



Municipal Technical Advisory Service  
INSTITUTE *for* PUBLIC SERVICE

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## Compressed Natural Gas (CNG) Stations

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We hope this information will be useful to you; reference to it will assist you with many of the questions that will arise in your tenure with municipal government. However, the *Tennessee Code Annotated* and other relevant laws or regulations should always be consulted before any action is taken based upon the contents of this document.

Please feel free to contact us if you have questions or comments regarding this information or any other MTAS website material.

Sincerely,

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# Table of Contents

Compressed Natural Gas (CNG) Stations .....	3
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# Compressed Natural Gas (CNG) Stations

**Reference Number:** MTAS-707

## **CNG Station Siting Tips**

There is clearly a need to develop the infrastructure for CNG fueling stations in Tennessee. Selecting the right configuration is critical to success. According to Energy International, a global energy consulting firm, the main considerations in choosing a station are the number and type of vehicles fueled and their fueling pattern. Secondary considerations include location, potential future growth, and permitting restrictions. The CNG Station Guide is available online at [http://www.afdc.energy.gov/fuels/natural\\_gas\\_stations.html](http://www.afdc.energy.gov/fuels/natural_gas_stations.html) [1].

## **CNG Station Types**

Energy International outlines four major station types:

**Time-Fill Stations** fill vehicles over a six- to eight-hour period. Compressors compress natural gas from pipeline pressure (5–100 psi) to the required vehicle pressure (2,400–3,600 psi) and dispense it into multiple vehicles simultaneously. These stations are best for vehicles such as school buses and utility trucks that return to a central location and can fuel while parked for an extended period. Among all options, they are least expensive to build and staff and require no full-time attendant. Extended fueling time is needed, however, because time-fill stations have relatively small compressors and no CNG storage.

**Cascade Fast-Fill Stations** provide fast and convenient fueling similar to that provided by conventional liquid fuel stations. CNG storage vessels arranged in cascades, or banks, are used to quickly fill vehicles during peak fueling times, when the compressors alone cannot meet demand. During offpeak times, the compressors refill the CNG storage cascades. These stations are suitable for fueling light-duty vehicles at public access stations where use patterns are random. They also are suitable for fueling fleets of light-duty vehicles, such as taxis and police cars, which require a fast-fill and have peak fueling periods. Cascade fast-fill stations are not appropriate for continuous, high-volume fueling because the compressors are not large enough to provide a fast fill once the CNG storage has been depleted. Most of the several hundred public access CNG stations in North America use a cascade fast-fill system.

**Buffered Fast-Fill Stations** provide fast, continuous, high-volume fueling. Relatively large compressors run continuously during fueling, filling vehicles and, in the interval between vehicles, a CNG storage buffer. The storage buffer provides CNG to vehicles at the beginning of the fueling cycle and allows the compressor to run for long periods. Unlike CNG storage in cascade fast-fill systems, buffer storage is not separated into separate banks. Buffered fast-fill stations are suitable for quickly fueling large numbers of heavy-duty, high-fuel capacity vehicles, such as transit buses.

**Vehicle Refueling Appliances (VRAs)** are like small time-fill stations, containing a small compressor and other equipment within a single unit. VRAs use natural gas from low-pressure pipelines found in many homes and businesses and require 220-volt, single-phase electricity. They are suitable for fueling individual vehicles over an extended period. Grouping multiple VRAs together and adding a cascade storage system provides small- to medium-sized light-duty fleets with fast-fill fueling. VRAs will soon be available for residential installation.

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## **Links:**

[1] [http://www.afdc.energy.gov/fuels/natural\\_gas\\_stations.html](http://www.afdc.energy.gov/fuels/natural_gas_stations.html)

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