



GUEST EDITORIAL

Nick Little, Acting Director of the Center for Railway Research & Education, Michigan State University

The ESG Pathway to Rail Modernization¹

Railways, passenger, and freight, need to think and behave differently to survive and prosper.

A recent McKinsey article was titled “*How to prepare for a sustainable future along the value chain.*” This is unusual because it talks about the value chain, not the supply chain. Value chains, by definition, are a series of relationships that result in the **outcome** of consumer value. The value chain combines a series of intermediate value-adds, both outputs and outcomes.

Supply chains are much more about combining several discrete **outputs**, many of which contribute to overall value. Only end-consumers put real money into either a value chain or a supply chain. Modern consumers invest in brands they perceive to have close alignment with their personal values.

A key area of interest and activity for all supply chains, especially energy and transportation delivery networks, is emerging around “sustainability” or environmental, social, and governance (ESG) - an organization’s policies for sustainable development in environment, societal impact, and governance.

Value chains are driven by achievement. Providing the final consumer with things they value, even those attributes that are hard to define and incredibly hard to evaluate or measure. Successful value chains share much more than data. Successful value chains share and amplify consumer expectations and experiences. Successful value chains include companies that identify with each other’s strategic imperatives. They replace mere visibility (data) with transparency — alignment of business models.

What does this mean for railways and railroads? It means reduced emissions, reduced fuel consumption, and an improved carbon footprint. We must look at end-to-end journeys and calculate these for each alternate mode or motive power/propulsion used to develop a scientific result. We, therefore, look at the “well-to-wheel” cycle.

¹ This article is an abridged version of an article that appeared in the February 4, 2022 Edition of Railway Age: <https://www.railwayage.com/freight/evolution-of-green-value-chains/>

Passenger journeys often start from home and involve walking, riding a bike, driving/using a car, or taking a bus, plane, or train. Apps are now available that can calculate your carbon footprint using different modes for the individual sectors in a given journey so individuals can offset variables such as journey time against global impact against cost.

Trucking and some railroads have adopted SmartWay (the Federal EPA's transport-related emissions calculator). Yet, it is still not easy to calculate the E2E sustainability impact of just carbon emissions back through a value chain. Experts project that by 2050, global freight emissions will surpass those from passenger vehicles. This assumes a constant (slow?) rate of adoption of EV technology for freight transportation.

I suggest that both passenger vehicles (cars, buses, and trains — particularly when electrified) and heavy trucks in the developed world — will accelerate the adoption rate of low- and zero-emission power technologies. Rail faces a danger. Rail locomotives have a much longer life expectancy and hence require more capital asset replacement spend to try and level the competitive playing field. Rebuilding locos to battery or hydrogen fuel-cell/battery hybrids may be an answer, as demonstrated in recent BNSF/Wabtec trials. However, diesel fuel has significant energy density benefits over other options that may not be easily addressed. Fuel additives, revised fuel injection, and biodiesel are also interim options.



Photo courtesy of Railway Age

Once electricity that is generated from renewable sources and hydrogen can be produced at scale and onsite by electrolysis from 100 percent renewably sourced electricity, or we find an economic way for long-distance electrification of relatively uncongested transcon routes, railroads face a prospect of being left behind in the dust of other transportation modes that are more readily able to convert, adapt, and change to low- or zero-emissions power.

Thoughtful end-users need to be informed, accurately and fully, of the positive contributions rail can make to the product or service they buy. Our industry should start well beyond currently proposed systems, many of which serve only to provide specific output metrics. We must seek to provide true

visibility that meets customers' strategic goals. We need to show all of the net benefits from the rail network for the whole origin to destination, not just a segment on a Class I intermodal train.

The time to start doing this is **now**. We have the base data to make calculations. The rail industry should consider producing an App that allows prospective shippers to see comparative emissions data for different traffic types over a route, including interchanges. Think of something like Google Maps on steroids combined with Uber.

Finally, from MSU ... GO GREEN!