



WHAT WE'LL COVER TODAY

- ✓ **WHAT IS BIODIESEL?**
- ✓ **JOINT LANDFILL GAS/BIODIESEL PROJECTS**

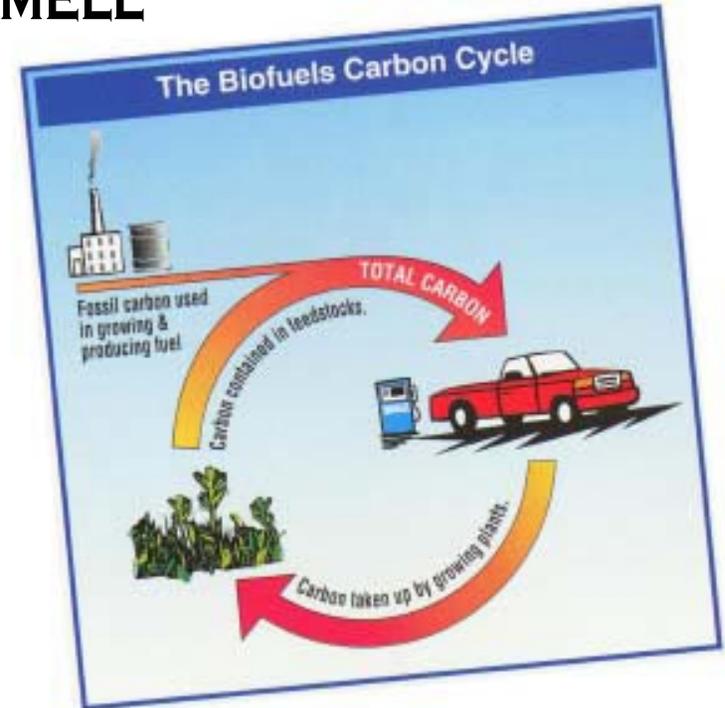


Architectural rendering of proposed site in Nanjing, China

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FOR MORE INFORMATION: WWW.PIPELINE.TO/BIODIESEL**

WHAT IS BIODIESEL?

- ✓ **VEGETABLE OIL BASED DIESEL FUEL**
 - ✓ **MADE FROM RECYCLED & VIRGIN OILS**
 - ✓ **NON-TOXIC, BIODEGRADABLE**
 - ✓ **“FRENCH FRY” EXHAUST SMELL**
 - ✓ **REDUCES EMISSIONS**
- ✓ **RENEWABLE
RESOURCE**
- ✓ **GREENHOUSE
GAS REDUCTION**
- ✓ **NATIONAL ENERGY SECURITY**





HOW DOES BIODIESEL OPERATE AS A FUEL?

- ✓ HIGHER CETANE
- ✓ BETTER LUBRICITY
- ✓ MIXES WITH PETROLEUM DIESEL
- ✓ NO ENGINE MODIFICATIONS
- ✓ SIMILAR POWER AND TORQUE
- ✓ MEETS ASTM STANDARDS





BIODIESEL CAN BE USED IN ANY DIESEL ENGINE

- ✓ TRANSIT & SCHOOL BUSES
- ✓ SHIPS & TRAINS
- ✓ MINING EQUIPMENT
- ✓ GARBAGE TRUCKS
- ✓ AIRPORT EQUIPMENT
- ✓ SNOW REMOVAL
- ✓ POWER PLANTS / GENSETS

EVEN A DUCK...





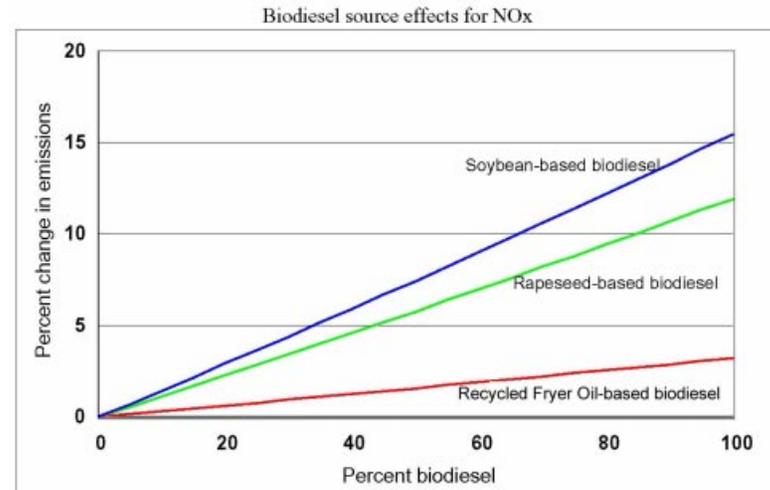
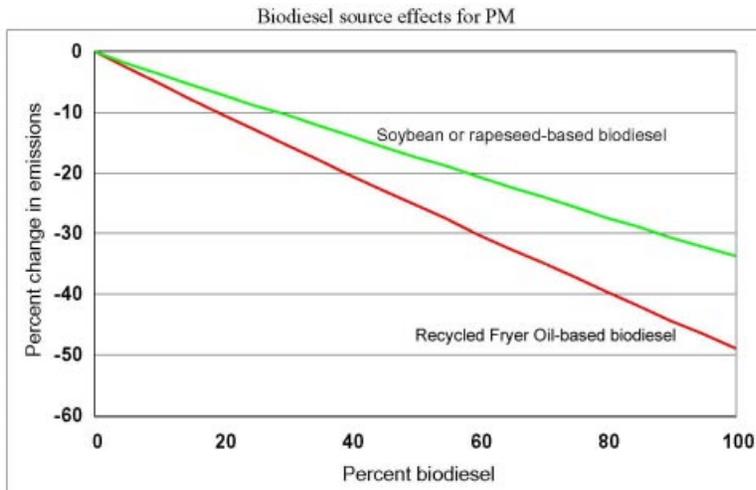
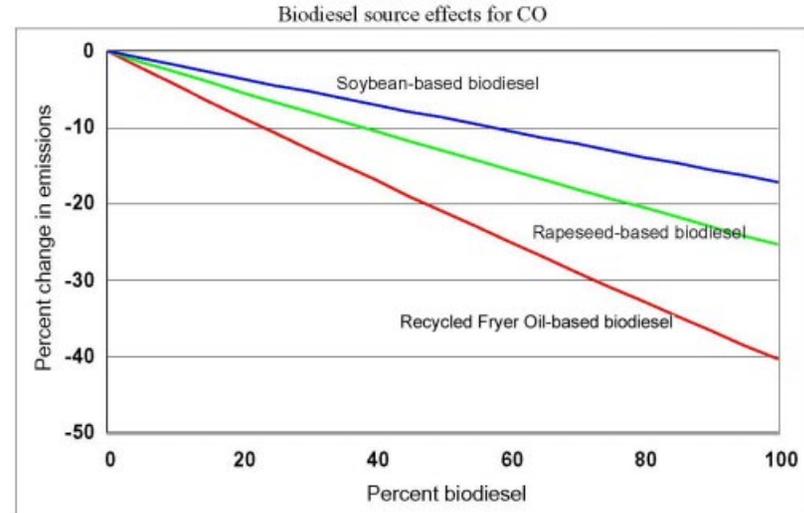
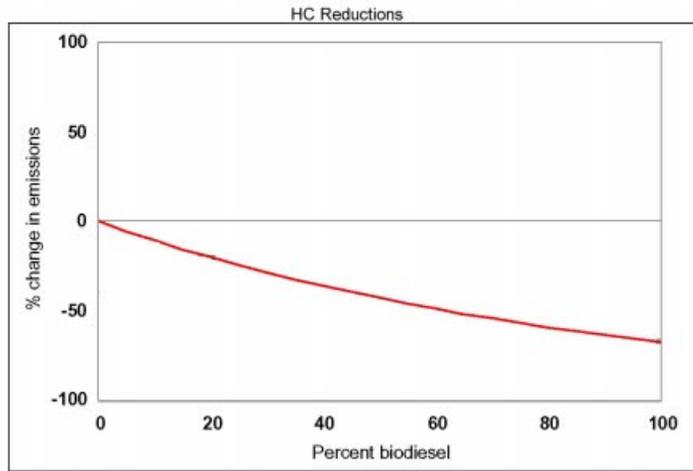
BIODIESEL MEETS FEDERAL REGULATIONS

- ✓ DESIGNATED “ALTERNATIVE FUEL”
- ✓ MEETS EPA CT REQUIREMENTS
- ✓ REGISTERED WITH EPA
- ✓ USED FOR OIL SPILL CLEAN UP





CRITERIA EMISSION BENEFITS





✓ SUMMARY OF EMISSION BENEFITS

POLLUTANT	B20	B100
CARBON MONOXIDE	-12.6%	-43.2%
HYDROCARBONS	-11.0%	-56.3%
PARTICULATE MATTER	-18.0%	-55.4%
NOX (RECYCLED BIO)	0%	0%
NOX (VIRGIN BIO)	+5.8%	+1.2%
TOXICITY	-12-20%	-60-90%
MUTENAGICITY	-20%	-80-90%
SULFUR	LESS THAN 15PPM FOR B100	





✓ BIODIESEL MODULAR PRODUCTION UNITS (MPU)



- **SITES IN CA, NEVADA, & AUSTRALIA**
 - **REDUCED CAPITAL OUTLAY**
 - **DISTRIBUTED PRODUCTION MODEL**
 - **COMBINED HEAT & POWER**



✓ **THE MPU IN LAS VEGAS SUPPORTS OVER 3,000 GOVERNMENT VEHICLES, INCLUDING NEARLY 1,200 SCHOOL BUSES**



✓ **DESIGNED TO PRODUCE UP TO 3,000,000 GPY USING WASTE FRYER OIL FROM LOCAL CASINO/RESORTS**



✓ **IN NEW SOUTH WALES, AUSTRALIA
MULIPLE MPU'S ARE CONFIGURED TO
PRODUCE OVER 10 MILLION GALLONS OF
BIODIESEL ANNUALLY**



✓ **AUSTRALIA'S FIRST BIODIESEL FLEET**



✓ **USES VIRGIN AND RECYCLED
FEEDSTOCKS & MEETS
US AND EUROPEAN
BIODIESEL STANDARDS**



✓ **US NAVY'S MINI MPU DESIGNED FOR RESEARCH AND DEVELOPMENT, 1/10 SCALE**



✓ **SUITABLE FOR REMOTE AND MOBILE OPERATIONS**





JOINT LANDFILL GAS/ BIODIESEL PROJECTS



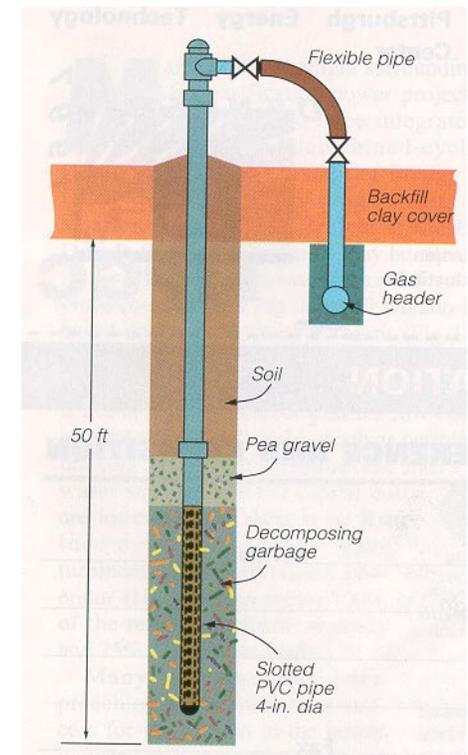
✓ **DTE BIOMASS ENERGY HAS 32 LANDFILL GAS PROJECTS NATIONWIDE**

✓ **REDUCES GREENHOUSE GASES
(METHANE 21 TIMES WORSE THAN CO₂)**

✓ **GENERATES GREEN POWER**

✓ **TAX INCENTIVES DISAPPEARING**

✓ **HARDER TO FIND VIABLE PROJECTS**





TYPICAL LANDFILL GAS FLARE NONPRODUCTIVE USE

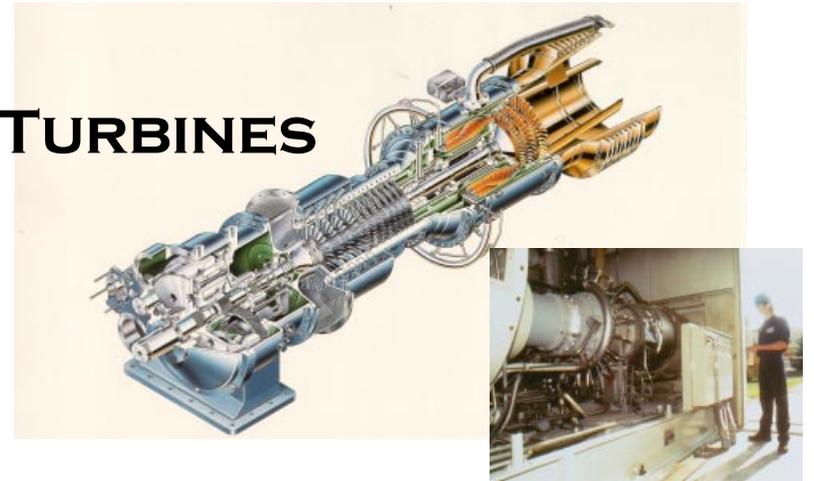


LANDFILL GAS PRODUCTIVE USES POWER GENERATION



✓ **“CAT” IN A CAN**

✓ **TURBINES**



✓ **8 CATS AT CA LANDFILL**



✓ **8 MILLION CUBIC FEET ANNUALLY
FOR POWER PLANT IN FLORIDA**



LANDFILL GAS PRODUCTIVE INDUSTRIAL USES



✓ **BOILER**



✓ **ASPHALT,
CONCRETE,
SMELTING**



BIODIESEL PRODUCTION SYNERGIES



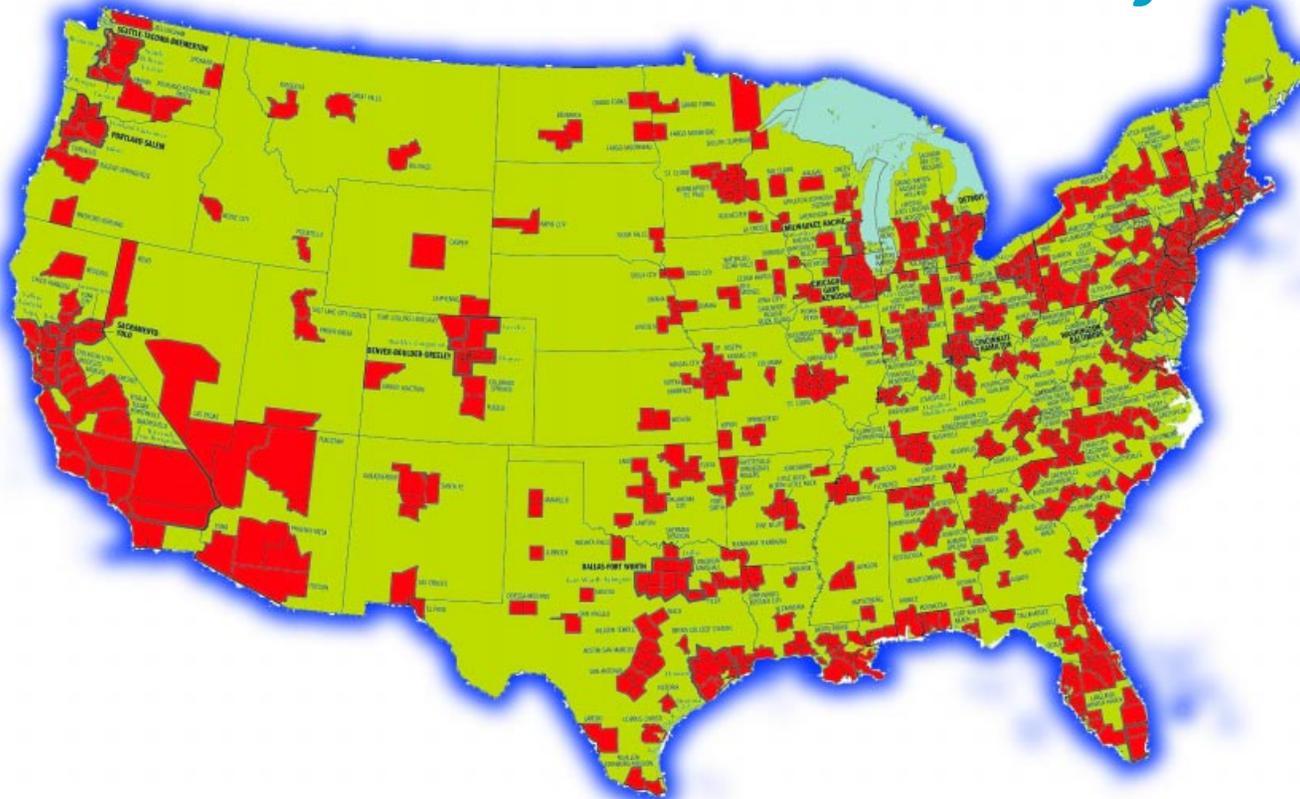
- ✓ **MANY LANDFILLS ARE LOCATED NEAR BIODIESEL FEEDSTOCKS AND CUSTOMERS**
- ✓ **LANDFILL GAS PRODUCTIVE USES GENERATE WASTE HEAT THAT CAN BE RECOVERED BY BIODIESEL PRODUCTION**
- ✓ **DEVELOPMENT AND OPERATION COSTS CAN BE SHARED**
- ✓ **CAN BE COMBINED WITH OTHER RENEWABLE ENERGY PROJECTS TO CREATE UNINTERRUPTABLE POWER**
- ✓ **BOTH HELP IMPROVE REGIONAL AIR QUALITY, ENERGY SELF SUFFICIENCY AND ECONOMIC DEVELOPMENT**



✓ **THERE ARE APPROXIMATELY 2,500
LANDFILLS IN THE US**



There are over 275
Metropolitan Areas in the US that
could sustain biodiesel production
using only recycled fryer oil
available locally



✓ **BIODIESEL PRODUCTION CAN MAKE LANDFILL GAS
PROJECTS ECONOMICALLY JUSTIFIABLE**



QUESTIONS?

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