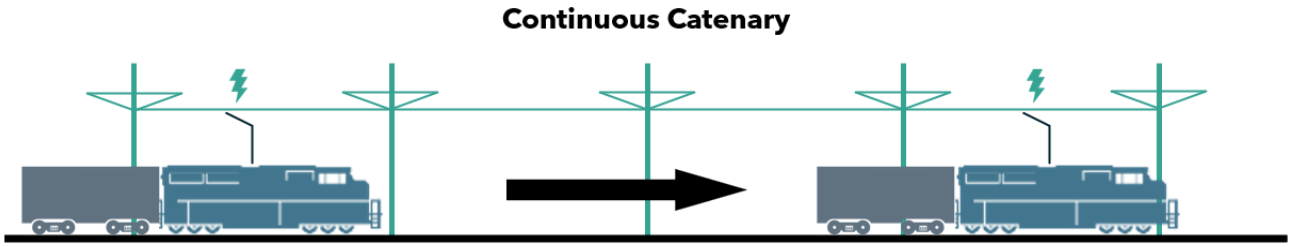
Overhead Catenary System Rail Fact Sheet

Overhead catenary systems (OCS) use overhead wires carrying electricity to power a locomotive. This century-old technology is common around the world and used in some parts of the United States. OCS can be in the form of continuous or discontinuous.

Continuous Overhead Catenary Systems

Continuous OCS electrifies an entire route with overhead wires. Locomotives on routes with Continuous OCS do not need additional power sources like diesel engines or batteries.

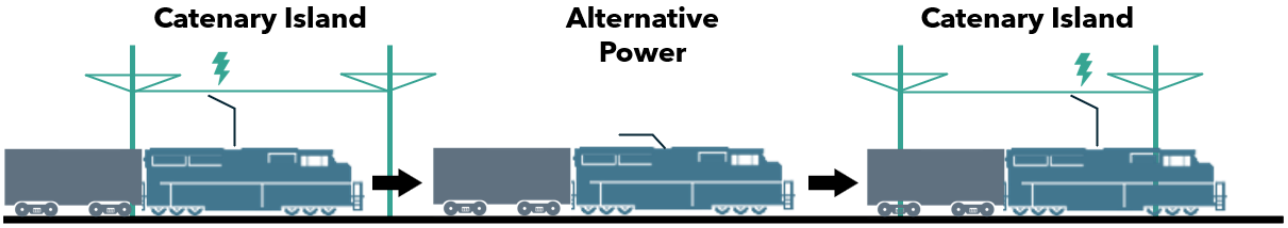
Figure 1: Continuous Overhead Catenary System Concept Diagram



Discontinuous Overhead Catenary Systems

Discontinuous OCS electrifies a route in segments. The areas of track with OCS are called "catenary islands". In non-electrified segments of the track, locomotives may use alternative power sources such as diesel engines or batteries.

Figure 2: Discontinuous Overhead Catenary System Concept Diagram



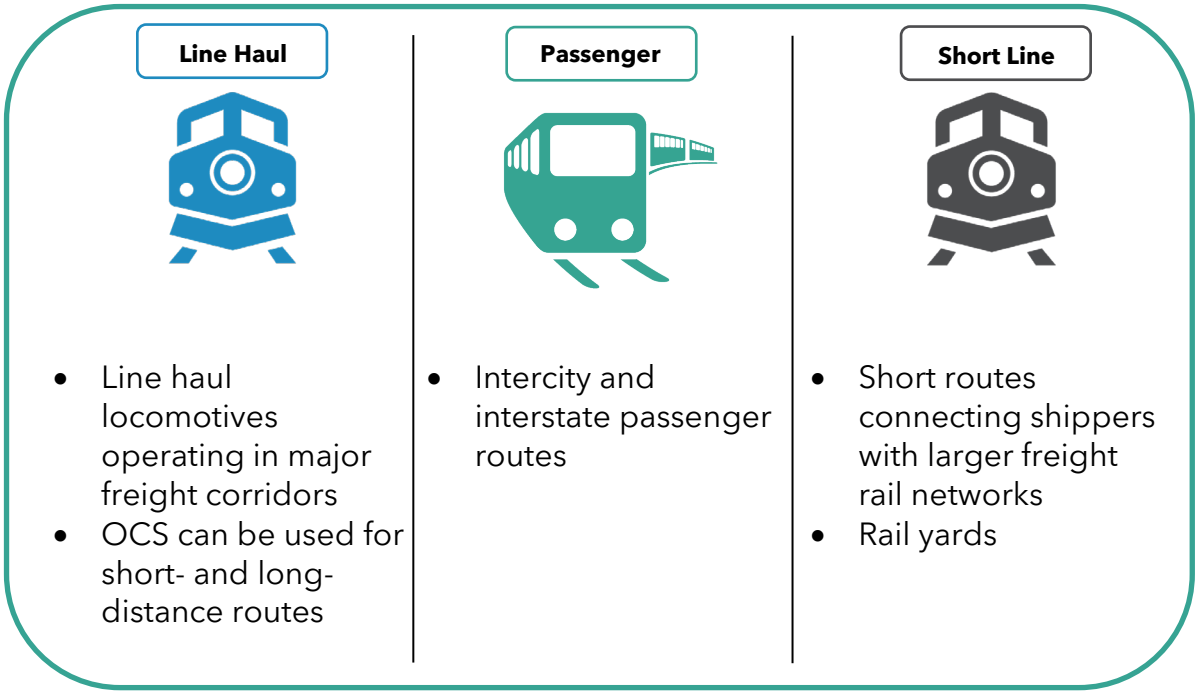
Pros

- Established and reliable technology
- Reduced tailpipe emissions (zero emissions with continuous catenary)
- High speed capability
- Lower operating costs
- Supports grid resilience by allowing right-of-way sharing for transmission lines

Cons

- High infrastructure costs
- Damaged OCS may cause service disruptions
- OCS locomotives can only operate where there is OCS infrastructure

Applications of Overhead Catenary Systems



Safety

Catenary wires are designed to minimize electrical hazards. Locomotives using OCS go through the same rigorous safety testing as any other locomotive. The Federal Railroad Administration requires specific crashworthiness testing, daily inspections, yearly tests, and many more safety precautions.[1]

Resources

California State Rail Plan

U.S. Department of Energy Action Plan for Rail Energy and Emissions Innovation

Federal Railroad Administration Cost and Benefit Risk Framework for Modern Railway Electrification Options

Federal Railroad Administration Framework for a Technology Innovation for Energy-Efficient Railyards (TIEER) Pilot Study

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[1] Code of Federal Regulations, Title 49, Subtitle B, Chapter II, Part 229. Weblink: *https://www.ecfr.gov/current/title-49/subtitle-B/chapter-II/part-229*