

## THE FRENCH GREEN HYDROGEN PLAN 2020-2030



FRANCE IS SHAPING UP TO BECOME ONE OF THE  
MOST COMPETITIVE, INNOVATIVE AND  
LOW-CARBON ECONOMIES IN THE WORLD



# FRANCE, A PIONEER IN THE FIELD OF CARBON-FREE HYDROGEN

## ENERGY TRANSITION FOR GREEN GROWTH ACT (2015)

UP TO **40%** OF ELECTRICITY PRODUCTION FROM RENEWABLE ENERGY IN 2030  
**30%** REDUCTION IN FOSSIL FUEL CONSUMPTION  
**10%** DECARBONIZATION OF GAS

## GOVERNMENT SUPPORT BETWEEN 2010 AND 2018

**€100 MILLION** TO IMPLEMENT DEMONSTRATORS AND INVEST IN HIGH POTENTIAL COMPANIES (NATIONAL INVESTMENT PROGRAM)  
**€110 MILLION** FOR R&D FROM THE NATIONAL RESEARCH AGENCY (ANR)  
FINANCIAL SUPPORT FROM BPIFRANCE FOR STARTUPS AND SMES  
**€80 MILLION** TO SUPPORT H<sub>2</sub> MOBILITY FROM ADEME AND **€12 MILLION** FOR INDUSTRIAL PROJECTS (NATIONAL INVESTMENT PROGRAM)  
FINANCIAL SUPPORT FROM THE BANQUE DES TERRITOIRES (CDC GROUP) FOR THE DEVELOPMENT OF REGIONAL PROJECTS

## A VERY SUCCESSFUL FIRST NATIONWIDE CALL FOR EXPRESSIONS OF INTEREST (2020)

**160 PROJECTS** SUBMITTED BY BUSINESSES, LOCAL AUTHORITIES AND R&D CENTERS  
REPRESENTING A TOTAL INVESTMENT OF **€32.5 BILLION**

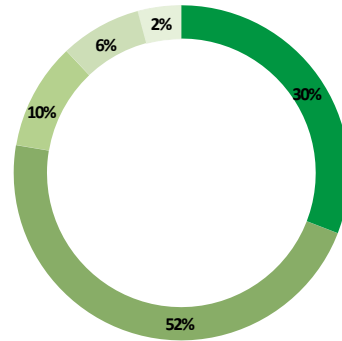
## FRANCE, THE 2ND MOST INNOVATIVE EUROPEAN COUNTRY FOR LOW-CARBON ENERGY

WITH **17,487 PATENTS** FILED BETWEEN 2000 AND 2019, AFTER GERMANY (52,684) BUT AHEAD OF THE UNITED KINGDOM (11,289)





# STRONG GLOBAL GROWTH PROSPECTS FOR CARBON-FREE H<sub>2</sub>



- REFINERIES
- AMMONIA
- BASE CHEMICALS
- METALLURGY
- OTHERS

Worldwide H<sub>2</sub> demand (2018)

ACCORDING TO THE HYDROGEN COUNCIL,  
CARBON-FREE HYDROGEN COULD MEET  
**20% OF OVERALL ENERGY DEMAND BY 2050**  
(+50%)

**400 MILLION CARS, 15 MILLION BUSES,**  
**5 MILLION TRUCKS,**  
**20% OF TRAINS**  
**- 3,2GT OF CO<sub>2</sub> EMISSIONS BY 2050**  
(HYDROGEN COUNCIL)

## INDUSTRIES

**DECARBONIZATION** (REFINERIES, AMMONIA,  
METHANOL)

**NEW USES** (ELECTRICITY PRODUCTION,  
INDUSTRIAL HEAT, ALTERNATIVES TO  
PETROLEUM FUELS, ETC)

**POWER TO GAS** (SHORT AND LONG TERM  
STORAGE SOLUTIONS, MORE FLEXIBILITY,  
FEWER INVESTMENTS)

## MOBILITY → FUEL CELLS

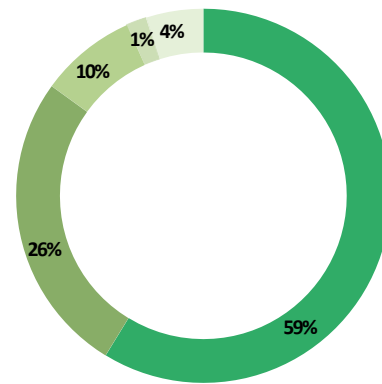
**DECARBONIZATION** OF LIGHT VEHICLES,  
BUSES, TRUCKS (BY 2025), HEAVY VEHICLES,  
TRAINS, PASSENGER BOATS (2030), PLANES &  
SHIPPING (2040)

**DEPLOYMENT OF ELECTRONIC DEVICES,**  
MOBILE GENERATORS AND CHARGING  
STATIONS





# STRONG GROWTH PROSPECTS FOR CARBON-FREE H<sub>2</sub> IN FRANCE



- REFINERIES
- AMMONIA
- BASE CHEMICALS
- METALLURGY
- OTHERS

H<sub>2</sub> demand in France (2018)

BY 2050, CARBON-FREE HYDROGEN COULD MEET **20% OF OVERALL ENERGY DEMAND**,  
REDUCE ANNUAL CO<sub>2</sub> EMISSIONS BY AROUND **55MT**,  
REPRESENT **12%** OF THE HEATING AND ELECTRICITY DEMAND OF HOUSEHOLDS AND  
**10% FOR INDUSTRY** (MINISTRY OF ECOLOGICAL TRANSITION, AFHYPAC)

DEVELOPMENT OF A CARBON-FREE H<sub>2</sub> SECTOR AIMING AT  
ADDRESSING 20-40% OF NEW INDUSTRIAL USES BY 2028  
(COMBINED WITH AN H<sub>2</sub> TRACEABILITY SYSTEM)

MOBILITY: **20-50,000** LIGHT VEHICLES, UP TO **2,000** HEAVY VEHICLES  
AND **1,000** STORAGE STATIONS BY 2028  
(**18%** OF VEHICLE FLEET BY 2050)

DEPLOYMENT OF STORAGE CAPACITIES TO HELP LOCAL  
AUTHORITIES INTEGRATE POWER TO GAS SOLUTIONS





# A GROWING ECOSYSTEM FOCUSING ON NEW H<sub>2</sub> MARKET OPPORTUNITIES

## MULTINATIONALS & ENERGY SUPPLIERS



#2 H<sub>2</sub> PRODUCER IN THE WORLD



LAUNCHED ITS OWN H<sub>2</sub> SUBSIDIARY  
IN 2018



SPECIALTY CHEMICALS & HIGH PERFORMANCE  
H<sub>2</sub> TANKS



H<sub>2</sub> TANKS AND FUEL CELLS WITH THE CEA

## STARTUPS & SMES



CARBON-FREE H<sub>2</sub> PRODUCTION



STATIONARY & MOBILE ENERGY  
STORAGE



H<sub>2</sub> MOBILITY



POWER TO GAS SERVICES

## PUBLIC PLAYERS (R&D, STRATEGY, LOCAL SUPPORT)



PUBLIC R&D CENTERS



NATIONAL AGENCIES



PROFESSIONAL ASSOCIATIONS &  
PLATFORMS



REGIONAL CLUSTERS





# A MASSIVE PLAN TO BECOME A LEADING PLAYER IN THE GREEN H<sub>2</sub> FIELD

## THREE MAIN TARGETS BY 2030

TO ACHIEVE MASS-PRODUCTION OF H<sub>2</sub> BY ELECTROLYSIS  
(CAPACITY OF **6.5 GW**) AND SAVE **6MT** CO<sub>2</sub> BY 2030

TO PROMOTE CARBON-FREE H<sub>2</sub>-FUELED  
HEAVY MOBILITY

TO DEVELOP A FULLY INTEGRATED AND COMPETITIVE  
SECTOR WITH 50,000 TO 150,000 JOBS

FRANCE WELCOMES ALL BUSINESSES INVOLVED IN THE FIGHT AGAINST ENVIRONMENTAL IMPACTS





# €7 BILLION TO SUPPORT ALL PLAYERS IN THE GREEN H<sub>2</sub> SECTOR IN FRANCE

## FROM 2020 :

- **“[REGIONAL HYDROGEN HUB](#)” CALL FOR PROJECTS BY ADEME BACKED BY €275 MILLION UNTIL 2023**
- **“[TECHNOLOGICAL AND DEMONSTRATOR BRICKS](#)” CALL FOR PROJECTS BY ADEME BACKED BY €350 MILLION UNTIL 2023**
- **CALL UP OF OWN INVESTMENT FUNDS IN THE NATIONAL INVESTMENT PROGRAM**

## IN 2021 :

- **CONSTRUCTION OF AN [IMPORTANT PROJECT OF COMMON EUROPEAN INTEREST \(IPCEI\)](#) ON HYDROGEN. EXCEPTIONAL FINANCIAL CONTRIBUTION OF €1.5 BILLION**
- **CALL FOR EXPRESSIONS OF INTEREST (PRIORITY RESEARCH PROGRAM PRP) “HYDROGEN APPLICATIONS” OPERATED BY THE [NATIONAL RESEARCH AGENCY](#) AND BACKED BY €65 MILLION**

## IN 2022:

- **CALL FOR TENDERS IN THE SCOPE FOR THE SUPPORT MECHANISM FOR LOW-CARBON HYDROGEN PRODUCTION, BY ADDITIONAL REMUNERATION**

## **NEW FRAMEWORK FOR PUBLIC SUPPORT FOR RENEWABLE AND LOW-CARBON HYDROGEN BY ELECTROLYSIS IN WATER (INTRODUCED BY THE “HYDROGEN” ORDER – TERMS DEFINED BY THE DECREE OF THE COUNCIL OF STATE IN THE SECOND HALF OF 2021)**

- **TWO DISTINCTIVE FORMS: OPERATIONAL SUPPORT (MAXIMUM OF 20 YEARS) / COMBINATION WITH FINANCIAL SUPPORT FOR INVESTMENT AND OPERATIONAL AID**
- **SUPPORT GRANTED AFTER CALL FOR TENDERS FIXING THE ECONOMIC AND ENVIRONMENTAL CRITERIA FOR SELECTING PLAYERS**
- **BENEFICIARIES: ANY PERSON INSTALLED IN THE TERRITORY OF AN EU OR EEA MEMBER STATE RUNNING A PRODUCTION FACILITY IN FRANCE**





# A REGULATORY FRAMEWORK TO STRUCTURE PRODUCTION AND THE COMMERCIALIZATION OF HYDROGEN

(HYDROGEN ORDER OF FEBRUARY 17, 2021)

## THREE CATEGORIES OF HYDROGEN DEFINED

- **RENEWABLE:** PRODUCT OF ELECTRICITY FROM RENEWABLE ENERGY SOURCES AND WHOSE PRODUCTION PROCESS EMITS A QUANTITY OF CO<sub>2</sub> PER KG OF H<sub>2</sub> PRODUCED INFERIOR TO ONE THRESHOLD
- **LOW-CARBON:** PRODUCT USING NON-RENEWABLE ENERGY SOURCES RESPECTING THE SAME THRESHOLD OF KGCO<sub>2</sub>EQ / KGH<sub>2</sub>
- ➔ **AN EMISSIONS THRESHOLD WILL BE SET BY THE REGULATOR FOR THESE TWO TYPES OF HYDROGEN**
- **CARBON:** REFERS TO NON-RENEWABLE NON LOW-CARBON HYDROGEN

## INJECTION OF HYDROGEN IN NATURAL GAS NETWORKS

- **RESPONSIBILITY OF TRANSPORT NETWORK AND NATURAL GAS DISTRIBUTION MANAGERS**
- **SPECIFIC ARRANGEMENT FOR GUARANTEE OF ORIGIN OF RENEWABLE GAS INJECTED INTO THE NATURAL GAS NETWORK**

## IMPLEMENTATION OF A TRACING SYSTEM

- **GUARANTEE OF ORIGIN** NECESSARY, PARTICULARLY IF HYDROGEN IS LIKELY TO BE MERGED WITH ANOTHER TYPE OF HYDROGEN OR ANOTHER GAS.
- **GUARANTEE OF TRACEABILITY** SUFFICIENT IF RENEWABLE OR LOW-CARBON HYDROGEN IS NOT MIXED WITH ANOTHER TYPE OF HYDROGEN OR ANOTHER GAS
- **RECOGNITION OF GUARANTEE OF ORIGIN** COMING FROM OTHER MEMBER STATES STARTING ON JUNE 30, 2021
- ➔ **THE GUARANTEES WILL BE MANAGED BY AN INDEPENDENT BODY**

## CREATION OF THE NATIONAL HYDROGEN COUNCIL

- **ENSURING THE DEVELOPMENT OF A COMPETITIVE LOW-CARBON FRENCH HYDROGEN SECTOR**
- **PROMOTING THE EMERGENCE OF COLLABORATIVE PROJECTS** AIMING TO STRUCTURE A COMPLETE VALUE CHAIN ON FRENCH TERRITORY OR WITHIN EUROPEAN COOPERATION FRAMEWORKS.







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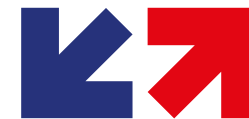
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