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COURTESY OF

Brotherhood of Locomotive Engineers
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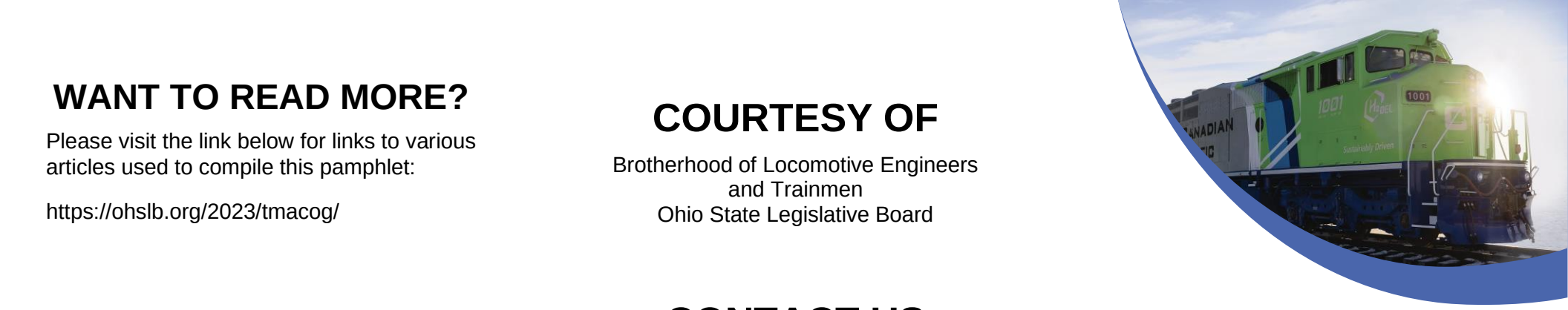

MODERN RAIL TECHNOLOGY

ADVANCEMENTS IN MOTIVE POWER

TMACOG

2023 Summer Non-Governmental Caucus

NEW TECHNOLOGY

Modern locomotives already use electric traction motors, making them ideal candidates for alternative fuel options.

B20 DIESEL

CSX has utilized more than 200,000 gallons of 20% soybean-oil based diesel (B20), which reduces greenhouse gasses by as much as 20%. Partnering with Wabtec, CSX has retrofitted 10 diesel locomotives to use the fuel and uses them exclusively with Mosaic, a Tampa based phosphate customer.

BATTERY ELECTRIC

Several North American railroads are testing fully electric locomotives in switching and local operations. These locomotives use regenerative braking to charge the battery systems, and can be built new or offered as retrofit options. The EMD Joule is one such example, currently in use in California.

HYDROGEN FUEL CELLS

Canadian National (CN) is leading the charge to develop hydrogen fuel cell locomotives, partnering with Bilton Welding and Manufacturing to construct three fully operational units for testing. Although these locomotives are carbon neutral, the process to transform water into hydrogen is still energy intensive. This leads to an “at the rails” energy efficiency of 34% for hydrogen fuel cells requiring 2.94 MWh of energy to power 1 MWh of motive power.

Recently, CPKC and CSX announced a partnership to develop similar technology.

OTHER OPTIONS

Modern solutions for motive power are exciting, but there are other solutions that should be considered.

SYSTEM ELECTRIFICATION

Selective freight line electrification – particularly those areas with dense, frequent traffic also produces impressive results. Overhead electrification systems operate at an “at the rails” energy efficiency of 86% requiring only 1.17 MWh of energy to power 1 MWh of motive power. Many light rail networks use this technology today, but substantial upgrades would be needed to implement the system for freight.