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Transport Robert opts for compressed natural gas (CNG) forklifts

Transport Robert doesn't only rely on liquefied natural gas for its heavy trucks. For a year now, it has also used natural gas in its compressed form to fuel its fleet of forklift trucks. The new private station fuels some 20 forklifts at its main cross dock facility in Boucherville.

After having tried unsuccessfully to use electricity and after using propane cylinders for several years, the customer made the wise choice of choosing compressed natural gas (CNG). In this article, we will describe the many advantages stemming from this judicious decision, and we will also try to demystify this technology, which represents a responsible choice from an economical and an environmental point of view.

Several advantages

In Québec, only a few private stations fuel fleets of forklift trucks with CNG, while in Ontario they are counted by the dozen. However, this energy has many advantages, especially for fleets of more than 10 forklifts that operate continuously.

- **Direct savings on fuel costs**

The savings vary, depending on the costs of propane, diesel or gasoline as well as the quantity of fuel consumed. The savings have to be subject to case-by-case analyses.

- **Better air quality**

The CSST (*Commission de la santé et de la sécurité du travail*) prescribes a formula for evaluating the quantity of fresh air required when vehicles run on propane or gasoline inside a building. Some calculations show that up to 10 new air changes per hour would be needed to meet CSST requirements. This results in high heating costs. With CNG, the levels of CO and of NOx are considerably reduced when the vehicles motors are adequately adjusted. Air quality is thus increased and the costs of heating fresh air (now limited) are reduced.

- **Significant reduction in risk of work accidents**

Since CNG tanks are permanently fixed on the vehicle, no manipulation of cylinders is required.

- **No competency certificate required**

No competency certificate is required, contrary to refilling propane cylinders.

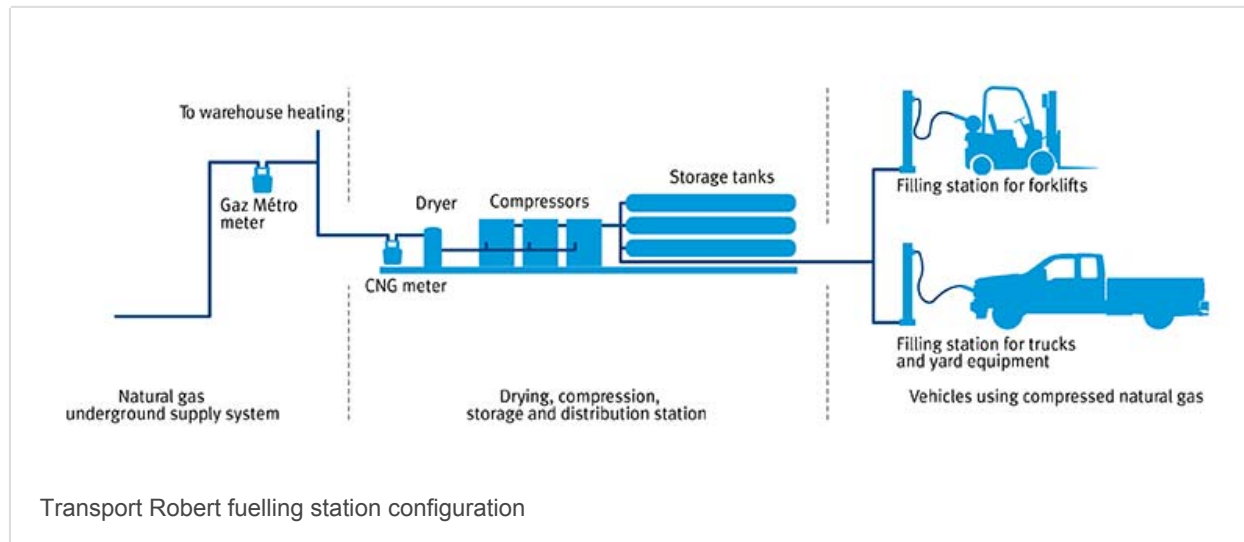
- **No loss of residual energy in cylinders**

To avoid forklift breakdowns, some operators replace the propane cylinders before they are empty, thus wasting residual energy. With CNG, the client pays the right price.

- **Less than a minute needed for refuelling, leading to an increase in productivity**

Some companies only replace propane cylinders when they are empty in order to use the maximum energy. Replacing cylinders not only increases work time, it also requires significant physical effort. Using CNG can lead to substantial productivity gains.

In sum, it is estimated that a fleet of 20 forklift trucks can, on average, generate 30% in savings (combined fuel costs and productivity gains). But, as indicated above, some parameters differ from one distribution centre to another. Moreover, this figure does not take into account the additional savings on the fresh air needed to meet CSST requirements, nor the costs avoided due to possible absences as a result of injuries. This estimate is even higher if other CNG vehicles are refuelled at the station (economies of scale).



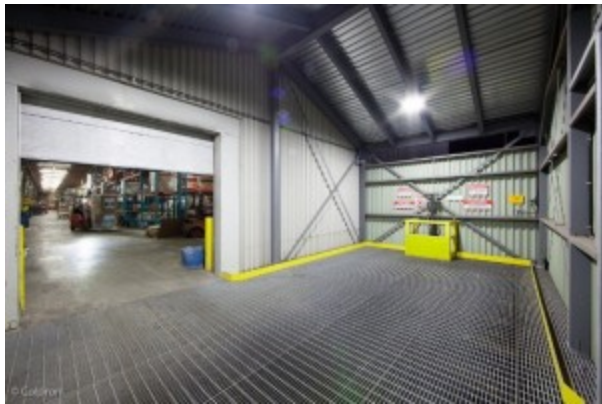
State of the art CNG fast-fill station

While only one compressor may be sufficient, Gaz M tro Transport Solutions (GMTS), the contractor who built the station, chose to install 3 small compressors for maximum redundancy. These compressors each have a capacity of 24 Nm³/h. The units supply a bank of 3 stationary reservoirs, totalling 3 m³ water equivalent or about 890 Nm³ of natural gas at 250 bars (3600 psig). This is the pressure that the Natural Gas Vehicle and Fuelling Station Installations Code (CSA B108) authorizes for fuelling a vehicle at 21 C. The bank can, of course, handle greater pressure, assuming future growth in demand. The GMTS design team has, in fact, made provision for the customer to ultimately use CNG to fuel its yard vehicles (manoeuvring tractors and vans). A second refuelling station outside has already been installed for this purpose. As soon as demand increases, that facility will be ready to receive the equipment needed for cascade fast-filling.

Cascade fast-filling effectively prioritizes the maximum difference in pressure between the vehicle's tank and the bank. If the bank's 3 reservoirs had the same pressure, the time to fill a truck would be longer since a pressure equilibrium between the tank and the bank would be reached after a certain time. However, with the filling managed by 3 reservoirs at independent pressures, filling time can be optimized. A priority panel could be installed at a later date to make the cascade operable.

Safe installation

Such an installation calls for increased vigilance when it comes to respecting the codes described in [this issue](#). GMTS worked in concert with the customer, who was responsible for the electrical connection and for the structure, in order to optimize the minimum physical clearances for all the equipment. Approvals of the installation by the municipality's fire department and regulatory authorities are also pre-requisites not to be overlooked. But one of the particularities of this project is the design of the CNG refuelling platform. It is juxtaposed with the compression station and the loading dock and has openings in walls and floor to provide sufficient natural ventilation. It could eventually be moved if the customer wants to enlarge the distribution facility.



Why not make the most of its private station faster?

The cost of converting a propane forklift truck to CNG is about \$3,500. To maximize the CNG station so it can reach its full potential, why not increase the number of vehicles to be refuelled? The outcome will not only be lower fuel costs, but also fewer GHG emissions.

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