

# Hydrogen Energy:

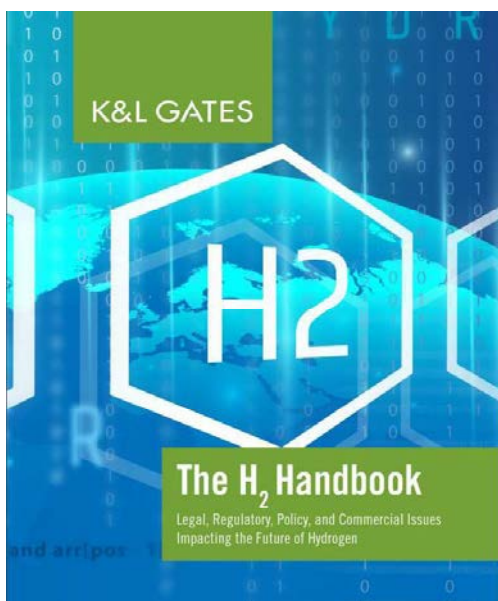
## Unique Considerations for Hydrogen Projects

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## Producing Hydrogen



### Production Methods

- Steam reformation (SMR)
  - Natural gas or landfill gas
- Autothermal reformation
  - Natural gas or landfill gas
- Electrolysis
  - Low temperature (uses electricity)
  - High temperature (electricity and heat)

### Onsite vs. Offsite

- Electrolyzers are modular and have a small footprint providing flexibility as to size and location
- SMR typically requires utility-scale investments
- Hydrogen hubs can serve as both onsite and offsite suppliers

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## Using Hydrogen

### Industrial processes

- Refining Petroleum
- Producing Fertilizer
- Chemical Production
- Food Processing

### Wholesale/retail market supply

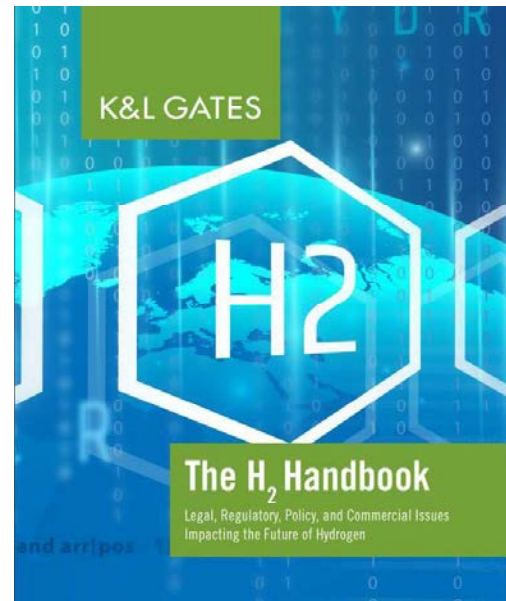
### Transportation fuel

### Natural gas blending

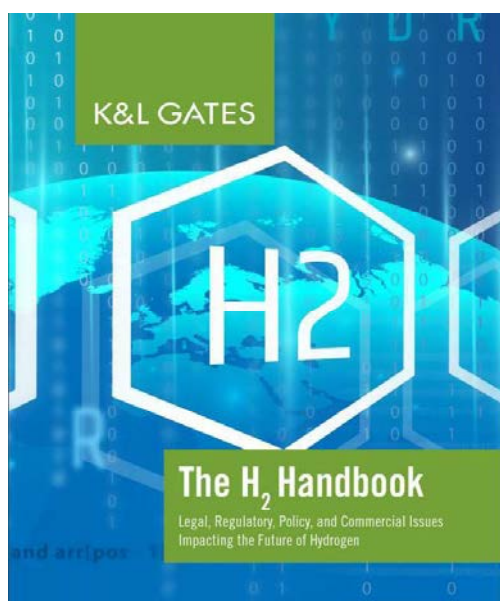
### Electricity generation

### Electricity storage

### Gas turbine fuel



## Onsite Electrolytic Hydrogen Projects



Siting is on Customer Premises

Lease vs. License

Feedstock

Onsite Storage

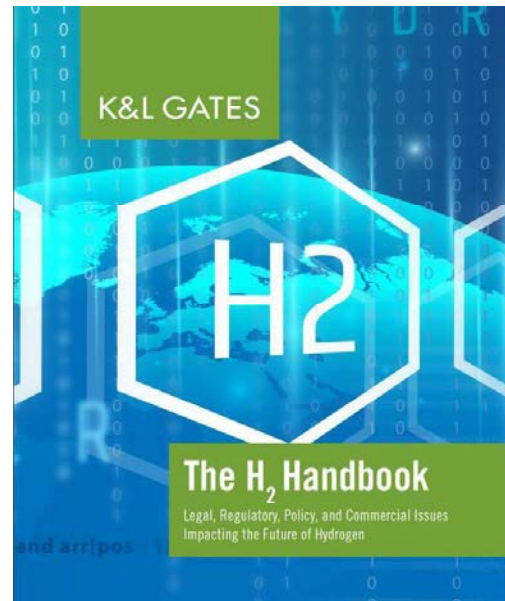
Delivery Point

Fully Wrapped vs. Partial Wrapped Contracts

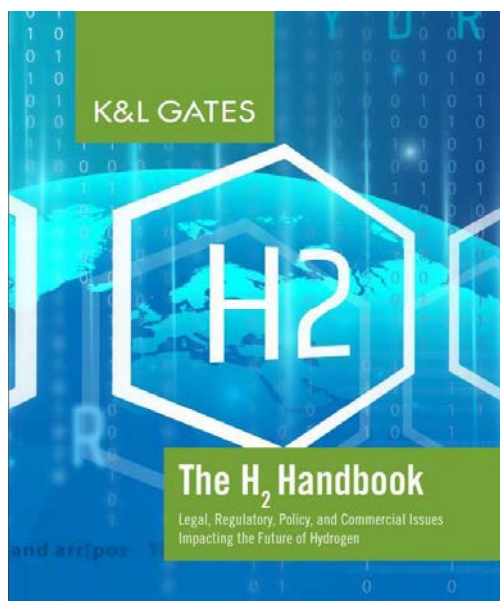
## Onsite Hydrogen Projects: Power Supply

### Low-emission resources

- Types:
  - Renewables (solar, wind, geothermal, hydro)
  - Nuclear
  - Fossil fuels or biomass with CCS
- Co-located
  - PPA, Lease, or Build-Transfer/EPC Agreements
- Grid Power + RECs
  - Virtual Power Purchase Agreements (VPPAs)



## Onsite Hydrogen Projects: Water Supply



### Water Specifications

- testing and certification as to quality

### Water Scarcity - allocation of risks

- Supplier wants:
  - Unqualified responsibility by Customer to supply full water requirements on demand
- Customer wants:
  - Change in Law Provisions addressing government-imposed water restrictions
  - Force Majeure Provisions that cover water shortfall

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## Title search: Hydrogen Energy: Unique Considerations for Transaction Documents

First appeared as part of the conference materials for the  
19<sup>th</sup> Annual Renewable Energy Law Institute session  
"Hydrogen Energy: Unique Considerations for Transaction Documents"