



Strategic Planning: Hydrogen

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The enemy of a good plan is the dream of a perfect plan.

Carl Von Clausewitz



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- Climatic protection: Alternative energies are forced
- Ever more accidents for example with hydrogen vehicles or gas cells in buildings
- The fire-brigades must develop the tactics of the future
- What can we do if hydrogen is out of control?

Fuel cells

The infrastructure

H2-transportation

H2- service stations

Gas station

Garage with gas station

H2-Bus

H2-car

Primary Electricity Supply

Hydrogen

Hydrogen-Generated Electricity



Hydrogen Fuel



Hydrogen Storage



Hydrogen-Powered Electrical Generator



Hydrogen Dispenser



Personal Fuel Appliance (PFA)



Hydrogen Fuel

Hydrogen Residential Storage Unit

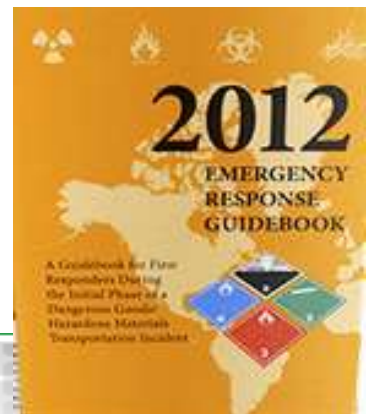
- **Database** „Hydrogen accidents / fires / explosions“
  - > Evaluation of interventions
  - > Up to date informations (teaching material: clips ..)
- **Preventive** fire and hazard protection Facility Planning
- **Education** and training
- **Operational tactics** and recommendations for action
  - > SOP (in Hamburg “Tactic-standards”)

Lessons learned from accidents

What is in the future if hydrogen
vehicles are involved in fires ...?

H₂Incidents

Hydrogen Incident Reporting Tool



Incident Report

Hydrogen Fire at a Hydrogen Storage Facility



Preventive fire and hazard protection Facility Planning

- -> use Drones,..., Mobile Computing – simulations - apps



Risk analysis

Accidents with hydrogen

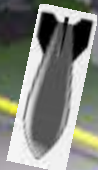
- The hydrogen filling station itself

Gas station



- In the environment of the hydrogen filling station

H₂-car



Risk-view

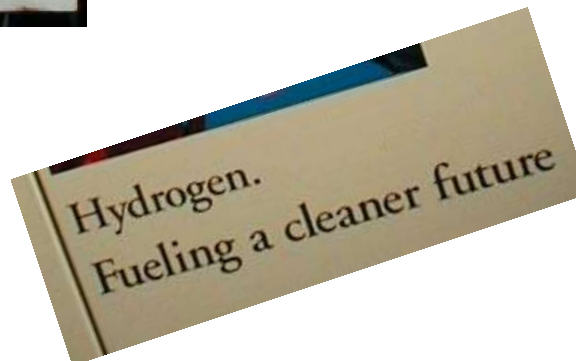
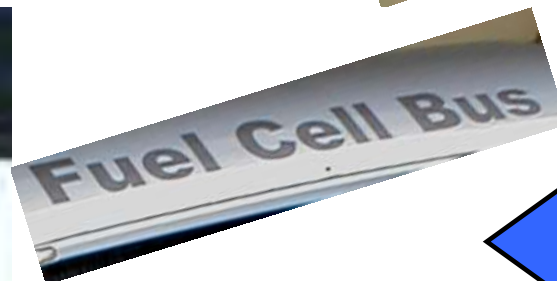
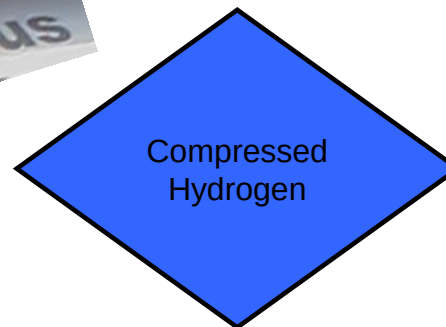
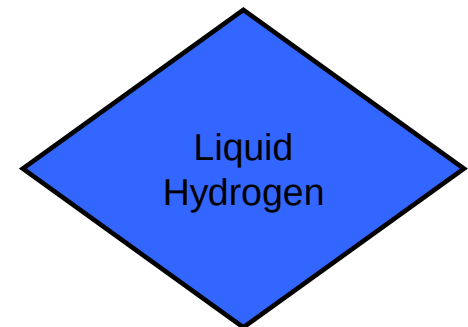


Tunnel fire



Garage fire

Identify danger? Possibilities?





Each technology also brings risks ... ..

... it is not about abolishing hydrogen or inhibit!

The goal is optimal safety, especially for firefighters

Attention to the Image of Hydrogen!

-> Summarize all alternative energy!

Treat under the umbrella term “Alternative Energy”(Exploitation of synergies, avoid duplication of effort)

● Education and training

-> Simulation games, virtual reality,
augmented reality, social media;
Virales marketing

How much time we have for the
Hydrogen training?

Who pays this?

State fire department and emergency medical service EMS Hamburg - Hydroprom Expd 2014

Approval Process - Risk analysis - Tactics - Measurement- .... ??



- Operational tactics and recommendations for action
  - > SOP (in Hamburg “Tactic-standards”)

Keywords: Technical Assistance explosion

Instructions (examples):

Alternative Energies - Traffic accident **S4**

Hydrogen Station **O15**