ANGI ENERGY SYSTEMS

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Presented to:

Wisconsin Natural Gas for Transportation Roundtable

September 11th, 2013

Presented by:

ANGI Energy Systems

Dan Hicks
Midwest Regional Sales Manager

Overview of Natural Gas Infrastructure from a Manufacturer's Perspective

Why Fuel Your Vehicle on CNG?

- Lower Fuel Costs
- Abundant Supply of American Natural Gas
- Less Dependence on Foreign Oil
- Burns Cleaner than Gasoline or Diesel
- Safe

30 YEARS IN THE BUSINESS

- Incorporated in 1983 in Milton, WI
- Started by converting diesel school buses to CNG
- Family owned since 1997
- Moved from Milton to Janesville in 2012
- Our factory offers more than 200,000 ft² of manufacturing space
- Separate 6,500 ft² Building for R&D and Equipment Testing
- Over 200 employees
- Installed more than 1,000 CNG fueling stations worldwide
- Compressor packages range from 10 to 900 HP

ANGI Customers

Historically, ANGI's Customers have been Municipalities, Utilities, and Private Fleets in the United States

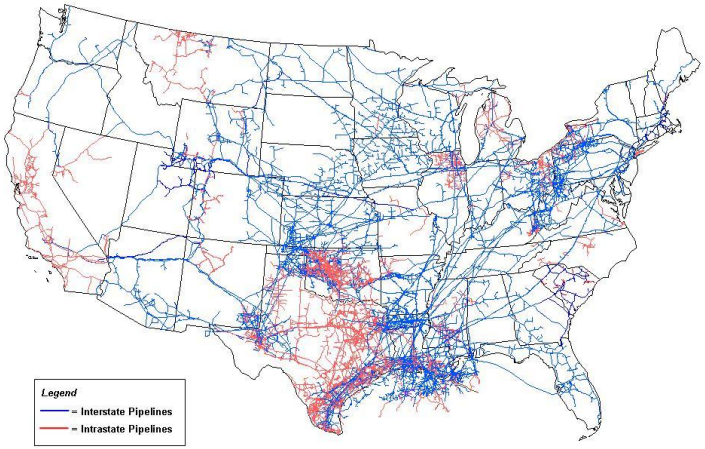
For current Customers like Kwik Trip, MG&E, Love's, BioCNG, Stripes, US Oil, and Dane County Parks, it's becoming standard practice to offer or feature public fueling

Custom Designs

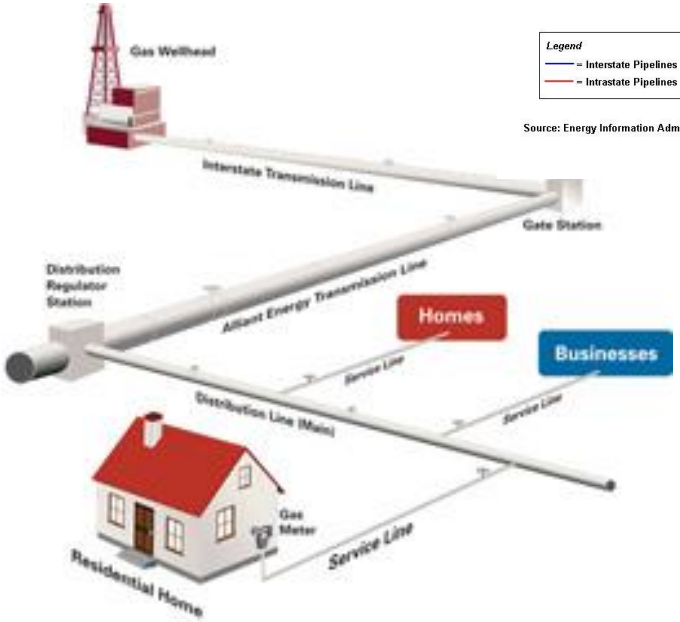
Applications in Mobile Fueling, Tube Trailer Filling, Trailer Mounted Compressors, Biogas Fueling Systems, and Integrated Skids Keep Our Engineering Staff Busy

How does infrastructure affect the manufacturer?

Natural Gas Supply



Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division, Gas Transportation Information System

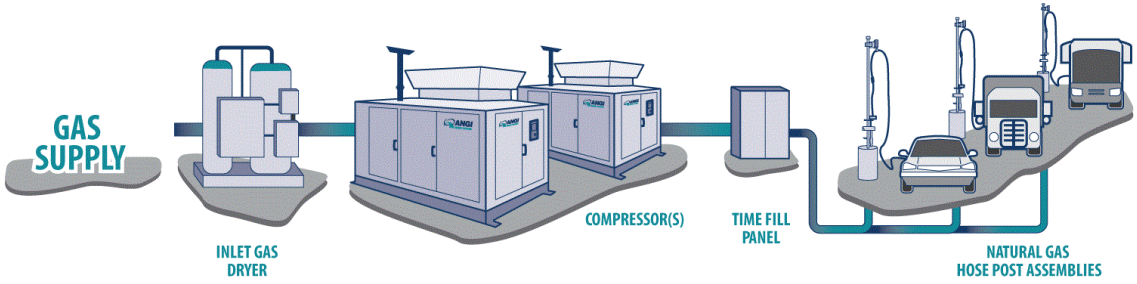


Source: alliantenergy.com/SafetyAndReliability/GasSafety/AtHomeAtWork

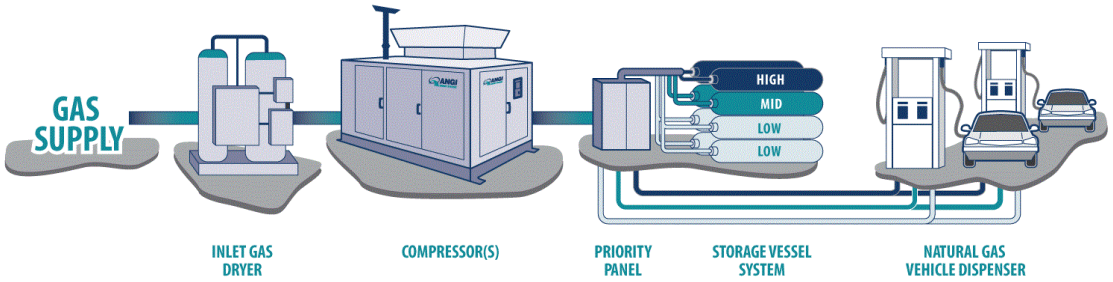
Source: Kwik Trip - Sturtevant, WI

Sizing the Compressor

CNG Fueling: Time Fill



CNG Fueling: Fast Fill



The Wild Card : Public Fueling

PTT fueling station in Thailand

An Important Note

Over sizing the Compressor

- Will generate higher electrical charges every time the compressor starts
- Will increase the initial cost of the station

Under sizing the Compressor

- Will not generate enough fuel during the calculated fueling windows. Once storage is depleted, the vehicles will fill directly from the compressor/s at the rated flow.

Public Fueling Options

Credit card reader in the dispenser's door or in a pedestal located 5 feet away?

Special nozzle required?

Backup Compressor Required?

Miscellaneous options like additional storage, twin vessel dryer, extra displays on the dispenser, metering time fill systems, custom remote monitoring systems, site design, and planning for future expansion can affect pricing and delivery.

Infrastructure

Models for Infrastructure

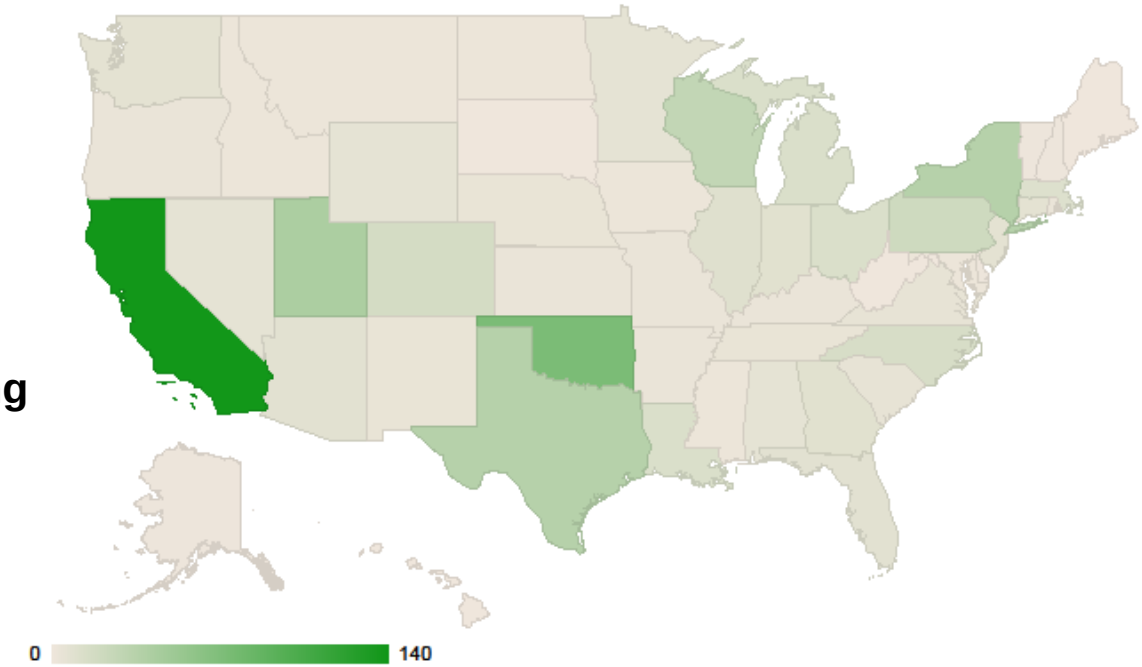
- **Onsite private fueling for fleets** – Fuels the fleet's vehicles only.
- **Onsite private fueling for fleets including public fueling** – Fuels the fleet's vehicles and offers fuel to the public. Offering a dispenser "outside of the fence" is common in this scenario.
- **Offsite private fueling for fleets** – Fuels the fleet's vehicles only. Generally uses magnetic key cards for access. The station is typically owned, operated, and maintained by a third party.
- **Retail / Public fueling** – Fueling is provided for consumers and fleets with open access to the station. Ideally, the owner has identified or contracted a fleet to provide a minimum load for the station.

Source: www.anga.us/media/content/F7D3861D-9ADE-7964-0C27B6F29D0A662B/files/11_1803_anga_module5_cng_dd10.pdf

1,200+ CNG Fueling Stations in the U.S.

600+ Public CNG Fueling Stations in the U.S.

Natural Gas Fueling Stations by State



Source: AFDC Alternative Fueling Station Locator Data
Several regions in the United States have fueling stations that provide compressed natural gas (CNG). Roll over a state on the map for a count of public CNG stations. To map CNG stations near a specific address or city, use the Alternative Fueling Station Locator. Total station counts for all alternative fuels are updated monthly.

Source: Dept. of Energy

Using Infrastructure From Point A to Point B

Google.

Trip planning web sites like cngprices.com and cngnow.com identify stations across the country.

I found 28 stations between Madison and NYC. The greatest distance between stations was 158 miles. Most web sites offered prices, fill pressures, and a notification if the station was not working.

Where to Fuel?

CNG Stations

- Wisconsin
  - 36 CNG Stations
    - 1 LNG
    - 4 Bio-diesel
    - 52 Propane
    - 126 E85
- United States
  - 1235 CNG Stations
    - 73 LNG
    - 736 Bio-diesel
    - 2855 Propane
    - 2630 E85

Top 10 : California 253, New York 110, Oklahoma 93, Utah 88, Texas 63, Pennsylvania 45, Illinois 38, Colorado 36, **Wisconsin 36**, Arizona 33

Info taken from CNGPrices.com

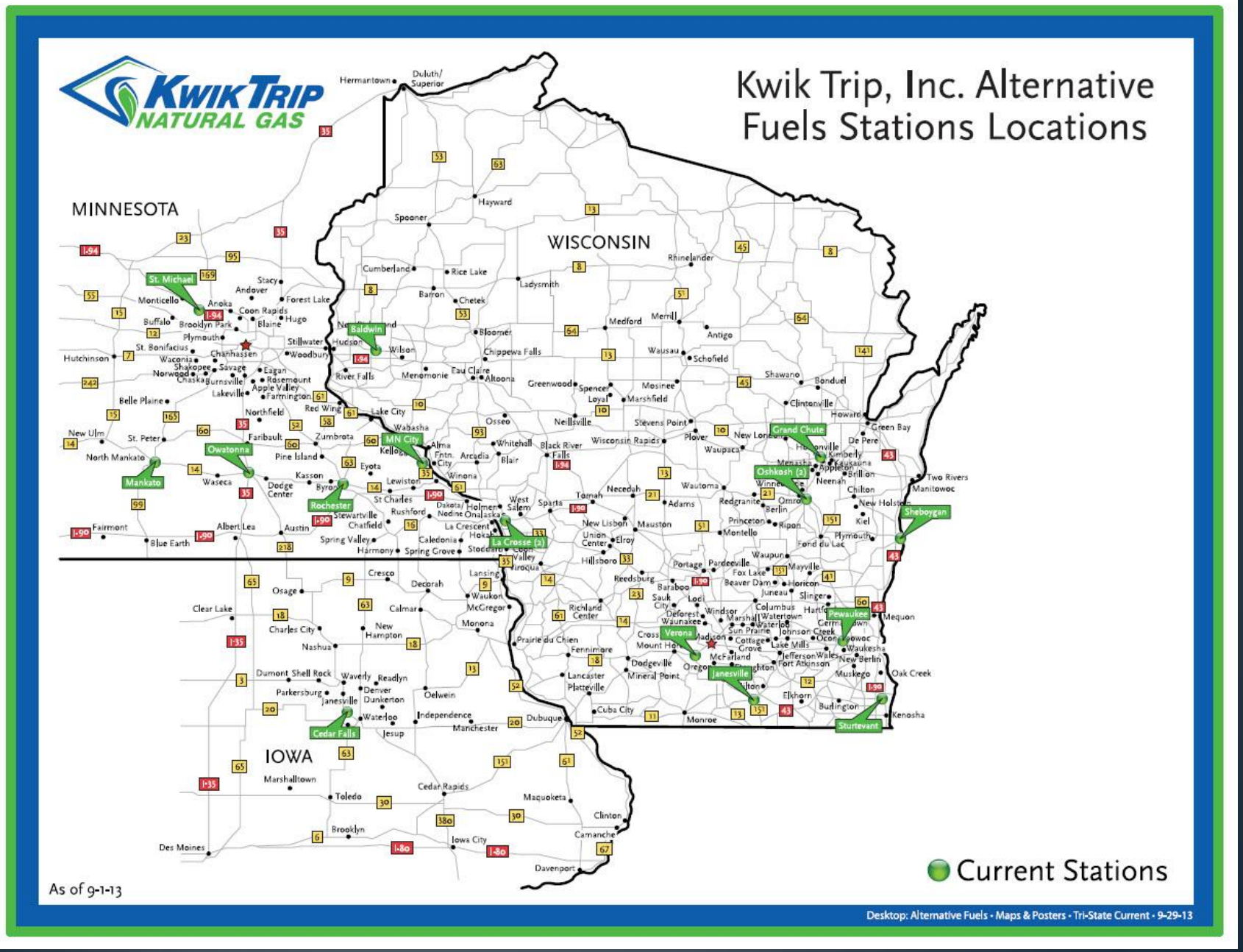
CNG Stations in Wisconsin

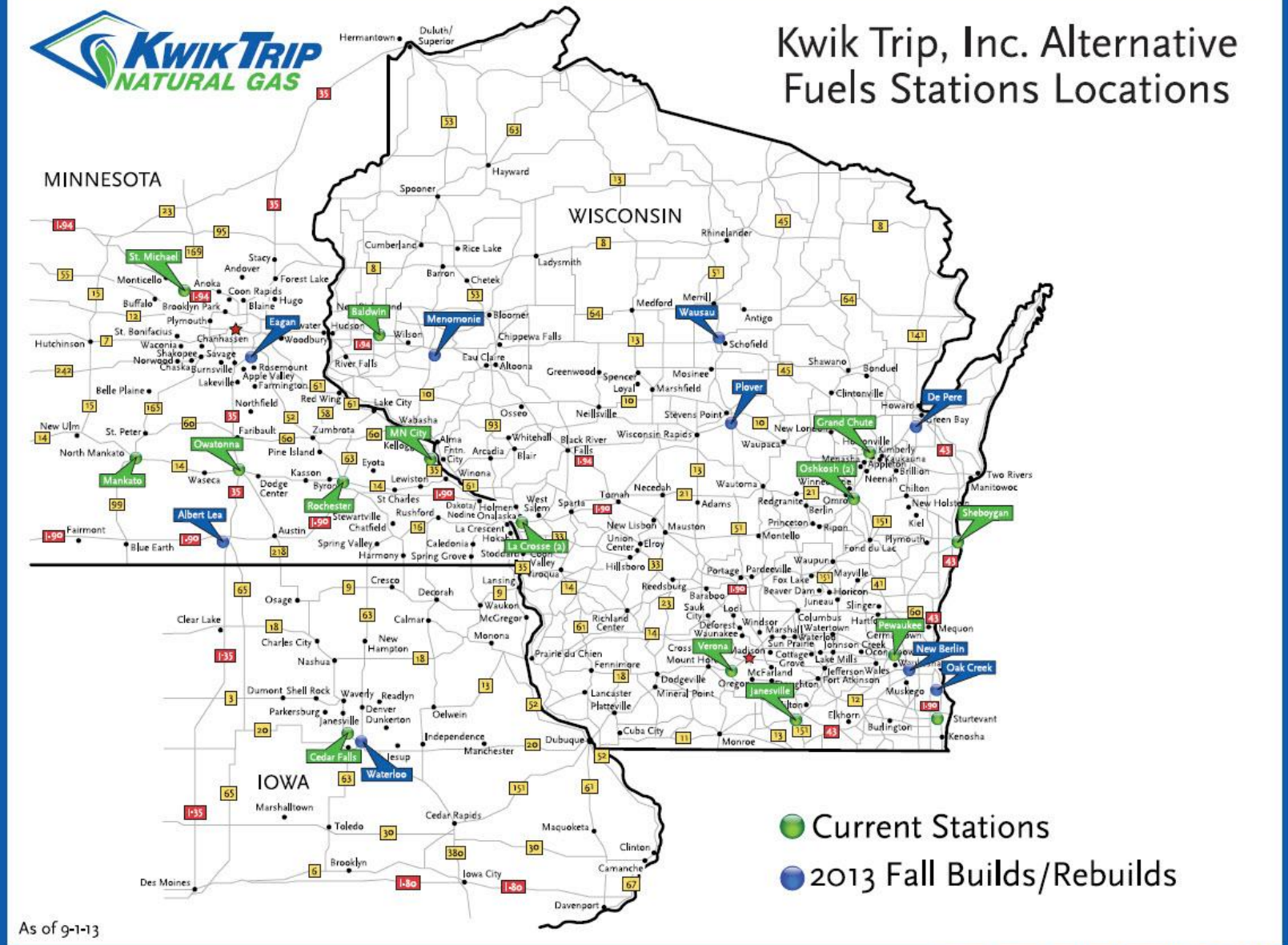
CNG Stations In Wisconsin

- Gain
- Trillium
- City of Milwaukee
- Milwaukee Airport
- Kulp Energy Solutions
- Kwik Trip

Kwik Trip CNG Infrastructure

- Current Stations
  - La Crosse, WI (2)
  - Sturtevant, WI
  - Oshkosh, WI (2)
  - MN City, MN
  - Rochester, MN
  - Owatonna, MN
  - Sheboygan, WI
  - Pewaukee, WI
  - Appleton, WI
  - Verona, WI
  - Cedar Falls, IA
  - St. Michael, MN
  - Janesville, WI
  - Baldwin, WI
  - Mankato, MN
- 2013 Builds
  - Eagan, MN
  - Albert Lea, MN
  - New Berlin, WI
  - De Pere, WI
  - Oak Creek, WI
  - Plover, WI
  - Waterloo, IA
  - Menomonie, WI
  - Wausau, WI


KWIK TRIP NATURAL GAS
Kwik Trip, Inc. Alternative Fuels Stations Locations
MINNESOTA
WISCONSIN
IOWA
St. Michael
Baldwin
MN City
Owatonna
Mankato
Rochester
La Crosse (2)
Grand Chute
Oshkosh (2)
Sheboygan
Pewaukee
Verona
Janesville
Sturtevant
Cedar Falls
Current Stations
As of 9-1-13
Desktop: Alternative Fuels • Maps & Posters • Tri-State Current • 9-29-13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MN City
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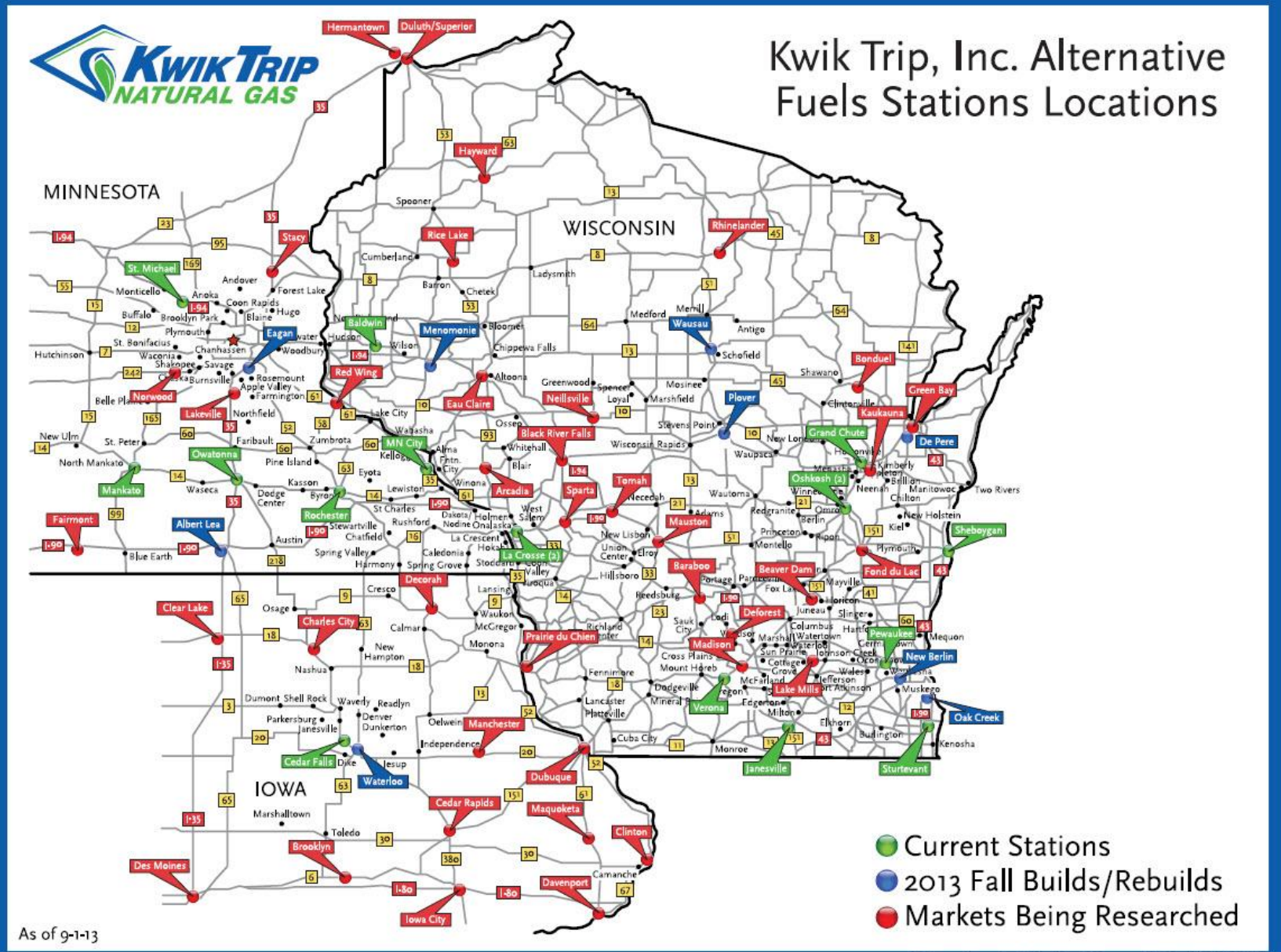
KwikTrip NATURAL GAS
Kwik Trip, Inc. Alternative Fuels Stations Locations
MINNESOTA
WISCONSIN
IOWA
Hermantown
Duluth/Superior
Hayward
Rice Lake
Stacy
St. Michael
Eagan
Baldwin
Menomonie
Red Wing
Norwood
Lakeville
Eau Claire
Neillsville
Black River Falls
Rhinelander
Wausau
Plover
Bonduel
Green Bay
Kaukauna
De Pere
Grand Chute
Oshkosh (2)
Sheboygan
Fond du Lac
Beaver Dam
Deforest
Madison
Pewaukee
New Berlin
Lake Mills
Verona
Oak Creek
Janesville
Sturtevant
Mauston
Baraboo
Tomah
Sparta
Arcadia
MN City
Owatonna
Mankato
Fairmont
Albert Lea
Rochester
La Crosse (2)
Decorah
Clear Lake
Charles City
Prairie du Chien
Manchester
Cedar Falls
Waterloo
Dubuque
Cedar Rapids
Maquoketa
Clinton
Davenport
Iowa City
Brooklyn
Des Moines
Wisconsin Rapids
Stevens Point
Marshfield
Merrill
Antigo
Medford
Chippewa Falls
Altoona
Greenwood
Spencer
Loyal
Mosinee
Shawano
Menasha
Neenah
Appleton
Kimberly
Manitowoc
Two Rivers
Chilton
New Holstein
Kiel
Plymouth
Ripon
Princeton
Montello
Redgranite
Berlin
Omro
Wautoma
Waupaca
New Lisbon
Union Center
Elroy
Hillsboro
Portage
Pardeeville
Fox Lake
Mayville
Horicon
Juneau
Slinger
Needsburg
Sauk City
Lodi
Columbus
Watertown
Waterloo
Marshall
Sun Prairie
Johnson Creek
Cottage Grove
Cross Plains
Mount Horeb
Fennimore
Dodgeville
Mineral Point
Lancaster
Platteville
Cuba City
Monroe
McFarland
Edgerton
Milton
Elkhorn
Burlington
Kenosha
Muskego
Waukesha
Mequon
Cedarburg
Waterloo
Jefferson
Fort Atkinson
Oelwein
Independence
Dumont
Shell Rock
Waverly
Readlyn
Parkersburg
Janesville
Denver
Dunkerton
Dike
Jesup
Marshalltown
Toledo
Camanche
Nashua
New Hampton
Calmar
McCregor
Waukon
Monona
Osage
Cresco
Lansing
Spring Grove
Harmony
Spring Valley
Caledonia
Stoddard
Genoa
Holmen
Onalaska
La Crescent
Dakota/Nodine
West Salem
Rushford
Chatfield
Stewartville
Austin
Blue Earth
Waseca
Dodge Center
Byron
Kasson
Lewiston
St Charles
Eyota
Winona
Alma
Fntn. City
Kellogg
Wabasha
Lake City
Zumbrota
Pine Island
Faribault
Northfield
Apple Valley
Farmington
Rosemount
Burnsville
Savage
Shakopee
Chanhassen
Waconia
St. Bonifacius
Hutchinson
Plymouth
Buffalo
Brooklyn Park
Blaine
Hugo
Coon Rapids
Anoka
Andover
Forest Lake
Monticello
Woodbury
Hudson
Wilson
Cumberland
Barron
Chetek
Bloomer
Ladysmith
Spooner
Ossee
Whitehall
Blair
Neceedah
Adams
Redgranite
Omro
Berlin
Oshkosh
Winneconne
Neenah
Menasha
Appleton
Kimberly
Manitowoc
Two Rivers
Chilton
New Holstein
Kiel
Plymouth
Sheboygan
Fond du Lac
Mayville
Horicon
Juneau
Slinger
Mequon
Pewaukee
New Berlin
Muskego
Oak Creek
Kenosha
Janesville
Sturtevant
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Burlington
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Deforest
Baraboo
Mauston
Tomah
Sparta
Arcadia
Black River Falls
Neillsville
Eau Claire
Rice Lake
Hayward
Stacy
St. Michael
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Thank you!

- Eric Kruse

  Kwik Trip Alternative Fuels

  608-793-5998

  ekruse@kwiktrip.com

  www.kwiktrip.com

KwikTrip

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References

Web Resources

- Dept. of Energy - eere.energy.gov/cleancities
- NGV America - ngvamerica.com
- Alternative Fuels Data Center - afdc.energy.gov
- America's Natural Gas Alliance - anga.us
- Clean Vehicle Education Foundation - cleanvehicle.org
- CNGnow.com
- CNGprices.com

Suggested Reading

- Compressed Natural Gas Infrastructure Report
  by America's Natural Gas Alliance

Thank You

www.angienergy.com
305 W. Delavan Drive Janesville, Wisconsin 53546 USA
Tel 800 955 4626 Fax 608 531 2635 E-mail: sales@angienergy.com