

HEI's **Special Committee on Emerging Technologies** has prepared two charts that summarize information on the timing and likelihood of use for new fuels from various feedstocks and for new diesel technologies. These charts will help HEI and others focus research and assessments on the most likely forthcoming technologic and fuel changes. Some regulatory agencies and diesel manufacturers have given useful input to the diesel chart, and HEI welcomes input from others. Please email comments to HEI's Director of Science, Jane Warren (jwarren@healtheffects.org).



EMERGING
TECHNOLOGIES

Chart 2. Years until Significant Commercialization of Transportation Fuels⁽¹⁾ DRAFT

Fuels	Feedstocks					
	Petroleum	Natural Gas	Coal	Oil Shale	Oil Sands ⁽²⁾	Biomass
Gasoline	Current	<10	20+	20+	20+	-
Gasoline/EtOH Blend	Current	<10	20+	20+	20+	Current ⁽⁸⁾
Gasoline/MTBE Blend ⁽³⁾	Current	-	-	-	-	-
Gasoline/ETBE Blend	<10	-	-	-	-	<10 ⁽⁸⁾
Diesel ^(4,5)	Current	<10	20+	20+	20+	-
Diesel/EtOH Emulsion ⁽⁶⁾	-	-	-	-	-	-
Diesel/H ₂ O Emulsion ⁽⁶⁾	-	-	-	-	-	-
Diesel/Biodiesel Blend	-	-	-	-	-	<10
Biodiesel ⁽⁷⁾	-	-	-	-	-	<10
LPG	<5	<5	-	-	-	-
CNG	-	<5	-	-	-	-
LNG	-	<5	-	-	-	-
MeOH	-	<10	20+	20+	20+	20+
EtOH	-	-	-	-	-	<10 ⁽⁸⁾ 20+ ⁽⁹⁾
CHF ⁽¹⁰⁾	<10	<10	20+	20+	20+	-
DME	-	<10	20+	20+	20+	-
Hydrogen - Including: Compressed Liquid Hydrides	-	<10	20+	20+	20+	20+

Notes

1. "Significant Commercialization" means >0.5% of total transportation fuels used within a particular geographic region
2. Canadian Tar Sands are currently used as feedstocks for gasoline and diesel fuel in limited locations. Time estimate of 20+ years refers to significant commercial use in the U.S.
3. Assume that MTBE usage will be completely phased-out, so no gasoline/MTBE blends are anticipated in the far future
4. Future diesel fuels will be reformulated to contain very low sulfur contents:
 - 15 ppm S maximum for on-road U.S. diesel fuel in 2006
 - 15 ppm S maximum for off-road U.S. diesel fuel in 2007 or 2010 (proposed)
5. Significant use of urea and/or ammonia is possible if Selective Catalytic Reduction (SCR) becomes a common NOx reduction technology for future diesel engines
6. Diesel emulsion fuels also require inclusion of emulsifiers
7. Includes seed crop methyl esters (SCME)
8. Ethanol from grain
9. Ethanol from cellulose
10. Clean Hydrocarbon Fuels - to be used in fuel cells and/or HCCI engines

Abbreviations

CHF	clean hydrocarbon fuels
CNG	compressed natural gas
DME	dimethyl ether
ETBE	ethyl <i>tert</i> -butyl ether
EtOH	ethanol
HCCI	homogeneous charge compression ignition
LNG	liquid natural gas
LPG	liquid petroleum gas
MeOH	methanol
MTBE	methyl <i>tert</i> -butyl ether
NOx	nitrogen oxides
SCME	seed crop methyl esters
SCR	selective catalytic reduction
US	United States