



## The Revolution of Alternative Fuel Vehicle Systems



Property of ICOM North America

# Benefits of Utilizing Propane Autogas



**PROPANE**  
CLEAN AMERICAN ENERGY™

\$\$\$

Substantial fuel cost savings as compared to gasoline or diesel



Reduce emissions of toxins by up to 30-90% compared to gasoline



Domestic – Propane is produced in North America, with large reserves in the U.S. and Canada

\$\$\$

Lower maintenance cost



Greenhouse gas emissions are reduced approximately 20%



Maintains the torque, horsepower, and drivability you would feel in a gasoline vehicle



*clean air choice*®

**AMERICAN LUNG ASSOCIATION.**  
OF THE UPPER MIDWEST

*For some more information on propane please visit the U.S. Department of Energy, Energy Efficiency and Renewable Energy website or contact your local American Lung Association office.*

### **What is Propane?**

Propane is liquefied petroleum gas that consists of propane, propylene, butane, and butylenes in various mixtures. In the United States, propane is the primary ingredient. Propane is a by-product of natural gas processing and petroleum refining and it is stored under moderate pressure to maintain its liquid state.

### **Why is Propane a Clean Air Choice?**

Propane vehicles produce less tailpipe emissions of virtually all pollutants associated with automobile vehicles that use gasoline or diesel. According to the U.S. Environmental Protection Agency, a typical four-horsepower gasoline lawnmower engine generates almost six times as much volatile organic compound (VOCs) per hour of use as a typical car. Converting small utility engines such as lawnmowers to burn propane can reduce emissions of ozone precursors by one third and increase fuel economy by 14 percent.

### **What are the other benefits of Propane?**

- **Energy Security:** the majority of propane used in the U.S. today is domestically produced.
- **Cost:** Propane costs less than gasoline and diesel fuel per gallon
- **Availability:** with numerous propane vehicles available and a national infrastructure of pipelines, processing facilities, and storage already exists for the efficient distribution of propane, the propane option is accessible to the masses.

### **American Lung Association of The Upper Midwest**

490 Concordia Avenue

St. Paul, MN 55103-2441

Phone: 651-227-8014

Fax: 651-227-5459

Email: [cleanairchoice@lungum.org](mailto:cleanairchoice@lungum.org)



Property of ICOM North America

# Propane Autogas is Safe.

- Meets all federal motor vehicle safety standards.
- Fuel tanks are 20 times more puncture-resistant than gasoline and diesel tanks.
- Stored at relatively low pressure, about 250 psi.





Courtesy of:



# Propane Autogas is Safe

Propane Autogas is a contained fuel source:

- No spillage
- No shrinkage
- No pilferage
- No contamination
- Non-toxic





Courtesy of:



# This is Propane Autogas!!

**Clean**

**Cost Effective**

**Conserves Resources**

**Common Sense**

**Commitment friendly**

**Domestic**

**Abundant**

**Affordable**

**Available**



**Propane Autogas is the viable alternative fuel**

# Icom's Global Presence

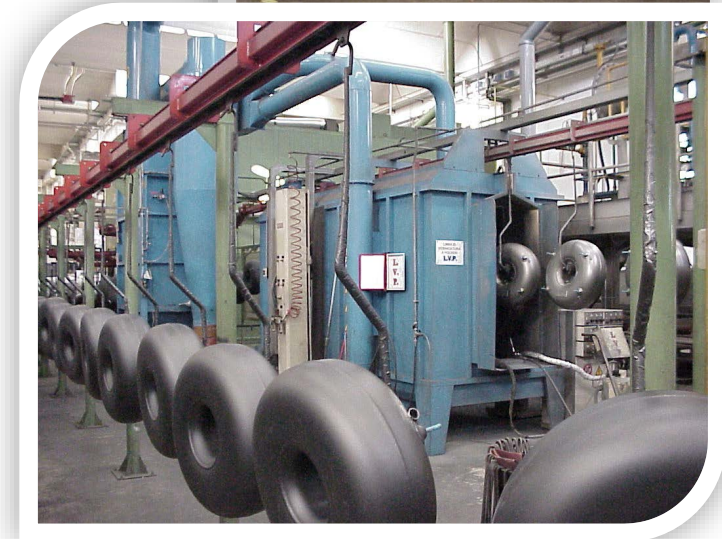


- - Manufacturing Plants
- - Distribution Centers

# ICOM Manufacturing Italy



- Founded in 1984
- Invented and patented the toroidal LPG tank
- Holds numerous patents on alternative fuel systems
- Sold over 3 million LPG automotive tanks
- Sold over 250,000 JTG liquid propane systems
- ISO 9001 and ISO 14001 Certified
- Holds numerous EN67 certifications
- ASME certified
- Has distribution in 15 countries on 5 continents
- Tier I OEM supplier
- JTG® System approved to rigid Canadian -40° testing





# ICOM North America



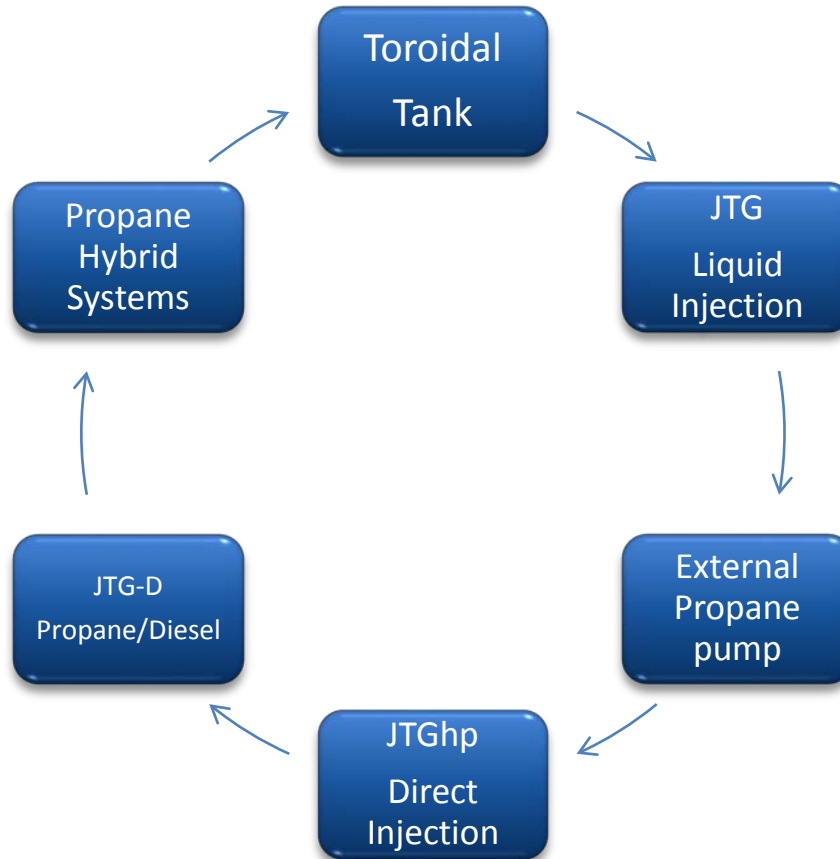
- Established its North American operations in 2004.
- Headquarters and Assembly Plant in New Hudson, Michigan
- Assembles the Icom JTG system including: Toroidal tanks, Cylindrical Tanks, Fuels Rails, Hoses Regulators and ICU at the New Hudson Plant using a substantial percentage of domestic components.
- NFPA 58 Compliant, EPA Certified, Canadian IGAC Certified and E67/01 Certified, Crash Tested.
- Bifuel & Monofuel Systems

# Icom Systems and Technology in North America

*Approximately:*

- 12,000 Propane Systems in use in North America utilizing Icom Technology
- Fleets enjoyed a huge fuel cost savings of \$168,000,000 to date
- Estimated emissions reduction of 30% and Particulate reduced to almost 0
- 124,300,000 gallons of Propane Autogas utilized
- 111,870,000 gallons of gasoline and diesel displaced
- 290,000,000 miles driven
- Icom is working hard with our partners and Dealers to get over **100,000 Icom systems**, in the next 5 years

# Icom Innovations Driving the Industry



**icom JTG**  
L'impianto per chi aumenta le prestazioni della tua auto

idea geniale,  
cambio dirazionale

Non installa un impianto qualunque,  
scegli **icom JTG**  
+ potenza  
+ ecologia  
+ convenienza

È per le nuove auto ad iniezione diretta  
grazie al nuovo **icom JTG**  
l'unico che evita il ggi ad alta pressione  
per viaggiare sempre a gas.

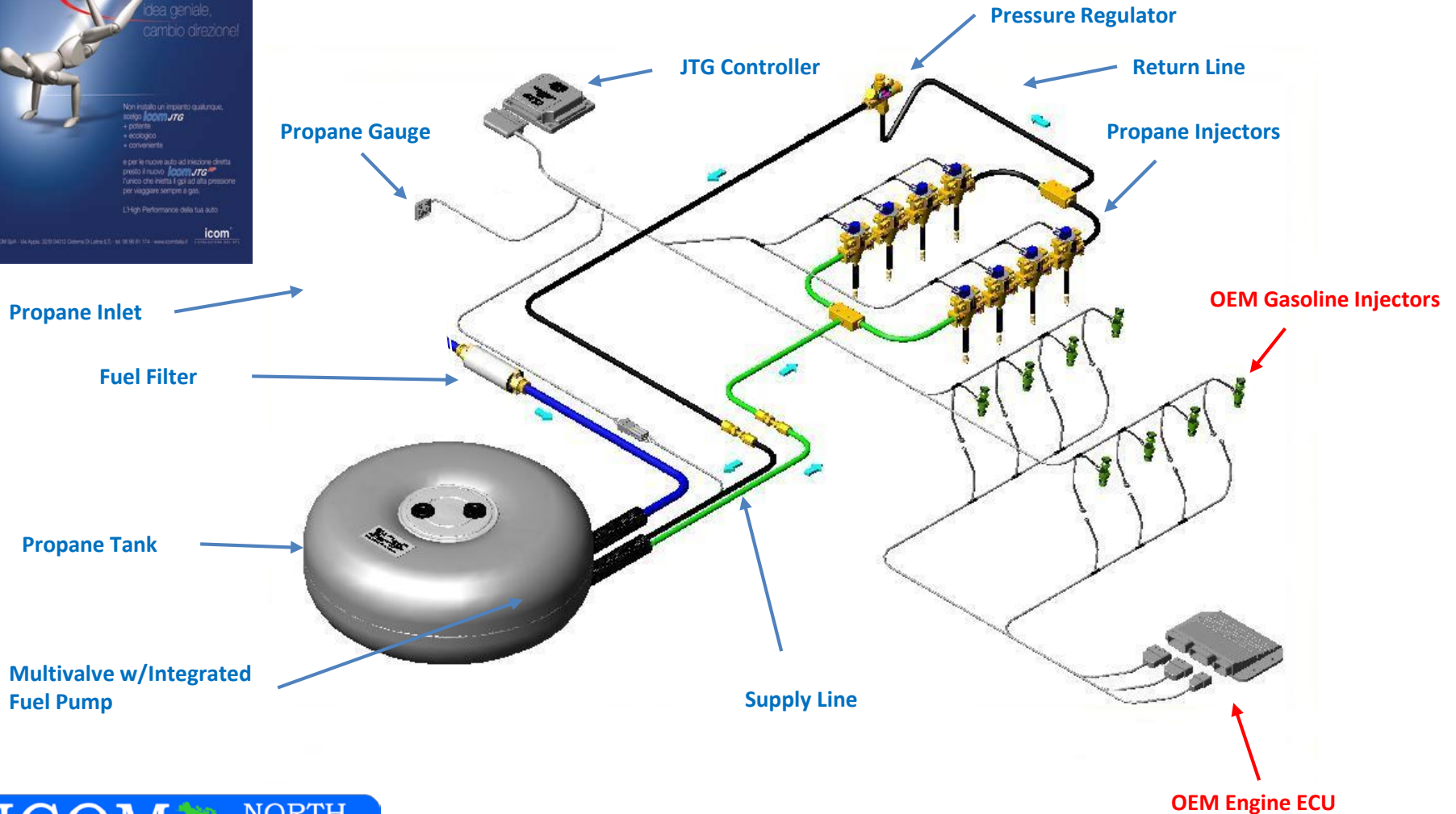
High Performance della tua auto

icom

ICOM SpA - Via Appia, 32 00147 Roma, Italia S.p.A. tel. 06/831.114 - www.icom.it

# Icom's JTG<sup>®</sup> Bi-Fuel System

## Liquid Propane Injection System Schematic

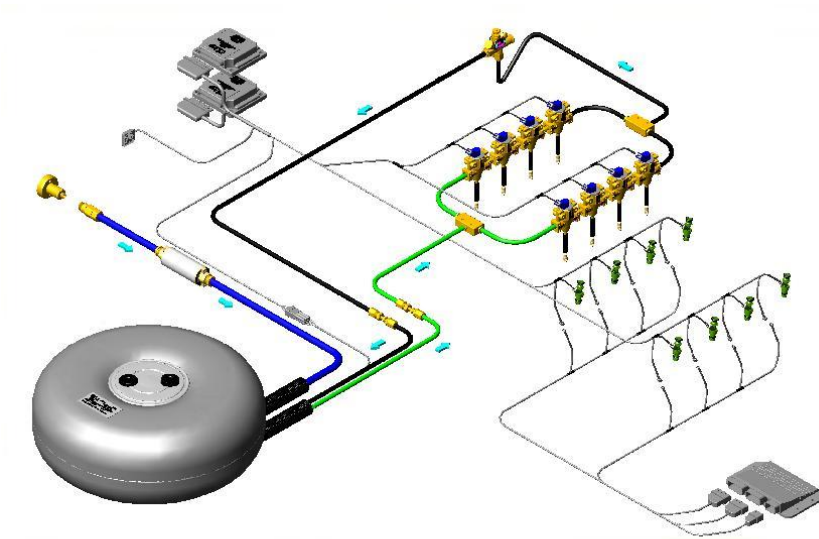


# icom JTG®

Icom invented and patented the revolutionary JTG® liquid propane injection system and electronically-controlled LPG multivalve

## JTG® System Advantages:

- 1) The JTG® system is 'plug and play' – the fuel tank, fuel rails and hoses are preassembled.
- 2) No need to alter OEM ECU in any way.
- 3) Propane injectors calibrated to match gasoline injectors in amount of energy delivered with fuel.
- 4) Complete standard OBDII factory diagnostics.
- 5) Propane injection system not affected by temperature changes.
- 6) No cutting, splicing nor soldering required – only three electrical connections needed to operate the JTG® system



## Liquid Propane Injection System

# ICOM JTG<sup>®</sup> Liquid Injection VS. Vapor Propane Systems

## Power

Noticeable increase compared to gasoline vs. decrease for vapor.

## Torque

Increase due to cooling effect as propane evaporates, increasing air-propane mixture density. More mixture can be introduced into engine cylinders increasing peak torque (and power). No such advantage for vapor systems.

## Drivability

Better throttle response and no acceleration lag

## Cold Start

Reliable in cold climates. Vapor systems are affected by ice blockages.

## Valve Recession

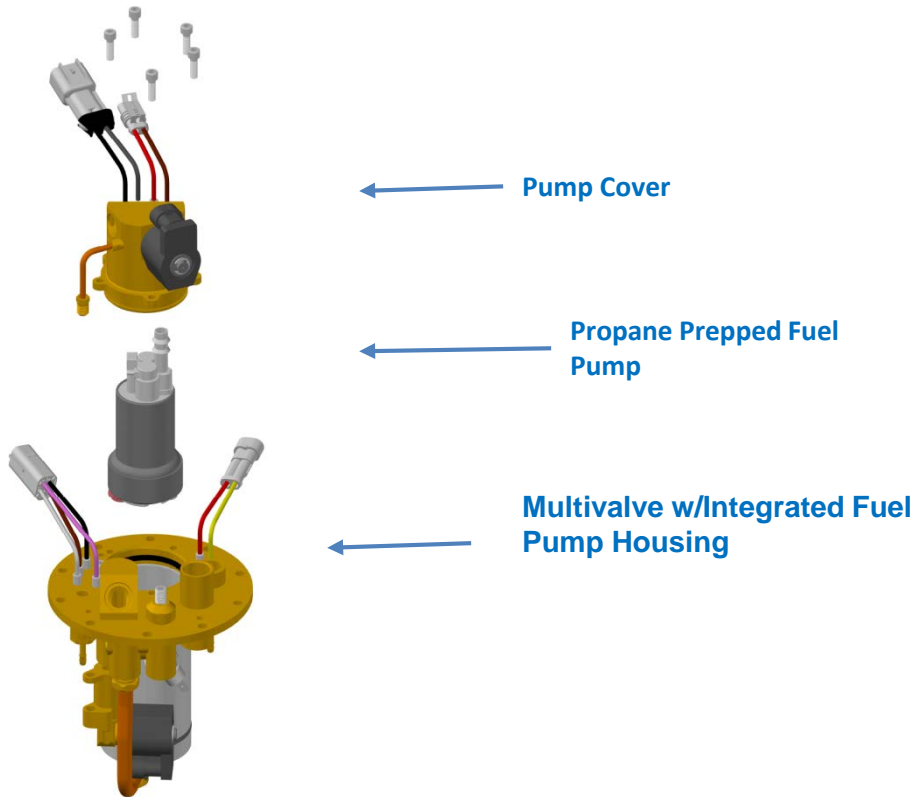
Liquid Injection does not lead to excessive valve recession or engine failure as many vapor systems could.



*OEM quality fuel injector  
and fuel pump designed  
specifically for propane*



# JTG<sup>®</sup> MultiValve



The Advanced JTG  
Multivalve with Integrated Fuel  
Pump

Developed and Patented by Icom  
for improved serviceability – no  
need to depressurize fuel tank to  
access fuel pump  
Increased flow rate for fast filling

# ICOM JTG II Liquid Injection Propane System

## Advantages & FAQ's

The Icom JTG System injects propane as a liquid thus creating numerous attributes:

### Substantial cooling of the intake charge

- ✓ Due to rapid evaporation of propane in the intake manifold, very similar to gasoline, helps efficiency, and power, by providing a cool dense fuel air charge.

### System simplicity

- ✓ The system has no vaporizer. No vaporizer means no “heavy ends” to build up in the system, eliminating down time, and maintenance costs. No water hoses to cut into, no diaphragms to clean/adjust. The system “looks”, and acts, like a normal fuel injection system.

### Cooling of the exhaust valve

- ✓ Due to the substantial cooling effect, the exhaust valve, seat, and combustion chamber receive some much needed cooling, reducing exhaust seat erosion, when compared to other vapor injection/carburetion systems.



# ICOM JTG II Liquid Injection Propane System

## Advantages & FAQ's (cont.)

### Fuel Efficiency/Utilization

- ✓ Cooling the combustion chamber allows the engines computer to advance ignition timing creating more power, and more efficiency.
- ✓ Since the chamber is actually cooling the chamber and exhaust valve, valve recession is minimized compared to gasoline.
- ✓ Due to the complete vaporization of propane, more of the fuel is used to make power, not leaving carbon deposits behind in rings, contaminating oil, or generally "sooting" the engine.

### Icom JTG Bifuel System starts up on gasoline

- ✓ Starting on gasoline retains the "cold start" program, which is perfect and is beneficial in retaining the use of gasoline as a "back up" fuel. Exercising the gasoline system every time the vehicle starts keeps the original fuel system in good working order, and keeps the fuel "fresh" in the gasoline tank.
- ✓ Starting on gasoline allows us to retain the factory PCM calibration, allowing the use of O.E. scan tools.
- ✓ Since both systems are very similar, and utilize the same PCM, and calibration, no specific Icom calibrations are needed.

# ICOM JTG II Liquid Injection Propane System

## Advantages & FAQ's (cont.)

### Ease of Installation

✓ The Icom system is a modular system. The electronic control system is not vehicle specific, the same ICU will fit all engines

### Patented collar is also a vapor seal

✓ Our patented collar allows for different configurations. If you have an externally mounted tank or an internally mounted tank, we can utilize the collar to vapor seal the system, or, as a normal valve guard/weather seal.

### Simple to Maintain

- ✓ Removable pump assembly.
- ✓ Standardized connections, and fittings.
- ✓ You can use generic scan tools with Icom systems.

### Faster R.O.I.

✓ The Icom JTG propane system utilizes all the inherent efficiencies and technology that the O.E.'s use in parallel with gasoline. In recent tests, the Icom JTG system produced 13.8 (propane), and 14.1 MPG on gasoline in a full sized Chevy truck.

# ICOM Priority Target Markets

These sectors are chosen as priority for various reasons including:

- Concentrated vehicle populations (fleet size)
- Available EPA Certifications
- ROI based on fuel usage
- Centrally fueled



# Fleet Applications



## Airports

Including shuttles, cabs, limos, park & rides, ground support, vendor delivery, vehicles, etc.

## Cab & Limo Companies

## People Transportation Vans

Including shuttles, railroads, employee ride, lawn service, amusement parks, colleges, etc.



## Service Vans

Including telephone companies, cable companies, carpet cleaners, plumbers, service, windshield repair, etc.



# Fleet Applications

## EMS Vehicles

(Note: They may do a lot of miles but idle much of the time and use a lot of fuel).

## Delivery Trucks

Including package, bakery, linen, snack, uniform, etc.

## Government & Law Enforcement Vehicles

Including Police, DHS, DOE, State fleets such as DOT's, water companies, etc.

## Municipalities



# ICOM JTG Liquid Injection System vehicles



## VS. CNG vehicles



### Cost

Propane system installed is less expensive so the ROI is more beneficial & savings are increased

### Performance

Increased throttle response with superior power, torque, & drivability

No backfires & no acceleration lag with propane vehicles

### Environment – Fueling Infrastructure

Unlike CNG propane is not a greenhouse gas

Propane can be found more available in rural areas

Propane fuel costs & maintenance costs are less

Propane is more prevalent throughout the USA, Canada, & globally

### Tanks

LPG tanks are approximately 4x smaller than CNG tanks of the same useable gallonage

Propane utilizes more useable gallonage per tank

LPG tanks are usually lighter

### Pressure

Propane pressure is at 312psi maximum

CNG pressure is at 3600psi maximum

### Facility

Propane Vehicle system installation and service normally do not require any modifications to the existing building while CNG often requires substantial modifications at large costs

(please check NFPA 58 and NFPA 52 building requirements).

# System Financing



ICOM SYSTEMS COULD BE FINANCED  
THROUGH ICOM'S FINANCING  
PARTNER, *VFG Leasing and Finance*

*For further information please contact:*

Frederick S. Summers  
*Chairman & CEO*

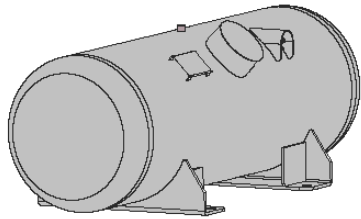
888.VFG.FAST  
(888.834.3278) or  
412.539.1500 x. 280  
706-991-9938 (direct)



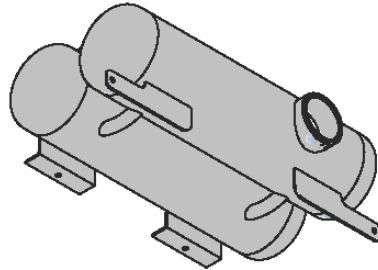
**Leasing & Finance**

# Propane Tanks

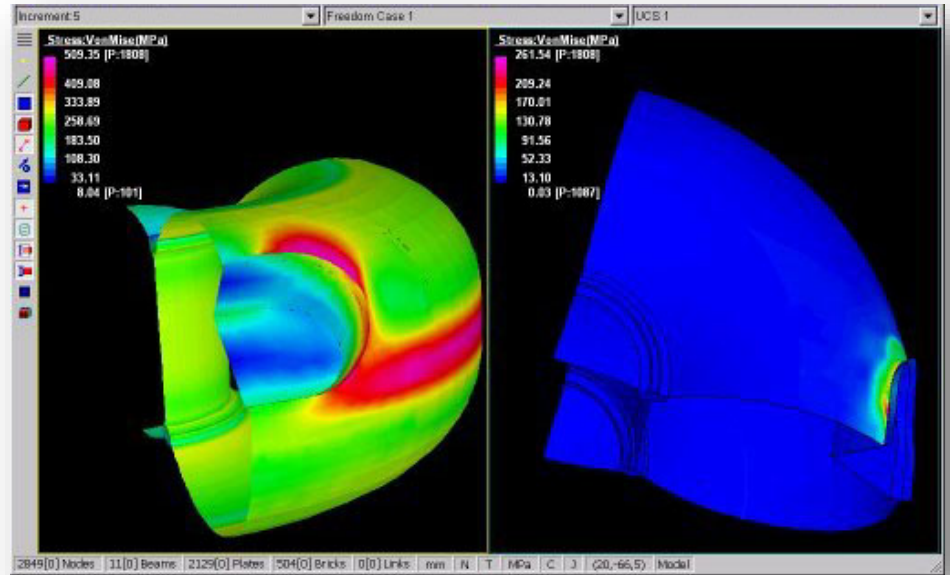
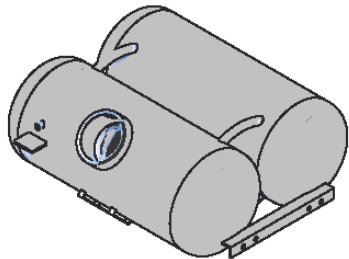
The ICOM JTG<sup>®</sup> system can utilize virtually any propane vehicle tank including cylindrical, manifold and toroidal. All tanks include the ICOM patented recessed valves for the ultimate in protection and safety.



IN-BED TANK SYSTEM



UNDER VEHICLE DOUBLE MANIFOLD TANK SYSTEMS



*Icom utilizes the most advanced technology and state-of-the-art tools to design its fuel systems and components.*



# Current EPA On-Road Approval Paths

For ease of understanding for sales people Icom will simply outline the available EPA Approval Paths:



- **EPA Certification:** Required for any vehicle greater than or equal to the current calendar year minus one.

Example: In calendar year 2012 both 2011 & 2012 require full EPA Certification. Certificate issued by EPA.

If we have an EPA Certification that goes back further it is valid too.

Example: if we have a 2009 MY (model year) EPA Certification is valid.

- **EPA Compliance/Intermediate:** MY  $\leq$  current calendar year minus 2 and within useful life of vehicle (useful life is 120,000 miles or ten years old, whichever comes first, for a light duty vehicle).

Example: In calendar year 2012 light duty vehicles from 2010 back to 2003 that are not over 120,000 miles have to be either EPA Compliance or EPA Certified. No certificate is issued by EPA but Compliance testing and submission to EPA is required.

# Approval Paths (continued)

- **Outside Useful Life:** Light duty vehicles that are over 120,000 miles or ten years old (whichever is first). No certificate is issued by the EPA but Technical Justification and OBD scan tool test attestation submission to the EPA is required. Often cabs and other livery type vehicles meet this guideline in a year or two.



*Please note this is a very simplified explanation.  
Please check the Icom EPA Certification and Compliance List  
to confirm vehicles or contact Icom.*

# EPA Certifications

The Icom JTG II system is EPA Certified for over 700 2009-2015 vehicle platforms including many Ford models.

*The Total Solution for any Type of Fleet!*



**E150  
E250  
E350**



**F 150 F450  
F250 F550  
F350 F650**



**E450**



**Crown  
Victoria**



**Ford Expedition**



**Lincoln  
Navigator**



**F53  
F59  
(Bakery, Linen,  
FedEx type  
box trucks)**

# EPA Certifications

ICOM JTG Liquid Injection Bi-Fuel Propane System is EPA certified for most 2010-2015 GMC and Chevrolet Light trucks and SUV's equipped with the 4.8L and 5.3L engine



**Chevy Silverado  
GMC Sierra**



**Chevy Tahoe  
GMC Yukon  
Chevy Suburban  
Chevy Avalanche**



**Chevy Express  
GMC Savana**

# Projected Late 2014 and Early 2015 New Certification Program



**Ford Transit**



**GM 6.0L, 4.3L  
(Van, Pickup & HD)**



**Ford F150 5.0L**



**Ford Explorer, Taurus, Transit,  
Lincoln MKZ 3.7L**

# OEM Monofuel Projects



























The ICOM JTG<sup>®</sup> Propane System is applicable to any multi-point injection vehicle including hybrids

# The Road to Propane

*Lake Michigan Mailers – Document, Data, Distribution company*



# The Road to Propane

Fuel Type	Vehicle Cost	Convert Cost	Fuel Cost	Range	Infrastructure	Maint. Cost
Electric						
Flex Fuel (E-85)						
CNG						
Propane						



# The Road to Propane

## Icom North America

- ✓ Experienced
- ✓ Michigan company
- ✓ EPA Certified
- ✓ Liquid vs. Vapor system
- ✓ “Smart” system – no driver interaction required
- ✓ No loss of cargo space

# Icom Customer **AA**Austin Express

- 150 vehicles
- \$6,000.00 per day saving
- 1.2 Million dollars savings per year for fuel
- 600,000 gallons of foreign oil displaced per year
- Projected 200 vehicles by 2014 with 2 million dollars savings per year
- Continue to add new Icom Systems



# Representative Icom Fleet Projects

## *METROCARS*

### *Detroit Airport Transportation Company*

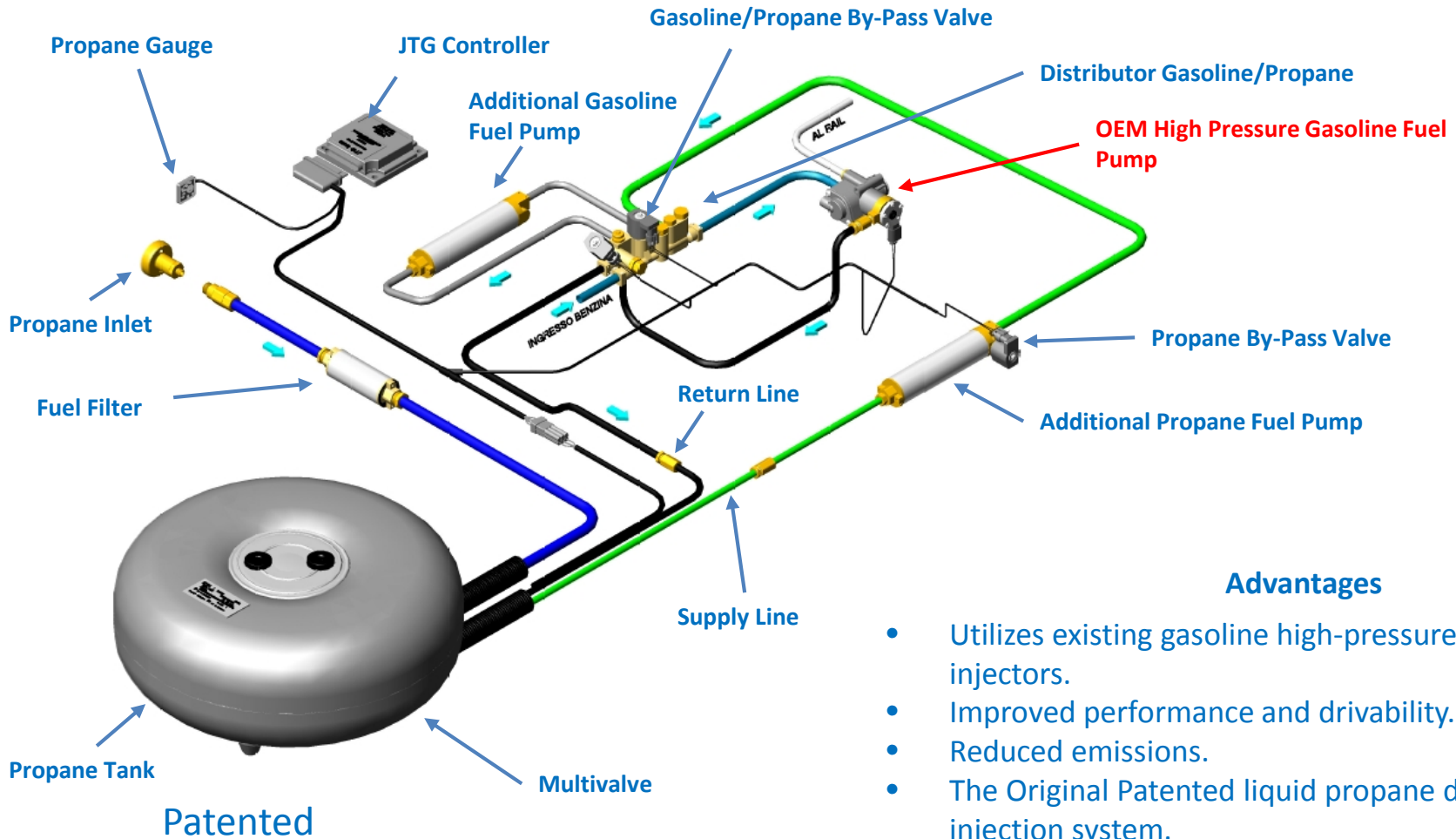
- Airport transportation Company
- Over \$2 per gallon savings
- 200 vehicles with Icom system
- Millions of dollars saved annually on fuel cost
- Continue to add new Icom Systems



***METROCARS*** Icom JTG II Bi-fuel Lincoln Navigator

# icom JTG<sup>HP</sup>

## Liquid Propane Direct Injection System



### Advantages

- Utilizes existing gasoline high-pressure pump and injectors.
- Improved performance and drivability.
- Reduced emissions.
- The Original Patented liquid propane direct injection system.
- Globally available on over 100 platforms.

# Direct Injection North American Applications

*Coming 2015*



**Chevrolet Impala, Caprice 3.6L Ecotec**



**Ford F150 3.5L EcoBoost**



**Chevrolet Silverado, Tahoe 5.3L Ecotec3**

*2014 First EPA Certified Direct  
Injection Propane System*



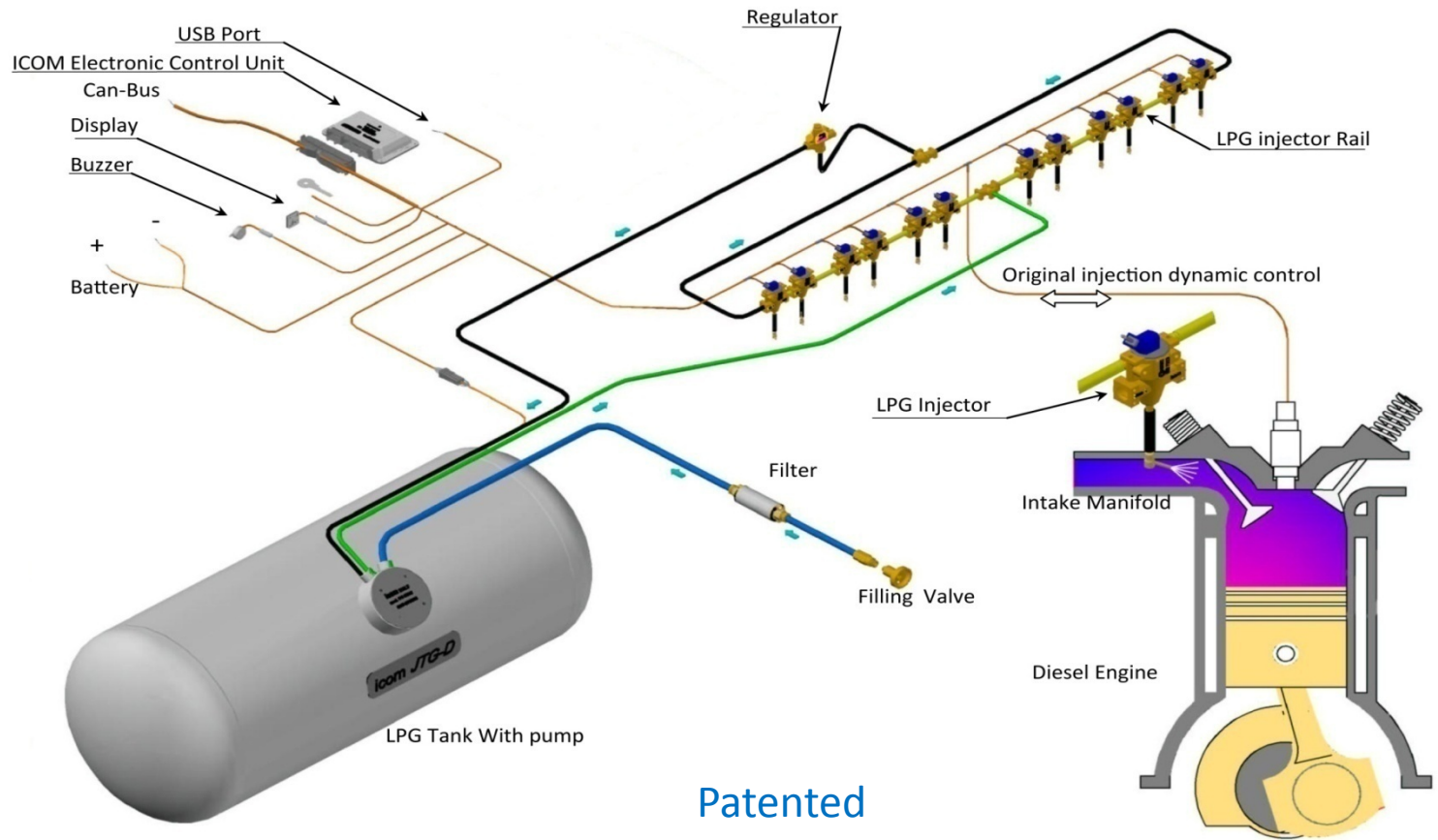
**Ford Taurus, Explorer, Transit and MKT  
3.5L EcoBoost**

**JTG** *HP*

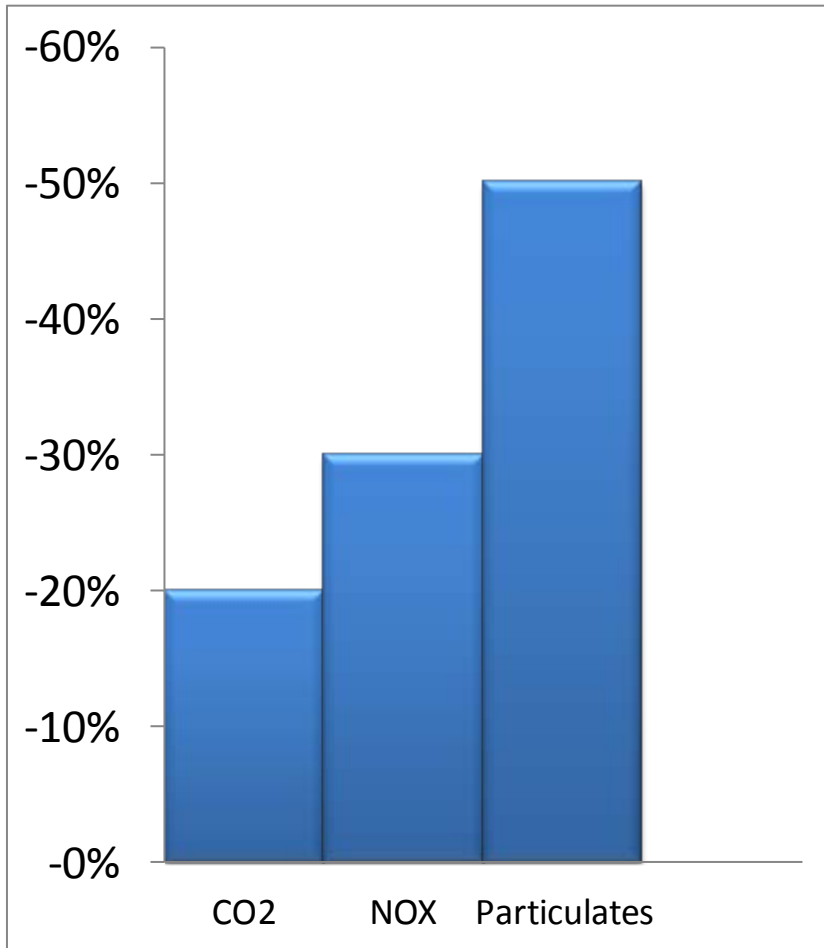
**ICOM**  **NORTH  
AMERICA**  
Alternative Fuel Systems

Property of ICOM North America

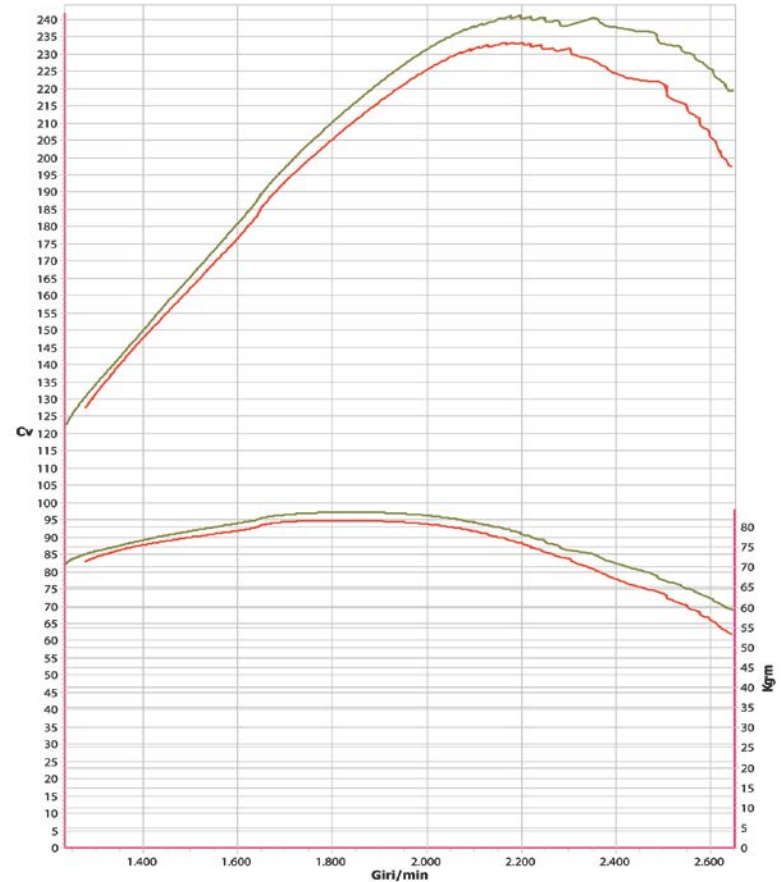
# Dual Fuel Propane-Diesel *JTG-Dynamic*



# ITG-Dynamic Emissions, Power & Torque



Emission Reduction



# JTG-Dynamic On Road Applications



Icom Presents Turn Key Solutions with its Propane Fueling Partners for seamless integration



# JTG-Dynamic Port Applications



- Terminal Tractors
- Side Loaders
- Cranes
- Generators



# ICOM Factory Installation Service & Support Center

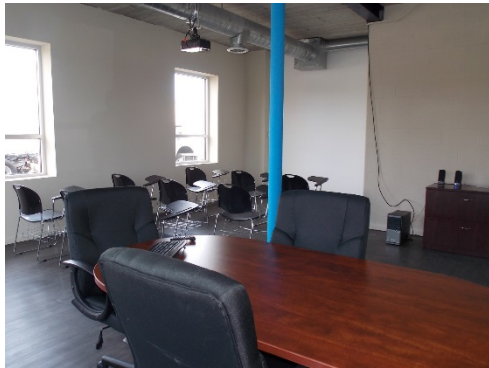


- Complete System Installation
- Scheduled Service & Maintenance Support
- Factory Trained Technicians



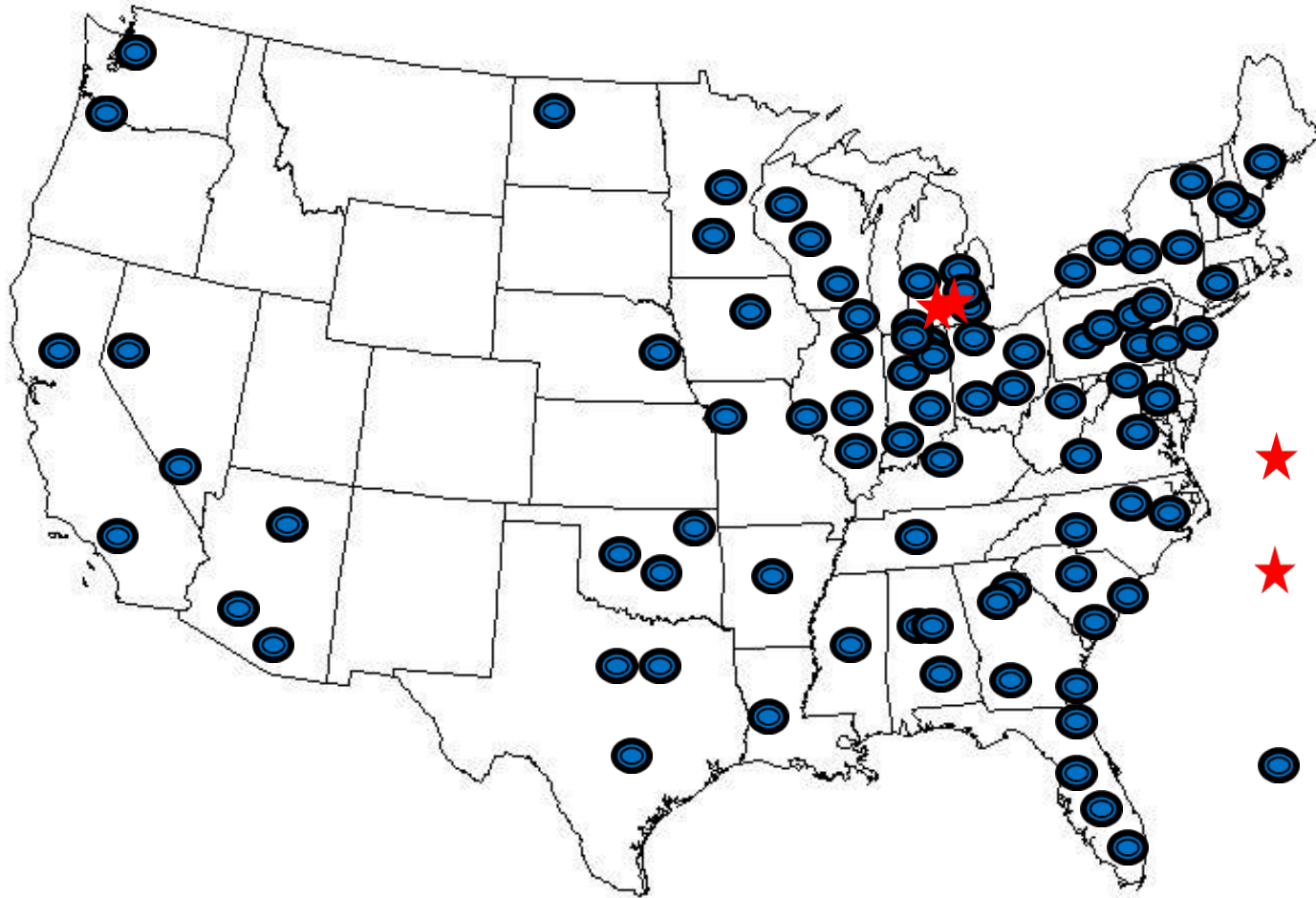
# New ICOM Technology & Training Center

Opened 9/30/2014



Property of ICOM North America

# Icom Installation & Service Points - USA



★ Icom North America Plant  
New Hudson, MI

★ Icom Technology &  
Training Center  
New Hudson, MI

● Additional Service &  
Installation Points



## Icom JTG systems are distributed, installed and serviced throughout Canada



Canadian IGAC Certified to -40  
Icom Tanks CRN Registered

# Thank You for your interest!

With the proper use of alternative fuels, we can enjoy increased energy security, increased employment in an emerging sector, and decreased emissions.



[www.icomnorthamerica.com](http://www.icomnorthamerica.com)

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