

Grigorovich D.N.  
Alternative fuels for railway transport // Energy: economy, technology, ecology.

- ✓ Railway vehicles with internal combustion engines (ICE) have great power. Currently, work is underway to create a cheap technology for producing hydrogen fuel, and new power plants are being designed that convert the chemical energy of hydrogen into electrochemical. Such installations include fuel cell electrochemical generators.
- ✓ Natural gas is proven, proven, efficient, economical and clean fuel. Natural gas can be in two states: liquefied (LNG) and compressed or compressed (CNG). Each of the state of aggregation of natural gas has its drawbacks, and therefore its choice should be related to the operating conditions of diesel locomotives: shunting and trunk.
- ✓ As an alternative to diesel fuel, an environmentally friendly type of fuel is offered - biofuel that can be used in internal combustion engines, both independently, after preliminary adjustment of the engine, and mixed with conventional fuel, without making changes to the design of the diesel engine. As a result of tests, measuring the toxicity of exhaust gases showed that the addition of biofuels reduces the content of carbon oxides in diesel exhaust gases from 2% to 25%.

**ЦИФРЫ И ФАКТЫ**  
**Физико-химические показатели альтернативных видов топлива**

Показатели	ДМЭ	Дизельное топливо	Метанол	Этанол	Сжатый газ (метан)	Пропан	Бутан
Низшая теплотворная способность, МДж/кг	27.6	42.5	19.5	25	50	46.4	45.7
Плотность, г/мл	0.66	0.84	0.79	0.91	–	0.5	0.61
Цетановое число	60	40–55	5	8	–	–	–
Температура самовоспламенения, °С	235	250	450	420	650	470	365
Октановое число	–	–	11	108	130	90...	...100
Стехиометрическое соотношение	9.0	14.0	6.5	9.0	17.2	15.3	13.1
Температура кипения, °С	–25	180–370	65	78	–162	–42	–0.5
Теплота испарения, кДж	460	250	1110	904	–	344	386
Пределы взрывоопасности (% газа в воздухе)	3.4–18	0.6–6.5	5.5–26	3.5–15	5–15	2.1–9.4	1.9–8.4
Содержание, мас.%							
углерода	52.2	86.0	37.5	52.2	75.5	75.5	82.8
водорода	13.0	14.0	12.5	13.0	25.0	25.0	17.2
кислорода	34.8	0	50.0	34.8	0	0	0