

Member	Recent In-Country Developments / Update on Policy	Highlights (R&D, Demo – budget included where possible)	Other News (market/commercial)
Australia	<ul style="list-style-type: none"> • COAG Energy Council agreed to develop a National Hydrogen Strategy by the end of 2019 • Implementation will be 2020 – 2030 • Western Australia (WA) Government establishes the WA Hydrogen Council • WA Government planning 4 strategic focus areas on Hydrogen: Gas Blending, Export, Remote Applications (Mine site and communities) and Transport 	<ul style="list-style-type: none"> • ARENA awarded \$22.1 M in funding for renewable hydrogen research • Direct water electrolysis • Solar hydrogen generation • Solar thermochemical hydrogen • Hydrogen to Ammonia • Biological hydrogen production • Photovoltaic electrolysis to generate hydrogen • Waste biomass to renewable hydrogen 	<ul style="list-style-type: none"> • Toyota Australia launched trial program of the Mirai with external stakeholders in November 2018 • Hyundai NEXO commercially launched in December 2018 • ACT Government to operate first Australian FCEV fleet (20 Hyundai NEXO) – Canberra refueling station currently in progress • National Hydrogen Strategy commenced development in January 2019 and will scope potential to build refueling stations in every Australian state and territory with focus on heavy transport
Austria	<p>FTI-Roadmap Power-to-Gas</p> <ul style="list-style-type: none"> • Austrian research, technology and innovation roadmap Power-to-gas • Status, vision and challenges concerning the PtG-technology <p>WIVA P&G - Hydrogen Initiative Model Region Austria Power & Gas</p> <ul style="list-style-type: none"> • RTI initiative by the Climate and Energy Fund of the Austrian Federal Gov't <p>Hydrogen strategy</p> <ul style="list-style-type: none"> • A hydrogen strategy will be launched in the first half of 2019 	<p>(1)=R&D (2)=Demo</p> <p>Transport</p> <ul style="list-style-type: none"> • ReFuel (2), HySnow (2), KEYTECH4EV (2), HyTruck (1), UpHy (1) <p>Buildings</p> <ul style="list-style-type: none"> • Autonomer Adler (2) <p>Industry</p> <ul style="list-style-type: none"> • H2Pioneer (2), H2FUTURE (2) <p>Energy System level</p> <ul style="list-style-type: none"> • Underground Sun Storage (2), Underground Sun Conversion (1), Renewable Gasfield (2), HydroMetha (1) <p>Hydrogen Production & Purification</p> <ul style="list-style-type: none"> • Wind2hydrogen (2), Hydrocell (1), HyLy pure (1), Hytechbasis (1) 	<p>WIVA P&G</p> <ul style="list-style-type: none"> • Goal: Demonstrating the conversion of the Austrian economy to a highly hydrogen-based energy system <p>WIVA P&G focuses on three segments:</p> <ol style="list-style-type: none"> 1. Green Energy 2. Green Industry 3. Green Mobility <p>WIVA P&G subsumes the experiences of more than 30 completed and ongoing projects and is going to implement 25 sub-projects within the energy model region</p>
China	<ul style="list-style-type: none"> • Fiscal subsidy policies have been implemented by National Development and Reform Commission, Ministry of Industry and 	<ul style="list-style-type: none"> • It is suggested that hydrogen energy should be included in the national energy system from different aspects. 	<p>Blue Books and Reports on Hydrogen Energy</p> <ul style="list-style-type: none"> • 26th Sep. - Blue Book on China Automobile Hydrogen Industry

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China Cont'd	<p>Information Technology, Ministry of Finance and Ministry of Science and Technology</p> <ul style="list-style-type: none"> • There will be subsidies on bus, freight car, medium and heavy logistics vehicles and fueling station. • Beijing, Shanghai, Guangdong, Wuhan and Chongqing have carried out local subsidies for FCEVs. • Hydrogen energy will be take at least 10% proportion of China's terminal energy system. 	<ul style="list-style-type: none"> • It is expected that China's hydrogen energy industry will develop a national roadmap, where goals and tasks of hydrogen development will be defined. • At least 9 state key research programmes on hydrogen energy are listed on the website of MOST, and next five-year-plan on hydrogen energy will be prepared in 2019. 	<ul style="list-style-type: none"> • 11th Oct. - China Hydrogen Energy and Fuel Cell industry Development Report • 7th Nov. <i>Pathway to Produce Hydrogen with Low Carbon and Low Cost</i> - Blue Book on China Hydrogen Industry Infrastructure Development
Denmark	<ul style="list-style-type: none"> • New government agreement on renewable energy (RE). The aim is total 55% RE in 2030. Part of this is a RE share of electric consumption of 100% and a RE • share of heat consumption not less than 90%. • The share of bio-methane in the natural gas grid is expected to be 15% in 2019. There is a large potential for bio-methane production. • Continuation of full tax exemption of registration tax on fuel cell vehicles until 2021. At the same time increasing tax on electric vehicles. • Increase in funding of energy R&D. The government is part of the "Mission Innovation" initiative, which means an obligation to double funding of energy R&D from 2015 to 2020. 	<ul style="list-style-type: none"> • H2BusEurope – 600 new FC busses in Europe, there of 200 in Denmark. NEL Hydrogen is a major partner in the project and will supply filling stations to the project • P2G-Biocat Roslev. Upscaling of the Avedore P2G project where bacteria converts CO2 and H2 to methane. Electrolyser 8 MWe. Electrochea, NEL, Energinet, DGC, Neas, AUC, Rybjerggaard. A pre-project to verify frame conditions is funded. 2018-19. • Electricity-upgraded biogas II. Continuation of biogas upgrading plant based on Sabatier and SOEC. Haldor Topsoe, Xergi, Aarhus University. EUDP funded. 2017-20 	<p><u>Danish Gas Technology Centre (DGC)</u></p> <ul style="list-style-type: none"> • DGC is an independent company, owned by the gas DSO/TSO but operating at arms length of the sector. • DGC holds a laboratory, accredited (EN 17025) to test gas appliances and to make gas analysis, and a Test Centre for Green Gases for analysis of biogas, hydrogen etc. • Key areas of expertise include gas utilization, green gas production/cleaning, sector coupling/hybrid applications and environmental performance. <p>DGC represents the Danish gas sector in various European organisations like Marcogaz, GERG, ERIG etc.</p>

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EC	<ul style="list-style-type: none"> • EU Energy Ministers "Hydrogen Initiative" - Informal meeting of the EU Energy Ministers (18/9/28) is dedicated to hydrogen and energy storage solutions. • Energy package "Clean Energy for all Europeans" goes beyond promoting de-carbonization, the package supports market based integration of energy storage, including hydrogen technologies. The package includes 8 legislative acts. • 2050 Long-term EU Strategy - On 28/11/18 the Commission presented its strategic long-term vision for a prosperous, modern, competitive and climate-neutral economy by 2050 – A Clean Planet for All 	<ul style="list-style-type: none"> • 2019 Call for Proposals FCH2JU: is now open deadline 23/4/2019; indicative budget EUR 80.8 million • 2018 Call for Proposals: 61 proposals received with a budget of approx. EUR 73 million; 19 proposals preselected and are under grant agreement preparation • FCH JU is in the process of setting up of the 'European fuel cells and hydrogen market and policy observatory' to act as a reference point for information about fuel cells and hydrogen technologies and applications in Europe. • Published the 2nd procurement for the development of the European HRS availability system (https://h2-map.eu/) aiming to set-up a system for HRS availability giving access to reliable, up-to-date and standardised data on the status of HRS in the EU. 	
France	<p>National Plan on hydrogen, 1/6/18</p> <ul style="list-style-type: none"> • Decarbonize industry • develop hydrogen storage of renewable energies • starting in 2019, 100 M Euro will be devoted to deeply • hydrogen in sectors of industry, mobility and energy 	<p>Hydrogen Train: enthusiasm in a lot of Regions in France</p> <p>"SNCF will order during the summer 2019 the first prototypes of h2 trains to start at the beginning of 2022.</p> <p>The aim is the final stopping of diesel powered trains in 2035."</p>	<ul style="list-style-type: none"> • Hype taxis company - 600 hydrogen taxis in end of 2020 (2018: 100 taxis in Paris) with fast refueling - 400km range - 24 h in operation • 8 bus on a high service line in Pau - there will be 30 buses end of 2019

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Italy	<ul style="list-style-type: none"> The Italian Ministry for Economic Development, in agreement with other EU countries, on 18/09/2018 at Linz Conference signed "The Hydrogen Initiative", a policy document to support the development of sustainable hydrogen The Italian Ministry for Economic Development, on 23/10/2018 in Tokyo signed the "Tokyo Statement" With the Legislative Decree n. 257 (dated 16/12/2016) the Italian Government has adopted the European Directive 2014/94/EU (dated 22 October 2014) for the creation of an infrastructure for alternative fuels, wherein hydrogen is officially included. Additional regulatory dispositions for HRS have been issued by the Ministry of the Interior and the Ministry of Infrastructure and Transport in a Decree published on 23/10/2018. 	<ul style="list-style-type: none"> Italy is a leader in terms of R&D in the field of Hydrogen and Fuel Cells, with 128 projects financed by the FCH 2 JU in the period 2008-2017, involving over 80 Italian beneficiaries and mobilizing over 90 M€ funding. REMOTE project (2018-2021, 6.8 M€): technical and economic feasibility of two FC-based H2 energy storage solutions deployed in a demo plant based on renewables in Stromboli Island will be demonstrated. H2PORTS project (2019-2021, 4 M€): development of port industry towards an effective low-carbon/zero-emission, demonstrating new FC technologies oriented to increase energy efficiency, decarbonisation and safety of port terminals. Biological processes – project Bio2Energy (2016-2018): Development of bio-hydrogen (and biogas) production process from organic wastes and sludge (https://www.bio2energy.it) Power-to-Gas – project +Gas (2016-2018): Hydrogen production from RES and its utilization to improve biomethane production (www.piugas.enea.it) 	<ul style="list-style-type: none"> Great interest of FFS/RFI with some Italian Regions, Toscana, Puglia and Calabria, for the deployment of hydrogen train Presence of hydrogen as key multipurpose energy carrier in the Italian “Piano Energia Clima” (Energy & Climate Plan) sent to EU

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Japan	<p><u>“Basic Hydrogen Strategy” (Dec, 2017)</u></p> <ul style="list-style-type: none"> • H2 Cost target < JPY 20/Nm3 (in future) • METI will revise their H2 Roadmap (in Mar, 2019) <p><u>international collaboration</u></p> <ul style="list-style-type: none"> • G20 (Jun, 2019), 2nd Hydrogen Energy Ministerial (Sep, 2019) • Follow-up “Tokyo Statement” <p>Expanding RD&D program</p>	<ul style="list-style-type: none"> • Large scale demo of a 10MW Electrolysis Power to Gas in Fukushima may complete construction in 2019 • Continue 1MW H2 gas turbine demo project in 2019 • Start International collaboration on RCS for HRS, FCV • Increasing budget in JFY 2019 (Apr-Mar) (in million US\$ (US\$1 = JPY 110) 	<ul style="list-style-type: none"> • Tokyo Metropolitan Government increase number of FC-Bus • Kyocera, Miura and MHPS launched stationary fuel cell (SOFC) in • 2017 and slightly increase its number of installations • Toyota provides financial scheme for FCV (leasing: US\$ 200 / mo.)
NZ	<p>National Energy strategy In November 2018 legislation ends new offshore oil and gas exploration in New Zealand Government policy incentives</p> <ul style="list-style-type: none"> • A target of doubling the number of electric vehicles in New Zealand every year to 2021 or about 2% of the fleet. • Tax exemptions on electric vehicles until they make up 2% percent of the fleet. • US\$700k annually for a nationwide electric vehicle information and promotion campaign over five years • Establishment of an electric vehicles leadership group across business, local and central government. • Memorandum of Cooperation on hydrogen with Japan signed 2018. • New Zealand Hydrogen Association formed Sept. 2018. 	<p>UniQuad - fuel cell farm bike completed. It has a 12kWh Li-FeYPO4 battery; 3 kW PEM fuel cell; 1.6 kg 350 bar fuel H2 tank. Funding still required for field trials</p>	<ul style="list-style-type: none"> • Hiringa – awarded \$950k (US\$641k) in July 2018 to scope the engineering and design of two hydrogen generation facilities, up to four mobile compressed hydrogen storage and distribution containers, and up to three hydrogen refuelling stations. • Ports of Auckland will complete NZ’s first hydrogen refuelling station in 2019 • Partners on one project have been awarded a 14% subsidy for the purchase of a hydrogen fuel cell (HFC) bus and three HFC cars. • Arup Consultants awarded \$150k (US\$101k) to assist government to develop a national hydrogen roadmap by April 2019. • Tuaropaki Trust, a Maori Trust, and Japan’s Obayashi Corporation are commissioning a pilot hydrogen production electrolysis plant that utilises heat from the Mokai geothermal field.

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The Netherlands	<p>Dutch Climate Agreement 2018 / 2019</p> <ul style="list-style-type: none"> Roundtable discussions on going to achieve an agreement in 2018 on how to realise 2030 climate targets Hydrogen is seen as a robust element in the CO₂-free energy and feedstock system. The outline of the agreement contains a separate chapter on hydrogen. Policy measures and regulation will be defined as part of programmatic approach. 	<p>Current Programs</p> <ol style="list-style-type: none"> Innovation program on Hydrogen: <ul style="list-style-type: none"> Part Top Consortium Knowledge and Innovation on Gas (TKI Gas) Demonstration energy innovation <ul style="list-style-type: none"> Flexibilization of energy system 33 M€ (incl. 10M € H₂ in industry) CO₂ reduction industry 25 M€ (f.i. CCUS) Natural gas free building area's 11 M€ Arrangement demonstration climate technologies and innovations for transport Fiscal incentive programs (rebate on investments) (EIA & Mia/Vamil) 	<ul style="list-style-type: none"> Up to 800 MW plans for electrolysis by 2025 Dutch Climate Agreement: The H₂ Platform establishes a Covenant for the realization of 50 hydrogen filling stations, 15,000 FCEV cars and 3,000 heavy vehicles with a fuel cell hydrogen in 2025. NL involved G20 report: Clingendaal (Jabbe van Leeuwen), H₂ envoy (Noe van Hulst)
NOW	<ul style="list-style-type: none"> 2018 politically successful for hydrogen on a European level with a strong impact on the national level of the member states Renewable Energy Directive II (REDII) Hydrogen technology named as IPCEI projects National Innovation program for hydrogen and fuel cells with regional projects HYLAND 7th energy framework program with special call for large scale hydrogen projects (Reallabore) 	<p>Integrated large-scale projects</p> <ul style="list-style-type: none"> Mission Innovation IC#8 H₂ Valley Reallabore / HYLAND projects <p>Potential of the initiatives</p> <ul style="list-style-type: none"> Story line for hydrogen technologies Stakeholder network Including existing initiatives Including national stakeholders in international activities Link between national and international activities 	<ul style="list-style-type: none"> First serial passenger cars with a fuel cell by Daimler are delivered to costumers