North Carolina Clean Fuel and Advanced Technology Matrix

Fuel Type	Applications	Manufacturers	Vehicle Costs	Approximate Fuel Cost	Emission Reductions			Refueling Infrastructure
Biodiesel	Light duty (LD) and Heavy duty (HD) diesel vehicles	Biodiesel can be used in all diesel vehicles	No incremental cost	2007 average[1] State contract price for B20 +$0.04 per gal compared to diesel $.50-$1.00 federal blenders credit		B20	B100	Easily used in existing diesel pumps & tanks Federal tax credits available for up to 30% of infrastructure costs
					CO	11%	47%	
					HC	21%	67%	
					NOx	+2%[2]	+9%	
					PM	10%	48%	
Compressed or Liquefied Natural Gas CNG/LNG	CNG used in LD fleet vehicles, buses, medium to HD trucks LNG appropriate for HD long distance vehicles	Most HD Original Equipment Manufactures (OEMs) offer bi-fuel & dedicated models Honda GX only LD OEM LD, medium, and HD upfits are available	+ $6,000 for Honda GX to + $60,000 for 40 ft CNG/LNG transit bus Federal tax credits for LD & HD	CNG gge (gasoline gallon equivalent) = $1.24 [Asheville '07] $0.50 federal motor fuels excise credit available	CO 74 - 90% HC 70% NOx 50 - 85% PM 90 - 97%			For home or small-med fleets: $2,000-$90,000 Large fleets: $250,000+ Federal tax credits for up to 30% of station costs available
Electric (EV)	Neighborhood Electric Vehicles (NEVs) for streets zoned up to 35 MPH	Dynasty, E-ride, Global Electric Motorcar (GEM), MILES, ParCar, ZAP, ZENN	$6,900 and up for NEVs	~ 33% less than petroleum fuels No Fed & State tax	No emissions with renewable electricity Emissions reduce by half with electricity from fossil fuels			NEVs are charged with household 110v outlets
Ethanol (E-85)	Many LD flex-fuel vehicles (FFVs) available that are capable of running on either E-85 or gasoline	Select 2008 models; Chrysler: Sebring, Aspen Ford: Crown Victoria, F-150 GM: Yukon, Sierra Chevy: Impala, Tahoe Dodge: Avenger, Durango Nissan: Armada, Titan Mercedes: C300 series	No incremental cost	July 2007 State Contract price (Wake Co) for E85 -$0.15 per gal compared to gas	CO 40% VOCs 15% NOx 10% PM 20%			Can use existing infrastructure w/ modifications for material compatibility Retrofit: $1,000-10,000 New: $60,000-90,000

[1] Based on Wake County average prices Jan-June
[2] 2005 NC DOT study found a 10% reduction in NOx with B20 in on-road testing of dump trucks

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Propane (LPG)	LD passenger to medium duty delivery trucks forklifts / mowers	Conversions only: BAF Technologies Baytech Corporation Cummins Westport Enviro-Guard Inc.	+ $8,700	5 - 40% less than gasoline $0.50 federal motor fuels excise credit	CO 50-90% HC 30-60% NOx 50% PM 80-95%	$12,000-$40,000 Costs may be paid by fuel provider for large fuel volumes
Hybrid Electric Vehicle (HEV)	Many LD HEV models available Also for buses (HEBs) & utility bucket trucks	LD: Ford, Toyota, Honda, Saturn, Nissan HD: Ebus, GM/Allison, Advanced Vehicle Systems, Orion, TransTeq, DesignLine	+ $5,000 for LD HEV (Some tax credit available) + $450,000 for hybrid electric bus	Reduced fuel costs based on improved fuel economy	2007 Hybrid Honda Civic compared to average LD vehicle: CO 97% VOCs 99% NOx 98%	HEVs do not require recharging Plug-in hybrids (PHEVs) can use household 110v outlets
Mobile Idle Reduction Systems[3]	For use in most HD vehicles; direct-fired heaters auxiliary units automatic engine idling systems	Bergstrom Inc. Cummins Engine Carrier Transicold MidAtlantic Thermo King Corp. Webasto Product N.A.	+ $600-7,000 for direct-fired heaters + $3,000-9,000 auxiliary units + $1,000-4,000 for auto engine idling systems	No additional fuel costs Savings of about 1 gallon per hour when not idling	Varies	None
Diesel Retrofits	For HD diesel vehicles / buses Includes DOCs- Oxidation Catalyst, DMF- multi stage filters and DPFs- Particulate Filter	Caterpillar Cleaire Horizon Clean Diesel Techs. Donaldson Company Engine Control Systems International Truck Corp	+ $400-1,200 for DOCs + $4,000-6,000 for DMFs, and + $5-10,000 for DPFs	Retrofits, except DOCs, require ULSD	CO / HC / PM DOCs 40% / 50% / 20% DMFs 50% DPFs 60-90%	DOCs and DMFs require no maintenance annual maintenance required for DPFs DPFs and DOCs can add Close Crankcase Ventilation (CCV) for increased benefits

[3] Stationary Technologies including Truck Stop Electrification (requires on-board unit for heating and cooling) and Advanced Truck Stop Electrification (IdleAire) are also available

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