

Report: The Future of Hydrogen in Natural Gas Pipelines

A framework for natural gas metering devices





According to strategic roadmaps by the International Energy Agency (IEA) and research firm Navigant, hydrogen will play an important role in decarbonizing the energy sector by 2050. The IEA's Global Hydrogen Review considers low-carbon hydrogen a bridge fuel to reaching net zero global emissions by 2050. In the U.S., the Biden-Harris Administration announced an historic \$7 Billion funding opportunity to jump start America's clean hydrogen economy.

The combination of aggressive decarbonization goals and funding opportunities has utilities around the world searching for cost-effective low carbon fuel options like hydrogen.

For the last few years, Itron has been conducting secondary research including working with universities, collecting industry reports and white papers, participating in the NEWGASMET project on a standardization framework and developing suitable test facilities, and gathering utility feedback to define our hydrogen strategy. To help validate our early assumptions, Itron created a white paper titled Evaluating Hydrogen Compatibility: A Framework for Natural Gas Metering Devices. <https://go.itron.com/hydrogen-whitepaper>

The goal was two fold – educate and inform utilities and gather voice of customer.

Itron posted the whitepaper on itron.com in July 2022.

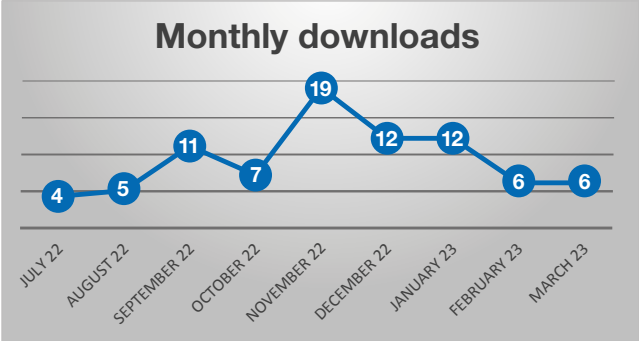
To download the white paper, interested readers were required to complete a brief online questionnaire. Below are the survey questions:

- » Does your company plan to undertake activities on hydrogen and new gases?
- » What is the expected timeframe for your organization to adopt hydrogen on a medium-large scale (beyond pilot projects)?
- » With reference to Hydrogen, what is the composition your organization is looking to adopt?

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SURVEY RESULTS

A total of 82 respondents downloaded the whitepaper from July 2022 to March 2023. Most of the respondents were U.S. gas utilities. Utilities from the United Kingdom, Netherlands, Canada, South Korea, and Australia also completed the survey. In addition, a few utilities reached out directly through their sales representative to share their view on hydrogen. The number of downloads increased in November most likely as a result of an article on the subject of hydrogen published on the Public Utility Fortnightly website.



Does your company plan to undertake activities on hydrogen and new gases?

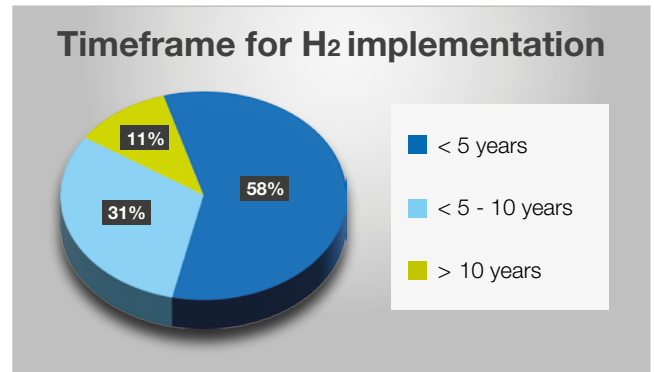
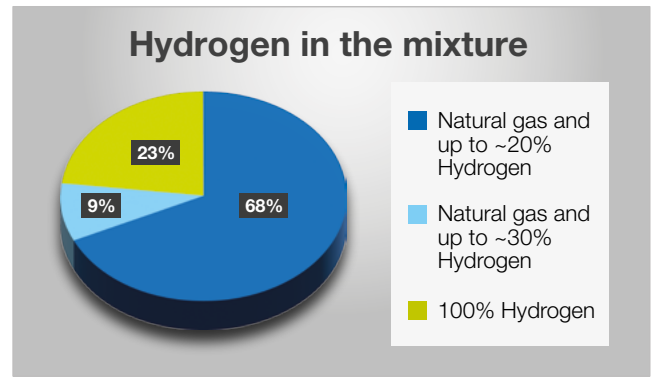
When asked whether they plan to add hydrogen or other new gases, almost half of the respondents (45%) indicated yes. Approximately, 33% said maybe and 22% are not considering hydrogen.

What is the expected timeframe for your organization to adopt hydrogen on a medium to large scale (beyond pilot projects)?

About 58% of the respondents who answered the question are considering hydrogen in less than five years with 31% stating a five to 10-year timeframe. Only 9% plan to wait ten years or more to add hydrogen to their natural gas mix.

With reference to Hydrogen, what is the composition your organization is looking to adopt?

Almost 70% of respondents who answered the question are planning a pipeline composition of up to 20% hydrogen. Interestingly, about 23% are considering pure hydrogen networks.



SUMMARY

Survey results confirm Itron's earlier assumptions that utilities are planning to adopt up to 20% hydrogen in the natural gas pipeline composition over the next five to 10 years. We've also heard from Itron customers who are adding hydrogen compatibility to their requirements. Itron is currently using a five-part framework to test the capabilities of our solid-state natural gas meters with a 20% hydrogen blend, including the Intelis 250 and 425 gas meters. We expect both to be hydrogen compatible. The Intelis 425 is scheduled for release in August 2023.

Right now, very few standard organizations provide facilities for testing hydrogen meters. The results of the NewGasMet project, supported by Itron among others, will give to standardization bodies the ability to revise existing standards for hydrogen compatibility, and support testing bodies to develop suitable testing facilities.

In addition to decarbonization goals and clean energy incentives, we expect regulatory agencies may also incentive or penalize utilities for not achieving carbon reduction goals. Local, state, and federal governments could also influence adoption by implementing clean energy policies. At this time, an integrated natural gas and electric grid and electrification are both viable options for decarbonization.

Itron will continue to be a leader in the hydrogen market providing our customers with relevant information and solutions. If you want more information on hydrogen, please visit [itron.com](https://www.itron.com).

EXHIBIT

Preliminary list of country or state hydrogen initiatives.

Australia	Hydrogen strategy is in place with the goal of making the country a leader in hydrogen production, thanks to the wide availability of renewables (sun, wind).
California	A state government-issued executive order mandates that all vehicles sold in the state must be zero-emissions by 2035.
China	The Fuel Cell Electric Vehicle (FCEV) pilot programme rewards clusters of cities that deploy more than 1 000 FCEVs that meet certain technical standards, achieve a maximum delivered hydrogen price of CNY 35/kg (~USD 5/kg) and establish at least 15 operational HRSs.
France	France wants to be a leader in green hydrogen by 2030 and build low-carbon planes and small nuclear reactors as part of a 30 billion euro (\$35 billion) investment plan.
Germany	The government's H2 Global programme will tender ten-year purchase agreements on hydrogen-based products, providing investor certainty on project bankability.
Norway	The government has announced that the country's largest ferry connection will be hydrogen-fueled.
Switzerland	The country adopted the LSVA road tax, which levies trucks weighing more than 3.5 tonnes, but waives fees for ZEVs.
European Union	As part of Fit for 55, the European Commission has proposed a Renewable Energy Directive modification to mandate 50% renewable hydrogen consumption in industry by 2030.
European Union	In the ReFuel Aviation Initiative, the European Commission proposed a rising quota for synthetic aviation fuels (from a 0.7% share in 2030 to 28% in 2050).
Germany	The National Hydrogen Strategy announced a new Carbon Contracts for Difference (CCfD) pilot programme for the steel and chemical industries. It will pay the difference between a project's CO2 abatement costs and the CO2 price in the EU ETS. If the EU ETS price is higher than the project's CO2 abatement costs, companies will have to repay the government the difference.
Korea	Planning hydrogen injection up to 20% from 2026 to 2030.
India	The government announced that, in the framework of becoming energy independent by 2047 and achieving Net Zero by 2070 a specific activity (Mission) has been started to make India the Global Hub for production, usage and export of Green Hydrogen and its derivatives.
Italy	National hydrogen strategy includes plans for injecting up to 20% H2 into the grid by 2030. Italian law allows up to 2% H2 in the grid.
Portugal	The National Hydrogen Strategy targets blending 10-15 vol% of hydrogen in natural gas by 2030.
United States	As part of the Draft of DOE National Clean Hydrogen Strategy and Roadmap Biden-Harris Administration announced an historic \$750 million in funding for clean hydrogen (Sept 2022).



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