CAHYO WIDOKO LAKSONO, M.Env.

PhD Candidate – Environmental Systems | Energy & Resource Recovery from Waste
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PROFESSIONAL SUMMARY

Environmental researcher with 8+ years of combined academic and professional experience spanning experimental laboratory research, computational modelling, and environmental policy implementation. Currently pursuing a PhD at The University of Tokyo, designing phased decarbonization pathways for Indonesia's waste sector and developing the Adaptive Life Cycle Sustainability Assessment (LCSA) framework. Research integrates thermochemical waste conversion, carbon pricing economics, and life cycle assessment across environmental, economic, social, and circularity dimensions.
Prior laboratory experience includes nanomaterial synthesis and characterisation (AgNPs, Graphene Oxide), biogas optimisation reactor experiments, and wastewater treatment system design. Complementary expertise in GIS-based spatial analysis (mangrove blue carbon), data analytics (Python), and environmental management systems (ISO 14001/50001). Published researcher, ADB–Japan Scholar, and Japan Science and Technology researcher fellow.

The University of Tokyo – Doctoral Program *2024 – Present (Expected Sep 2027)*
Graduate School of Frontier Sciences, Department of Environmental Systems, Kashiwa, Japan
Funded by Japan Science and Technology Agency (JST) SPRING GX Program

- Thesis: Assessment of Energy and Resource Recovery from Wastes in the Decarbonization Efforts Aligned with Sustainable Life Cycle
- Supervisors: Prof. Yasuaki Hijioka, Prof. Minoru Fujii, Prof. Kenichi Nakajima
- Designed six-scenario backcasting framework for Indonesia's net-zero waste sector pathway (2025–2060)
- Developed Adaptive-LCSA framework with Dynamic Boundary Condition Logic for multi-decade WtE assessment
- Carbon price calibration using PCHIP interpolation and Monte Carlo simulation (N=5,000)

The University of Tokyo – Master of Environmental Studies *2022 – 2024*
GPA: 4.00/4.00 | ADB–Japan Scholarship Program

- Thesis: Spatial Cost-Benefit Analysis of Mangrove Restoration for Blue Carbon under Climate Scenarios
- Developed QGIS/Python-based geospatial models integrating climate projections with ecosystem service valuations

Universitas Islam Indonesia – B.Eng. Environmental Engineering *2014 – 2018*
GPA: 3.81/4.00 | Outstanding Student Award

- Thesis: Performance of Luffa cylindrica Sponge Media Coated with Silver Nanoparticles (AgNPs) and Graphene Oxide (GO) for Wastewater Disinfection
- Hands-on nanomaterial synthesis, characterisation (SEM, XRD), and bench-scale reactor experiments

SELF-DIRECTED RESEARCH PROJECTS (DOCTORAL)

DecarBond *2025 – 2026*
Hybrid Concrete Systems Utilizing MSW Insulators and 3D-Printed Plastic Lattices for Net-Zero Construction

- Designing experimental programme for mechanical testing of MSW-derived insulator composites in concrete matrices
- Integrating waste-stream material characterisation with structural performance evaluation

Polygeneration from MSW via Chemical Looping *2025 – 2026*
Chemical Looping Hydrogen Generation from Municipal Solid Waste

- Developing reactor design concepts for oxygen carrier-mediated hydrogen production from waste feedstocks
- Evaluating Fe/Cu/Mn-based oxygen carriers for MSW syngas conversion with inherent CO_2 separation

Social Impact Assessment of WtE Integration *2026 – Present*
Field Evidence from TPA Benowo, Surabaya, Indonesia

- Conducting primary field data collection on socio-economic impacts of WtE facility integration
- Developing S-LCA indicators for informal waste sector transition in developing economies

PROFESSIONAL EXPERIENCE

Research Assistant – National Institute for Environmental Studies (NIES) *2025 – Present*
Social System Division, Tsukuba, Japan

- Conducting research on decarbonization strategies and life cycle sustainability assessment
- Developing computational models for sustainability assessment of social systems

Biogas Analyst – Arsec Bioenergy, GPSS Group, Kashiwa Lab *2023 – 2024*

- Performed laboratory-scale biogas optimisation experiments: substrate characterisation, batch digestion trials, gas chromatography analysis
- Applied statistical methods to identify optimal operating parameters for methane yield improvement

Data Analyst – Ministry of Environment and Forestry, Indonesia *2020 – 2022*
Center for Facilitation of Environment and Forestry Instruments Standard Implementation

- Designed and implemented data analysis pipelines for national environmental and forestry standards
- Supported regulatory compliance frameworks for sustainable practices across government programmes

PUBLICATIONS & PROFESSIONAL CONTRIBUTIONS

- Nurmiyanto, A., Ardhayanti, L.I., Wigati, A., & Laksono, C. (2020). Performance evaluation of water filter made from oyong (Luffa cylindrica) fiber coated with silver nanoparticles for coliform bacteria removal in wastewater. Applied Mechanics and Materials, 898, 9–15.
- Co-author, Indonesia SCP Framework Implementation Strategy 2020–2030 (Ministry of Environment and Forestry)
- Co-author, Indonesian Sustainable Action Guidelines (first edition)
- Facilitator, Environmental Management System Guidelines for SMEs development

TECHNICAL SKILLS

Assessment & Modelling: Life Cycle Assessment (OpenLCA), LCSA, Carbon Pricing Models, Monte Carlo Simulation, Discounted Cash Flow Analysis, Backcasting Scenario Design
Computational: Python (NumPy, SciPy, Pandas, Matplotlib), Fortran, QGIS, ArcGIS, AutoCAD
Laboratory: Nanomaterial Synthesis (AgNPs, GO), Biogas Reactor Operation, Gas Chromatography, SEM/XRD Characterisation, Wastewater Treatment System Design
Standards & Certification: ISO 14001 EMS, ISO 50001 EnMS, Data Analyst Professional Academy
Languages: English (Fluent), Indonesian (Native), Japanese (Beginner), German (Beginner)

HONOURS & AWARDS

- JST SPRING GX Doctoral Fellowship, Japan Science and Technology Agency (2024)
- Asian Development Bank – Japan Scholarship Program (full funding, 2022)
- Winner, KLHK SDGs Nation Essay Competition, Ministry of Environment and Forestry (2021)
- Blog Competition Winner, Ambition for Climate Adaptation, IESR (2020)
- Outstanding Student, Department of Environmental Engineering, UII (2018)

PROFESSIONAL MEMBERSHIPS & LEADERSHIP

- Member, International Society for Ecological Industry (2026–Present)
- Member, Institute of Life Cycle Assessment, Japan (2024–Present)
- Co-founder & Head of Research, Zero Waste UII – led zero waste campaigns and policy implementation (2016–2018)