



**S  
D  
G  
's**

**9** **INDUSTRY, INNOVATION  
AND INFRASTRUCTURE**



**R  
E  
P  
O  
R  
T**

“Investments in infrastructure – transport, irrigation, energy and information and communication technology – are crucial to achieving sustainable development and empowering communities in many countries.”

-THE Impact Rankings

# 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



Number of	
Number of employees	3,760
Number of academic staff	1,950
Research income from industry and commerce: Total (IDR)	768,507,872,162

Number of	
Number of academic staff by subject area: STEM	937
Number of academic staff by subject area: Medicine	398
Number of academic staff by subject area: Arts & Humanities / Social sciences	615
Number of university spin-offs	111

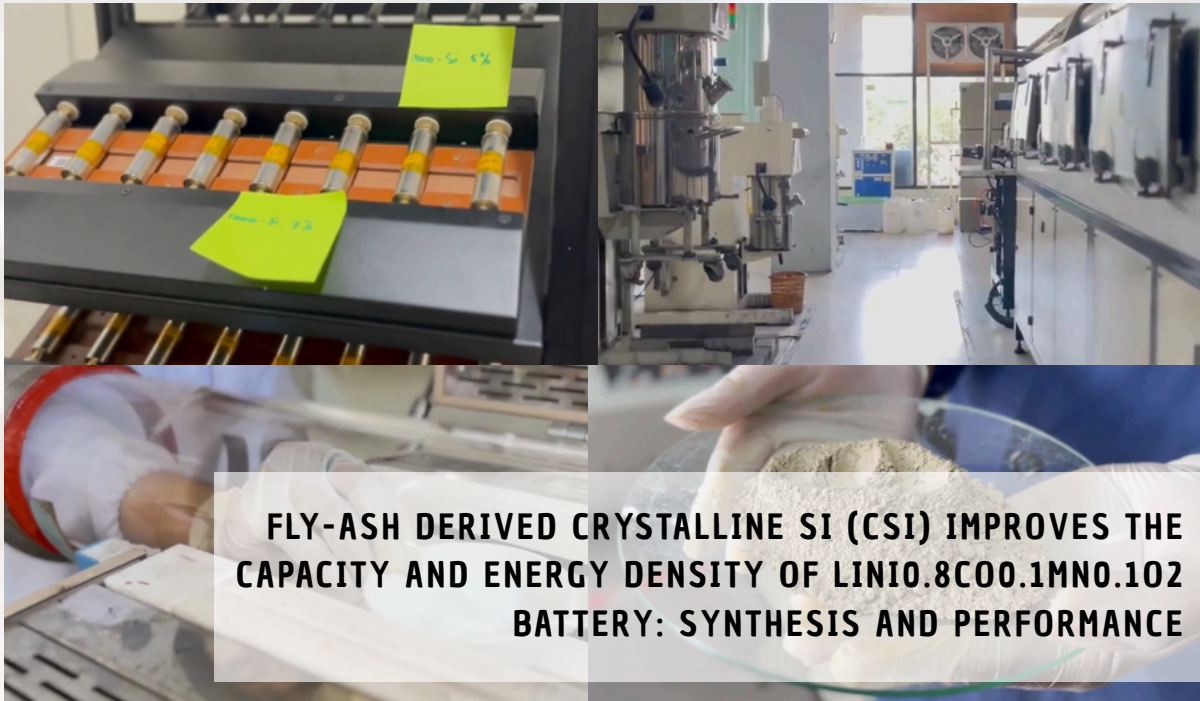
“  
14.1  
Impact Factor

RESEARCH IN NUMBERS (2024)  
178  
publications



Universitas Sebelas Maret (UNS) is committed to disseminating and implementing the values of SDGs 1-17 through a wide range of education, research, and community engagement programs. One example of this commitment is the dissemination of this research on

# SDG 9



**FLY-ASH DERIVED CRYSTALLINE SI (CSI) IMPROVES THE CAPACITY AND ENERGY DENSITY OF  $\text{LiNi}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_2$  BATTERY: SYNTHESIS AND PERFORMANCE**



## RESEARCH ARTICLE

The study successfully converted type-C fly ash into high-purity crystalline silicon (cSi) and incorporated it into  $\text{LiNi}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_2$  battery cells, resulting in significantly improved capacity and energy density, demonstrating a promising route for sustainable battery material development



## 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



# BUILD RESILIENT, INFRASTRUCTURE, PROMOTE SUSTAINABLE INDUSTRIALISATION, AND FOSTER INNOVATION

## 1 PUI Lithium Battery and Faculty of Engineering UNS Host 2024 International Conference

Universitas Sebelas Maret, through the Center of Excellence for Science and Technology (PUI) Lithium Battery in collaboration with the Faculty of Engineering, held the **2024 ICESTA and ICCEEAS International Conferences**. This event served as a scientific forum for sharing research findings, innovations, and technological advancements in sustainable energy, power systems, and electrical engineering. The main objective was **to foster global collaboration in supporting the clean energy transition and to strengthen Indonesia's role in the battery and future energy technology industries.**



The conference demonstrated its strong contribution to technological innovation and development through 54 accepted articles, all of which underwent a rigorous selection process published in leading international journals. It is expected that this conference will serve as **a platform to sustain collaboration and bridge knowledge and research exchanges with relevant institutions worldwide.**

## 2 Innovation in the Automotive Sector



The Bengawan Team from Universitas Sebelas Maret (UNS) achieved outstanding success at the **2024 Energy Efficient Car Contest (KMHE)**. The team showcased a highly efficient and innovative vehicle, **winning first place** in two categories: Prototype MPD Gasoline, with an impressive efficiency record of 743.10 km/liter, and Urban MPD Diesel, with a record of 226.83 km/liter. This remarkable achievement underscores UNS's strong commitment to **advancing sustainable and energy-efficient automotive technology innovation.**

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



BUILD RESILIENT, INFRASTRUCTURE, PROMOTE SUSTAINABLE INDUSTRIALISATION, AND FOSTER INNOVATION

3 Innovation to Enhance Productivity in the Aren Flour Industry



A research team from the Faculty of Engineering, Universitas Sebelas Maret (UNS) Surakarta successfully implemented a **Community Service and Research Program (P2M)** in Dalem Village, Tulung Subdistrict, Klaten Regency. This initiative aimed to **enhance the productivity of the local aren flour industry** through agricultural mechanization by introducing a specially designed aren grating and pressing machine to accelerate and simplify the production process.

The program yielded positive outcomes, including **improved production efficiency and significant savings in time and labor**. The increased output of aren extract has enabled farmers to **boost their production capacity and income, contributing to the growth and sustainability of local agro-industries**.

4 Universitas Sebelas Maret (UNS) Develops and Tests BESS with PLN at Pelabuhan Ratu

Universitas Sebelas Maret (UNS) demonstrates its role in renewable energy innovation by **providing Battery Energy Storage System (BESS) training to PT PLN (Persero)**. In addition to training, UNS has independently **developed and produced BESS units** as a result of its research and technological advancement in power engineering. The **BESS prototype has been tested at PLN's Production Office in Pelabuhan Ratu**, West Java, to support efficiency and stability in renewable energy-based power systems. This initiative highlights UNS's commitment to advancing clean energy transition and enhancing human resource capacity in Indonesia's electricity sector.

