

# Inaugural Lecture

## Kathmandu University

**Sunil Prasad Lohani, PhD**

**Lead : Renewable and Sustainable Energy Laboratory**

**Department of Mechanical Engineering, Kathmandu University**

Email: [splohani@ku.edu.np](mailto:splohani@ku.edu.np)

October 2, 2024

# Brief Information

**Sunil Prasad Lohani, PhD**  
**Associate Professor since 2018 June**

## **Teaching**

**Renewable Energy for Undergraduate and Graduate**  
**Research Methodology for Graduate**  
**Engineering Thermodynamics for Undergraduate**

## **Project and Thesis Supervision**

**Graduate projects, theses and dissertations**  
**Undergraduate projects**

A Brief Glance of  
**Renewable and Sustainable Energy  
Laboratory (RSEL)**  
Kathmandu University



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# RSEL Objectives

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- Contribute to the research and development of clean energy solutions in Nepal via scientific, Local, and practitioner knowledge
- Create a collaborative bridge between academia, policy maker, national and international partners, society to identify challenges, solutions, and holistic information
- Provide aid in formulating evidence-based and clean energy-based economic development policies at the local and national level
- Strengthen research capacity development of faculty and students, and support interdisciplinary graduate program

# RSEL Thematic Area

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Net zero emissions and 100% Renewables



Energy Storage



Building Energy Efficiency



Circular Bio-Economy



Clean energy transition (clean cooking, transport etc.)

# RSEL Team

Prof. Sunil P Lohani



## Lead

Renewable and Sustainable  
Energy Laboratory (RSEL)  
School of Engineering  
Kathmandu University

## PhD Fellows



Geeta Bhatta



Navin Jha



Sujesh  
Shrestha



Ravi Suwal



Utsav S.  
Rajbhandari

## Researchers



Poushan Shrestha



Urusha Gautam



Rajani Neupane



Smika Sharma

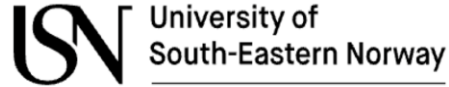


Sarvesh Pandey

# International Collaborations with Professors from:

Europe

Technology  
Arts Sciences  
TH Köln



university of  
 groningen



WAGENINGEN  
UNIVERSITY & RESEARCH

USA



Australia



Charles Sturt  
University



Australian  
National  
University

Asia



# Current Projects

|  | Budget     | Involvements                           | Year      |
|--|------------|--|-----------|
| Blended Learning Environments for Nepal's Dynamic Energy Development using an Interactive Distance Education Approach (BLENDED-IDEA). Funded by ERASMUS PLUS, EU.  | 577K Euro  | Germany, Italy, Nepal                  | 2025-2026 |
| Advanced Climate Change Education for Sustainable futures and Systems change (ACCESS). Funded by ERASMUS PLUS.   | 400K Euro  | Finland, Nepal                         | 2024-2026 |
| Technological and socio-economic solutions to reduce small scale combustion emissions in Nepal (SmokefreeHome). Funded by Research Council of Finland.   | 577K Euro  | Finland, Nepal                         | 2023-2026 |
| Instituting of Research-based education systems for the development of Renewable energy technology in the Circular economy (Re-Tech). Funded by Norwegian Partnership Programme for Global Academic Cooperation (NORPART). | 8.1mil NOK | Norway, Nepal<br>Bangladesh, Sri Lanka | 2022-2026 |



# Current Projects

|   | Budget      | Involvements                  | Year      |
|---|-------------|-------------------------------|-----------|
| Promoting Himalayan Development by Strengthening Teaching and Research on Sustainable Development Goals (ForHimSDG) Funded by Federal Ministry for Economic Cooperation and Development, German Academic Exchange Service (DAAD). | 325K Euro   | Germany, Nepal, Thailand      | 2022-2025 |
| The Doctoral school in Sustainable Energy Engineering (SEED) Funded by Swedish Research Council (VR).   | 7.49mil NOK | Sweden, Bolivia, India, Nepal | 2022-2025 |
| Demonstrating applicability of modified prefabricated household floating drum biodigester (ENEP-RENP-II-22-04) Funded by EnergizeNepal Project (NORAD).   | 6.9mil NRs  | Nepal                         | 2022-2024 |
| Energizing Higher Education – Renewable Energy for Economic Transition (e-REET),Funded by German Academic Exchange Program (DAAD), Germany.   | 200K Euro   | Germany, Nepal                | 2021-2024 |

# Student Mobility Under Current Projects (2021-2024)

36 - Total Exchange

29- Exchange from KU

7 – Exchange to KU

## SEED

7 PhD exchange

## e-REET

2 PhD, 7 masters and 2 Bachelor's exchange  
and 2 masters exchange to KU

## Re-Tech

1 PhD, 5 masters exchange

## ForHimSDG

2 PhD, 1 masters exchange to AIT  
and 3 masters: AIT to KU

10 more exchange by 2026

- [1] Lohani SP, Acharya R, Shrestha P, Shrestha S, Manisha K, Pradhan P. Sustainable biogas production potential in Nepal using waste biomass: A spatial analysis. *Sustainable Development* 2024. doi: <https://doi.org/10.1002/sd.2937>
- [2] Lohani SP, Shaw TK, Shrestha S, Dhungana B, Jha NK, Chen H, et al. Household biogas technology in the cold climate of low-income countries: a review of sustainable technologies for accelerating biogas generation. *Prog Energy* 2024;6:032003. doi: 10.1088/2516-1083/ad407f.
- [3] KC D, Lohani SP, Shrestha P, Xue C. Expert perspective on technological choice for cooking energy transition in Nepal. *Clean Energy* 2024;8:40–8.
- [4] Timilsina MS, Chaudhary Y, Shah AK, Lohani SP, Bhandari R, Uprety B. Syngas composition analysis for waste to methanol production: Techno-economic assessment using machine learning and Aspen plus. *Renewable Energy* 2024;228:120574.
- [5] Jha NK, Mainali B, Lohani SP. Strategy for Circularity Enhancement in Bioeconomy Sector: A Case Study from Biogas Sector of Nepal. *Circular Economy and Sustainability* 2024:1–27.
- [6] Shaw TK, Rajendran DK, Raghuvanshi S, Lohani SP. Evaluating the Influence of Calcined Eggshells and Ultrasonication in the Co-Digestion of Avoidable and Unavoidable Food Waste and OLS regression analysis of the Reactor System. *Journal of Cleaner Production* 2024:142789.
- [7] Cheng S, Lohani SP, Rajbhandari US, Shrestha P, Shrees S, Bhandari R, et al. Sustainability of large-scale commercial biogas plants in Nepal. *Journal of Cleaner Production* 2023:139777. doi: 10.1016/j.jclepro.2023.139777.
- [8] Shrestha RP, Jirakiattikul S, Lohani SP, Shrestha M. Perceived impact of electricity on productive end use and its reality: Transition from electricity to income for rural Nepalese women. *Energy Policy* 2023;183:113839.

# Recent Publications (2021-2024)

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- [9] Lin L, Yang D, Luo Z, Liu D, Lohani SP, Jia S, et al. Numerical study on melting and heat transfer characteristics of vertical cylindrical PCM with a focus on the solid-liquid interface heat transfer rate. *Journal of Energy Storage* 2023;72:108370.
- [10] Shrestha S, Pandey R, Aryal N, Lohani SP. Recent advances in co-digestion conjugates for anaerobic digestion of food waste. *Journal of Environmental Management* 2023;345:118785. doi: 10.1016/j.jenvman.2023.118785.
- [11] Xu Q, Yang G, Wang C, Liu Z, Zhang X, Li Z, et al. Experimental study on the reinforcement of a gravity heat pipe based on a latent thermal functionally fluid. *Energy* 2023;278:127782.
- [12] Chen H, Xu Q, Cheng S, Wu T, Boitin T, Lohani SP, et al. Comprehensive Analysis and Greenhouse Gas Reduction Assessment of the First Large-Scale Biogas Generation Plant in West Africa. *Atmosphere* 2023;14. doi: 10.3390/atmos14050876.
- [13] Bista U, Rayamajhi B, Dhungana B, Lohani SP. Biogas Production by Co-Digestion of Food Waste with Sewage Sludge and Poultry Litter: A Way Towards Sustainable Waste-to-Energy Conversion. *Journal of Renewable Energy and Environment* 2023;10:39–44. doi: 10.30501/jree.2022.333462.1342.
- [14] Lohani SP, Gurung P, Gautam B, Kafle U, Fulford D, Jeuland M. Current status, prospects, and implications of renewable energy for achieving sustainable development goals in Nepal. *Sustainable Development* 2023;31:572–85. doi: 10.1002/sd.2392.
- [15] Kafle U, Anderson T, Lohani SP. The potential for rooftop photovoltaic systems in Nepal. *Energies* 2023;16:747.
- [16] Sedai A, Dhakal R, Koirala P, Gautam S, Pokhrel R, Lohani SP, et al. Renewable energy resource assessment for rural electrification: a case study in Nepal. *International Journal of Low-Carbon Technologies* 2023;18:1107–19.

# Recent Publications (2021-2024)

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- [17] Shrestha S, Lohani SP. CFD analysis for mixing performance of different types of household biodigesters. *Clean Energy* 2022;6:325–34.
- [18] Dhungana B, Lohani SP, Marsolek M. Anaerobic co-digestion of food waste with livestock manure at ambient temperature: a biogas based circular economy and sustainable development goals. *Sustainability* 2022;14:3307.
- [19] Lohani SP, Pokhrel D, Bhattarai S, Pokhrel AK. Technical assessment of installed domestic biogas plants in Kavre, Nepal. *Renewable Energy* 2022;181:1250–7. doi: 10.1016/j.renene.2021.09.092.
- [20] Lohani SP, Keitsch M, Shakya S, Fulford D. Waste to energy in Kathmandu Nepal—A way toward achieving sustainable development goals. *Sustainable Development* 2021;29:906–14. doi: 10.1002/sd.2183.
- [21] Lohani SP, Dhungana B, Horn H, Khatiwada D. Small-scale biogas technology and clean cooking fuel: Assessing the potential and links with SDGs in low-income countries – A case study of Nepal. *Sustainable Energy Technologies and Assessments* 2021;46:101301. doi: 10.1016/j.seta.2021.101301.
- [22] Lohani SP, Blakers A. 100% renewable energy with pumped-hydro-energy storage in Nepal. *Clean Energy* 2021;5:243–53.
- [23] Paudel D, Jeuland M, Lohani SP. Cooking-energy transition in Nepal: trend review. *Clean Energy* 2021;5:1–9. doi: 10.1093/ce/zkaa022.
- [24] Lohani SP, Shakya S, Gurung P, Dhungana B, Paudel D, Mainali B. Anaerobic co-digestion of food waste, poultry litter and sewage sludge: seasonal performance under ambient condition and model evaluation. *Energy Sources, Part A: Recovery, Utilization, and Environmental Effects* 2021:1–16. doi: 10.1080/15567036.2021.1887976.

# Key Activities of RSEL in 2024

## Re-Tech Project meeting at the University of South Eastern Norway



**Prof. Sunil Lohani, attended Re-Tech, NORPART project meeting at the University of South Eastern Norway, where he met with Prof. Morten Christian Melaaen, Dean of the Faculty of Technology, Natural Sciences, and Maritime Sciences.**

# Key Activities of RSEL in 2024



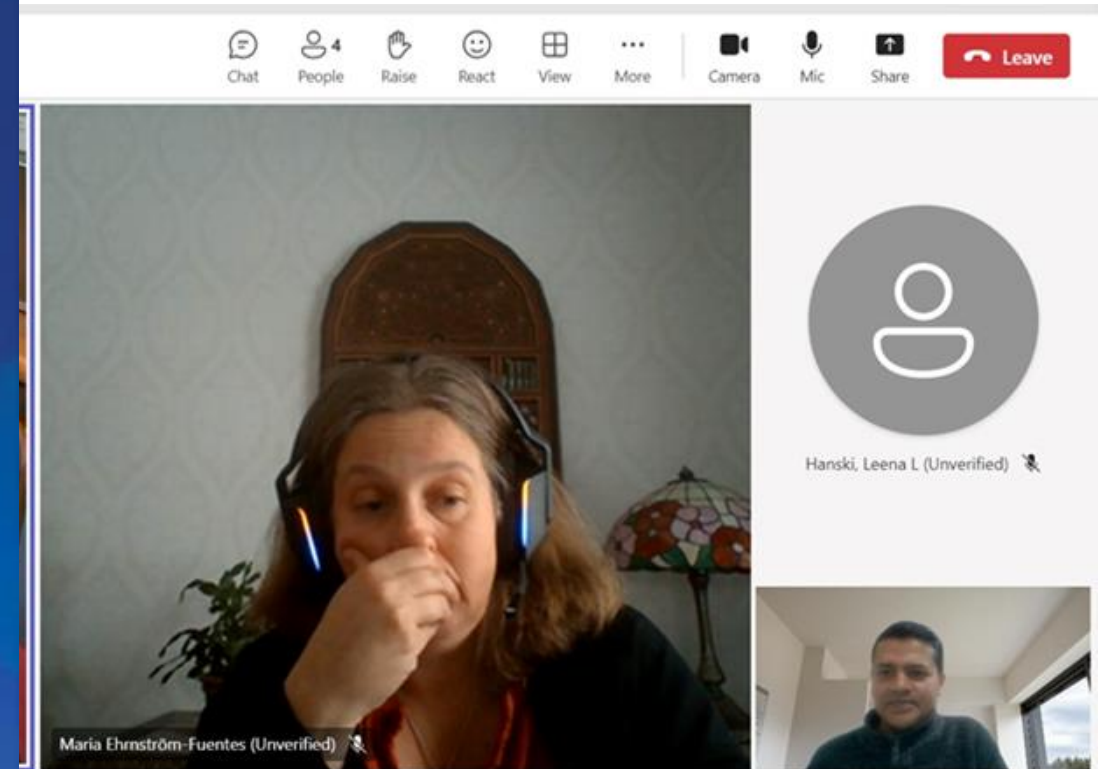
**Prof. Sunil Lohani with Dr. Maheswar Rupakheti of the Research Institute for Sustainability (RIFS), Prof. Juergen at the Potsdam Institute of Climate Impact Research (PIK) and with Prof. Florian's team at the Berlin University of Applied Science (BHT) during his visit to Germany.**

# Key Activities of RSEL in 2024

What is next for good research practice and responsible partnerships?



|  |  |   |   |
|--|--|---|---|
| <b>Kajantie</b><br>vulnerable newborns<br>transgenerational<br>health and<br>development | <b>Dr. Sunil Prasad Lohani</b><br>Technological and socio-<br>economic solutions to<br>reduce indoor air pollution<br>in Nepal | <b>Dr. Laura Stark</b><br>LGBTQI+ and Street-level<br>bureaucrats: Assessing<br>Motives, Violence and<br>Possibilities for Collective<br>Advocacy | <b>Dr. Anu Valtonen</b><br>Towards sustainable<br>harvesting of African edible<br>bush-cricket ( <i>Ruspolia<br/>differens</i> ) for enhancing<br>food security and rural<br>livelihoods in East Africa |
|--|--|---|---|



**Prof. Sunil Lohani as the Panelist on the Opening Seminar “Towards Sustainable Partnerships, DEVELOP2” organized by the Research Council of Finland.**



# Key Activities of RSEL in 2024



A visit to **KTH Royal Institute of Technology, Stockholm** and **Linnaeus University, Växjö** for delivering guest lecture in sustainable energy and strengthening connections.

# Key Activities of RSEL in 2024

Visit to the Ministry of Foreign Affairs of Finland, the University of Turku, Finland Future Research Center, Helsinki University, Aalto University and Wageningen University as part of the ACCESS project.



# Key Activities of RSEL in 2024



**Prof. Sunil Prasad Lohani and the RSEL team visited Pokhara under Re-Tech Project for networking and monitoring the Gandaki University, Green Road, and Ithaka Institute.**



**Prof. Sunil Prasad Lohani, delivered an insightful guest lecture on "Energy Source Diversification in Nepal" at Khwopo College of Engineering.**

# Key Activities of RSEL in 2024



OPERATIONAL RESEARCH SOCIETY OF NEPAL

## 15<sup>th</sup> ORSN INTERNATIONAL CONFERENCE

ENERGY, DIGITALIZATION AND SUSTAINABILITY

15<sup>th</sup> International Conference will be held on February 1-2, 2024 on the occasion of 17<sup>th</sup> Annual day of ORSN.

### Keynote Speakers



**PROF. DR. AVANISH KUMAR**  
Bundelkhand University  
Jhansi, India



**PROF. DR. MAHANANDA CHALISE**  
Tribhuvan University



**PROF. DR. NAN ZHU**  
Swufe University, China



**PROF. DR. TANKA NATH DHAMALA**  
Tribhuvan University



**MR. SHASHI BHATTARAI**  
Co-Creator: Decision Mentor



**PROF. DR. RAM PRASAD KHATIWADA**  
Tribhuvan University



**DR. RAJIB SUBBA**  
Former DIG, Nepal Police



**DR. SANJAY PRASAD GORKHALI**  
Adjunct Faculty - Management of Sustainable Development, SOMTU



**DR. SUNIL PRASAD LOHANI**  
Associate Professor, Kathmandu University



## 15<sup>TH</sup> ORSN

### INTERNATIONAL CONFERENCE

Energy, Digitalization and Sustainability

### MEET OUR SPEAKER



#### DR. SUNIL PRASAD LOHANI

Associate Professor,  
Kathmandu University

### CONFERENCE DATE

Feb 1-2, 2024

FOR MORE INFORMATION



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Prof. Sunil Lohani as the keynote speaker on the 15<sup>th</sup> Operational Research Society of Nepal (ORSN) International Conference held on 1<sup>st</sup>- 2<sup>nd</sup> February, 2024.

# Key Activities of RSEL in 2024



Successfully organized the “**Advance Climate Change Education for Sustainable Future and System Changes (ACCESS) Kickoff Workshop.**” with **more than 45 participants** from different sectors and countries like **Finland** and the **Netherlands**.



RSEL successfully organized the project dissemination workshop for “**Demonstrating Applicability of Modified Prefabricated Household Floating Drum Biodigester**” with **33 participants** from Nepal’s biogas sector.

# Key Activities of RSEL in 2024



Organized a **two-day International Workshop** on "**Energy Transition for Sustainable Development**", part of a joint project "**Sustainable Energy Engineering Doctoral Program (SEED)**". Nearly **50 participants** from two different countries, **Nepal, and Sweden**, actively engaged in intense discussions on energy transition for sustainable development.



**RSEL** in collaboration with the **Renewable Energy Confederation of Nepal (RECON)** successfully organized a seminar on "**Biogas, Biomass, and Waste Management**". which was part of the **NORPART-funded Re-Tech** project, brought together **45 stakeholders**.

# Key Professional Contribution

npj | climate action

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## CALL FOR PAPERS: Barrier and Pathways to Climate Action

Inspired by the theme of the 2024 Annual Conference of The Sociological Society, "The Social Side of the Climate Crisis".

**Submission deadline: 30 April 2024**

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Dr. Sunil Prasad Lohani  
Kathmandu University  
Department of Mechanical Engineering,  
School of Engineering  
Dhulikhel  
Nepal

Heidelberg, 28th September 2021

Climate Action – Welcome to our Editorial Board

Dear Dr. Lohani,

On behalf of the Editor-in-Chief of *Climate Action*, Professor Jale Tosun, I am delighted to welcome you to the Editorial Board of *Climate Action* as Associate Editor, for an initial period of 3 years. This period will automatically be extended if you do not hear otherwise.

I would like to thank you for your interest in supporting the journal and look forward to a fruitful collaboration. We believe a distinguished scientist of your rank and expertise will be of great value to our journal

# Editorial Board Member



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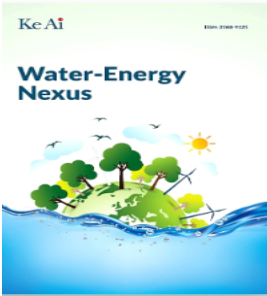
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## Water-Energy Nexus

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# Guest Editor



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### Guest Editors

Dr. Nabin Aryal, Dr. Wenche Hennie Bergland, Dr. Sunil Prasad Lohani

### Deadline

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# Special Issue

Invitation to submit



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### EDITORIAL article

Front. Energy Res., 01 June 2023

Sec. Energy Storage

Volume 11 - 2023 |

<https://doi.org/10.3389/fenrg.2023.1221873>

This article is part of the Research Topic  
Materials, Process, and Applications in  
Energy Storage Systems

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## Editorial: Materials, process, and applications in energy storage systems



Feng Jiang<sup>1</sup>



Yaxuan Xiong<sup>2\*</sup>



Qian Xu<sup>3</sup>



Sunil Prasad Lohani<sup>4</sup>



Zhu Jiang<sup>5</sup>



Yanqi Zhao<sup>6</sup>



Xiaodong Peng<sup>7</sup>

**Serving as Reviewer for almost all Q1 Journals including Nature Portfolio in Renewable Energy and Climate change**

**Future Plan ???**

**Scale-up all activities that I have been involved by establishing a “Center for Renewable Energy and Sustainability Studies (CRESS)”.**

# Thank you!

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