Integrated Energy

COURSE OVERVIEW

Mobility across the world is in the midst of a huge transition to decarbonize, reflecting the needs of society today for a cleaner solution than we have had in the past. Consequently lower or zero emission vehicles such as electric/internal combustion engine hybrids, plug in hybrid electric vehicles, battery electric vehicles, and now hydrogen fuel cell electric vehicles are dominating new vehicle sales already in some countries and rising rapidly worldwide. This transition introduces substantial new requirements for hydrogen fuel supply and electrical infrastructure, as well as new approaches to vehicle safety and skills for design, operations and maintenance.

This course will enable the participants to become familiarized with low carbon mobility concepts, frameworks and benefits; to have a better understanding of the safety, standards and performance of different types of low carbon vehicles; to gain knowledge about the infrastructure requirements and economic benefits of these vehicles, and their application to land, air and sea

COURSE AGENDA (DAY 1 - DAY 5)

Module 1
LOW CARBON MOBILITY - AN OVERVIEW OF THE AREA
- Definitions of types of vehicles
- Who is doing what at a high level – What companies are involved

Module 2 *ELECTRIC VEHICLE APPLICATION*
- Hybrid, Plug In Hybrid Electric Vehicles, Battery Electric Vehicles
- Vehicle Characteristics and Performance
- Battery and drive technologies, motorsport development
- Life cycle economics, environmental aspects and safety

Module 3 *HYDROGEN VEHICLE APPLICATION*
- Hydrogen Fuel Cell Electric Vehicles and Hydrogen Internal Combustion Engine Vehicles
- Vehicle Characteristics and Performance

Fuel cell and hydrogen storage technologies, liquid and gas Motorsport development, Life cycle economics, environment and safety

Module 4 *INFRASTRUCTURE TO SUPPORT EVS*
- Standards and Requirements for EV charging
- EV Charger interfaces, capacities and leading suppliers
- Remote area solutions and network integration
- Renewable energy supply solutions and conventional models

Module 5 *INFRASTRUCTURE TO SUPPORT HYDROGEN VEHICLES*
- Safety and Standards for Hydrogen Refuelling and Transport
- Hydrogen Production and Distribution Methods
- Safety based design solutions
- Gaseous and Liquid Hydrogen Distribution Models
- Solutions for heavy duty transportation and light vehicle fleets

Integration of Hydrogen Fuelling and Electric Vehicle Charging Infrastructure

Module 6 *LOW CARBON RAIL MOBILITY SOLUTIONS*
- Diesel, electric and hydrogen rail alternatives
- Current evaluation criteria and implementation programs

Module 7
TECHNOLOGIES AND DATA STANDARDS
- Data Standards
- Typical information networks and flows
- Network management approaches
- Mobile working technologies

Module 8 *SUSTAINABLE MARINE TRANSPORT AND AVIATION*
- Marine application of battery electric, hydrogen fuel cell, hydrogen derivative fuels as alternative to diesel or LNG fuels
- Tugs, ferries and ocean-going cargo vessels
- Classification society rules for hydrogen and ammonia
- International supply chains and refuelling facilities
- Airborne application of battery electric, hydrogen fuel cell, hydrogen to drones, light aircraft, and commercial airliners

Performance characteristics, development and deployment pathways

Module 9 *OPERATIONS AND MAINTENANCE*
- Competencies and Qualifications for Electric and Hydrogen technologies
- Maintenance facility requirements
- Operations and maintenance strategies

Module 10 *LESSONS LEARNED AND CASE STUDIES FROM APPLICATION OF LOW CARBON MOBILITY*
- Key Lessons learned
- Key Success Factors
- Common Pitfalls in the application of Low Carbon Mobility

PROGRAM SCHEDULE
(Day 1 – Day 5)

12:50	Registration
13:00 – 13:50	1st Session
13:50 – 14:00	1st Break
14:00 – 14:50	2nd Session
14:50 – 15:00	2nd Break
15:00 – 15:50	3rd Session
15:50 – 16:00	3rd Break
16:00 – 17:00	4th Session

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