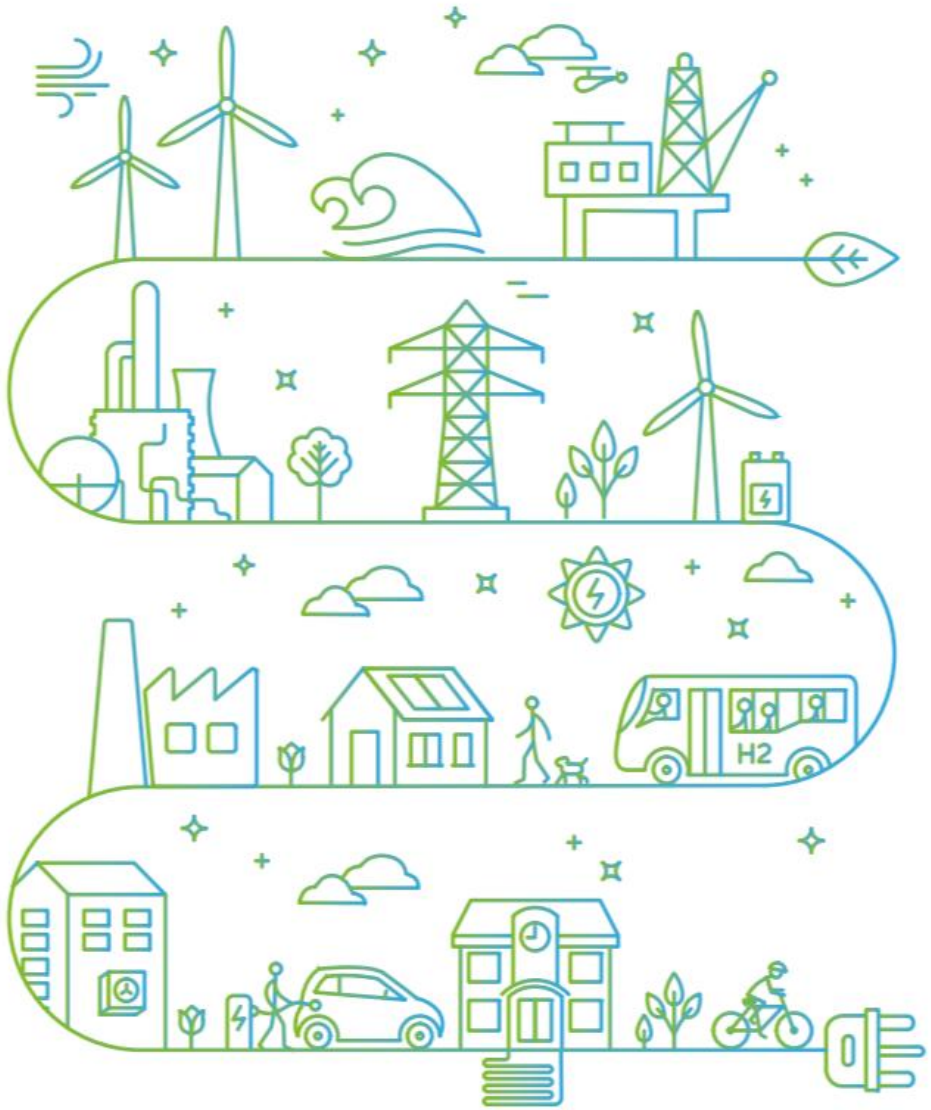
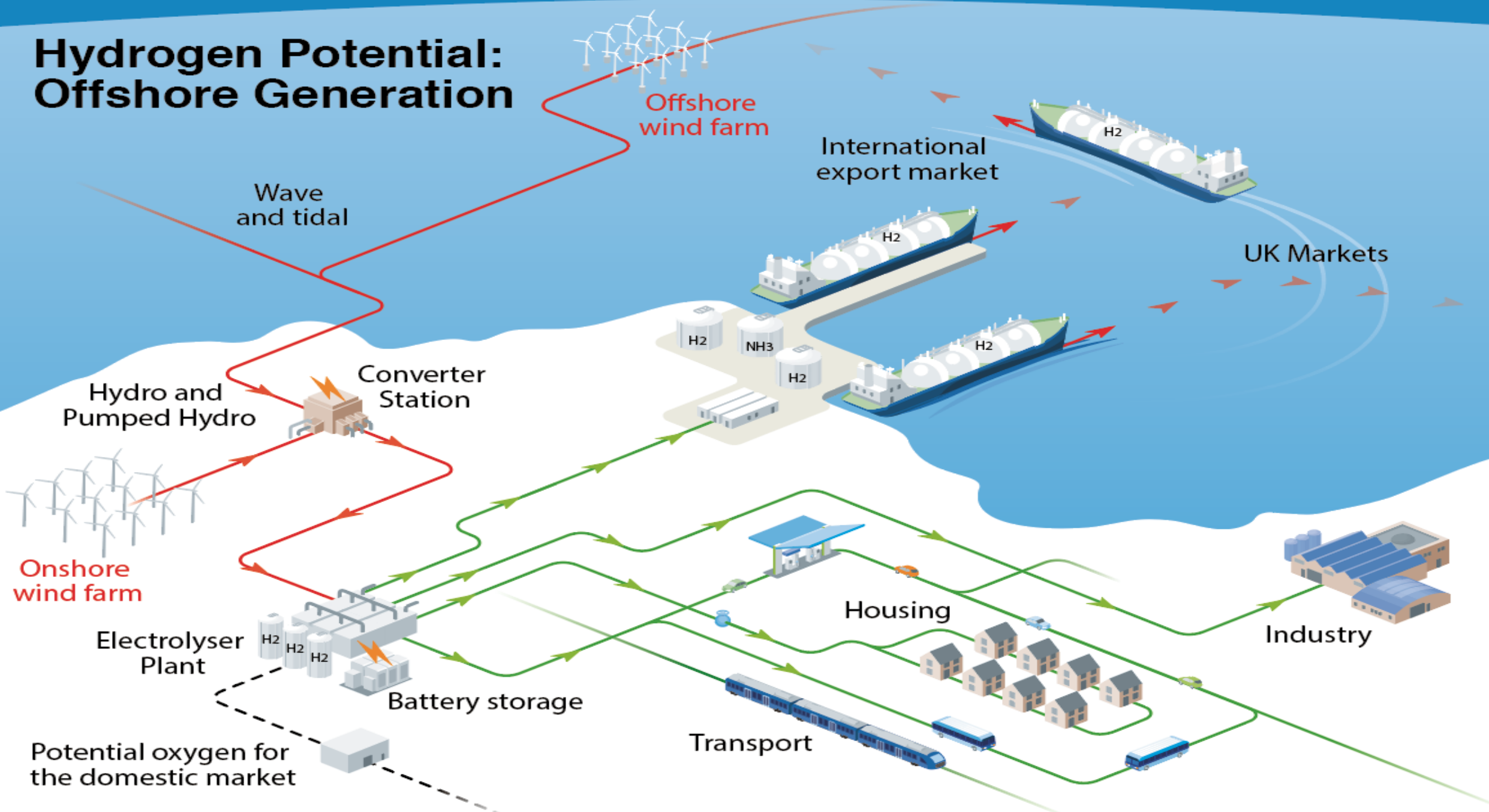


# Hydrogen Policy Scottish Government

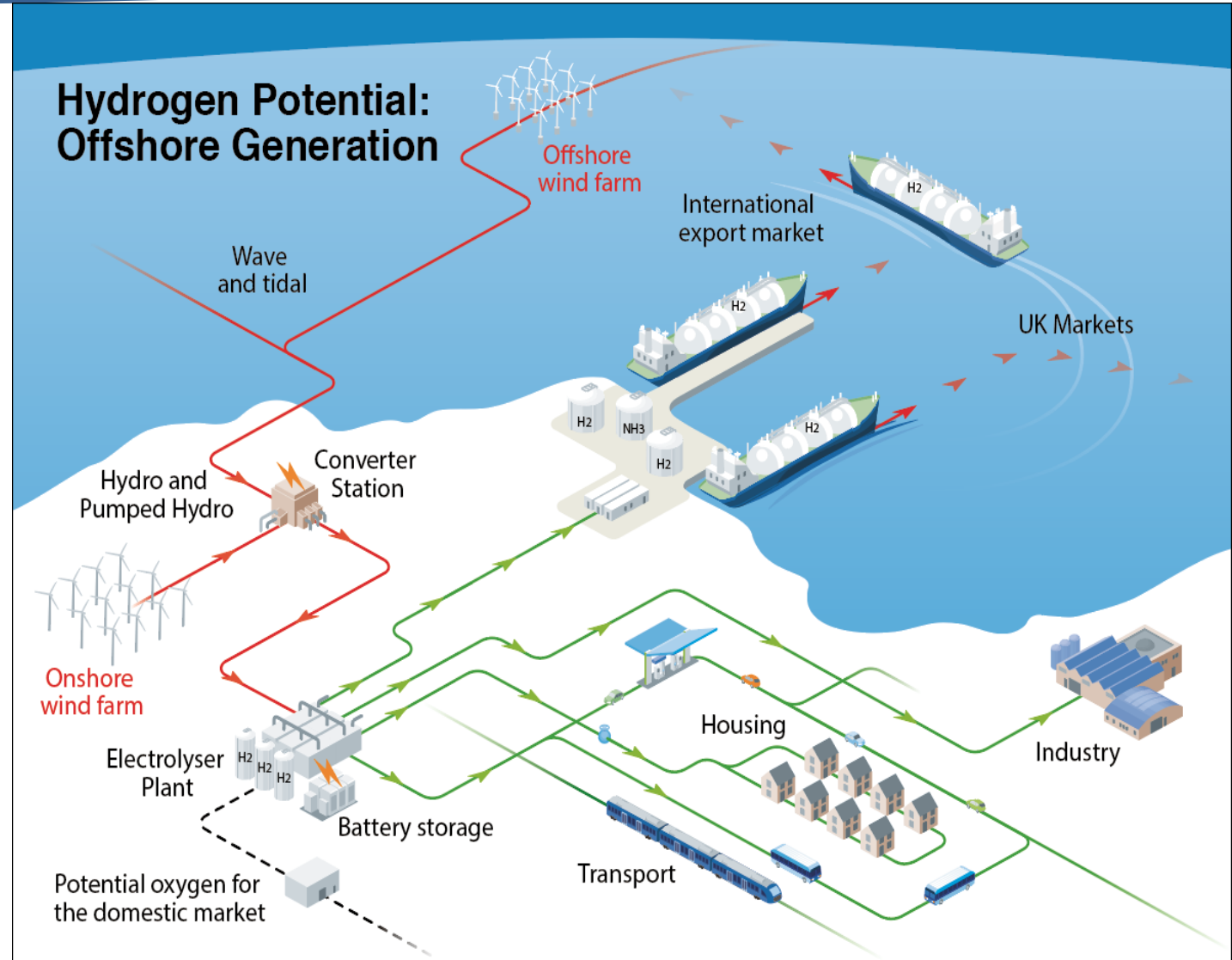


# Hydrogen Potential: Offshore Generation



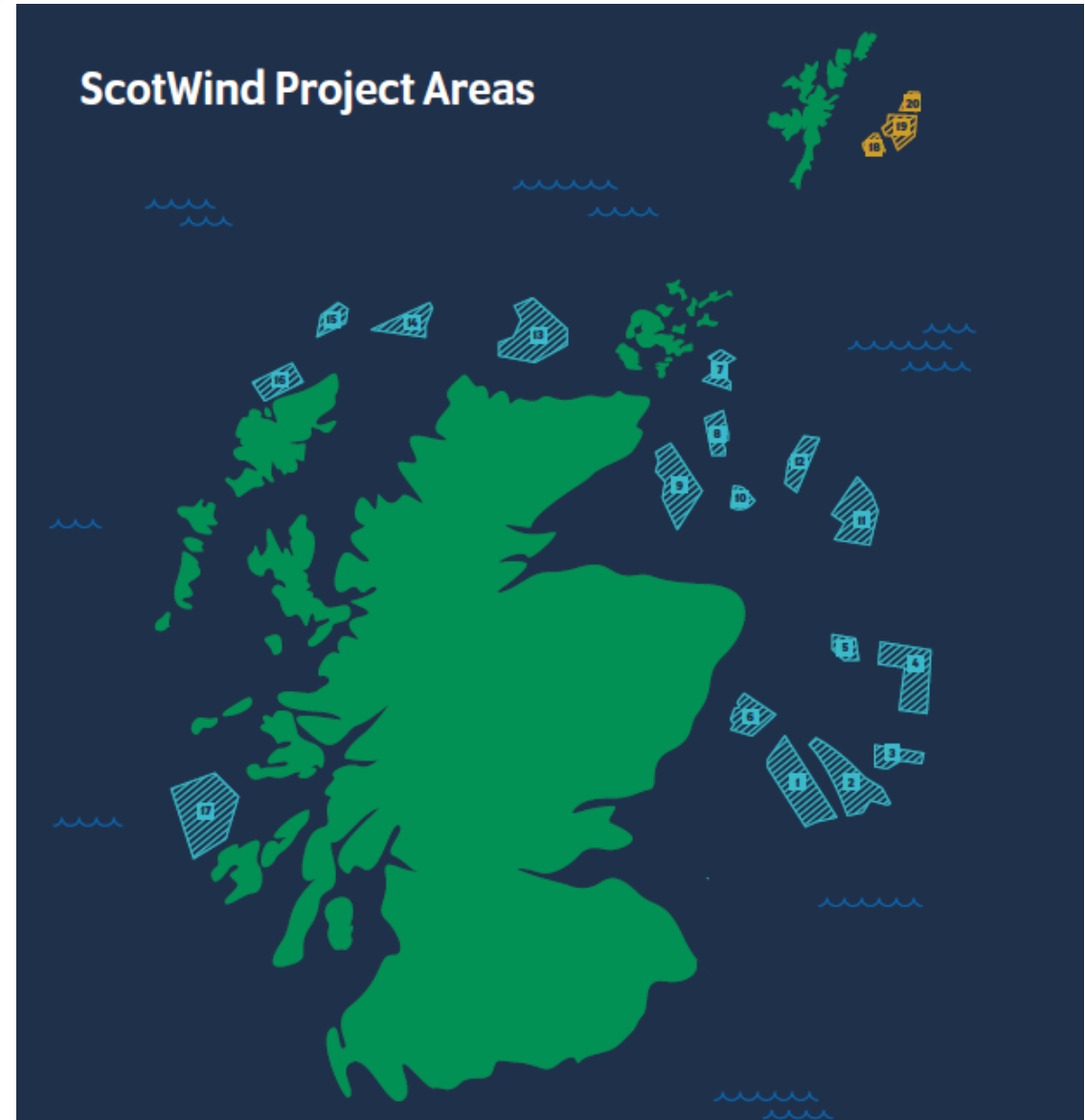
# Scottish Hydrogen Economy

- ✓ Abundant natural resources
- ✓ Experienced energy exporter
- ✓ Skilled energy supply chain
- ✓ Research and innovation expertise
- ✓ Supportive policy environment



# Scottish Energy Landscape

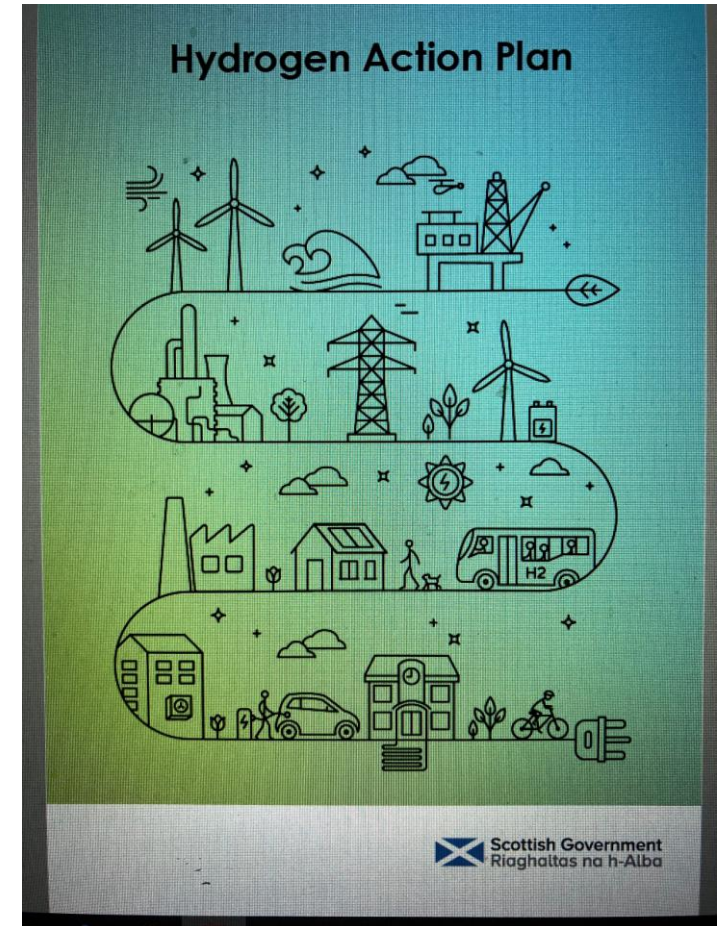
- Scotland is already a net exporter of electricity
- Offshore Wind Leasing agreements for 28GW's
- Significant opportunity for green hydrogen production







- **Ambition of 5GW installed hydrogen production capacity by 2030 and 25GW by 2045**
- Supported by UK and Scottish investment package
  - Net Zero Hydrogen Fund, Hydrogen Business Model, Emerging Energy Technologies Fund
- Both renewable and low-carbon hydrogen will play an important role in our transition to net zero in 2045
- Vast renewable resources in Scotland will support both a domestic and export market for hydrogen



# SCOTLAND'S REGIONAL HYDROGEN HUBS

1



## ABERDEEN

- One of Europe's most pioneering hydrogen cities
- Two public refuelling stations and one of Europe's largest hydrogen fleets
- Ambitious hydrogen production projects in planning
- New South Harbour – the UK's largest marine infrastructure project
- Energy Transition Zone (ETZ) – catalyst for high-value manufacturing, R&D & hydrogen development
- Other projects include Dolphyn (ERM), VT1 (Vattenfall), ACORN (Storegga) and North East Vision (SGN)

2



## ARGYLL & ISLANDS

- Plans to establish a green hydrogen production and distribution site at Machrihanish Airbase
- Former military aerodrome
- Community-owned business park
- Vast development space
- Over 1000 acres (400+ hectares) of properties, development land and assets
- Airport on site

3



## AYRSHIRE

- Emerging hub of hydrogen activity
- Several projects looking at production and end-use of hydrogen and derivatives
- Hunterston–
  - ideal landing point for nearby offshore wind farms
  - Vast industrial options for hydrogen production and export
  - Strong grid connections
  - Existing marine infrastructure
- Prestwick Aerospace
  - Home to Scotland's aerospace sector
  - Aviation as key end user



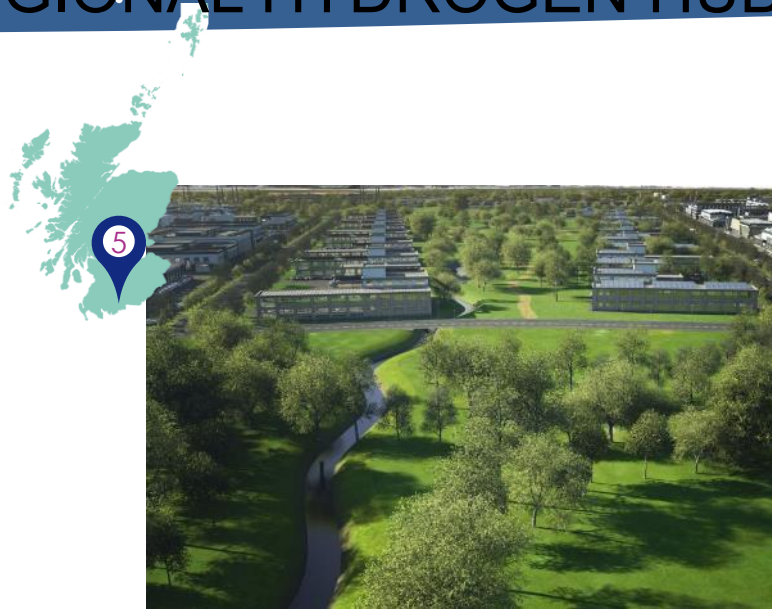


# SCOTLAND'S REGIONAL HYDROGEN HUBS



## CROMARTY

- Driving ambition for region to become a hydrogen economy
- Home to the North of Scotland Hydrogen Programme
- State-of-the-art hub to produce, store and distribute green hydrogen at scale
- Will service the local area and UK and export to Europe
- Proximity to large-scale renewable electricity supply
- Huge local demand from distilleries, industry, transport and domestic
- Skilled and experienced supply chain



## DUMFRIES & GALLOWAY

- Produces 11% of Scotland's renewable energy
- Offers easy access to existing gas transmission pipelines and future 'Project Union' and 'European Backbone' transmission infrastructure
- Existing hydrogen supply chain cluster, including hydrogen-enabled industrial boilers
- Key development sites include Chapelcross – which offers up to 500 acres



## DUNDEE

- Ambitions to deploy hydrogen production, refuelling infrastructure and hydrogen vehicle fleets
- Proximity to offshore windfarms
- Michellin Scotland Innovation Parc (MSIP) – focused on driving innovation and R&D in sustainable mobility and low carbon energy
- MSIP offers industrial spaces, cutting-edge research facilities and a Skills Centre of Excellence



# SCOTLAND'S REGIONAL HYDROGEN HUBS



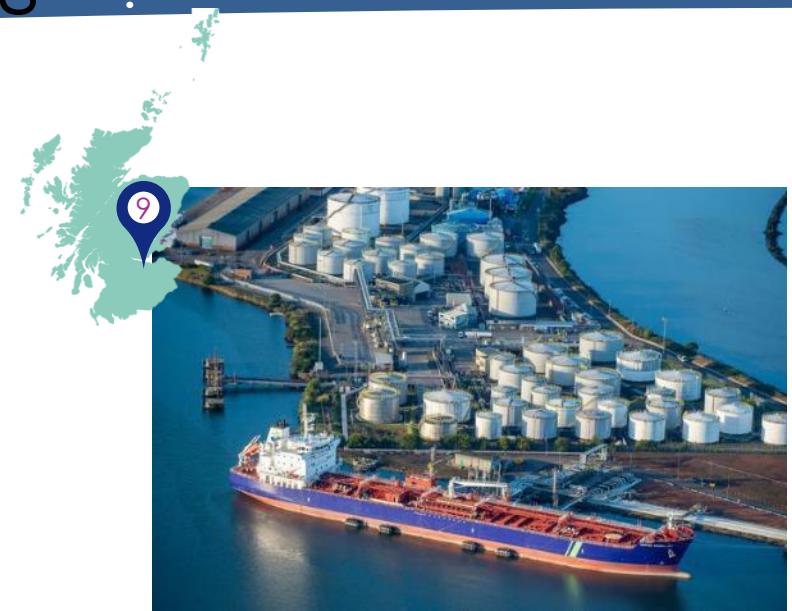
## FIFE

- H100 project to be deployed in 2023:
  - World-first 100% hydrogen network
  - Heat to 300 homes
  - Clean gas produced by a dedicated electrolysis plant
- Legacy of the Hydrogen Office:
  - Launched in 2011 with a 750kW wind turbine and 30kW electrolyser
  - Added a solar PV, smart microgrid, fleet of 17 hydrogen vehicles, 250kW of electrolysis and 100kW fuel cell



## GLASGOW

- Scotland's largest city
- Sustainable Glasgow initiative – net zero by 2030
- Projects include hydrogen refuse collection vehicles and new refuelling infrastructure
- Whitelee wind farm, one of Europe's largest onshore wind farms, will be home to the UK's largest electrolyser (20MW)
- Hy2Go project – green hydrogen production and refuelling park off the M74 motorway



## GRANGEMOUTH

- Scotland's largest industrial area
- Huge opportunity to decarbonise
- New energy plant due to commission in late 2023 – designed to fuel switch to hydrogen in the future
- Large-scale hydrogen production plant will export captured carbon offshore for permanent storage via the ACORN project
- SGN project could repurpose existing pipeline to transport hydrogen to Edinburgh





# SCOTLAND'S REGIONAL HYDROGEN HUBS



## ORKNEY

- Flotta Hydrogen Hub – ambitious multi-billion project
- Industrial-scale green hydrogen production on an existing oil terminal
- Will export hydrogen to Europe and the UK gas grid at St Fergus by 2030
- Forms the foundation for an International maritime green hydrogen refuelling hub



## SCOTTISH BORDERS

- Large onshore windfarms in the region
- Proximity to offshore windfarms on Scotland's East Coast
- Easy access to the European Hydrogen Backbone initiative
- Gas transmission pipelines to England
- 'Project Union' infrastructure
- Strong electrolyser supply chain potential from local engineering firms



## SHETLAND

- ORION Clean Energy Project – world-leading clean energy hub
- Maximises wind, wave and tidal resources
- Green energy to power homes, businesses and vehicles
- Electrify oil and gas installations
- Serve hydrogen export markets
- Existing infrastructure includes Shetland Gas Plant and Sullom Voe, a deepwater port/oil terminal



## WESTERN ISLES

- Hydrogen production, storage and distribution opportunities
- The Outer Hebrides Energy Hub – maximise the islands' abundant onshore and offshore wind resources
- Will produce green hydrogen to power the islands
- Export to the UK domestic and international markets
- Experienced maritime infrastructure



## ELECTROLYSER MANUFACTURING

- Ideal location for electrolyser manufacturing to service Scotland's huge project pipeline and export markets
- Global leader in high value and advanced manufacturing
- Transformational investment in infrastructure, innovation and skills initiatives
- Opportunities for the integration of knowledge and skills hubs, training academies and research centres
- Range of sites suitable for large-scale manufacturing facilities
- Reduce your carbon footprint with Scotland's low carbon and green electricity

## HYDROGEN STORAGE, CONVERSION AND DISTRIBUTION

- Opportunity for innovative technologies and equipment to store, convert and transport hydrogen
- Ideal location for Carbon Capture, Utilisation & Storage (CCUS) projects
- Proximity to offshore CO<sup>2</sup> storage resources
- Readily available natural gas supplies
- Existing oil and gas infrastructure and technical expertise
- Transferable skills from the oil and gas sector
- World-leading offshore and subsea expertise
- R&D and innovation facilities to support the development and deployment of new technologies



- [Hydrogen Action Plan](#)
- [Hydrogen Policy Statement](#)
- [2020 Hydrogen Assessment](#) report
- [Think Hydrogen, Think Scotland](#) (Scottish Hydrogen Investment Proposition)
- [Assessment of electrolyzers: report](#)

[Hydrogen as a storage medium in Scotland \(climatexchange.org.uk\)](https://climatexchange.org.uk)

## Hydrogen Action Plan





Thank You

