University of Yamanashi (University Functions to be Enhanced: 1. Boost academic excellence in specific areas of the university's strength, 2. Generate innovation that can help solve global issues and advance societal reform, 3. Take a lead in resolving regional issues through collaboration with regional communities.)

Collaborator: Fukushima University

Participators: Tohoku University, Institute of Science Tokyo, Shinshu University, Kyoto University, Osaka University, Kyushu University, Seikei University, National Institute for Materials Science, FC-Cubic, Yamanashi Prefectural Industrial Technology Center, Paul Scherrer Institute, University of Bern, Technical University of Braunschweig, Technical University of Munich, University of Poitiers, University of California (Merced), Brookhaven National Laboratory, University of Quebec, Simon Fraser University, National University of Malaysia, University Putra Malaysia, Universiti Teknologi PETRONAS, Korea Institute of Energy Technology

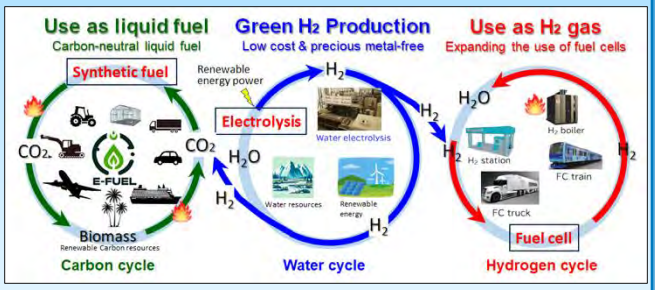
Summary

Vision: University of Yamanashi with
- **world-leading research capabilities in the field of green hydrogen**
- **leadership in economic development through green hydrogen innovation**

Approach the vision

Breakthroughs in technological innovation

- Low-cost H_2 production
- High-performance, durable Fuel cells
- Direct synthesis of fuel from CO_2 & H_2
- Development of world-leading core materials



Accelerating the societal Integration of green hydrogen

- Technology transfer to global companies
- Establishment of model communities, expansion to other regions

Elucidating Mass & Heat Transport Across the Time-Space Hierarchy from Atoms to Devices As a World-Leading Research Hub

Materials Science × AI: A New Experimental Paradigm	Establishment of Trans-Scale Charge Transfer Energy Engineering	Elucidation of the Circulation of Water, Energy and Life

Level Up

Establish A Research and Education Hub

GR/EEN Global Research Institute for Energy and Environmental Neutrality

Advance the Initiatives for Research Enhancement

- **Strengthening Cutting-Edge Research**
- **Brain Circulation across sectors/levels**
- **Tech Transfer Acceleration**
- **Talent Development**

Vision: University of Yamanashi with
- **world-leading research capabilities in the field of green hydrogen**
- **leadership in economic development through green hydrogen innovation**

Excellence in Research
Shape global trends and achieve technological innovations in clean energy research

Global Innovation
Become a world-class innovation hub where knowledge and talent from across the globe converge to drive transformative change

Social Contribution
Lead the social implementation of green hydrogen and develop model communities for a sustainable future

Virtuous Cycle of Research & Education
Foster a sustainable pipeline of highly skilled talent to advance a carbon-neutral society through research and education

Level up & Approach the vision

World-Leading Research Hub | **Breakthroughs in Technological Innovation** | **Accelerating the Societal Integration of Green Hydrogen**

Challenges

- Improve productivity of researchers
- Increase international influence
- Execute the social implementation process
- Resolve the shortage of human resources

Initiative-driven problem solving

Initiative 1: Strengthening Cutting-Edge Research
- Recruit the top-tier researchers and promising young talent. Implement a flexible, performance-based salary and HR system to attract and retain excellence
- Prioritize the strategic deployment of highly skilled professional staff to support GR/EEN researchers
- Introduce new scholarship to promote enrollment of PhD students

Initiative 2: Brain Circulation across Sectors/levels
- Establish international joint research bases to foster collaboration between Yamanashi Univ. and global institutions
- Enhance clean energy research through domestic and international partnership
- Promote interdisciplinary research across fields

Research and Innovation Promotion Headquarters
President-led governance and allocation of various resources, strategic Intelligence analysis etc.

GR/EEN — Global Research Institute for Energy and Environmental Neutrality
- **Research & Education Hub of Clean Energy**
- **Zero Emission MIRAI Lab**
  Schedule to complete in 2025

Initiative 4: Talent Development
- Offer the unique Integrated education program from undergraduate to PhD level on Clean Energy Specialty Course
- Establish a Dual Degree program as an international collaborative graduate education framework
- Provide a new Collaborative Education program with Fukushima Univ. as “Joint HR Development Courses”

Initiative 3: Technology Transfer Acceleration
- Establish a feedback system between R&D & social value to assess impact
- Attract joint bases with FC-Cubic to promote industry-academia-government collaboration
- Construct a new incubation center to support start-up creation and Innovation

Framework

University Headquarters: governance structure to realize initiatives

The headquarter, headed by the president, will strategically allocate resources and promote reform of existing systems.

Research and Innovation Promotion Headquarters

- Planning and formulating strategies to improve research capabilities, and Management of the initiatives by the President & seven Vice Presidents

Working Group to support Headquarters

Members: Vice Presidents in charge, University Research Administrators, staffs from the Academic Research Department and the Finance Department

Research Strategy Office *Newly established

Research strategists collect information and analyze data to evaluate our research capabilities which lead to evidence-based management

Advise by International External Evaluation Committee

Manage progress

Organization for the Promotion of Research and Social Collaboration as strategy execution body

Academic Research Department	Core Facility Center	Research Administration Center	Social Collaboration & Intellectual Property Office
Administrative staff and assistants	Management & promotion of sharing research equipment & lab technicians	URA: Pre- & Post-Award Research administration	Coordinate & manage joint research, IP & start up seeds

UEA (Newly established) : Univ. Education Administrator; support for educational tasks of professors

request ⇅ dispatched

coordination

Focused support

Allocate staff

Implementation system to level up GR/EEN research capability

Strengthen connections with:

- Yamanashi prefectural-Next Generation Energy System R & D Village (**Nesrad**)
- Yamanashi Hydrogen and Fuel Cell Network Conference

Promote international collaborations

- Set up the overseas bases
- Develop collaborative research
- Create the Dual Degree program for graduate students

Set up the base at GR/ EEN

Collaborator: Fukushima University
Hydrogen Energy Research Institute

Invite GR/EEN Vice Director, As a Cross Appointment Resercher

Platform for sharing faculty members

GR/EEN

Members:

- **Top-Tier Researchers and Young Researchers (certified by SHINGEN research fellowship program)**
- **Doctoral students (certified by Next-SHINGEN scholarship)**

GR/EEN support office

- URA • UEA • Lab Technician • Administrative staff
- International Collaboration Coordinator
- Regional Revitalization Coordinator • IP manager

Cutting-Edge Research

- **Hydrogen and Fuel Cell Nanomaterials Center**
- **Clean Energy Research Center**

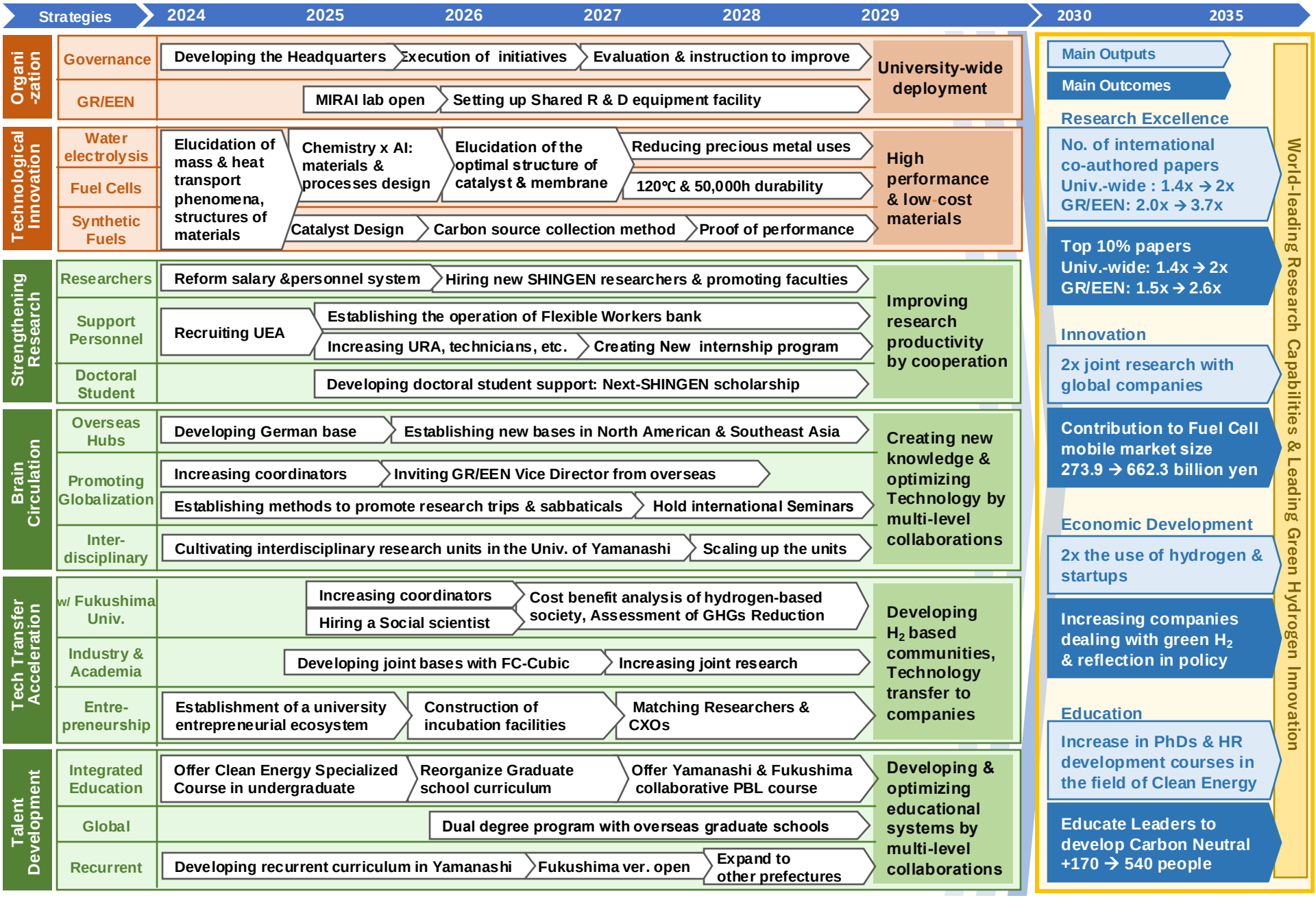
Integration

Flexible Worker Bank: Use effectively retired faculties etc.

Departments in charge of educational governance, admission, student support, etc.

Increase interdisciplinary research units & next cutting-edge research from faculties of engineering, medicine, life & environmental science, & education

Timeline


Strategies
2024
2025
2026
2027
2028
2029
2030
2035
Organi-zation
Governance
Developing the Headquarters
Execution of initiatives
Evaluation & instruction to improve
GR/EEN
MIRAI lab open
Setting up Shared R & D equipment facility
University-wide deployment
Technological Innovation
Water electrolysis
Fuel Cells
Synthetic Fuels
Elucidation of mass & heat transport phenomena, structures of materials
Chemistry x AI: materials & processes design
Elucidation of the optimal structure of catalyst & membrane
Reducing precious metal uses
120℃ & 50,000h durability
Catalyst Design
Carbon source collection method
Proof of performance
High performance & low-cost materials
Strengthening Research
Researchers
Reform salary &personnel system
Hiring new SHINGEN researchers & promoting faculties
Support Personnel
Recruiting UEA
Establishing the operation of Flexible Workers bank
Increasing URA, technicians, etc.
Creating New internship program
Doctoral Student
Developing doctoral student support: Next-SHINGEN scholarship
Improving research productivity by cooperation
Brain Circulation
Overseas Hubs
Developing German base
Establishing new bases in North American & Southeast Asia
Promoting Globalization
Increasing coordinators
Inviting GR/EEN Vice Director from overseas
Establishing methods to promote research trips & sabbaticals
Hold international Seminars
Inter-disciplinary
Cultivating interdisciplinary research units in the Univ. of Yamanashi
Scaling up the units
Creating new knowledge & optimizing Technology by multi-level collaborations
Tech Transfer Acceleration
w/ Fukushima Univ.
Increasing coordinators
Hiring a Social scientist
Cost benefit analysis of hydrogen-based society, Assessment of GHGs Reduction
Industry & Academia
Developing joint bases with FC-Cubic
Increasing joint research
Entre-preneurship
Establishment of a university entrepreneurial ecosystem
Construction of incubation facilities
Matching Researchers & CXOs
Developing H_2 based communities, Technology transfer to companies
Talent Development
Integrated Education
Offer Clean Energy Specialized Course in undergraduate
Reorganize Graduate school curriculum
Offer Yamanashi & Fukushima collaborative PBL course
Global
Dual degree program with overseas graduate schools
Recurrent
Developing recurrent curriculum in Yamanashi
Fukushima ver. open
Expand to other prefectures
Developing & optimizing educational systems by multi-level collaborations
Main Outputs
Main Outcomes
Research Excellence
No. of international co-authored papers
Univ.-wide : 1.4x → 2x
GR/EEN: 2.0x → 3.7x
Top 10% papers
Univ.-wide: 1.4x → 2x
GR/EEN: 1.5x → 2.6x
Innovation
2x joint research with global companies
Contribution to Fuel Cell mobile market size
273.9 → 662.3 billion yen
Economic Development
2x the use of hydrogen & startups
Increasing companies dealing with green H_2 & reflection in policy
Education
Increase in PhDs & HR development courses in the field of Clean Energy
Educate Leaders to develop Carbon Neutral
+170 → 540 people
World-leading Research Capabilities & Leading Green Hydrogen Innovation