6% CAGR. The total two-wheeler imports are estimated to be around USD 417 million in 2030. Based on the conservative scenario, Nepal could have a potential electric two-wheeler import potential of USD 104 million in 2030, while in the aggressive scenario, the 2030 electric two-wheeler import potential is estimated at around USD 375 million.

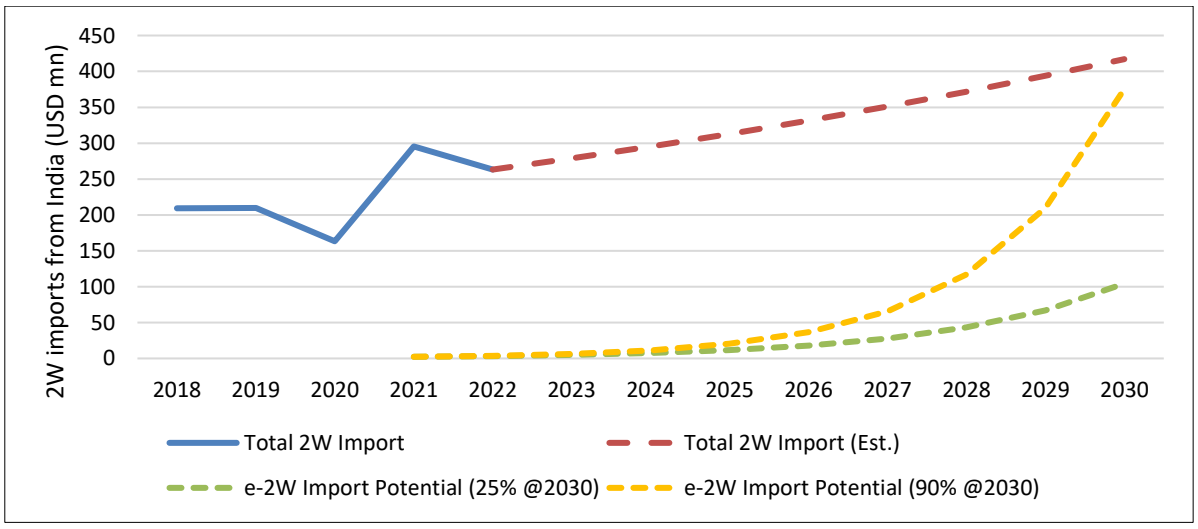

Figure 5: Potential for electric two-wheeler imports by Nepal upto 2030

Given India holds almost the entire share of conventional two-wheeler exports to Nepal (Fig. 6), it opens a significant market opportunity for Indian automotive industry to capture and provide significant scale to electric two-wheeler manufacturing in India, adding significant value to the domestic market as well. At thes same time, China remains the leading exporter of electric two-wheelers to Nepal (Fig. 7). Given the estimated market size of USD 104 – 375 million by 2030 for electric two-wheeler imports, India would have to compete with China.

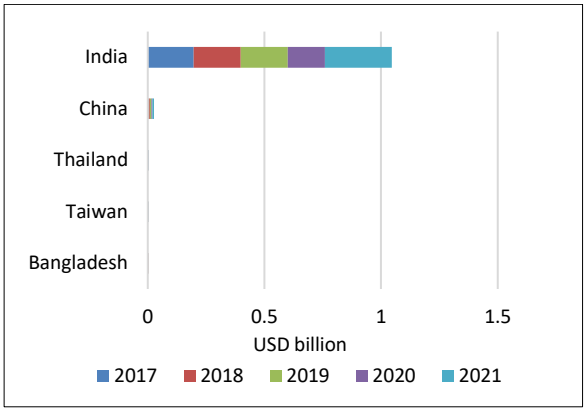

Figure 6: Two-wheeler imports of Nepal (2017-2021)

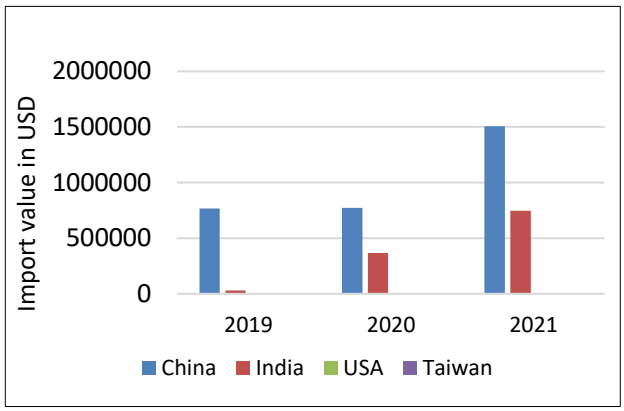

Figure 7: Electric Two-Wheeler import of Nepal 2019-202

5.2 Enhancing competitiveness in two-wheeler exports to Chile

In the case of Chile, India contributes about 20% to its total two-wheeler imports, which are currently entirely ICE two-wheelers. In 2021, Chile imported about 17% of its total two-wheelers as electric, largely from China. The share of Chinese imports of electric two-wheelers in Chile reached a peak of 50% in 2021, and then declined to 38% in 2022. India currently exports no electric two-wheelers to Chile.

Based on historical data, we estimate Chile's future two-wheeler imports to grow at a CAGR of 4% from 2022 to 2030, reaching about USD 322 million. Chile has also in its NDC submission as part of the Paris Agreement has set a target for 100% electrification for light duty vehicles, buses and two-wheelers [8]. We evaluate two scenarios, a base case with a conservative estimate of 25% imports being electric two-wheelers by 2030, and a more ambitious target of 100% electric two-wheelers by 2030 as the high case. The import potential of electric two-wheelers in the two scenarios for Chile ranges from USD 81 million to USD 322 million in 2030 (Fig. 8).

We then estimate two scenarios for India's exports to Chile. The first scenario assumes only ICE 2W exports as is currently the case, with India's market share in Chilean imports going from 22% in 2022 to 40% in 2030. The second scenario assesses a case where India exports both ICE and electric two-wheelers to Chile, with its market share going from 1% in 2024 to 10% in 2030 for electric two-wheelers, while the ICE two-wheeler market share remains at 40% in 2030. We find that India could add an additional USD 8 million in revenue in 2030 by pursuing an electric two-wheeler export strategy.

This would also help India remain competitive in the growing electric two-wheeler export market, where it currently has limited competitive advantage. More importantly, with Chile being a key producer of lithium for cell manufacturing, India could enter into a partnership with Chile, wherein it exports electric two-wheelers facilitating the EV transition in Chile, and in turn could potentially secure access to critical minerals (lithium) for its own domestic cell manufacturing program.

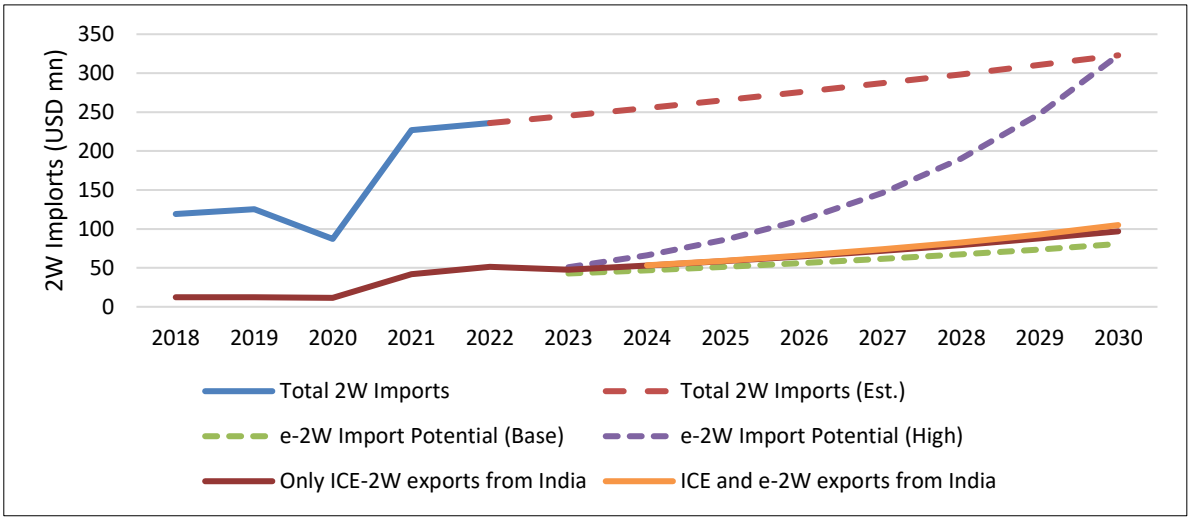

Figure 8: Potential for electric two-wheeler imports by Chile upto 2030

6 Discussion and Conclusion

India is a significant player in the global two-wheeler market, and its position in the two-wheeler export industry has been growing steadily in recent years. As per the data from the Ministry of Commerce and Industry, Government of India, exports of two-wheelers were approximately USD 3 billion in the period April 2021- March 2022 [9].

India's two-wheeler exports are primarily driven by the demand for its motorcycles and scooters in several countries around the world, particularly in Africa, Latin America, and Southeast Asia. The major Indian two-wheeler manufacturers have a strong presence in the global market and have been expanding to newer markets.

More recently, there has been a focused approach by the Indian Government to promote electric vehicle manufacturing including two-wheelers for both the domestic and export markets. The Production Linked Incentive (PLI) Scheme for EV and EV Components announced in September 2021 provides incentives to automotive manufacturers to produce electric vehicles in India contributing to domestic value-add, and for exporting minimum volumes of EVs each year. The scheme includes incentives for both vehicle and component manufacturing, providing an opportunity to scale technology development and lower costs, thereby potentially putting India as a leading global player in the EV ecosystem [10].

Based on the analysis, we find that a strategic approach by India across government and industry to identify key markets with export potential for electric two-wheelers, mapping key competitors and aligning incentives for technology development and manufacturing to enhance India's competitive advantage would go a long way in determining India's role as a global player in the EV transition.

Lastly, with India's G20 Presidency in 2023, it provides an opportunity for greater cooperation in the global South in facilitating EV transitions, especially in the case of two-wheelers, which can be an affordable and sustainable alternative, with wide-ranging implications for a just and equitable road transport decarbonization pathway in the region.

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Presenter Biography

Dr Chandra works as a postdoctoral researcher at the India ZEV Research Centre and the Electric Vehicle Research Center at the Institute of Transportation Studies, University of California, Davis. Her work focuses on studying plug-in hybrid & electric vehicle market usage and adoption in both the United States and India.