Sustainable Transportation System

**Topic Background**
Sustainable transportation, or ‘green transportation,’ refers to transportation methods that leave a smaller environmental footprint. By definition, sustainable transportation uses renewable energy sources, encourages shared public transit, or adopts hybrid technologies that combine fuel usage and electric power. In the context of international trade, sustainable transportation is also an issue of emerging importance. The revolutionary global decline in transportation costs has given rise to the unprecedented mobility of goods, people, and ideas. Cotton from South Carolina is sent to Bangladesh to be spun into clothing sold in France. Oil from Kazakhstan is processed into plastic toys in China and sold to children in the US. Fundamentally, global trade flows today are made possible by interconnected networks of transportation.

This dramatic shift from local to global production has benefited many. However, such improvements have not impacted everyone equitably. Economically, the unequal development of physical infrastructure across the world has exacerbated disparities in trade and growth. Mass transport is now a critical pipeline to the global economy, but countries that cannot afford the much-needed infrastructure are rapidly falling behind. Environmentally, over a quarter of all greenhouse gas emissions come from the burning of fossil fuels for transport.

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fastest-growing source of carbon emissions, making sustainable transportation a priority for climate mitigation. This is especially pertinent for countries that are vulnerable to the effects of climate change or developing economies that have yet to adopt sustainable transport technology.

The balance between economic development and climate concerns permeates global debates. Making things “sustainable” requires effort, time, and money. Regular infrastructure requires labor and heavy machinery, and green infrastructure presents even more complex engineering demands. Furthermore, roads, charging stations, pipelines, and train tracks are long-term infrastructure projects that require forward-thinking political will. Given the cost of infrastructure, consensus for action is still plagued by questions of which initiatives should be embraced, where, when, and paid for by whom. For example, disagreements persist about which actors should shoulder the investment burden of building greener infrastructure globally. While developed countries may have a historical obligation to do so as beneficiaries of industrial pollution, some believe that developing countries should be responsible for green infrastructure investment, in order to reap economic growth in the long-run.

**Past International Action**

While sustainable transportation is not explicitly mentioned in any of the 17 Sustainable Development Goals (SDGs), the former UN Secretary-General Ban ki-Moon named the issue a major priority in 2012. Sustainable transportation is most relevant and critical to achieving SDGs 9 and 11:

- **SDG 9:** “Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation”\(^6\)
- **SDG 11:** “Make cities and human settlements inclusive, safe, resilient and sustainable”\(^7\)

The United Nations first officially recognized the need for sustainable transportation during the 1992 Earth Summit. The importance of this issue was reaffirmed at the 1997 Agenda 21 Special Summit. In 2002, at the World Summit on Sustainable Development (WSSD) in Johannesburg, South Africa, the construction of sustainable transportation was specifically written into the resulting Plan of Implementation. At the same summit in 2012, sustainable transportation was

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\(^8\) “Sustainable Transportation.” United Nations Department of Economic and Social Affairs. https://sustainabledevelopment.un.org/topics/sustainabletransport
outlined as a major priority in the WSSD Outcome Document entitled “The Future We Want.”

In August 2014, then-Secretary-General Ban Ki-Moon created the High-Level Advisory Group on Sustainable Transport (HLAG-ST). The HLAG-ST is comprised of a large coalition of legal experts, engineers, and industry experts. Members of the group work with all levels of government around the world to provide recommendations for sustainable transport solutions. Two years later, in November 2016, the first Global Sustainable Transport Conference was held in Ashgabat, Turkmenistan. Convened by then-Secretary-General Ban Ki-Moon, this conference was created by a Turkmen-sponsored amendment to UN General Assembly Resolution 70/197.

Beyond the United Nations, past international actions have also been spearheaded by individual Member States through multilateral partnerships. For example, in 2013, Chinese President Xi Jinping announced the Belt and Road Initiative (BRI), a massive infrastructure investment plan that seeks to economically unite countries along the historic Silk Road. This connectivity plan, eleven times bigger than the Marshall Plan, is funded primarily through the Chinese-led Asian Infrastructure Investment Bank (AIIB). Development financing through the BRI focuses on exporting Chinese railway technology, among other forms of efficient transportation mechanisms. Another example is the French government’s plan to eliminate the sale of non-electric vehicles by 2040, an ambitious objective announced in July 2017. Germany, the Netherlands, Norway, and India announced similar plans, with some countries aiming for even earlier targets.

Non-governmental organizations (NGOs) and civil society are also key to the global movement toward sustainable transportation. Acknowledging that sustainable transportation is expensive to implement and requires centralized state-oriented planning, most NGO work in this area complement public and private sector contributions by crafting policy recommendations. One such NGO is the Institute for Transportation and Development Policy (ITDP). This non-profit group helps localities put together infrastructure plans and assists governments in implementing a focused, growth-based strategy.

Possible Solutions

First, cars and automobiles have been a critical part of the transportation market for nearly a century. Hybrid/transition vehicles have been developed to achieve higher fuel efficiency through engineering advancements. Such vehicles run on a small combustion engine coupled with an electric counterpart. While hybrids are dramatically more efficient than normal cars, they still burn fossil fuels and will never be truly carbon-free. Another innovative option is electric cars, which rely entirely on grid-sourced battery power for propulsion. While electric grids can still be powered by fossil fuels, electric vehicles benefit from higher energy efficiency than traditional automobiles, and can also use renewable energy sources. A notable challenge facing the integration of electric vehicles is their short range and need for constantly available charging stations. Most batteries require several hours to attain full charge, and travel exceeding 200 miles is infeasible for most electric vehicles.

Second, compared to transportation methods such as trains or planes, automobiles have relatively low road-space efficiency. In urban areas with growing populations, automobiles lead to congestion and stalling traffic. On the other hand, trains can move far more people and freight, both more efficiently and at a cheaper cost. However, the availability of railways is globally inconsistent. Tracks can be incredibly expensive to build, coupled with other major expenses such as land acquisition and personnel and legal costs. While it is agreed that high-speed rail lines can significantly improve transit worldwide with positive environmental externalities, the associated cost has limited its development. For example, Japan initiated the first high-speed rail lines after it nationalized the entire industry. China, through asserting government-centered land rights, has also invested heavily in high-speed rail. While high-speed rail provides many benefits, it is impossibly expensive to implement in countries with privatized railroads.

Third, airplanes have long been a hotbed of environmental innovation, and their energy efficiency is

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16 Ibid.
18 “Why Trains Suck in America.” Wendover Productions. https://www.youtube.com/watch?v=mbEfzuCLoAQ&list=PLqtidGFC6X0sv52gdw5i0TYHBShxHhldi&index=1
19 “The Economics of Airline Class.” Wendover Productions https://www.youtube.com/watch?v=BzB5xtGGsTc
20 “Why Trains Suck in America.” Wendover Productions. https://www.youtube.com/watch?v=mbEfzuCLoAQ&list=PLqtidGFC6X0sv52gdw5i0TYHBShxHhldi&index=1
21 “Why Trains are so Expensive.” Wendover Productions. https://www.youtube.com/watch?v=fwjwePe-HmA&list=PLqtidGFC6X0sv52gdw5i0TYHBShxHhldi&index=12
measured in distance travelled, per liter of fuel, per passenger. Plans usually have freight storage, allowing them to transport goods alongside people. Airline manufacturers have also experimented with making planes lighter, larger, and more fuel-efficient. However, fuel efficiency is embroiled in the debate of hub-based versus direct international lights.

Under a hub-and-spoke system, small to medium-sized planes fly from local airports to one large centralized airport, where passengers transfer to a larger and more efficient aircraft. However, the smaller plane’s flight to the main hub airport may be in the opposite direction of the destination, cutting the overall efficiency. Among major commercial aircraft producers, Boeing, and therefore the United States government and other countries that fund Boeing, are proponents of direct flights. AirBus has designed its planes around the hub system, meaning that France and countries that use AirBus will fight for hub-based standardization. Countries with many small airports but no hub cities would advocate for direct flights, whereas countries with large airport hubs prefer a system that allows them to keep the economic benefits associated with hosting hub cities.

Infrastructure Financing and Foreign Direct Investment

While developed countries have the luxury of debating different forms of sustainable transportation technologies, the least developed countries often cannot afford basic transportation infrastructure. Higher rates of population growth further propel developing countries to prioritize the development of transportation networks. Therefore, infrastructure financing is a key yet complex solution to bridging developmental disparities.

First, loans, commonly from international development or investment banks to governments, are a common source of infrastructure investment. However, the amount loaned, the interest rate, the currency and the political incentives of the lender are all important controversies that may arise. For instance, loans with high interest rates can be difficult for developing countries to repay, drawing accusations against lenders for putting developing countries in debt traps. Therefore, loan mismanagement is an important challenge for the governments of emerging economies.

Second, it is also common for developed countries to support infrastructure development through aid. While development assistance can be helpful for developing countries, the idea is often politically unpopular in the donor country. The donor conditions and ‘strings attached’ to development aid are also controversial, requiring aid recipients to allocate funds in specific ways according to the donor’s demands. Conditionality reduces the flexibility of the receiving
government, but it can help donor countries keep their partners accountable.

Third, transnational companies or businesses based in developed economies will directly build infrastructure or factories in a developing country through foreign direct investment (FDI). China, specifically, has started to construct railroads in Africa and elsewhere as a part of the Belt and Road Initiative.

Conclusion

Sustainable Transportation will prove critical in accommodating the world’s growing and increasingly mobile population over the coming decades. As urban centers grow ever outwards, the ability to supply and move through hubs of trade and information will become ever more vital. Perhaps most important will be the ability to uphold a booming global economy through environmentally-friendly transportation mechanisms. The world needs a combination of technological innovation, global governance frameworks, and development-based solutions to effectively address the current inadequacies in global transportation infrastructure, both economically and environmentally.

Further Research

Sustainable Development Goals Knowledge Platform – Sustainable Transport: https://sustainabledevelopment.un.org/topics/sustainabletransport
SDG 9: https://sustainabledevelopment.un.org/sdg9
Institute for Transportation and Development Policy: https://www.itdp.org/

Worksheet Questions

1. What is the name of the Chinese government-led initiative to economically unite most of Eurasia?
2. Where did the first UN-sponsored Conference on Sustainable Transport take place?
3. What is one benefit of investing in rail infrastructure?
4. What are two countries that plan to ban the sale of electric cars?
5. What do the HLAG-ST and the ITDP have in common?