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Achieving the Aichi 2030 Declaration Goal 6 National Access and Connectivity- Rail: Policy Action Recommendations

(Background Paper for Plenary Session 6: Review Goal 6 – National Access and Connectivity Realize Sustainable, Inclusive Economic Growth through Enhanced National Access and Connectivity)

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Policy Recommendations prepared for the High-Level 15th Regional EST Forum, Kuala Lumpur, Malaysia

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Key Policy Recommendations - Summary

Policy Recommendation 1: Implement transport policies that promote a modal shift towards rail as a lever of improved low-carbon national connectivity

Countries should integrate rail network planning into overall transport planning at both national and regional/city levels, to promote a cohesive, multimodal transportation strategy with rail as the backbone. This approach ensures that rail networks are seamlessly connected with other modes of transit, facilitating efficient and sustainable transportation systems, hence making the overall public transport system more attractive to users. In the pursuit of environmentally sustainable and decarbonized transportation, it is imperative to adopt a comprehensive policy approach which encourages integrated land use planning and the systemic development of transport systems as well as of the broader industry and infrastructure context in favor of connectivity, public and active travel.

Policy Recommendation 2: Set targets for rail activity, rail electrification and rail investment

A. Targets for Rail Activity

Considering the expansion and modernisation of railway networks with the development of supportive policies and appropriate investments to meet the SDG and Paris Agreement objectives. It is proposed that the railway freight and passenger activity growth outpace GDP growth rates.

B. Targets for Rail Electrification

On a pathway to near full electrification an ambitious target of 70% of tracks being electrified by 2030 and more than 80% being electrified by 2050 is proposed. However, the target recognises that the scale and rate of electrification would not be uniform across Asia.

C. Targets for Rail Investments

To meet the SDG and Paris Agreement objectives, a minimum regional investment target is proposed of at least 1.5% of GDP, i.e. 0.7% for Heavy Railways, 0.4% for high-speed railways and 0.4% for urban railways (metro and LRT) in Asia.

Policy Recommendation 3: Agree on 2050 carbon neutrality for the rail sector and clearly feature rail as a climate solution in the 2025 cycle of Nationally Determined Contributions as well as Long Term Emission Reduction Strategies

Carbon neutrality by 2050 is an ambitious yet achievable target for Asia's railway sector. Therefore, to reach the 2050 carbon neutrality target, UIC proposes a short-term target for the carbon intensity of 7 g/passenger-km or tonne-km by 2030. This target is aligned with the IEA's net zero transition requirement of 5.4% until 2030.

For the next cycle of NDCs due in 2025, it is recommended that rail projects are incorporated through a holistic approach and specific targets. It should link to other national strategies for transport and action at city level. It should envision both mitigation and adaptation strategies,

stating whether they are conditional or unconditional on financing, and what is needed from the international community to implement them.

Policy Recommendation 4: Incorporate Adaptation & Resilience measures in all steps of rail implementation

Enhancing resilience increases the capacity of railway systems to endure potential risks and swiftly recover from disruptive events. Adaptation plans should outline a clear roadmap for integrating climate adaptation into every stage of railway development, from design and construction to operation and maintenance.

Policy Recommendation 5: Sustainable Procurement

Promoting sustainable procurement within the rail sector across Asian countries is essential for not only reducing environmental impacts but also for ensuring long-term economic viability and contributing to the goals outlined in the Aichi Declaration 2030 for Environmentally Sustainable Transport.

To promote sustainable procurement in the rail sector, a comprehensive strategy is recommended. This includes the implementation of clear and enforceable green procurement requirements for rail construction and operations, emphasizing the use of renewable energy sources, energy-efficient technologies, and eco-friendly materials.

Policy Recommendation 6: Promotion of Gender Equality as a socioeconomic and environmental enabler for rail

Promoting gender equality within the rail sector in Asian countries is a fundamental step to unlock significant socioeconomic and environmental benefits and supports the acceleration of the UN Sustainable Development Goals. The sector should prioritize the recruitment of more women and other underrepresented groups to increase the talent pool and the diversity of the work force.

1. The Need to Act

1. Overall, since 2000, the conventional railway network in the Asia Pacific region has expanded by 140,000 kilometres i.e. from 350,000 to 490,000. This growth in conventional railway networks was highly uneven among economies, with a significant increase in the People's Republic of China, the Russian Federation, and India, among EST Forum participating countries; while a reduction occurred in Japan.

2. According to Asian Transport Outlook (ATO) estimates (Asian Transport Outlook, 2023), Asian economies between 2020 and 2030 could potentially add 78,000 kilometres to conventional railway networks. This increase is significantly lower than the 91,000 kilometres increase realised from 2010 to 2020, which was mainly due to rapid railway expansion in PRC. At present, however, only about fifteen economies in the Asia Pacific region have developed railway master plans, and only about 18,000 kilometres of conventional railway are currently in advanced planning or construction(IRJ-PRO, n.d.) in Asia and the Pacific region.

3. Since the launch of Japan's first high-speed rail system in 1964, Asia has added 6,500 (2000 to 2010) and 33,300 km (2010-2020) of high-speed railway network over the last two decades, with PRC alone expanding more than 27,000 kilometres, well more than the rest of the world combined.

4. With existing rail based policies, railway infrastructure expansion would continue to lag behind road expansion (1.9% vs 3.5% annual increase in road kilometres over 2020-2030). A significant mode shift from railways to the road sector, both in passenger and freight transport, can lead to higher negative transport-related externalities.

5. Building on the Sustainable Development 9.1, the Aichi 2030 Declaration Goal 6 on National Access and Connectivity aims to 'facilitate, by 2030, inclusive multi-modal national (including rural-urban) and regional (cross-border) connectivity through the provision of sustainable multi-modal freight and passenger transport infrastructure and services.'

6. Countries can work towards the achievement of Aichi Goal 6 by taking the following actions.

2. Policy Recommendations

Recommendation 1: Implement transport policies that promote a modal shift towards rail as a lever of improved low-carbon national connectivity

7. Railways have the capacity to transport around 40 times more passengers per square meter and utilize only one-third of the fuel required to transport one ton-kilometer of freight compared to road transport. When rail is electrified, the emission reduction is even more significant. High-speed rail can also present an important alternative to short-haul flights, with air travel being estimated to emit five to six times more CO2 per passenger-kilometre than travel by train.

8. Promoting modal shift is a challenging issue that requires 'push and pull' measures. For example, implementing a mix of fiscal measures like tax incentives, subsidies, or congestion pricing that favor rail and other low-carbon modes of transport, and non-fiscal incentives which involve awareness campaigns, improved accessibility to rail stations, and seamless integration with other modes of transportation, making it easier for individuals to choose sustainable mobility options.

9. **Countries should integrate rail network planning into overall transport planning at both national and regional/city levels, to promote a cohesive, multimodal transportation strategy with rail as the backbone.** This approach ensures that rail networks are seamlessly connected with other modes of transit, facilitating efficient and sustainable transportation systems, hence making the overall public transport system more attractive to users. **Consider system thinking with land use planning and connectivity with and other industrial/infrastructure development, public and active travel.**

10. **In the pursuit of environmentally sustainable and decarbonized transportation, it is imperative to adopt a comprehensive policy approach**. The Avoid-Shift-Improve (A-S-I) approach focuses on the demand-side and, when applied to the transport sector, prioritizes actions that substantially reduce greenhouse gas emissions, lower energy consumption, alleviate traffic congestion, and ultimately enhance the quality of urban living. Rail can play a significant role in supporting the "Shift" approach, whereby traffic of people and goods is shifted from higher emitting modes (i.e. individual motorized vehicles) to lower emitting modes like public transport and rail. These modes ensure, not only reduced CO2 emissions per passenger-km, but also reduced infrastructure occupancy per area.

Recommendation 2: Set targets for rail activity, rail electrification and rail investment

A. Targets for Rail Activity

11. The ITF 2021 Outlook and ADB's and AIIB's Asian Transport Outlook analysis confirm that the railway in Asia and the Pacific lost its passenger and freight mode share compared to

roads over the last two decades, i.e. road passenger and freight activity growth outpaced railways.

12. **Considering the expansion and modernisation of the railway network with the development of supportive policies and the effort required to meet the SDG and Paris Agreement objectives, it is proposed that the railway freight and passenger activity growth outpace GDP growth rates. Considering that overall transport activity has decoupled from GDP, railway transport activity growth outpacing economic growth (GDP) will ensure a freight modal shift from road to railways**.

B. Targets for Rail Electrification

13. Asian Transport Outlook estimates indicate that railway electrification has increased from 34% of tracks in 2000 to 56% of tracks in 2020. Three-fourths of the Asian railway tracks exist in three countries: by 2020, nearly 68%, 51% and 79% of railway tracks were electrified in the People's Republic of China, India and the Russian Federation. With 56% of tracks across Asia being electrified, International Energy Agency estimates that nearly 60% of railway energy consumption is electricity.

14. IEA has also estimated that by 2050, the share of electricity in fuel demand in the rail sector in an ambitious scenario could rise from 47% in 2017 to 73% in 2050 (IEA, 2019). Thus, even in the most ambitious plan, not all tracks will be electric globally by 2050. The main barriers to rail electrification are mainly from the freight transport segment - electrified rail routes require higher utilisation and occupancy/loading rates than non-electric ones for financial viability, and container staking may sometimes conflict with overhead line electrification and high-cost considerations. However, the large-scale transition towards electricity is inevitable considering the decarbonisation challenge, and Asia has made a start.

15. **On a pathway to near full electrification an ambitious target of 70% of tracks being electrified by 2030 and more than 80% being electrified by 2050 is proposed. However, the target recognises that the scale of electrification would be non-uniform across Asia**.

C. Targets for Rail Investments

16. Historical annual transport inland infrastructure investments in Asia have been estimated to be in the range of 1-3% of GDP. The average railway infrastructure investment in Asia as a share of GDP was estimated to be about 1% between 2000 to 2020 (regionally). On the other hand, the road sector infrastructure investment was about 1.5% of GDP. Since roads are less expensive to build and maintain per kilometer basis, road networks have become more prominent over time compared to railways. Since 2000, the road infrastructure has expanded by double the rate of railway infrastructure expansion in Asia.

17. **Based on current transport policies and plans, to develop, maintain and repair inland transport infrastructure in Asia and the Pacific region, a 1.6% of GDP investment would be required, i.e. 1.1% to roads and only 0.5% to railways**. However, such levels of railway infrastructure investment will not be enough for the rail sector to contribute its share to the SDG and the Paris Agreement objectives.

18. **To meet the SDG and Paris Agreement objectives, a minimum regional investment target is proposed of at least 1.5% of GDP, i.e. 0.7% for Heavy Railways, 0.4% for high-speed railways and 0.4% for urban railways (metro and LRT) in Asia** (ITDP, 2016). Investment by countries will vary depending on their national circumstances. The target investment is required for network expansion, improvement and maintenance. This proposed target is 50% higher than the average investment in the last two decades and could initiate the transformation of the railway sector in Asia. Asian Transport Outlook assessment indicates that with such a magnitude of investment, railway infrastructure could be expanded at more than double the historical growth rate in Asian economies. In addition, increasing railway investments will open new markets and grow passenger and freight activity.

Recommendation 3: Agree on 2050 carbon neutrality for the rail sector and clearly feature rail as a climate solution in the 2025 cycle of Nationally Determined Contributions as well as Long Term Emission Reduction Strategies.

19. Rail is among the most energy-efficient and lowest-emitting transport modes. It is the backbone of Asia's cleaner, more environmentally and climate-friendly, modern public transport system. For example, in 2018, while the Asian railways carried 6% and 16% of passenger and freight transport demand, they emitted only 3% of transport CO2 emissions.

20. In 2014, UIC committed a global target to reduce specific final energy consumption per traffic unit (50% by 2030 and 60% by 2050) and specific average CO2 emissions per traffic unit from train operations (50% by 2030 and 75% by 2050), all relative to a 1990 baseline. Further, at the European level, the UIC Energy Efficiency and CO2 Emissions Experts Network have agreed to adopt the UIC and CER Carbon Neutrality "Vision 2050" as a new 2050 Carbon Neutrality Target. Under this target trajectory, by 2030, specific GHG emissions from passenger trains and freight trains would be 24.8 gCO2eq/pkm and 12.7 gCO2eq/tkm. Thus, to align the ambitious EU target with the global target, in 2019, UIC proposed carbon neutrality by 2050 as an ambitious global target for the rail sector.

21. Due to electrification and high loading, the railway sector is highly efficient. Thus, considering the opportunities induced by modal shift, electrification and loading improvement, **carbon neutrality by 2050 is an ambitious yet achievable target for Asia's railway sector**. Therefore, to reach the 2050 carbon neutrality target, **UIC proposes a short-term target for the carbon intensity of 7 g/passenger-km or tonne-km by 2030. This target is aligned with the IEA's net zero transition requirement of 5.4% until 2030** (IEA, 2022). Furthermore, the

latest research by International Transport Forum (ITF, 2021) indicates that this target could be met with optimal policies and electrification.

22. Long Term Emission Reduction Strategies and Nationally Determined Contributions are an important process of the Paris Agreement on Climate Change and should be used to harness the development of rail and send positive policy signals as a priority step towards decarbonization of transport.

23. **There is a significant opportunity to include specific targets for the rail sector in NDCs and LTSs**. Article 6 mechanisms of the Paris Agreement, which provides a framework for countries to cooperate towards the implementation of NDCs through carbon markets and non-market modalities, climate finance could be available to finance rail expansion and improvement. Countries that wish to benefit from such mechanisms in the future should, therefore, showcase clear, measurable and ambitious targets for rail alongside clear conditional requirements for finance or other technical assistance.

24. According to the research carried out by UIC, only 45 out of all the 195 countries mention rail in their NDCs, with different levels of ambition. Few countries clearly state mitigation targets associated to rail projects, mostly based on expected modal shift from network expansion. Asia Pacific has the highest percentage of countries that mention rail in their NDCs (14 Asian countries in total), with all of them referencing mitigation strategies and four countries also including adaptation measures for rail.

25. Bangladesh and Laos PDR are two good examples where rail is well covered in their NDCs. Bangladesh specifies a clear goal of 10% modal shift of passenger-km and a potential 25%, if financing requirements are met (conditional contributions). It also lists the electrification of the railway network as a mitigation action. As for Laos, it establishes a mitigation target of 300 kt CO2e on average per year between 2020 and 2030, through a road to rail modal shift for both passengers and freight. It is also the only country in the region to include an evaluation framework to assess progress.

26. **For the next cycle of NDCs due in 2025, it is recommended that rail projects are incorporated through a holistic approach and specific targets. It should link to other national strategies for transport and action in city level. It should envision both mitigation and adaptation strategies, stating whether they are conditional or unconditional on financing, and what is needed from the international community to implement them**. Finally, it should also address a clear evaluation framework with roles and responsibilities established, allowing for success to be monitored and measured.

Recommendation 4: Incorporate Adaptation & Resilience measures in all steps of rail implementation.

27. **Enhancing resilience increases the capacity of railway systems to endure potential risks and swiftly recover from disruptive events.** The IPCC 6th Assessment

Report highlights that the efforts aimed at adaptation in Asia are generally at their early phases and tend to be reactive. About 57% of urban adaptation initiatives concentrate on preparatory measures like enhancing capacity, while the remaining 43% of cities have reported implementing actual adaptation measures. The implementation of urban adaptation measures is characterized by disparities, as significant urban centers receive greater funding and attention, while smaller cities, towns, and peri-urban areas experience relatively limited adaptation actions. This observation is also made with moderate confidence.

28. The Aichi Declaration states resilience as a cross-cutting strategy to address natural disasters and climate change impacts in the transport sector. It also recommends integration of resilience goals into master plans, standards, and regulations, with periodic adaptation and the introduction of financial incentives for service providers to encourage the development of resilient infrastructure services. This involves conducting thorough risk assessments to identify vulnerabilities, potential impacts, and opportunities for enhancing climate resilience across all aspects of railway operations. The **adaptation plans should outline a clear roadmap for integrating climate adaptation into every stage of railway development, from design and construction to operation and maintenance**.

29. To facilitate the effective implementation of these plans, it is crucial to establish clear requirements and guidelines for railway organizations. This includes incorporating climate adaptation considerations into the regulatory framework governing railways. Furthermore, the allocation of resources should not only cover the physical adaptation of infrastructure but also encompass the development of training programs and capacity-building initiatives. These programs would ensure that railway personnel are equipped with the necessary skills and knowledge to respond effectively to climate-related challenges.

30. In the current set of NDCs, only 5 countries in Asia Pacific have mentioned rail as part of their adaptation planning. Countries like Vietnam have expressed a concern over the potential disruption of railway lines, estimated to lead to economic losses of up to USD 2.3-2.6 million/day. Anticipating adaptation and resilience needs early on can prepare rail companies to absorb potential shocks of future extreme climate events, reducing the risk to operations and improving the community's ability to bounce back.

Recommendation 5: Sustainable Procurement

31. Public procurement constitutes a substantial portion of the GDP in nations worldwide, with estimates ranging from approximately 15% to 40%. **Promoting sustainable procurement within the rail sector across Asian countries, preferably from national and regional sources, is essential for not only reducing environmental impacts but also for ensuring long-term economic viability and contributing to the goals outlined in the Aichi Declaration 2030 for Environmentally Sustainable Transport**. Railway supply chains have a global reach, sourcing materials and services from various regions worldwide. Consequently, their responsibility in thoroughly evaluating and addressing the external impacts within their

value chains is essential for preserving rail transport's designation as a "sustainable mode of transportation."

32. A report by the Ellen MacArthur Foundation indicates that a circular economy approach, which aligns with sustainable procurement, could reduce material consumption by 30% in the rail industry, resulting in significant cost savings and reduced environmental impact. This is achieved through the deliberate prioritization of renewable energy sources, energy-efficient technologies, and less carbon intensive materials, ultimately avoiding GHG emissions, minimizing resource depletion, and mitigating pollution, while increasing value for money in the long run.

33. **To promote sustainable procurement in the rail sector, a comprehensive strategy is recommended. This includes the implementation of clear and enforceable green procurement requirements for rail construction and operations, emphasizing the use of renewable energy sources, energy-efficient technologies, and eco-friendly materials**. Additionally, it involves encouraging the adoption of life-cycle cost assessments in procurement decisions to comprehensively evaluate the economic and environmental impacts of rail projects. Collaborating closely with suppliers is essential, ensuring their adherence to sustainability standards and incentivizing them to introduce eco-friendly innovations. Robust monitoring and reporting mechanisms should be established to track and assess the environmental performance of rail projects, promoting transparency and accountability. Furthermore, launching public awareness campaigns is crucial to inform passengers and stakeholders about the environmental advantages of sustainable procurement in rail, encouraging a broader commitment to eco-friendly transportation choices.

34. By adopting sustainable procurement practices, Asian countries can build resilient and environmentally responsible rail companies that enhance the Aichi Declaration 2030's cross-cutting objective of promoting circular economy principle, through a lifecycle assessment approach. Such policies not only contribute to reducing the rail sector's embodied carbon emissions, but also drive innovation.

Recommendation 6: Promotion of Gender Equality as a socioeconomic and environmental enabler for rail

35. **Promoting gender equality within the rail sector in Asian countries is a fundamental step to unlock significant socioeconomic and environmental benefits and supports the acceleration of the UN Sustainable Development Goals**. The World Economic Forum highlights that gender diversity in the workforce leads to increased innovation, better problem-solving, and enhanced overall performance. Similarly, ensuring equal employment opportunities for women in rail opens up a talent pool that might otherwise be untapped. Currently according to the Asian Transport Observatory the share of female employment across

all transport (including storage and communications) is 13% (2021) for the region, about half compared to most OECD countries.

36. Access to reliable and affordable rail services can empower women economically. The International Labour Organization (ILO) notes that improved transportation options, including rail, can lead to increased employment opportunities for women by expanding their access to job markets and reducing commute times. When women have convenient and safe transportation choices, it enhances their mobility, independence, and participation in various aspects of life, including education, employment, and social activities for herself and family, in the case of primary caregivers.

37. The East Japan Railway Company (JR East) has been at the forefront of promoting gender diversity through women-friendly policies, such as flexible work arrangements and telecommuting options, making it easier for female employees to balance work and family responsibilities. Since the establishment of such policies, JR East has witnessed an increase in the number of female employees in recent years, from station attendants to engineers, improving the gender balance within their workforce.

38. **To advance gender equality in the rail sector, a multifaceted approach is recommended. This includes encouraging policies that mandate equal employment and pay opportunities, encompassing targeted recruitment, mentorship programs, and transparent promotion systems**. Additionally, investments should be made in creating a safe and inclusive travel environments for female passengers and may include measures like well-lit stations, gender-sensitive infrastructure, wayfinding, and signage, and (where appropriate) women-only compartments, particularly during rush and late hours. Tailored training and capacity-building programs for female employees can strengthen women's equal participation in the work force. To gauge progress and impact, comprehensive data collection and monitoring systems should be established. Lastly, public awareness campaigns should be launched, underscoring the economic and environmental benefits of gender equality within the rail industry.

39. Encouraging women's ridership in rail goes beyond gender equality and contributes to economic empowerment, safety, environmental sustainability, and social inclusion, leading to improved quality transport services, safety, and security for all.

40. It is recommended that a measurable target is set at a national level to both increase the proportion of women participation in the railway workforce (particularly leadership roles) and for the increase in numbers and in customer satisfaction for women passengers. Capacity building, awareness raising initiatives and projects should be launched to achieve this target; data availability on both employment and ridership is poor and disaggregated data and information collection is also recommended.

3. Suggestions for Support from the International Community

41. The International Union of Railways works with rail operators and infrastructure managers in Asia to promote international cooperation on all three fronts, through the Sustainability Platform, its multiple working groups, as well as rail-focused tools like the Rail Sustainability Index and the Traction Energy and Emissions Database.

42. International cooperation can unlock and accelerate the implementation of the vision established by the Aichi 2030 Declaration 6 on National Access and Connectivity through collective efforts in capacity building, financing, data collection and analysis. These are cross-cutting measures that can advance the delivery of all seven policy recommendations above and beyond.

43. Capacity building is used to increase awareness, access and analysis of data and information. Training for professionals working directly in rail sustainability can enable increased mainstreaming of environmental sustainability among decision-makers and experts of the rail sector. These efforts should be backed by technical and financial assistance for rail development, especially in low-resource settings, which can help bridge the infrastructure gap and foster inclusive connectivity, ensuring that rural and urban areas, as well as cross-border regions, are adequately linked. Finally, thorough data collection and analysis processes can help countries track the advances of the rail sector in reducing its own carbon emissions, as well as contributing to regional efforts to align to the Paris Agreement and UN Sustainable Development Goals. Information on good practice, successful programmes and examples illustrating the benefits of the recommendations is also suggested.

4. Wider Benefits and Linkages of National Connectivity and Access with other Aichi Goals, the SDGs, and the Paris Agreement

44. Achieving inclusive and sustainable multi-modal transport at the national and regional level is a key building block for the delivery of the Paris Agreement and the UN Sustainable Development Goals (SDGs), maximizing the benefits of regional collaboration within the transport sector. Rail sector companies are working to increase energy efficiency through digitization and through electrification, while adopting circular economy principles to reduce embodied carbon from materials and processes. These companies are also investing in building more climate-resilient rail infrastructure that can withstand varying climate and weather scenarios.

45. Not only do rail investments provide sustainable transport benefits, it also fosters multiple socio-economic benefits, such as job creation, improved access to economic opportunities. This aligns with several SDGs, particularly those related to poverty eradication, gender equality, and economic growth. Enhanced connectivity, especially in rural areas, can empower marginalized communities, bridging socio-economic disparities and promoting gender equality by improving access to education and employment opportunities.

46. It serves as a bridge that connects climate action with broader sustainable development objectives, highlighting the interdependence of environmental and socio-economic goals within the context of rail transport infrastructure and services.

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