



## **NATURAL GAS AND HYDROGEN SAFETY TRAINING A One Day Seminar on Vehicles and Fuelling Systems**

ENGVA offers a one day training seminar covering all the safety aspects about natural gas vehicles (NGVs), hydrogen vehicles (H2Vs) as well as natural gas and hydrogen fuelling stations. Both compressed and liquefied gaseous fuels (cryogenics) are included. Detailed discussion of light- & heavy-duty vehicles include: system modifications, components, fuel storage systems, and electronic safety devices. Topics relating to refuelling station technology include but are not limited to: risk areas and gas detection systems; safety zones of fuelling dispensers and mandated distances between compressors and dispensers. Additional information about maintenance workshops, accident handling and investigation also is discussed. Case studies and 'lessons learned' from the NGV experiences that relate to hydrogen and H2Vs are presented. Specifics of international regulations, standards and approvals for both vehicles and fuelling stations provide an understanding of the technical/legal framework for natural gas and hydrogen systems.

### **Who Should Attend?**

The course is designed for anyone with a technical or non-technical background interested in NGVs and H2Vs from the perspective of vehicle and fuelling station design, installation and safety issues related to each of these areas. A 'broad-brush' approach is taken in this one day seminar so the course is appropriate for professionals such as vehicle and fuelling station designers; equipment and system manufacturers; people involved in the development and implementation of codes and standards (including safety and fire officials); technical experts; researchers; and anyone else promoting or using NGVs or H2Vs who must be aware of the challenges as well as the benefits of introducing new technologies into the marketplace.

### **PROGRAM**

**08.30- 8.35**      **Welcome and Introduction** (Jeffrey Seisler, ENGVA)

**08.35- 09.15**      **General Overview: International Standards, Regulations & Safety** (Jeffrey Seisler)

- Introduction NGV's and H2Vs
- Why care about safety?
- International Standards Framework (Including overview of NGV Standards Gap Analysis)
- OEM vs Retrofit: promoting safety vs. cost

**09.15- 10.00 Light- and Heavy Duty NGVs** (Gert Jan Rap)

- CNG system overview
- Risk areas
- Mechanical construction of CNG system in vehicles
  - Vehicle related
    - Modification to the vehicle
    - Mounting of components to the vehicle
    - Crash zone and vehicle construction.
  - Component and system-related
    - Under-hood equipment including electronic safety devices of CNG system
    - CNG tanks, PRDs and related safety concerns

**10.00 – 10.20 BREAK**

**10.20 – 11.00 CNG Safety-related Regulations, Standards & Best Practices** (Gert Jan Rap)

- OEM vehicles
- Retrofit vehicles
- Retrofit installation workshop
- Vehicle repair workshop
- Underground parking

**11.00 – 11.45 Accident Handling and Investigation** (Gert Jan Rap)

- Safety requirements during and after accidents (fire, collision, etc.)
- Towing and lifting NGVs
- Repairs on NGVs

**11.45 – 12.15 Questions, Answers & Discussion**

**12.15 – 1.30 LUNCH (ON YOUR OWN)**

**1.30 – 2.30 Hydrogen Vehicles** (Karen Hall)

- General Overview: H2 Fuel Properties & Relationship to CNG
- Light duty H2Vs
- Safety-related Regulations, Standards & Best Practices
- Accident Handling and Investigation
- Future trends: OEMs, Retrofits, Storage, etc.

**2.30 – 3.15 CNG Fuelling Infrastructure** (Gert Jan Rap)

- Equipment (storage, compression & dispensing)
- Forecourt layout & safety requirements
- Emergency response to accidents

**3.15 - 3.35 BREAK**

**3.35 – 4.15 Hydrogen Fuelling Infrastructure** (Karen Hall)

- Hydrogen production, storage and delivery overview
- Refuelling station requirements: NFPA, ICC, validation activities
- Guidance documents (guideline for code officials, specification for hydrogen fuel quality, implications for station operators)

## **The Trainers**

### **Jeffrey Seisler**

Dr. Seisler has more than 20 years experience in the NGV/alternative fuels industry as a lobbyist, marketer and technologist. Having worked for several consulting firms in the areas of energy conservation, utility and solar energy policy analysis and marketing analysis, Dr. Seisler went on to begin his own management consulting business, specialising in energy and marketing analysis for the gas and electric industry as well as for other private sector and government clients. Dr. Seisler has since fulfilled the roles of the Associate Director of New Market Development at the American Gas Association, Executive Director of the Natural Gas Vehicle Coalition (NGVC) in the United States, and President of the International Association for NGVs. Dr. Seisler is the founding Executive Director of ENGVA (since 1994). He presents an overview of the international standards and regulatory framework in which safety issues are implemented at the international level.

### **Gert-Jan Rap**

With over 20 years of experience in the alternative fuels and vehicle technology industry, Mr. Rap has been involved in conversions of vehicles including those of various large vehicle manufacturers. Mr. Rap's expertise lies in the areas of the development of components and complete systems for retrofit and OEM systems, homologation, quality assurance during serial conversions, emissions optimisation, engine development for gaseous fuel engines, commercialisation of retrofit products and OEM systems, market development as well as the development, homologation and commercialisation of refuelling technology and transport equipment. Mr. Rap also provides services in the areas of market research, project management, technical and commercial training, assistance in applying for project incentives and financing and consulting for his own company RAP Clean Air Products. Mr. Rap is on contract with ENGVA at present to help develop the European Gaseous Fuels Training Institute.

### **Karen Hall**

Ms. Karen Hall (Technology Transition Corporation, Ltd. and US-based National Hydrogen Association) presents the hydrogen part of the training session. During this part of the session, a brief description of past, present and future applications for hydrogen is given and trends and timelines of ICEs and Fuel Cells along with various examples of progress and challenges in the field are cited. Certain vehicle safety issues also are discussed, in particular various national and international hydrogen vehicle safety activities, including SAE recommended practices, the California Fuel Cell Partnership guidelines and emergency responders manual and ISO activities. As for infrastructure and refueling issues, the following topics are included: Hydrogen production, storage, and delivery; Refueling station requirements and NFPA, ICC, validation activities; Guidance documents (guideline for code officials, specification for hydrogen fuel quality, implications for station operators).

Please contact ENGVA at [info@engva.nl](mailto:info@engva.nl) or visit [www.engva.org](http://www.engva.org)