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Discovering the losses in hydrogen's industrial supply chain: conventional and emerging uses

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Historically, molecular hydrogen (H2) is a vital ingredient in several industrial processes and promises potential widespread use as a fuel that produces only water upon combustion. Understanding emissions of hydrogen, akin to methane emissions from the natural gas supply chain is important to evaluate the potential burden of H2 emissions and the indirect impact on atmospheric radiative forcing.

Measurements of hydrogen emissions in eleven US states and one Canadian province from several different types of industrial facilities are presented. Various tracer release methods were employed to characterize emissions from steam methane reformers, refineries, chemical plants, gas processing and ammonia plants. Several other sources including pipelines, car fueling stations, natural gas blending, warehouses, liquefaction and electrolyzers have also been measured using these approaches.

Operating states at the facility and the impact on hydrogen emissions will be discussed when possible. An analysis of hydrogen emissions from general auto-traffic sources and an evaluation of observed gradients in the ambient levels of H2 on a regional basis will also be presented.