Green Hydrogen Technology for System Transformation in Energy and Business & Industry Sectors

4th – 5th October 2023, Benin

WASCAL INITIATIVES FOR GREEN HYDROGEN ECONOMY IN WEST AFRICA

Dr. Bruno KORGO

korgo.b@wascal.org

Regional Coordinator-Renewable Energy and Green Hydrogen

WASCAL

WASCAL
West African Science Service Centre on Climate Change and Adapted Land Use

www.wascal.org

Combating Climate Change. Improving Livelihoods

SPONSORED BY THE
Federal Ministry of Education and Research

WASCAL

- ✓ **WEST AFRICAN SCIENCE SERVICE CENTER FOR CLIMATE CHANGE AND ADAPTED LAND USE**

- ✓ **CREATED IN 2012, INTERNATIONAL ORGANISATION (12 WEST AFRICAN COUNTRIES + GERMANY)**

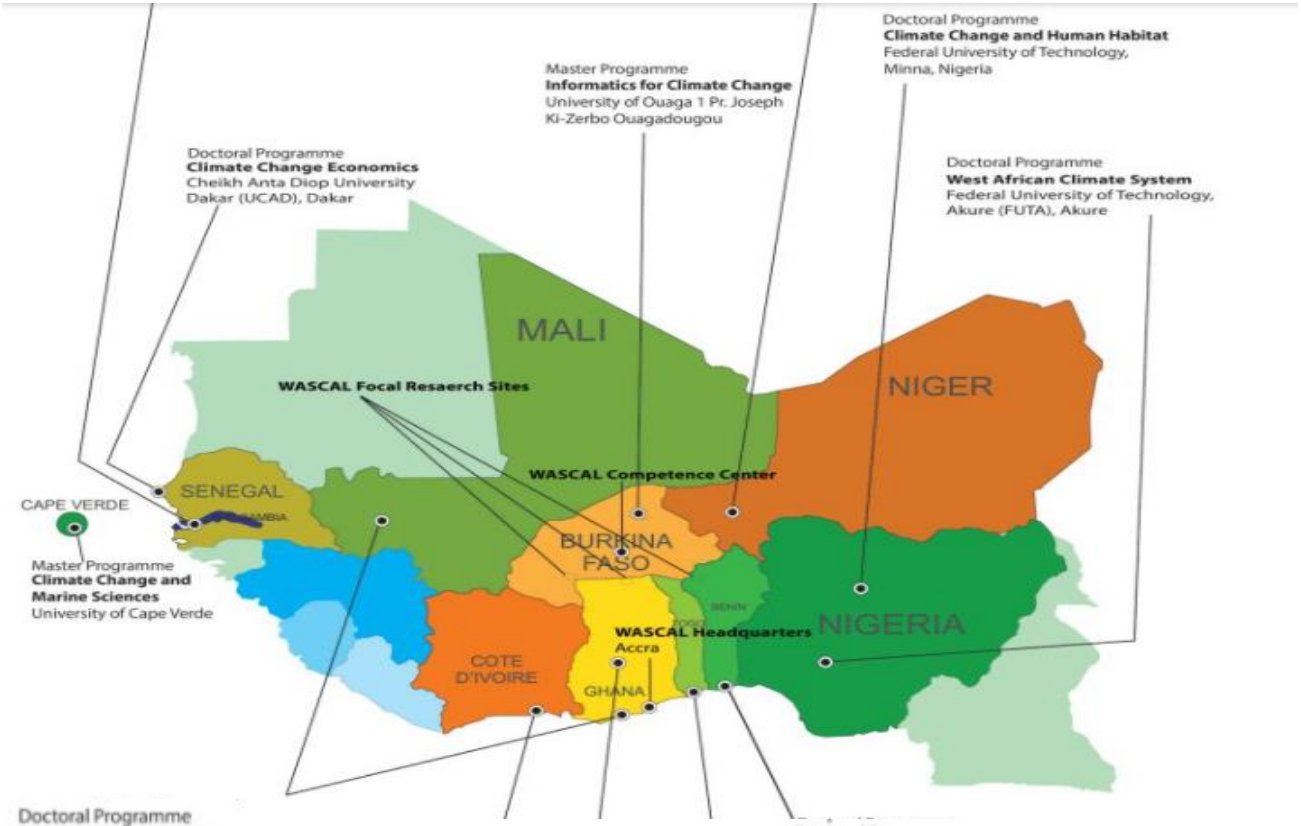
- ✓ **MISSION: IMPROVE SCIENTIFIC KNOWLEDGE ON CLIMATE CHANGE AND ALL RELATED FIELDS, BUILD STRONG CAPACITY AND CLIMATE SERVICES FOR LONG TERM RESILIENCE**

WASCAL
West African Science Service Centre on Climate Change and Adapted Land Use

WASCAL

- ✓ **2 DEPARTMENTS AND 2 PILLARS:**

1- CAPACITY BUILDING, ACCRA GHANA



WASCAL

2 - COMPETENCE CENTER, OUAGADOUGOU, BURKINA FASO: A RESEARCH AND INNOVATION HUB

5 PRIORITY THEMATICS LEADED BY REGIONAL COORDINATORS

- ✓ **Land use/Land cover/Land degradation and Climate Change Nexus**
- ✓ **Risks and vulnerability to climate extremes**
- ✓ **Rural-urban and cross border migration in West Africa**
- ✓ **Sustainable agriculture and climate smart landscapes nexus**
- ✓ **Renewable Energy and Green Hydrogen**

WASCAL GREEN HYDROGEN INITIATIVES

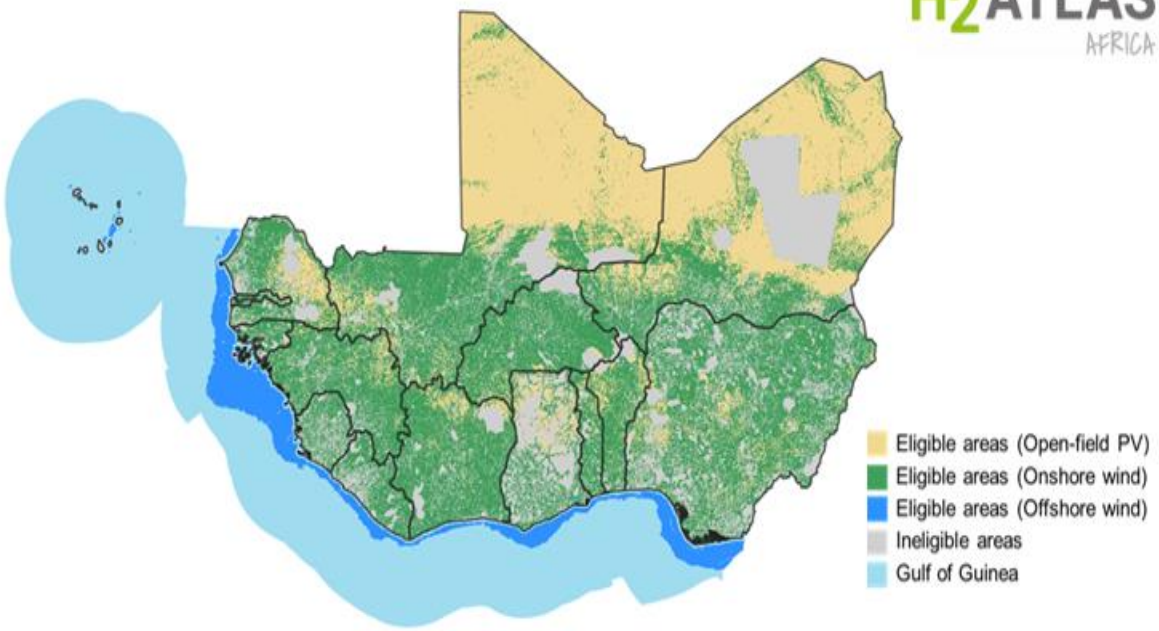
- THE H2 ATLAS AFRICA
- POLICY AND STRATEGIC SUPPORT TO ECOWAS
- INTERNATIONAL MASTER PROGRAM IN ENERGY AND GREEN HYDROGEN
- TECHNICAL STUDIES AND DEMONSTRATIVE PROJECTS

WASCAL GREEN HYDROGEN INITIATIVES

THE H2 ATLAS AFRICA PROJECT

- ✓ **Comprehensive scientific study of ECOWAS green hydrogen potential**
- ✓ **Interactive tool available online: https://africa.h2atlas.de/ecowas**

Result 1: Plenty of Land for Renewable Energies and Local Development

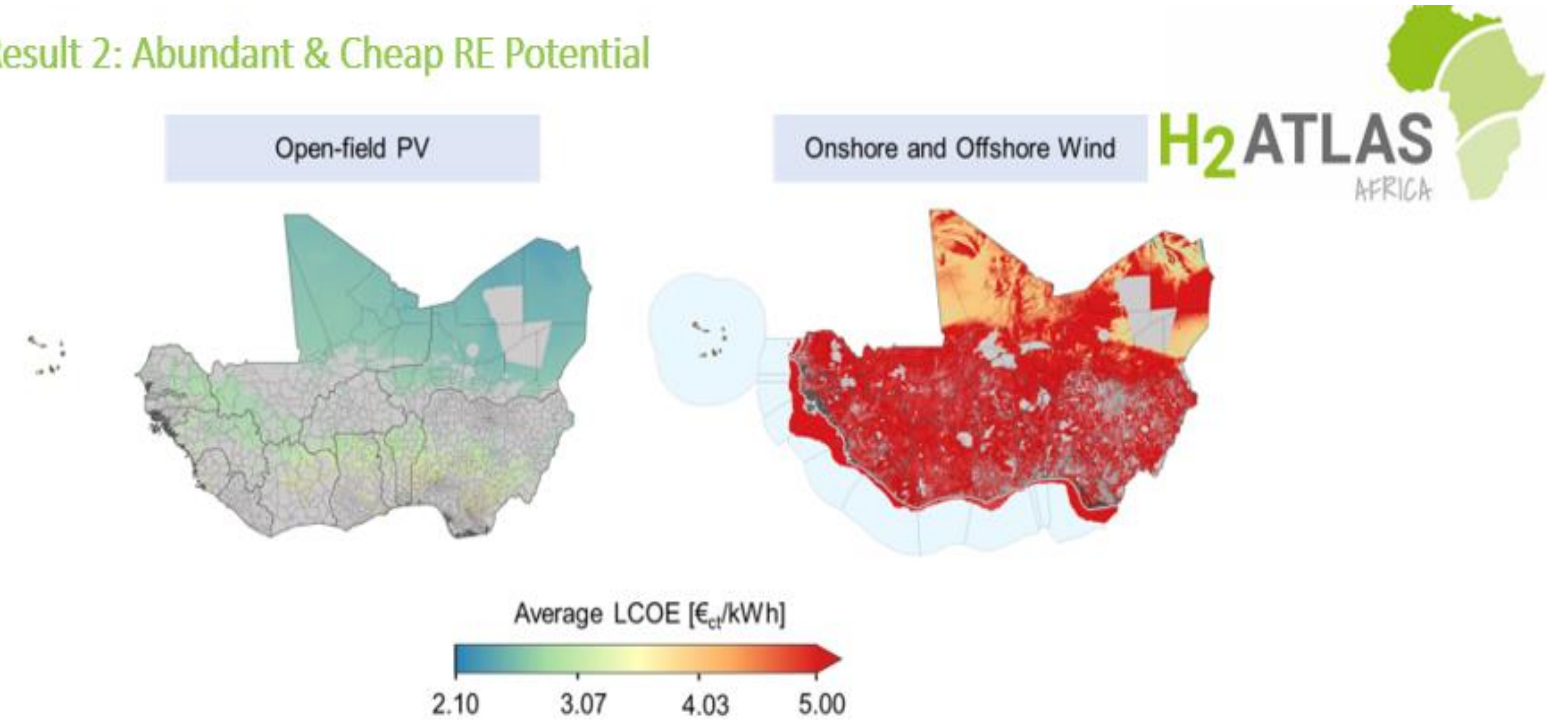


- Potential locations exceed the need for renewable energy placements

WASCAL GREEN HYDROGEN INITIATIVES

THE H2 ATLAS AFRICA PROJECT

Result 2: Abundant & Cheap RE Potential



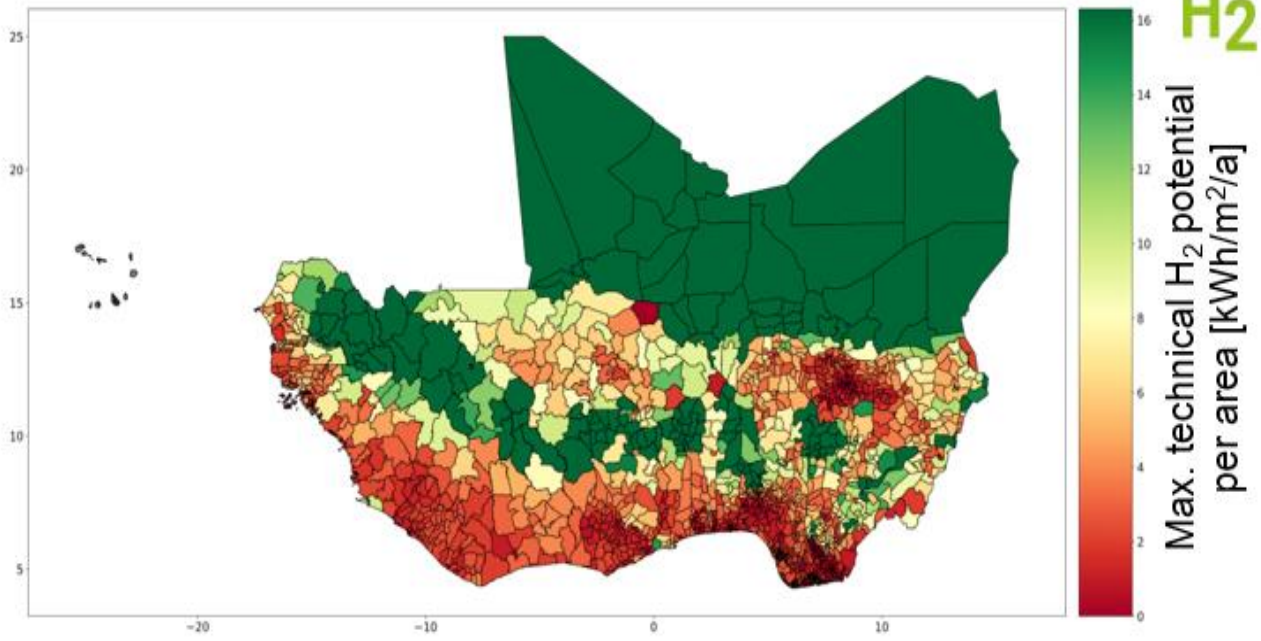
- In most locations wind energy is by far more expensive compared to open-field photovoltaic
- Preference should be given to expanding open-field photovoltaic in West Africa

WASCAL
West African Science Service Centre on Climate Change and Adapted Land Use

WASCAL GREEN HYDROGEN INITIATIVES

THE H2 ATLAS AFRICA PROJECT

Result 3: Huge Technical Green Hydrogen Potential



H2ATLAS AFRICA

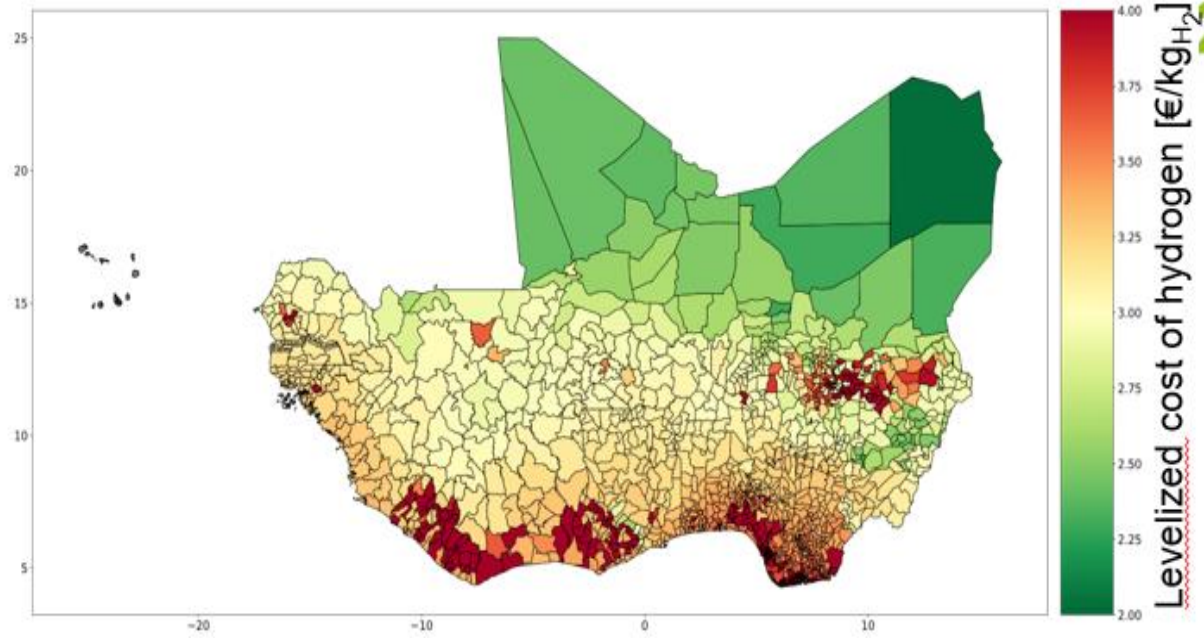
- Technical green hydrogen production potential over 160 PWh; without local demand/water constraint
- Of which ca. 75% are based on open-field photovoltaic

WASCAL
West African Science Service Centre on Climate Change and Adapted Land Use

WASCAL GREEN HYDROGEN INITIATIVES

THE H2 ATLAS AFRICA PROJECT

Result 4: Hydrogen Cost Starts at ~2 €/kgH2 assuming no water constraint



H2 ATLAS AFRICA

- Only moderate increase in hydrogen cost with increasing production
- Regions with cheapest hydrogen cost most often severely constrained by water availability

WASCAL GREEN HYDROGEN INITIATIVES

ECOWAS POLICY AND STRATEGIC SUPPORT

- ✓ **THE ECOWAS GREEN HYDROGEN POLICY**
  - ✓ STRONG COLLABORATION WITH ECREEE AND WASCAL
  - ✓ INVOLVEMENT OF THE ECOWAS COUNTRIES
  - ✓ ECOWAS GREEN HYDROGEN POLICY ADOPTED IN JULY 2023
- ✓ **MAIN OBJECTIVE:** POSITION ECOWAS REGION AS THE MAIN PROVIDER OF GREEN HYDROGEN AND ITS DERIVATIVES WHILE TARGETING LOCAL SOCIOECONOMIC GROWTH
- ✓ **TARGETS:**
  - ✓ 0,5 MILLION TON / YEAR BY 2030
  - ✓ 10 MILLIONS OF TONS / YEAR BY 2050
- ✓ **STRATEGY FRAMEWORK**
  - ✓ INSTITUTIONAL FRAMEWORK (Regional nodal agency, R&D, capacity building, investment)
  - ✓ POLICIES AND GUIDELINES (Certification mechanism, standards and international requirements)
  - ✓ MARKET DEVELOPMENT (Target market, market buiding mechanisms)
  - ✓ CAPACITY BUILDING
  - ✓ RESEARCH AND DEVELOPMENT (Demonstration projects, decentralized production and applications)
  - ✓ FINANCIAL MECHANISM (fiscal incentives, inventive funding mechanisms and PPPs)
  - ✓ INFRASTRUCTURE DEVELOPMENT (GH2 clusters, storage and transport infrastructure, desalination plants)
  - ✓ RISK ASSESSMENT & MITIGATION MECHANISMS

WASCAL GREEN HYDROGEN INITIATIVES

ECOWAS POLICY AND STRATEGIC SUPPORT

- ✓ **ECOWAS GREEN HYDROGEN STRATEGY AND ACTION PLAN**
  - ✓ ONGOING DEVELOPMENT
  - ✓ PROVIDE CONCRETE ACTIONS AND TIMELINE WITH INDICATORS TO REACH THE POLICY GOALS
  - ✓ TECHNICAL VALIDATION SCHEDULED 21 – 22 SEPTEMBER 2023
  - ✓ ADOPTION BY ENERGY MINISTER ON 5-7 OCTOBER 2023

WASCAL GREEN HYDROGEN INITIATIVES

INTERNATIONAL MASTER PROGRAM ON ENERGY AND GREEN HYDROGEN

- ✓ **PROGRAM DEVELOPPED UNDER THE LEADERSHIP OF WASCAL:** Collaboration beetwen 4 West African Universities and German Universities and Research institutions

- ✓ **60 STUDENTS FROM THE 15 ECOWAS COUNTRIES SELECTED**

- ✓ **4 TRAINING SPECIALITIES HOSTED BY 4 WA UNIVERSITIES**
  - ✓ Abdou Moumouni University, Niger: Photovoltaic / system Analysis for Green Hydrogen Technologies
  - ✓ University of Lomé, Togo: Bioenergy/Biofuels and Green Hydrogen Technology
  - ✓ University Félix Houphouet Boigny,Côte d'Ivoire: Green Hydrogen Production and Technology/Geo-resources (Wind/Water) And Green Hydrogen Technology
  - ✓ University Check Anta Diop, Senegal: Economics/Policies/Infrastructures and Green Hydrogen Technology

- ✓ **GERMANY FOR THE LAST SEMESTER: Practical works/lab experience/Thesis**

- ✓ **DEFENSE OF THESIS GRADUATION DONE ON OCTOBER**

WASCAL GREEN HYDROGEN INITIATIVES

DEMONSTRATION PROJECTS AND SCIENTIFIC STUDIES

- ✓ GHANA
- ✓ BURKINA FASO
- ✓ NIGER
- ✓ NIGERIA
- ✓ CÔTE D'IVOIRE
- ✓ CAP VERDE

Obrigado
Thank you
Merci
Danke

WASCAL HEADQUARTERS

West African Science Service Centre on Climate Change and Adapted Land Use

WASCAL, CSIR Office Complex, Agostino Road, Airport Residential Area, PMB CT 504, Cantonments-Accra, Ghana

Tel: +233 302 777 137

press@wascal.org
www.wascal.org