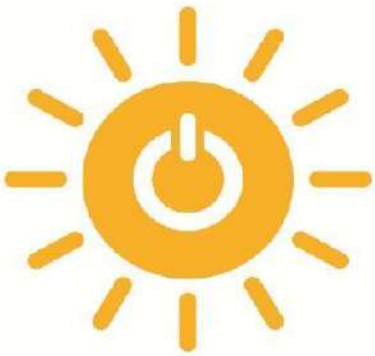
Swami Rama Himalayan University

NAAC A+

Report on

Sustainable Development Goal 7



AFFORDABLE AND CLEAN ENERGY

2025

SDG 7: Affordable and Clean Energy

Swami Rama Himalayan University (SRHU) advances SDG 7 through research, institutional energy-efficiency measures, responsible energy use, community engagement, and low-carbon energy adoption. Research on affordable and clean energy is supported by 31 SDG 7-aligned publications during 2021-2025, covering biofuels, energy storage, solar and renewable energy systems, and energy-efficient technologies. Clean energy measures include a 2.5 MW rooftop solar installation, LED retrofitting, energy-efficient HVAC systems, BLDC fans, energy audits, and a target to reduce campus energy consumption by 30-40% over five years. Energy use is systematically monitored; in 2024-25, SRHU recorded an Energy Performance Index of 14.94 kWh/m²/year. Energy and the community are promoted through renewable-energy awareness programmes, community outreach, rural solar initiatives, and a public commitment toward 100% renewable energy. Low-carbon energy use includes solar and biogas, with 10,472.6 GJ of energy generated from these low-carbon sources in 2025.

7.1 Research on clean energy

Since the inception of SRHU's research engagement with SDG 7 (Affordable and Clean Energy) in 2012, the university has produced a cumulative total of 38 publications aligned with the goal. In the most recent five-year period (2021-2025), 31 publications contributed to SDG 7, representing 81.6% of the university's total SDG 7 research output since inception. Of these, 11 publications were published in 2025, accounting for 35.5% of the five-year output. The 2025 contribution, "Intelligent node identification and dynamic clustering for underwater acoustic sensor networks," examines energy-efficient routing and clustering strategies for underwater acoustic sensor networks used in environmental and infrastructure monitoring, and provides a relevant connection to SDG 7 through themes of energy-efficient networked systems, smart monitoring technologies, and sustainable infrastructure design.

Research Metric	Value
Total Publications during 2021-2025	31
FWCI	1.58
Citation Count	618
Total Views	1279

7.1.1 Affordable and Clean Energy: CiteScore

During the 2021-2025 reporting period, SRHU produced 31 publications aligned with SDG 7 (Affordable and Clean Energy), of which 20 report CiteScore data, with an average of 6.635. During 2025, 8 out of 11 publications report CiteScore data, with an average of 6.4.

List of publications with CiteScore

S. No	Paper Title	Authors	Journal / Book Name	Year	Cite Score	DOI
1	A state-of-the-Art review on edible electronics: Next-generation technologies for biocompatible and ingestible devices	Kataria, P.| Gupta, R.K.| Gupta, A.K.| Kaur, R.| Sharma, M.| Jha, A.K.| Naik, B.| Kumar, V.| Tavassoli, M.| Kaur, S.	Trends in Food Science and Technology	2025	27.3	10.1016/j.tifs.2025.104880
2	Sal (Shorea robusta) seed oil: A sustainable alternative for cocoa butter and edible oil	Thapa, D.| Naik, B.| Kumar, V.| Saris, P.E.J.| Gupta, A.K.| Kumar, V.	Future Foods	2025	8.9	10.1016/j.fufo.2025.100655
3	Secure Hybrid Data Transmission Protocol for WSN with Key Management and Message Authentication	Sharmila, A.| Rishiwal, V.| Kumar, P.| Yadav, M.| Yadav, P.	SN Computer Science	2025	5	10.1007/s42979-025-03946-x
4	Biodiesel (biofuel) production from fish waste: A sustainable approach to biodiesel production	Rajput, V.| Topwal, A.| Sharma, C.| Naik, B.| Gupta, A.K.| Kumar, V.| Kumar, V.	Sustainable Chemistry One World	2025	3.1	10.1016/j.scowo.2025.100124
5	Intelligent node identification and dynamic clustering for underwater acoustic sensor networks	Gola, K.K.| Khan, G.| Kumar, S.| Kanauzia, R.	Discover Computing	2025	2	10.1007/s10791-025-09739-3
6	AI-Based Enhanced Production of Vanadium Dioxide Thermochromic Films	Dawange, G.P.| Diwan, T.D.| William, P.| Kumar, P.| Tingare, B.A.| Yogeesh, N.| Badholia, A.| Kulkarni, M.V.	Journal of Nano- and Electronic Physics	2025	1.8	10.21272/jnep.17(5).05015
7	The Human Side of Sustainability: Behavioural Economics in Climate Action and Neutrality	Trivedi, A.| Juyal, S.A.| Kandpal, V.	Climate Change Management	2025	1.7	10.1007/978-3-031-83250-5_15
8	ANODIZING PROCESS FOR ENHANCING CORROSION RESISTANCE OF ALUMINIUM ANODES IN 1M NaOH ALKALINE SOLUTION	Ahuja, D.| Srivastava, S.| Varshney, P.K.| Srivastava, S.	Rasayan Journal of Chemistry	2025	1.5	10.31788/RJC.2025.1819076
9	Adaptive QoS-Aware Routing for IoT Networks Using Deep Reinforcement Learning	Chaudhary, N.| Ather, D.| Kler, R.| Dubey, R.| Saxena, U.| Singh, G.	International Conference on Intelligent and Innovative Practices in Engineering and	2025	-	10.1109/IIPEM65914.2025.11548315

S. No	Paper Title	Authors	Journal / Book Name	Year	Cite Score	DOI
			Management, IIPEM 2025			
10	AI-Enhanced Energy Optimization for Smart Home IoT Devices Using Reinforcement Learning	Kler, R.| Dubey, R.| Rao, E.| Singh, G.| Chaudhary, N.| Ather, D.	International Conference on Intelligent and Innovative Practices in Engineering and Management, IIPEM 2025	2025	-	10.1109/IIPEM65914.2025.11548072
11	Development of Smart Materials for Enhanced Energy Storage in Solar Panels	Chauhan, A.| Pandey, G.| Sethi, M.| Deuri, J.| Rajput, V.	Solar Energy Optimization Using Generative Artificial Intelligence	2025	-	10.1002/9781394419494.ch2
12	Numerical analysis of the return flow solar air heater (RF-SAH) with assimilation of V-type artificial roughness	Raturi, P.| Deolal, H.| Kimothi, S.	Energy and Built Environment	2024	17.3	10.1016/j.enbenv.2022.09.002
13	Green chemistry revolutionizing sustainability in the food industry: A comprehensive review and call to action	Gupta, A.K.| Boruah, T.| Ghosh, P.| Ikram, A.| Rana, S.S.| Shanker M, A.| Bachetti, A.| Jha, A.K.| Naik, B.| Kumar, V.| Rustagi, S.	Sustainable Chemistry and Pharmacy	2024	8.8	10.1016/j.scp.2024.101774
14	Design expert based optimization of the pyrolysis process for the production of cattle dung bio-oil and properties characterization	Kaur, L.| Singh, J.| Ashok, A.| Kumar, V.	Scientific Reports	2024	6.7	10.1038/s41598-024-57843-z
15	Advancements in energy storage applications: harnessing the potential of fish industry waste	Rajput, V.| Naik, B.| Kumar, V.| Kumar, V.| Bhatt, S.C.| Rustagi, S.	Discover Materials	2024	3.6	10.1007/s43939-024-00161-y
16	Advanced technologies for realizing sustainable development goals: 5G, AI, big data, blockchain, and Industry 4.0 application	Bhatt, A.| Joshi, P.| Joshi, K.| Bijalwan, A.	Advanced Technologies for Realizing Sustainable Development Goals: 5G, AI, Big Data, Blockchain, and Industry 4.0 Application	2024	-	10.2174/9789815256680124010 1
17	Agricultural Innovations using IOT - A Comprehensive Review	Singh, J.N.| Mall, S.| Arthi, T.S.| Srivastava, D.| Hussein, L.	Proceedings - IEEE 2024 1st International Conference on Advances in Computing, Communication and Networking, ICAC2N 2024	2024	-	10.1109/ICAC2N63387.2024.10895646

S. No	Paper Title	Authors	Journal / Book Name	Year	Cite Score	DOI
18	An overview of renewable energy sources: technologies, applications and role of artificial intelligence	Singh, V.| Prasad, M.| Aswal, R.S.| Shrivastava, U.| Sharma, T.| Patel, N.K.	Computer Vision and Machine Intelligence for Renewable Energy Systems	2024	-	10.1016/B978-0-443-28947-7.00001-X
19	Impact of Artificial Intelligence (AI) in Bioremediation of Dairy Effluent by Microalgae and the Potential Application of the Produced Lipid Byproducts	Dhillon, N.| Kumar, V.| Bhandari, G.| Gupta, S.	Internet of Medicine for Smart Healthcare	2024	-	10.1002/9781394272266.ch11
20	Node MCU and Lily Pad based Relay Protection System for Laboratory Micro-Grid	Malik, S.| Jain, S.| Tiwari, P.| Tiwari, R.| Yamsani, N.| Al-Farouni, M.	2024 International Conference on Smart Devices, ICSD 2024	2024	-	10.1109/ICSD60021.2024.10751602
21	Valorization of wastewater through bioremediation approach	Aswal, R.S.| Prasad, M.| Kumar, A.	Biotechnologies for Wastewater Treatment and Resource Recovery: Current Trends and Future Scope	2024	-	10.1016/B978-0-443-27376-6.00010-4
22	Agro-industrial waste: a cost-effective and eco-friendly substrate to produce amylase	Naik, B.| Kumar, V.| Rizwanuddin, S.| Chauhan, M.| Gupta, A.K.| Rustagi, S.| Kumar, V.| Gupta, S.	Food Production, Processing and Nutrition	2023	6.9	10.1186/s43014-023-00143-2
23	A Perspective Review on Microbial Fuel Cells in Treatment and Product Recovery from Wastewater	Malik, S.| Kishore, S.| Dhasmana, A.| Kumari, P.| Mitra, T.| Chaudhary, V.| Kumari, R.| Bora, J.| Ranjan, A.| Minkina, T.| Rajput, V.D.	Water (Switzerland)	2023	5.8	10.3390/w15020316
24	Energy from Waste: Poterioochromonas malhamensis Used for Managing Dairy Effluent and Producing Valuable Microalgal Lipid	Dhillon, N.| Gupta, S.| Kumar, V.| Bhandari, G.| Arya, S.	Journal of Pure and Applied Microbiology	2023	2	10.22207/JPAM.17.2.48
25	Microgrid digital twins: concepts and their controlling through multi-agent systems	Negi, G.S.| Mishra, A.| Gupta, M.K.| Saxena, N.K.| Saini, D.J.B.| Joshi, K.	International Journal of High Performance Systems Architecture	2023	2	10.1504/IJHPSA.2023.139898
26	Chameleon-ACO Hybrid: Optimizing Power-Efficient Clustering and Routing in Wireless Networks	Das, S.| Bahadur Saini, D.J.| Joshi, K.| Singh, A.| Joshi, P.| Yedage, S.L.	Proceedings - 2023 3rd International Conference on Ubiquitous Computing and Intelligent Information	2023	-	10.1109/ICUIS60567.2023.00013

S. No	Paper Title	Authors	Journal / Book Name	Year	Cite Score	DOI
			Systems, ICUIS 2023			
27	Hydrothermal Liquefaction of Waste Agricultural Biomass for Biofuel and Biochar	Rajput, V.| Kumar, V.| Vlaskin, M.S.| Nanda, M.| Verma, M.	Agriculture Waste Management and Bioresource: The Circular Economy Perspective	2023	-	10.1002/9781119808428.ch11
28	Algae in wastewater treatment, mechanism, and application of biomass for production of value-added product	Bhatt, P.| Bhandari, G.| Turco, R.F.| Aminikhoei, Z.| Bhatt, K.| Simsek, H.	Environmental Pollution	2022	14.9	10.1016/j.envpol.2022.119688
29	Exploring Microbial-Based Green Nanobiotechnology for Wastewater Remediation: A Sustainable Strategy	Malik, S.| Dhasmana, A.| Preetam, S.| Mishra, Y.K.| Chaudhary, V.| Bera, S.P.| Ranjan, A.| Bora, J.| Kaushik, A.| Minkina, T.| Jatav, H.S.| Singh, R.K.| Rajput, V.D.	Nanomaterials	2022	7.4	10.3390/nano12234187
30	Analytical and post analytical phase of an ISO 15189:2012 Certified cytopathology laboratory-a five year institutional experience	Chandra, S.| Kusum, A.| Gaur, D.| Chandra, H.	Journal of Cytology	2022	2.3	10.4103/JOC.JOC_90_20
31	Microbial fuel cell united with other existing technologies for enhanced power generation and efficient wastewater treatment	Patwardhan, S.B.| Savla, N.| Pandit, S.| Gupta, P.K.| Mathuriya, A.S.| Lahiri, D.| Jadhav, D.A.| Rai, A.K.| Kanupriya| Ray, R.R.| Singh, V.| Kumar, V.| Prasad, R.	Applied Sciences (Switzerland)	2021	3.7	10.3390/app112210777

7.1.2 Affordable and Clean Energy: FWCI

During the 2021-2025 reporting period, SRHU produced 31 publications aligned with SDG 7, of which 26 report FWCI data, with an average of 1.57. During 2025, 7 publications reported FWCI data, with an average of 0.73.

List of publications with FWCI

S.No	Paper Title	Authors	Journal / Book Name	Year	FWCI	DOI
1	The Human Side of Sustainability: Behavioural Economics in Climate Action and Neutrality	Trivedi, A.| Juyal, S.A.| Kandpal, V.	Climate Change Management	2025	3.35	10.1007/978-3-031-83250-5_15
2	Secure Hybrid Data Transmission Protocol for WSN with Key	Sharmila, A.| Rishiwal, V.| Kumar, P.| Yadav, M.| Yadav, P.	SN Computer Science	2025	1.6	10.1007/s42979-025-03946-x

S.No	Paper Title	Authors	Journal / Book Name	Year	FWCI	DOI
	Management and Message Authentication					
3	Intelligent node identification and dynamic clustering for underwater acoustic sensor networks	Gola, K.K.| Khan, G.| Kumar, S.| Kanauzia, R.	Discover Computing	2025	1.56	10.1007/s10791-025-09739-3
4	A state-of-the-Art review on edible electronics: Next-generation technologies for biocompatible and ingestible devices	Kataria, P.| Gupta, R.K.| Gupta, A.K.| Kaur, R.| Sharma, M.| Jha, A.K.| Naik, B.| Kumar, V.| Tavassoli, M.| Kaur, S.	Trends in Food Science and Technology	2025	0.48	10.1016/j.tifs.2025.104880
5	Anodizing process for enhancing corrosion resistance of Aluminium anodes in 1M NAOH alkaline solution	Ahuja, D.| Srivastava, S.| Varshney, P.K.| Srivastava, S.	Rasayan Journal of Chemistry	2025	0.44	10.31788/RJC.2025.1819076
6	SAL (Shorea robusta) seed oil: A sustainable alternative for cocoa butter and edible oil	Thapa, D.| Naik, B.| Kumar, V.| Saris, P.E.J.| Gupta, A.K.| Kumar, V.	Future Foods	2025	0.41	10.1016/j.fufo.2025.100655
7	Biodiesel (biofuel) production from fish waste: A sustainable approach to biodiesel production	Rajput, V.| Topwal, A.| Sharma, C.| Naik, B.| Gupta, A.K.| Kumar, V.| Kumar, V.	Sustainable Chemistry One World	2025	0.19	10.1016/j.scowo.2025.100124
8	Adaptive QoS-Aware Routing for IoT Networks Using Deep Reinforcement Learning	Chaudhary, N.| Ather, D.| Kler, R.| Dubey, R.| Saxena, U.| Singh, G.	International Conference on Intelligent and Innovative Practices in Engineering and Management, IIPEM 2025	2025	0	10.1109/IIPEM65914.2025.11548315
9	AI-Based Enhanced Production of Vanadium Dioxide Thermochromic Films	Dawange, G.P.| Diwan, T.D.| William, P.| Kumar, P.| Tingare, B.A.| Yogeesh, N.| Badholia, A.| Kulkarni, M.V.	Journal of Nano- and Electronic Physics	2025	0	10.21272/jnep.17(5).05015
10	AI-Enhanced Energy Optimization for Smart Home IoT Devices Using Reinforcement Learning	Kler, R.| Dubey, R.| Rao, E.| Singh, G.| Chaudhary, N.| Ather, D.	International Conference on Intelligent and Innovative Practices in Engineering and Management, IIPEM 2025	2025	0	10.1109/IIPEM65914.2025.11548072
11	Development of Smart Materials for Enhanced Energy Storage in Solar Panels	Chauhan, A.| Pandey, G.| Sethi, M.| Deuri, J.| Rajput, V.	Solar Energy Optimization Using Generative Artificial Intelligence	2025	0	10.1002/9781394419494.ch2

S.No	Paper Title	Authors	Journal / Book Name	Year	FWCI	DOI
12	An overview of renewable energy sources: technologies, applications and role of artificial intelligence	Singh, V.| Prasad, M.| Aswal, R.S.| Shrivastava, U.| Sharma, T.| Patel, N.K.	Computer Vision and Machine Intelligence for Renewable Energy Systems	2024	1.75	10.1016/B978-0-443-28947-7.00001-X
13	Numerical analysis of the return flow solar air heater (RF-SAH) with assimilation of V-type artificial roughness	Raturi, P.| Deolal, H.| Kimothi, S.	Energy and Built Environment	2024	1.35	10.1016/j.enbenv.2022.09.002
14	Design expert based optimization of the pyrolysis process for the production of cattle dung bio-oil and properties characterization	Kaur, L.| Singh, J.| Ashok, A.| Kumar, V.	Scientific Reports	2024	1.23	10.1038/s41598-024-57843-z
15	Green chemistry revolutionizing sustainability in the food industry: A comprehensive review and call to action	Gupta, A.K.| Boruah, T.| Ghosh, P.| Ikram, A.| Rana, S.S.| Shanker M, A.| Bachetti, A.| Jha, A.K.| Naik, B.| Kumar, V.| Rustagi, S.	Sustainable Chemistry and Pharmacy	2024	0.89	10.1016/j.scp.2024.101774
16	Valorization of wastewater through bioremediation approach	Aswal, R.S.| Prasad, M.| Kumar, A.	Biotechnologies for Wastewater Treatment and Resource Recovery: Current Trends and Future Scope	2024	0.56	10.1016/B978-0-443-27376-6.00010-4
17	Impact of Artificial Intelligence (AI) in Bioremediation of Dairy Effluent by Microalgae and the Potential Application of the Produced Lipid Byproducts	Dhillon, N.| Kumar, V.| Bhandari, G.| Gupta, S.	Internet of Medicine for Smart Healthcare	2024	0.39	10.1002/9781394272266.ch11
18	Agricultural Innovations using IOT - A Comprehensive Review	Singh, J.N.| Mall, S.| Arthi, T.S.| Srivastava, D.| Hussein, L.	Proceedings - IEEE 2024 1st International Conference on Advances in Computing, Communication and Networking, ICAC2N 2024	2024	0.35	10.1109/ICAC2N63387.2024.10895646
19	Advanced technologies for realizing sustainable development goals: 5G, AI, big data, blockchain, and Industry 4.0 application	Bhatt, A.| Joshi, P.| Joshi, K.| Bijalwan, A.	Advanced Technologies for Realizing Sustainable Development Goals: 5G, AI, Big Data, Blockchain, and	2024	0.33	10.2174/9789815256680124010101

S.No	Paper Title	Authors	Journal / Book Name	Year	FWCI	DOI
			Industry 4.0 Application			
20	Advancements in energy storage applications: harnessing the potential of fish industry waste	Rajput, V.| Naik, B.| Kumar, V.| Kumar, V.| Bhatt, S.C.| Rustagi, S.	Discover Materials	2024	0.17	10.1007/s43939-024-00161-y
21	Node MCU and Lily Pad based Relay Protection System For Laboratory Micro-Grid	Malik, S.| Jain, S.| Tiwari, P.| Tiwari, R.| Yamsani, N.| Al-Farouni, M.	2024 International Conference on Smart Devices, ICSD 2024	2024	0	10.1109/ICSD60021.2024.10751602
22	Hydrothermal Liquefaction of Waste Agricultural Biomass for Biofuel and Biochar	Rajput, V.| Kumar, V.| Vlaskin, M.S.| Nanda, M.| Verma, M.	Agriculture Waste Management and Bioresource: The Circular Economy Perspective	2023	16.12	10.1002/9781119808428.ch11
23	A Perspective Review on Microbial Fuel Cells in Treatment and Product Recovery from Wastewater	Malik, S.| Kishore, S.| Dhasmana, A.| Kumari, P.| Mitra, T.| Chaudhary, V.| Kumari, R.| Bora, J.| Ranjan, A.| Minkina, T.| Rajput, V.D.	Water (Switzerland)	2023	4.05	10.3390/w15020316
24	Agro-industrial waste: a cost-effective and eco-friendly substrate to produce amylase	Naik, B.| Kumar, V.| Rizwanuddin, S.| Chauhan, M.| Gupta, A.K.| Rustagi, S.| Kumar, V.| Gupta, S.	Food Production, Processing and Nutrition	2023	2.59	10.1186/s43014-023-00143-2
25	Chameleon-ACO Hybrid: Optimizing Power-Efficient Clustering and Routing in Wireless Networks	Das, S.| Bahadur Saini, D.J.| Joshi, K.| Singh, A.| Joshi, P.| Yedage, S.L.	Proceedings - 2023 3rd International Conference on Ubiquitous Computing and Intelligent Information Systems, ICUIS 2023	2023	0.65	10.1109/ICUIS60567.2023.00013
26	Energy from Waste: Poterioochromonas malhamensis Used for Managing Dairy Effluent and Producing Valuable Microalgal Lipid	Dhillon, N.| Gupta, S.| Kumar, V.| Bhandari, G.| Arya, S.	Journal of Pure and Applied Microbiology	2023	0.17	10.22207/JPAM.17.2.48
27	Microgrid digital twins: concepts and their controlling through multi-agent systems	Negi, G.S.| Mishra, A.| Gupta, M.K.| Saxena, N.K.| Saini, D.J.B.| Joshi, K.	International Journal of High Performance Systems Architecture	2023	0.06	10.1504/IJHPSA.2023.139898

S.No	Paper Title	Authors	Journal / Book Name	Year	FWCI	DOI
28	Algae in wastewater treatment, mechanism, and application of biomass for production of value-added product	Bhatt, P.| Bhandari, G.| Turco, R.F.| Aminikhoei, Z.| Bhatt, K.| Simsek, H.	Environmental Pollution	2022	7.58	10.1016/j.envpol.2022.119688
29	Exploring Microbial-Based Green Nanobiotechnology for Wastewater Remediation: A Sustainable Strategy	Malik, S.| Dhasmana, A.| Preetam, S.| Mishra, Y.K.| Chaudhary, V.| Bera, S.P.| Ranjan, A.| Bora, J.| Kaushik, A.| Minkina, T.| Jatav, H.S.| Singh, R.K.| Rajput, V.D.	Nanomaterials	2022	1.28	10.3390/nano12234187
30	Analytical and post analytical phase of an ISO 15189:2012 Certified cytopathology laboratory-a five year institutional experience	Chandra, S.| Kusum, A.| Gaur, D.| Chandra, H.	Journal of Cytology	2022	0.27	10.4103/JOC.JOC_90_20
31	Microbial fuel cell united with other existing technologies for enhanced power generation and efficient wastewater treatment	Patwardhan, S.B.| Savla, N.| Pandit, S.| Gupta, P.K.| Mathuriya, A.S.| Lahiri, D.| Jadhav, D.A.| Rai, A.K.| Kanupriya| Ray, R.R.| Singh, V.| Kumar, V.| Prasad, R.	Applied Sciences (Switzerland)	2021	0.89	10.3390/app112210777

7.1.3 Affordable and Clean Energy: Publications

SRHU produced 31 publications aligned with SDG 7 during 2021-2025, spanning biofuel and biodiesel production, energy storage materials, solar and renewable energy systems, and energy-efficient sensor networks.

List of publications

S.No	Paper Title	Authors	Journal / Book Name	Year	DOI
1	Intelligent node identification and dynamic clustering for underwater acoustic sensor networks	Gola, K.K.; Khan, G.; Kumar, S.; Kanauzia, R.	Discover Computing	2025	10.1007/s10791-025-09739-3
2	Biodiesel (biofuel) production from fish waste: A sustainable approach to biodiesel production	Rajput, V.; Topwal, A.; Sharma, C.; Vijay, K.; Kumar, V.R.	Sustainable Chemistry One World	2025	10.1016/j.scowo.2025.100124
3	Sal (Shorea robusta) seed oil: A sustainable alternative for cocoa butter and edible oil	Thapa, D.; Naik, B.; Vijay, K.; Gupta, A.K.; Kumar, V.	Future Foods	2025	10.1016/j.fufo.2025.100655
4	Secure Hybrid Data Transmission Protocol for WSN with Key Management and Message Authentication	Sharmila, A.; Rishiwal, V.; Kumar, P.; Yadav, M.; Yadav, P.	SN Computer Science	2025	10.1007/s42979-025-03946-x

S.No	Paper Title	Authors	Journal / Book Name	Year	DOI
5	A state-of-the-Art review on edible electronics: Next-generation technologies for biocompatible and ingestible devices	Kataria, P.; Gupta, R.K.; Gupta, A.K.; Tavassoli, M.; Kaur, S.	Trends in Food Science and Technology	2025	10.1016/j.tifs.2025.104880
6	The Human Side of Sustainability: Behavioural Economics in Climate Action and Neutrality	Trivedi, A.; Juyal, S.A.; Kandpal, V.	Climate Change Management	2025	10.1007/978-3-031-83250-5_15
7	Anodizing Process for enhancing corrosion resistance of aluminium anodes in 1M NaOH alkaline solution	Ahuja, D.; Srivastava, S.; Varshney, P.K.; Srivastava, S.	Rasayan Journal of Chemistry	2025	10.31788/RJC.2025.1819076
8	AI-Enhanced Energy Optimization for Smart Home IoT Devices Using Reinforcement Learning	Kler, R.; Dubey, R.; Rao, E.; Chaudhary, N.; Ather, D.	International Conference on Intelligent and Innovative Practices in Engineering and Management, IIPEM	2025	10.1109/IIPEM65914.2025.11548072
9	Adaptive QoS-Aware Routing for IoT Networks Using Deep Reinforcement Learning	Chaudhary, N.; Ather, D.; Kler, R.; Saxena, U.; Singh, G.	International Conference on Intelligent and Innovative Practices in Engineering and Management, IIPEM	2025	10.1109/IIPEM65914.2025.11548315
10	Development of Smart Materials for Enhanced Energy Storage in Solar Panels	Chauhan, A.; Pandey, G.; Sethi, M.; Deuri, J.; Rajput, V.	Solar Energy Optimization Using Generative Artificial Intelligence	2025	10.1002/9781394419494.ch2
11	AI-Based Enhanced Production of Vanadium Dioxide Thermochromic Films	Dawange, G.P.; Diwan, T.D.; William, P.; Badholia, A.; Kulkarni, M.V.	Journal of Nano- and Electronic Physics	2025	10.21272/jnep.17(5).05015
12	Advancements in energy storage applications: harnessing the potential of fish industry waste	Rajput, V.; Naik, B.; Vijay, K.; Bhatt, S.C.; Rustagi, S.	Discover Materials	2024	10.1007/s43939-024-00161-y
13	Green chemistry revolutionizing sustainability in the food industry: A comprehensive review and call to action	Gupta, A.K.; Boruah, T.; Ghosh, P.; Vijay, K.; Rustagi, S.	Sustainable Chemistry and Pharmacy	2024	10.1016/j.scp.2024.101774
14	Design expert based optimization of the pyrolysis process for the production of cattle dung bio-oil and properties characterization	Kaur, L.; Singh, J.L.; Ashok, A.; Vijay, K.	Scientific Reports	2024	10.1038/s41598-024-57843-z
15	Advanced technologies for realizing sustainable development goals: 5G, AI, big data, blockchain, and Industry 4.0 application	Bhatt, A.; Joshi, P.; Joshi, K.P.; Bijalwan, A.	Advanced Technologies for Realizing Sustainable Development Goals 5G AI Big Data Blockchain and Industry 4.0 Application	2024	10.2174/978981525668012 40101
16	Numerical analysis of the return flow solar air heater (RF-SAH) with assimilation of V-type artificial roughness	Raturi, P.; Deolal, H.; Kimothi, S.K.	Energy and Built Environment	2024	10.1016/j.enbenv.2022.09.002
17	Impact of Artificial Intelligence (AI) in Bioremediation of Dairy Effluent by Microalgae and the Potential Application of the Produced Lipid Byproducts	Dhillon, N.; Kumar, V.R.; Bhandari, G.; Gupta, S.	Internet of Medicine for Smart Healthcare	2024	10.1002/9781394272266.ch11

S.No	Paper Title	Authors	Journal / Book Name	Year	DOI
18	Valorization of wastewater through bioremediation approach	Aswal, R.S.; Prasad, M.; Kumar, A.	Biotechnologies for Wastewater Treatment and Resource Recovery Current Trends and Future Scope	2024	10.1016/B978-0-443-27376-6.00010-4
19	Node MCU and Lily Pad based Relay Protection System for Laboratory Micro-Grid	Malik, S.; Jain, S.; Tiwari, P.; Yamsani, N.; Al-Farouni, M.H.	2024 International Conference on Smart Devices ICSD 2024	2024	10.1109/ICSD60021.2024.10751602
20	An overview of renewable energy sources: technologies, applications and role of artificial intelligence	Singh, V.; Prasad, M.; Aswal, R.S.; Sharma, T.; Patel, N.K.	Computer Vision and Machine Intelligence for Renewable Energy Systems	2024	10.1016/B978-0-443-28947-7.00001-X
21	Agricultural Innovations using IOT - A Comprehensive Review	Singh, J.N.; Mall, S.; Arthi, T.S.; Srivastava, D.; Hussein, L.	Proceedings IEEE 2024 1st International Conference on Advances in Computing Communication and Networking (ICAC2N 2024)	2024	10.1109/ICAC2N63387.2024.10895646
22	Agro-industrial waste: a cost-effective and eco-friendly substrate to produce amylase	Naik, B.; Vijay, K.; Rizwanuddin, S.; Kumar, V.; Gupta, S.	Food Production Processing and Nutrition	2023	10.1186/s43014-023-00143-2
23	Energy from Waste: Poterioochromonas malhamensis Used for Managing Dairy Effluent and Producing Valuable Microalgal Lipid	Dhillon, N.; Gupta, S.; Kumar, V.R.; Bhandari, G.; Arya, S.	Journal of Pure and Applied Microbiology	2023	10.22207/JPAM.17.2.48
24	Microgrid digital twins: concepts and their controlling through multi-agent systems	Negi, G.S.; Mishra, A.; Gupta, M.K.; Saini, D.K.J.B.; Joshi, K.P.	International Journal of High Performance Systems Architecture	2023	10.1504/IJHPSA.2023.139898
25	Chameleon-ACO Hybrid: Optimizing Power-Efficient Clustering and Routing in Wireless Networks	Das, D.S.; Saini, D.K.J.B.; Joshi, K.P.; Joshi, P.; Yedage, S.L.	Proceedings 2023 3rd International Conference on Ubiquitous Computing and Intelligent Information Systems (ICUIS 2023)	2023	10.1109/ICUIS60567.2023.00013
26	Hydrothermal Liquefaction of Waste Agricultural Biomass for Biofuel and Biochar	Rajput, V.; Dhatwalia, V.K.; Vlaskin, M.S.; Nanda, M.; Verma, M.	Agriculture Waste Management and Bioresource The Circular Economy Perspective	2023	10.1002/9781119808428.ch11
27	A Perspective Review on Microbial Fuel Cells in Treatment and Product Recovery from Wastewater	Malik, S.M.; Kishore, S.; Dhasmana, A.; Minkina, T.M.; Rajput, V.D.	Water Switzerland	2023	10.3390/w15020316
28	Exploring Microbial-Based Green Nanobiotechnology for Wastewater Remediation: A Sustainable Strategy	Malik, S.M.; Dhasmana, A.; Preetam, S.; Singh, R.K.; Rajput, V.D.	Nanomaterials	2022	10.3390/nano12234187
29	Algae in wastewater treatment, mechanism, and application of biomass for production of value-added product	Bhatt, P.; Bhandari, G.; Turco, R.F.; Bhatt, K.; Simsek, H.	Environmental Pollution	2022	10.1016/j.envpol.2022.119688
30	Analytical and post analytical phase of an ISO 15189:2012 Certified cytopathology laboratory-a five year institutional experience	Chandra, S.; Kusum, A.; Gaur, D.S.; Chandra, H.	Journal of Cytology	2022	10.4103/JOC.JOC_90_20

S.No	Paper Title	Authors	Journal / Book Name	Year	DOI
31	Microbial fuel cell united with other existing technologies for enhanced power generation and efficient wastewater treatment	Patwardhan, S.B.; Savla, N.; Pandit, S.; Kumar, V.R.; Prasad, R.	Applied Sciences Switzerland	2021	10.3390/app112210777

Curricular Mapping with SDG 7

Program Name	Course Name	Course Code
MBBS Third Prof Part I & Part II	Community medicine	1101301
MD Physiology	Systemic Physiology (system providing transport, nutrition and energy) including comparative Physiology	1101515
MD Community Medicine	Nutrition, Environmental Health, Primary Health Care system, Panchayat Raj system, National health Programs, RCH, Demography and Family Welfare, Health Care Administration, Health Management and Public Health Leadership.	1101509
MD Radio-diagnosis	Basic sciences related to Radiology (consists of Anatomy, Pathology, Basic and Radiation Physics, Imaging Techniques, and Film processing).	1101517
MD Radio-diagnosis	Recent advances, nuclear medicine; Radiology related to clinical specialties	1101517
MD Radiation oncology	Basic Principles in practice of Radiotherapy (Physics, Biology, Pathology, Equipment & Techniques of Radiotherapy)	1101518
MD Radiation Oncology	Clinical Radiation Oncology	1101518
MD Radiation Oncology	Allied Oncology Practices (Surgical oncology, medical oncology & Palliative Care)	1101518
MD Radiation Oncology	Recent Developments in Oncology, Cancer Control Programmes, Research methodologies in oncology	1101518
M.Sc. Clinical Research	Understanding the energy of positive words & thoughts/Power of Positive: Live	CDPR101
M.Sc. Epidemiology	Environmental and Occupational Epidemiology	CMEC001
MSc Medical Physics	Basic Nuclear Physics	MPCC101
MSc Medical Physics	Principles of Radiological Physics	MPCC102
MSc Medical Physics	Mathematical Physics and Quantum Mechanics	MPCC103
MSc Medical Physics	Solid State Physics and Thermodynamics	MPCC104
MSc Medical Physics	Atomic and Molecular Physics	MPCC105
MSc Medical Physics	Anatomy, Pathophysiology and Clinical Aspects of Radiation	MPCC201
MSc Medical Physics	Electronics and Instrumentation	MPCC202
MSc Medical Physics	Applied Statistics and Computational Techniques	MPCC203
MSc Medical Physics	Principles of Radiation Detection and Instrumentation	MPCC204

Program Name	Course Name	Course Code
MSc Medical Physics	Electromagnetic Theory	MPCC205
Bachelor of Physiotherapy (BPT)	Introduction to quality and patient safety(including emergency care, BLS, and biomedical waste)	BPT 306
Bachelor of Physiotherapy (BPT)	Environmental science -1	EVS 301
Bachelor of Physiotherapy (BPT)	Bio-Physics	BPT 401
Bachelor of Physiotherapy (BPT)	Electrotherapy	BPT 403
BMLT	Environmental Science - I	EVS 301
BMLT	Environmental Science - II	EVS302
B.Sc. Medical Radiology & Imaging Technology (BRIT)	Basic Radiation Physics-I	BRIT103
B.Sc. Medical Radiology & Imaging Technology (BRIT)	Basic Radiation Physics-II	BRIT 203
B.Sc. Medical Radiology & Imaging Technology (BRIT)	Physics of diagnostic radiology	BRIT302
B.Sc. Medical Radiology & Imaging Technology (BRIT)	Quality assurance and radiation protection	BRIT402
B.Sc. Medical Technology (Radiotherapy-BRT)	Radiation Physics-I	BRT103
B.Sc. Medical Technology (Radiotherapy-BRT)	Radiation Equipment and Radiobiology- I	BRT104
B.Sc. Medical Technology (Radiotherapy-BRT)	Radiation Physics- II	BRT203
B.Sc. Medical Technology (Radiotherapy-BRT)	Radiation Equipment and Radiobiology-II	BRT204
B.Sc. Medical Technology (Radiotherapy-BRT)	Environmental Science- I*	EVS 301
B.Sc. Medical Technology (Radiotherapy-BRT)	Environmental Science - II	EVS 301
B.Sc. Medical Technology (Radiotherapy-BRT)	Brachytherapy & Nuclear Medicine- I	BRT501
B.Sc. Medical Technology (Radiotherapy-BRT)	Radiation safety & Quality assurance-I	BRT503
B.Sc. Medical Technology (Radiotherapy-BRT)	Brachytherapy & Nuclear Medicine-II	BRT601
B.Sc. Medical Technology (Radiotherapy-BRT)	Radiation safety & Quality assurance-II	BRT603
Master of Physiotherapy (MPT)	Electrophysiology & Electro-diagnosis	MPT103
Master of Physiotherapy (MPT)	Musculoskeletal Disorders: Clinical Sciences I	MPT1 301
Master of Physiotherapy (MPT)	Musculoskeletal Disorders: Physiotherapeutics I	MPT1 302
Master of Physiotherapy (MPT)	Neurological Disorders: Clinical Sciences I	MPT2 301
Master of Physiotherapy (MPT)	Neurological Disorders: Physiotherapeutics I	MPT2 302
Master of Physiotherapy (MPT)	Neurological Disorders: Advanced Physiotherapeutics I	MPT2 304

Program Name	Course Name	Course Code
Master of Physiotherapy (MPT)	Musculoskeletal Disorders: Clinical Sciences II	MPT1 401
Master of Physiotherapy (MPT)	Musculoskeletal Disorders: Advanced Physiotherapeutics II	MPT1 404
Master of Physiotherapy (MPT)	Neurological Disorders: Clinical Sciences II	MPT2 401
Master of Physiotherapy (MPT)	Neurological Disorders: Advanced Physiotherapeutics II	MPT2 404
Master of Hospital Administration	Hospital Planning and Operations	MHA122
B.Sc. Nursing	Community Health Nursing I including Environmental Science & Epidemiology - Theory	N- COMH (I) 310
B.Sc. Nursing	Community Health Nursing I including Environmental Science & Epidemiology - Practical	N- COMH (I) 310
Post Basic BSc Nursing	Environmental Science	PBN207
M.Sc. Nursing	Community Health Nursing - II	MSN-201 B
M.Sc. Nursing	Community Health Nursing - II	MSN201 B
B.Sc. Biotechnology	Environmental Science-I	AECC 111
B.Sc. Biotechnology	Microbial physiology & metabolism	BMBC 121
B.Sc. Biotechnology	Environmental Biotechnology	BBTC 503
B.Sc. Biotechnology	Bioprocess Engineering	BBTE 501 B
B.Sc. Microbiology	Environmental Science-I	AECC 111
B.Sc. Microbiology	Microbial physiology & metabolism	BMBC 121
B.Sc. Microbiology	Industrial Microbiology	BMBC 122
M.Sc. Biotechnology, Sem-III	Agrobiotechnology	MBTE 305
M.Sc. Biotechnology, Sem-III	Metabolic Engineering	MBTE 306
M.Sc. Biotechnology, Sem-III	Microbial Technology	MBTE 307
M.Sc. Biotechnology, Sem-III	Energy & Environment	MBTE 310
M.Sc. Microbiology	Microbial Physiology & Metabolism Practical	MMBP 202
M.Sc. Microbiology	Microbial Technology	MMBE 301
M.Sc. Microbiology	Industrial Waste Management	MMBE 302
M.Sc. Microbiology	Bioprocess Technology	MMBE 310
MSc. Yoga Science and holistic health	Environmental Pollution and	MYS303
B.Tech (Hons.) CSE with AI & ML	Environmental Studies	HST112
B.Tech (Hons.) CSE with DS & ML	Environmental Studies	HST112
B.Tech CSE - Cyber Security	Environmental Studies	HST112
Bachelor of Computer Applications (BCA)	Environmental Studies	BCT125
B.Sc. Data Science	Environmental Studies	MD121T
BBA	Computing For Business	BBA 101
BBA	Business Mathematics	BBA 102

Program Name	Course Name	Course Code
BBA	Financial Accounting	BBA 103
BBA	Micro Economics	BBA 105
BBA	Business Statistics	BBA 202
BBA	Business Communication	BBA 203
BBA	Macro Economics	BBA 205
BBA	Human Resource Management	BBA 206
BBA	Production & Operations Management	BBA 305
BBA	Business Laws	BBA 402
BBA	Management Information System	BBA 403
BBA	Management Information System	BBA 503
B.Com	Micro Economics	BCM 105
B.Com	English	BCM 106
B.Com	Macro Economics	BCM 205
B.Com	Advanced Accounting - II	BCM 301
B.Com	Accounting Standards	BCM 401
B.Com	Banking & Insurance	BCM 402
B.Com	Indirect Taxes	BCM 403
B.Com	Soft Skills - II	BCM 406
B.Com	Company Law	BCM 501
B.Com	Financial Services Marketing	BCM 502
B.Com	Indirect Taxes	BCM 503
B.Com	Soft Skills II	BCM 506
B.Com	Human Resource Management	BCM 603
B.Com	Undergraduate Research Project*	BCM 604
MBA	Management Theory & Organizational Behaviour	MBA 101
MBA	Computer Application For Managers	MBA 105
MBA	Business Research	MBA 201
MBA	Management Information Systems	MBA 202
MBA	Legal Aspects Of Business	MBA 205
MBA	Operations Management	MBA 207
MBA	Project Management & Entrepreneurship	MBA303
MBA	Career Advancement Course For Managers	MBA304
MBA	Business Research Project	MBA 401

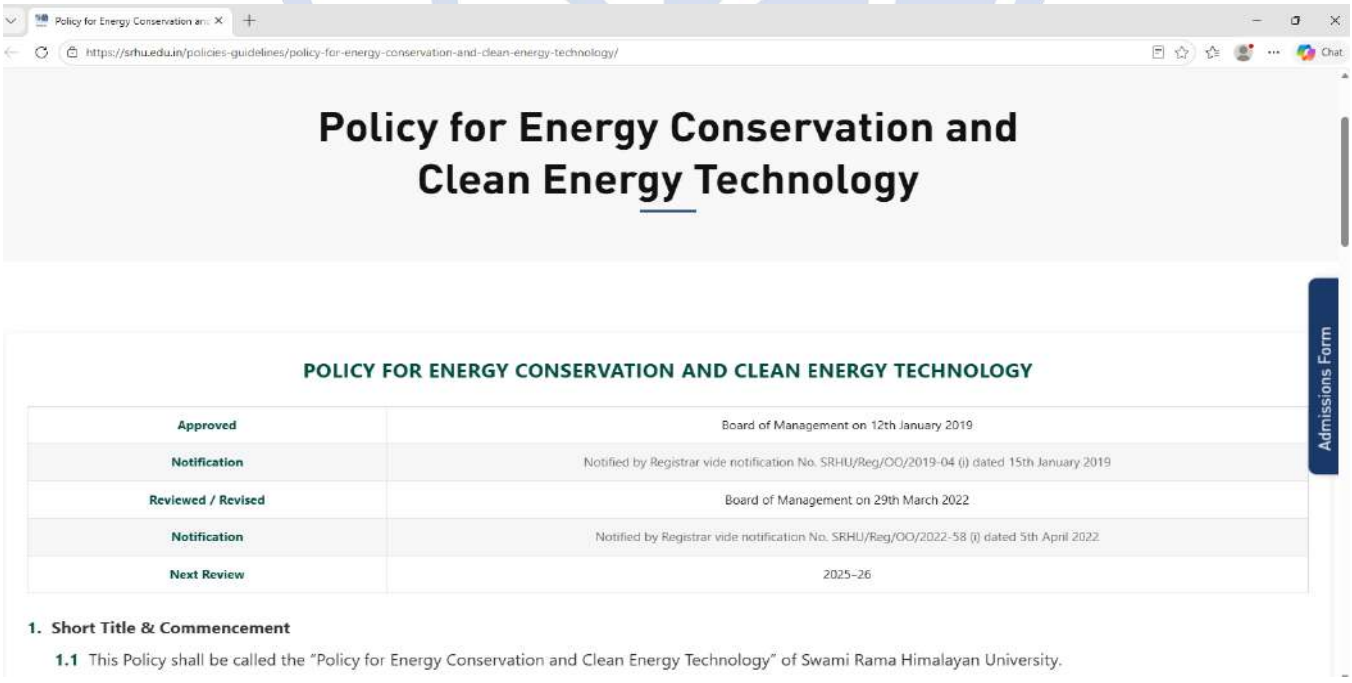
7.2 University measures towards affordable and clean energy

7.2.1 Energy-efficient renovation and building

Swami Rama Himalayan University ensures that all new constructions and major renovations strictly follow national and international green building standards as outlined in its **Policy for Energy Conservation and Clean Energy Technology.** The policy mandates adherence to IGBC and LEED principles, integration of solar and renewable systems, and pre-renovation energy audits to identify efficiency opportunities. By embedding energy-conscious design and renovation practices into institutional policy, SRHU demonstrates its commitment to minimizing environmental impact and promoting sustainable campus infrastructure.

Particulars	Status	Details
Existence of policy	Yes	Policy for Energy Conservation and Clean Energy Technology since 2019
Evidence Provided	Yes	Screenshot of policy provided
Is the Evidence provided public	Yes	Policy is available on the website URL: https://srhu.edu.in/policies-guidelines/policy-for-energy-conservation-and-clean-energy-technology/
Is the policy created or reviewed in period 2022-2026	Yes	Policy for Energy Conservation and Clean Energy Technology reviewed in 2022

Evidence:
Policy for Energy Conservation and Clean Energy Technology since 2019



7.2.2 Upgrade buildings to higher energy efficiency

Swami Rama Himalayan University (SRHU), Dehradun, has adopted a comprehensive, phased plan to enhance energy efficiency across its academic, residential, and healthcare facilities, aligning with its commitment to SDG 7 (Clean and Affordable Energy). Situated in the foothills of the Himalayas, the University's strategy is tailored to the region's mixed climate, warm summers, cool winters, and heavy monsoons, and combines both passive architectural measures and active technological upgrades to reduce overall energy consumption.

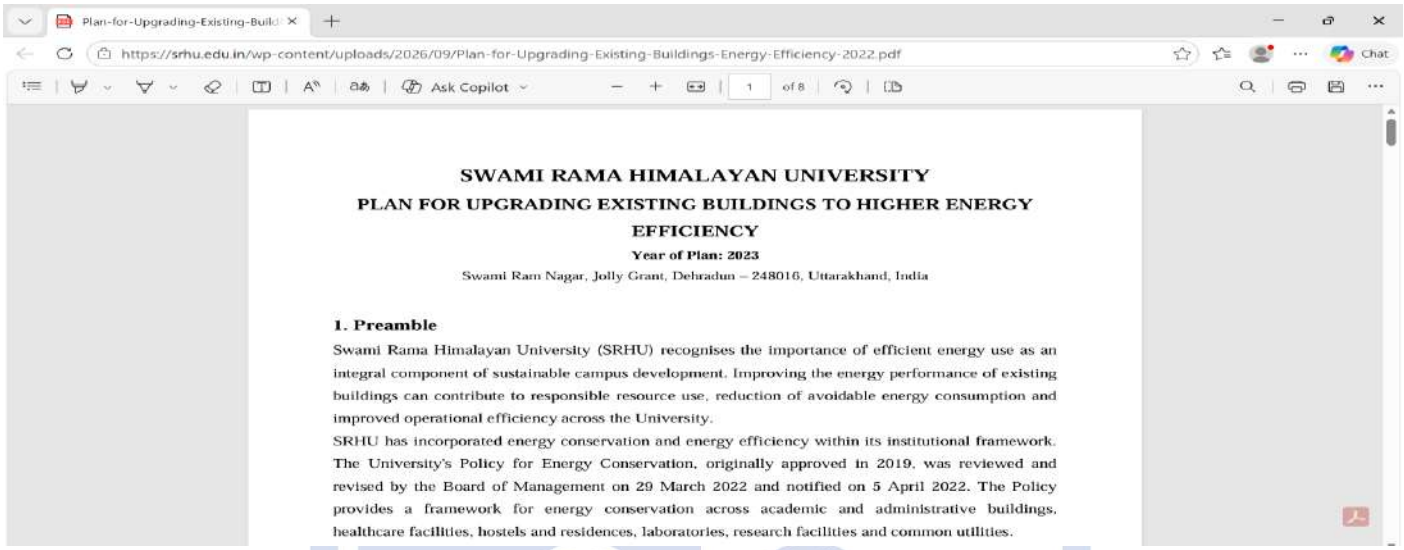
Particulars	Status	Details
Existence of plans	Yes	"Plan for upgrading existing buildings to higher energy efficiency" Since 2023
Evidence Provided	Yes	● Plan for upgrading existing buildings to higher energy efficiency ● Energy Audit report and certificate ● HVAC system installed in the University to optimize thermal comfort, reduce energy consumption ● Energy-efficient BLDC (Brushless Direct Current) fans within hospital premises to enhance energy conservation
Is the Evidence provided public	Yes	Complete Audit Report is available on the website ● URL: https://srhu.edu.in/sdg11/wp-content/uploads/2026/02/Final-Energy-Audit-Report-SRHU-2024-25-signed.pdf Plan for upgrading existing buildings to higher energy efficiency ● URL: https://srhu.edu.in/wp-content/uploads/2026/09/Plan-for-Upgrading-Existing-Buildings-Energy-Efficiency-2022.pdf

Evidences

Evidence 01:

Plan for upgrading existing buildings to higher energy efficiency





SWAMI RAMA HIMALAYAN UNIVERSITY

PLAN FOR UPGRADING EXISTING BUILDINGS TO HIGHER ENERGY EFFICIENCY

Year of Plan: 2023

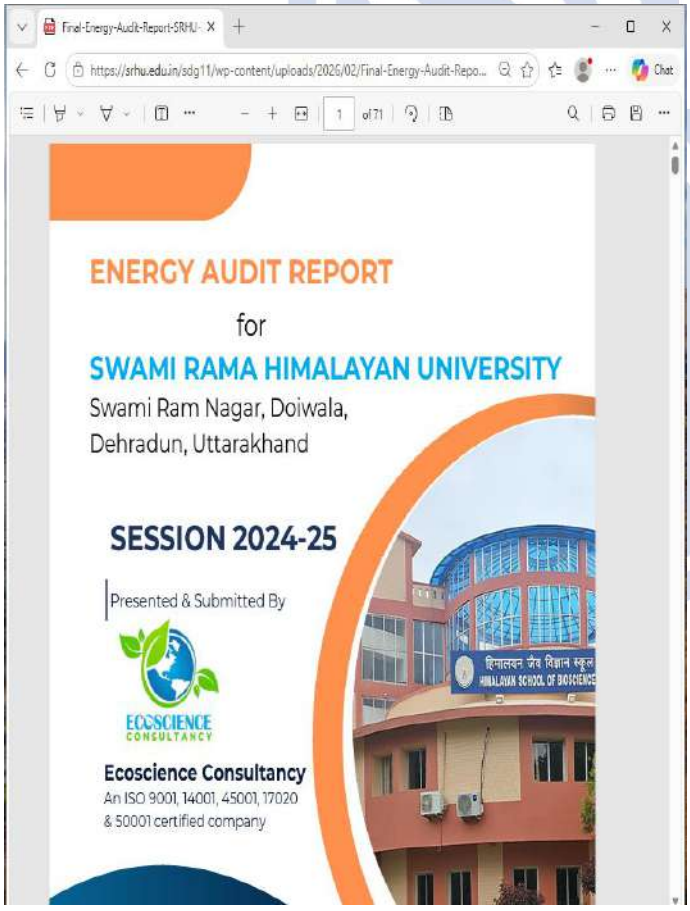
Swami Ram Nagar, Jolly Grant, Dehradun – 248016, Uttarakhand, India

1. Preamble

Swami Rama Himalayan University (SRHU) recognises the importance of efficient energy use as an integral component of sustainable campus development. Improving the energy performance of existing buildings can contribute to responsible resource use, reduction of avoidable energy consumption and improved operational efficiency across the University.

SRHU has incorporated energy conservation and energy efficiency within its institutional framework. The University's Policy for Energy Conservation, originally approved in 2019, was reviewed and revised by the Board of Management on 29 March 2022 and notified on 5 April 2022. The Policy provides a framework for energy conservation across academic and administrative buildings, healthcare facilities, hostels and residences, laboratories, research facilities and common utilities.

Evidence 02: Energy Audit



ENERGY AUDIT REPORT

for

SWAMI RAMA HIMALAYAN UNIVERSITY

Swami Ram Nagar, Doiwala,
Dehradun, Uttarakhand

SESSION 2024-25

Presented & Submitted By

ECOSCIENCE CONSULTANCY

Ecoscience Consultancy
An ISO 9001, 14001, 45001, 17020 & 50001 certified company



ECOSCIENCE CONSULTANCY

ENERGY AUDIT CERTIFICATE

(FOR THE YEAR 2024-25)

IS ISSUED TO

Swami Rama Himalayan University

LOCATED AT SWAMI RAM NAGAR, DOIWALA, DEHRADUN, UTTARAKHAND

for the successful completion of the **Energy Audit** for the year **2024-25**, conducted by M/s Ecoscience Consultancy. This recognition underscores the institution's commitment to sustainability and energy efficiency.
The University is certified to have done exceptionally well to conserve energy and sustainable development for the assessment period.

Mr. Pankaj Dhote
Lead Auditor
(BEE Approved Energy Auditor)

Award Date: 18th August 2025

Energy Audit Report

Energy Audit Certificate

Evidence 03:

HVAC system installed in the University to optimize thermal comfort and reduce energy consumption



Evidence 04:

Energy-efficient BLDC (Brushless Direct Current) fans within hospital premises to enhance energy conservation



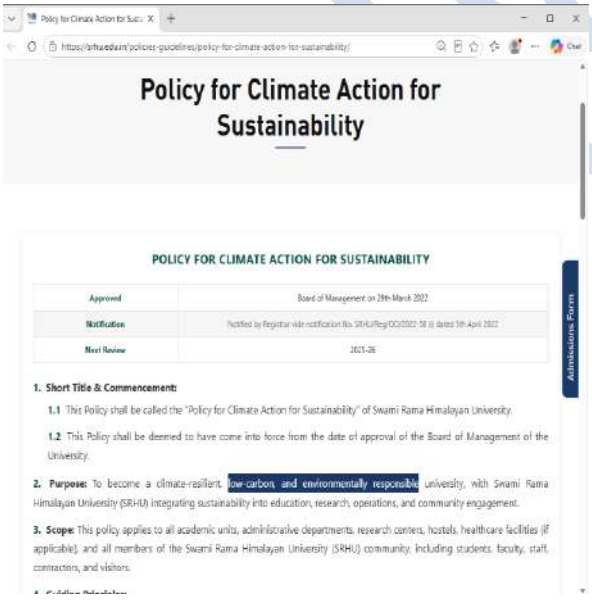
7.2.3 Carbon Reduction and Emission Reduction Process

Swami Rama Himalayan University implements a comprehensive and verified process for carbon management and emission reduction, guided by its Policy for Energy Conservation and Green Campus Initiatives. The University conducts regular Green Audits and Carbon Footprint Assessments through accredited third-party agencies.

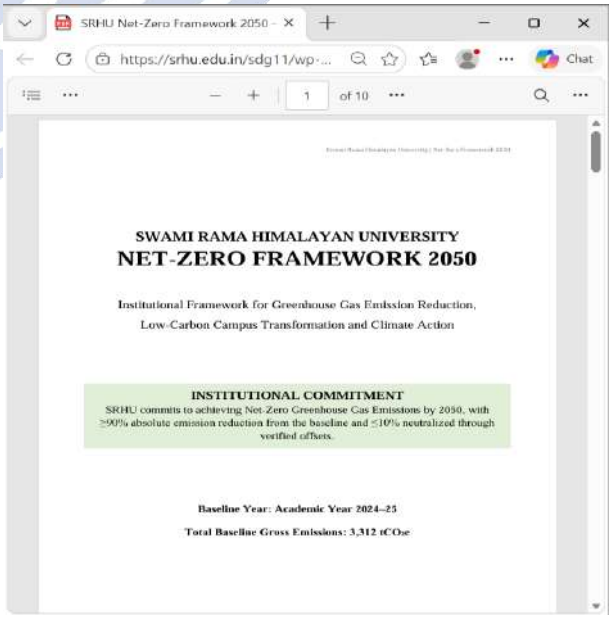
Particulars	Status	Details
Existence of process	Yes	● Policy for Climate Action for Sustainability since 2022 ● Net Zero Action Plan and framework 2050
Evidence Provided	Yes	Screenshots of the following: ● Policy for Climate Action for Sustainability ● Net Zero Action Plan and framework 2050 ● Carbon Footprint Certificate
Is the Evidence provided public	Yes	Available on the University website ● URL of policy: https://srhu.edu.in/policies-guidelines/policy-for-energy-conservation-and-clean-energy-technology/ ● URL of action plan: https://srhu.edu.in/sdg11/wp-content/uploads/2026/03/SRHU-Net-Zero-Action-Plan-2050-Final.pdf ● URL of carbon footprint certificate: https://srhu.edu.in/sdg11/wp-content/uploads/2026/02/Carbon-Footprint-Certificate_SRHU_24-25.pdf

Evidences

Evidence 01:
Policy for Climate Action for Sustainability



Evidence 02:
Net Zero Action Plan and Framework 2050



Evidence 03:
Screenshot of Carbon Footprint Certificate



CARBON FOOTPRINT CERTIFICATE

ECOSCIENCE CONSULTANCY

This is to certified that

Swami Rama Himalayan University

located at Swami Ram Nagar, Doiwala, Dehradun, Uttarakhand

has successfully conducted a Carbon Footprint Assessment for the year 2024–25, in accordance with standard methodologies.

The institution has demonstrated its commitment towards sustainability and environmental responsibility.

Scope of GHG Emissions	t CO_2e	Percentage
Direct emissions to air	921.32	27.8
Indirect emissions from purchased energy	9.21	0.3
Other indirect emissions	2,381.74	71.9
Total t CO2e		**3,312.33**

DR. GURPREET SINGH
LEAD AUDITOR

18.08.2025
DATE

Institutional Greenhouse Gas Inventory (2024-25)

To support evidence-based carbon management, Swami Rama Himalayan University conducts annual greenhouse gas accounting using internationally accepted emission categories. The University's carbon inventory includes direct emissions (Scope 1), indirect emissions from purchased electricity (Scope 2), and other indirect emissions (Scope 3), enabling systematic monitoring of emission sources and guiding institutional strategies for energy efficiency, renewable energy adoption, and long-term carbon reduction.

Emission Category	Emissions (tCO_2e)
Scope 1 (Direct Emissions)	921.32
Scope 2 (Purchased Electricity)	9.21
Scope 3 (Other Indirect Emissions)	2,381.74
Total Carbon Footprint	**3,312.33**

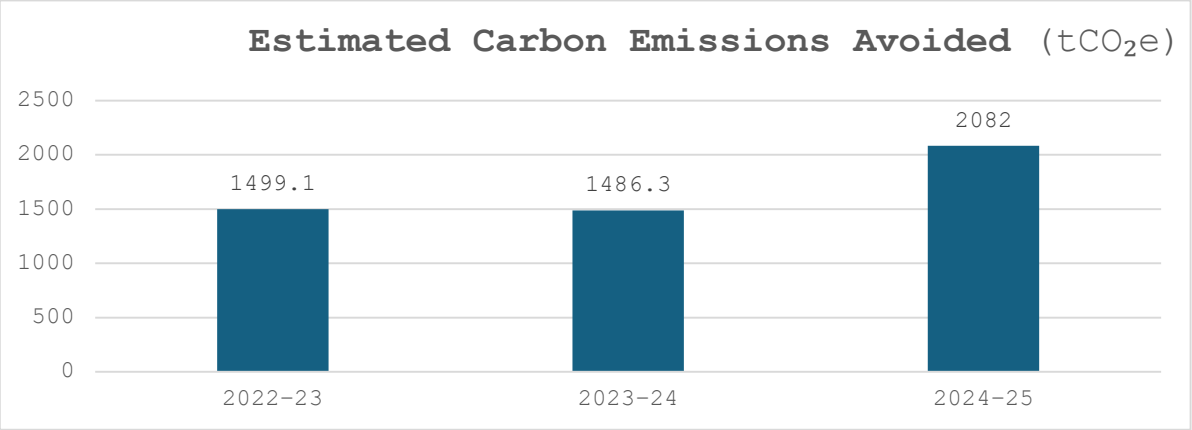
Swami Rama Himalayan University has established phased greenhouse gas reduction targets extending to 2050. These targets are supported through continued investment in renewable energy infrastructure, energy-

efficient buildings, sustainable procurement practices, waste management initiatives, and responsible institutional governance, reinforcing the University's commitment to low-carbon development and Sustainable Development Goal 7.

For 2024-25, SRHU's certified carbon footprint was 3,312.33 tCO_2e (as verified by Eco Science Consultancy, Uttarakhand), with 921.32 tCO_2e from direct emissions and 2,390.95 (2381.74+9.21) tCO_2e from indirect sources. To reduce these emissions, SRHU has installed 2,500 kW of rooftop solar capacity.

Additional measures include:

- **LED retrofitting** across teaching and residential areas;
- **Composting of 49254 kg of food waste (2024-25),** converting it into organic manure;
- **1 MLD Sewage Treatment** Plant reusing treated water for green belt irrigation; and
- **Strict campus mobility policy** promoting battery-powered vehicles and limiting automobile entry.

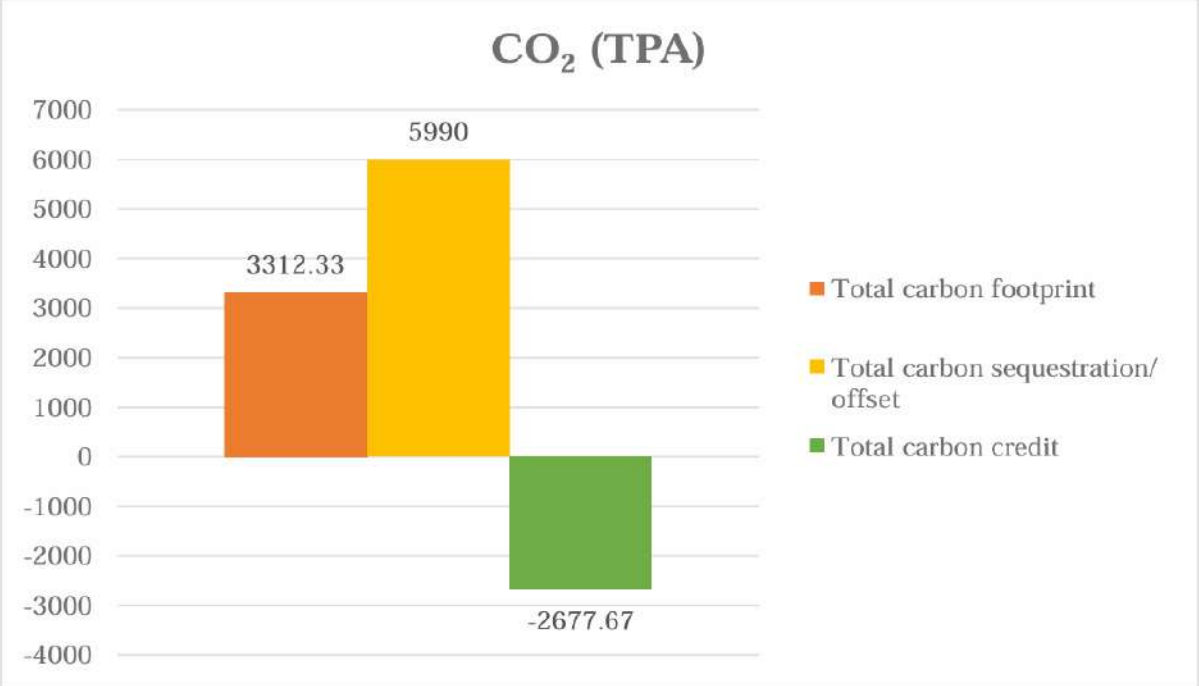


Carbon Emissions Avoided through Renewable Energy Initiatives at SRHU (2022-23 to 2024-25)

Avoidance of carbon emissions through renewable energy initiatives increased from **1,499.1 tCO_2e** in 2022-23 to **2,082 tCO_2e** in 2024-25, reflecting the positive environmental impact of expanded rooftop solar capacity and continued investment in clean energy infrastructure.

Carbon Credit of SRHU Campus (Carbon emission report 2024-25)

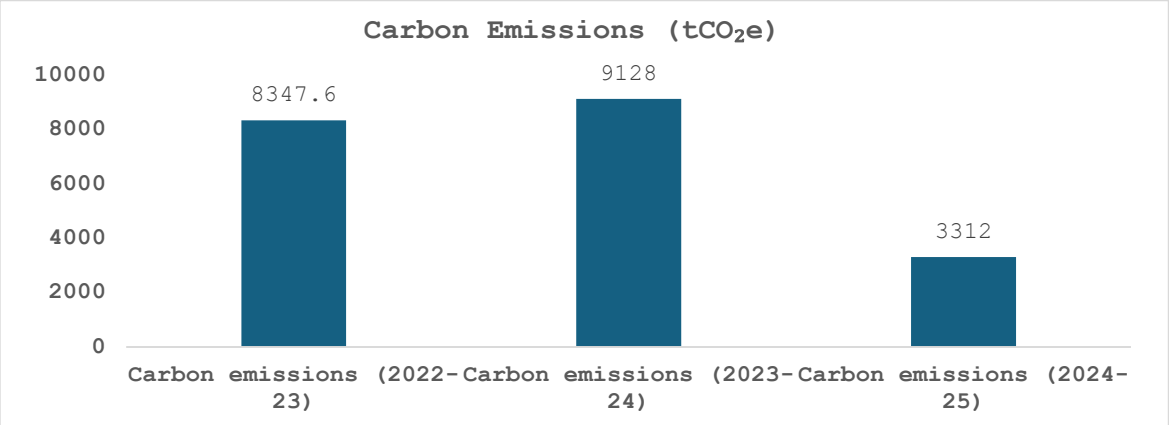
Particulars	Values (Tons CO_2/ Year)
Carbon Footprint	3,312.33
Carbon Sequestration/ Offset	5,990
Carbon Credit	2,677.67



Carbon Reduction Roadmap

Year	Target Carbon Emissions (Tons CO_2e)
2025 (Baseline)	3,312
2030	2,300
2040	1,000
2050	300

Comparison of Carbon Emissions of the last three years



7.2.4 Plan to Reduce Energy Consumption

Swami Rama Himalayan University (SRHU) has implemented the Policy for Energy Conservation and Clean Energy Technology since 2019, aligned with its commitment to sustainability and SDG 7: Affordable and Clean Energy. The University aims to reduce overall campus energy consumption by 30-40% over five years through systematic energy-efficiency measures and clean energy adoption. The Plan for reducing overall Energy Consumption includes regular energy audits, monitoring of energy consumption, use of LED lighting and energy-efficient equipment, optimization of HVAC systems, and improved building energy performance. SRHU is also promoting solar and other renewable energy sources to reduce dependence on conventional energy. Awareness programmes encourage students, faculty, and staff to adopt energy-conscious practices, supported by periodic reviews and performance assessments.

Energy Conservation Initiatives

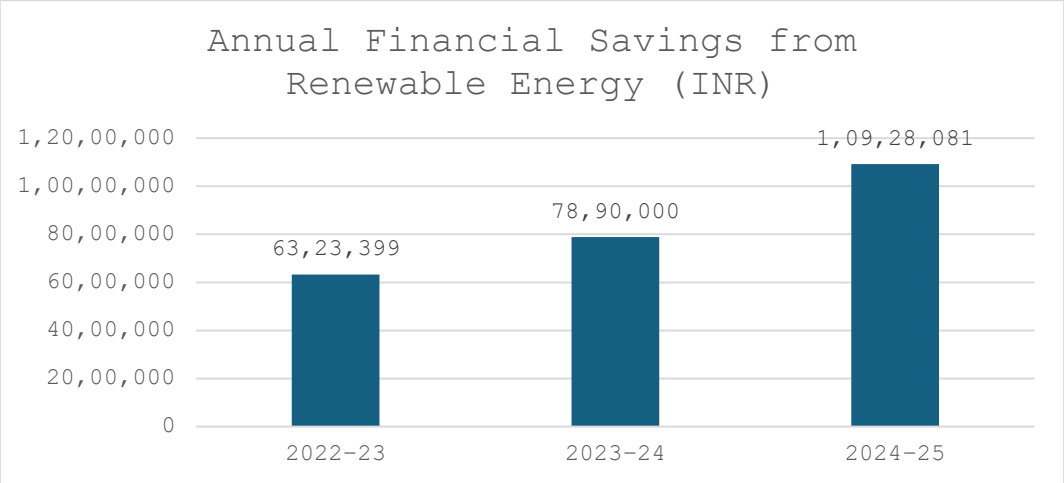
Key behavioural and technological interventions prioritized in 2024-25 include:

- Buildings designed with strategic ventilation and abundant natural light, our building effectively cuts energy consumption, lowering electricity loads while ensuring a sustainable, eco-friendly environment.
- LED Upgrades: 85% of standard lighting fixtures inside classrooms and corridors have been successfully transitioned to high-efficacy LED alternatives.
- Smart Sensors & Controls: Automatic motion-detector switches installed inside washrooms and common pathways to mitigate idle consumption.
- HVAC system installed in the University to optimize thermal comfort and reduce energy consumption
- Distribution Upgrades: Deployment of capacitor banks for localized power factor correction, maintaining standard efficiency limits over the internal grid.

Electricity consumption, generation by Renewable Energy Sources and export to grid

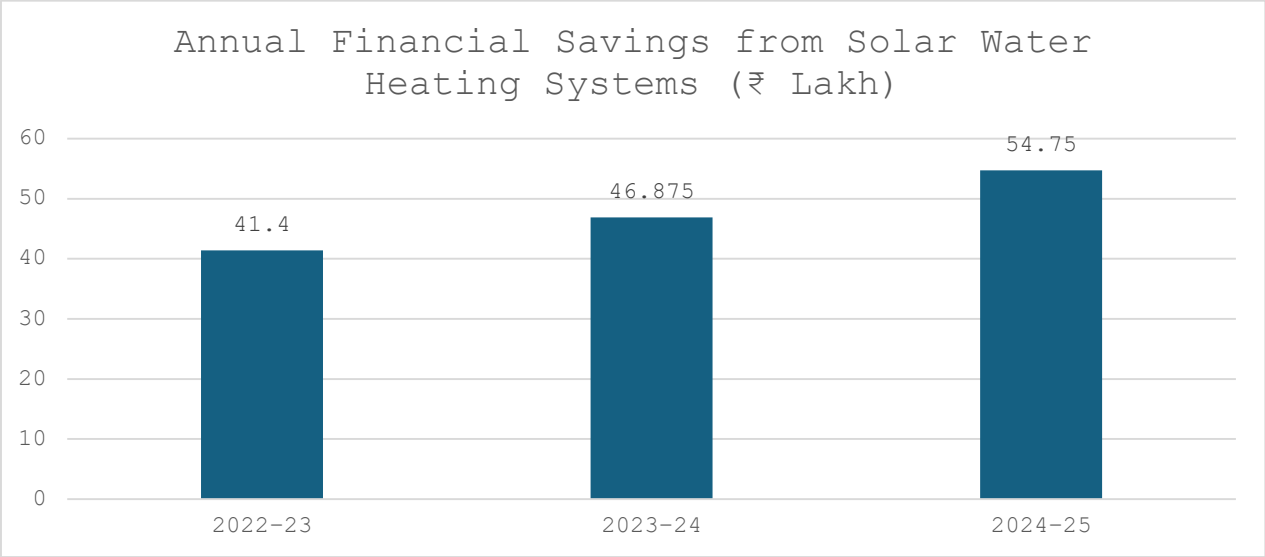
Financial Year	Total Electricity Consumed	Total Renewable Energy (RE) Power Installed (Solar + Others)	Total Electricity Generated by RE Technology (Solar + Others)	Electricity exported to grid by RE Technology (Solar + Others)	Total Built-up Area
Unit	(kWh)	(kWp)	(kWh)	(kWh)	(Sq. ft.)
2024-25	3828363	2500	2909058	138312	2758226.13
2023-24	3713182	1500	2075865	114796	2634265.77
2022-23	3770772	1500	2093840	121260	2634265.77

Annual Financial Savings Achieved through Renewable Energy Initiatives at SRHU (2022-23 to 2024-25)



Annual financial savings from renewable energy initiatives increased from ₹63.23 lakh in 2022-23 to ₹1.09 crore in 2024-25, representing a 72.82% increase over the three years. The substantial growth in savings reflects the expansion of rooftop solar infrastructure and improved energy efficiency, demonstrating the economic benefits of SRHU's investments in sustainable energy systems.

Annual Financial Savings from Solar Water Heating Systems at SRHU (2022-23 to 2024-25)



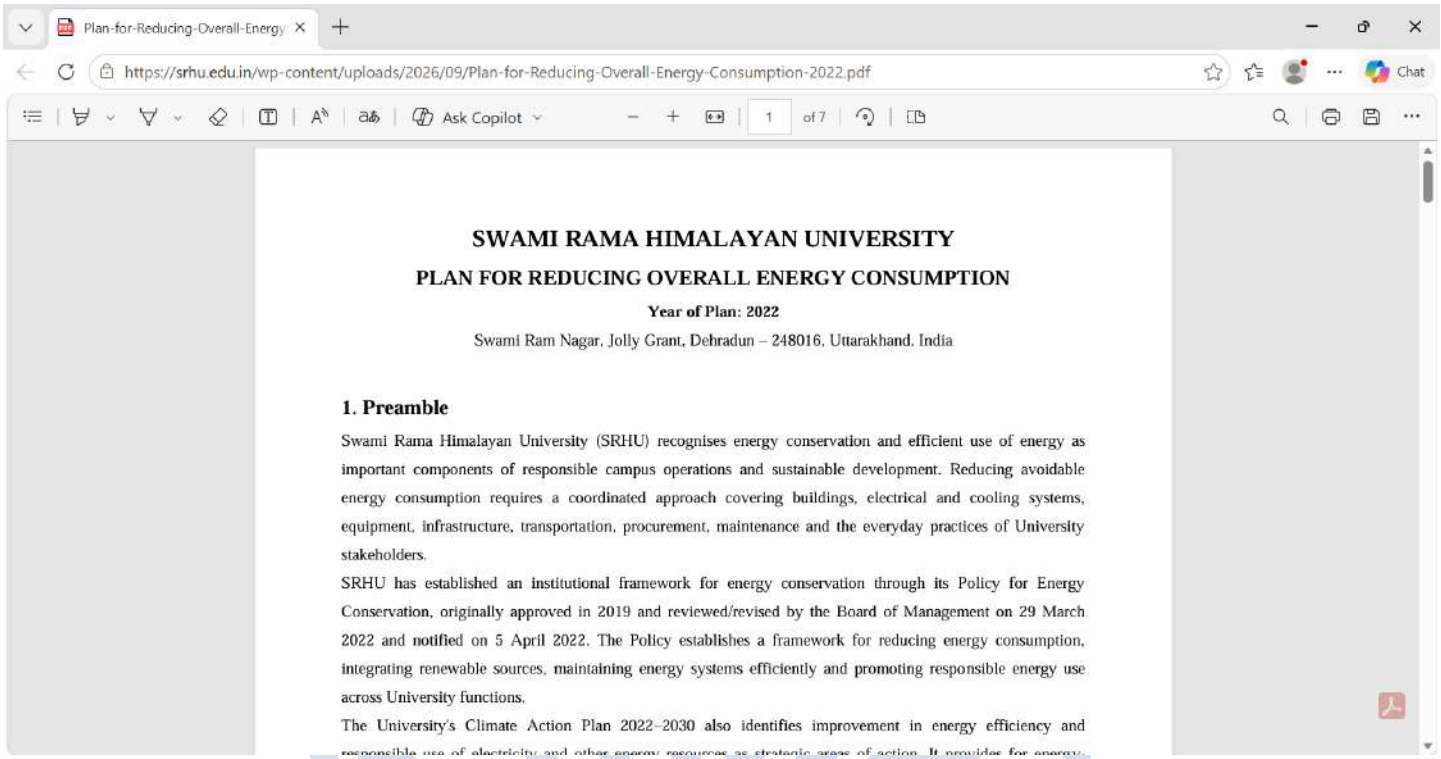
Annual financial savings from solar water heating systems increased from ₹41.40 lakh in 2022-23 to ₹54.75 lakh in 2024-25, representing a 32.25% increase over the three years. The sustained increase demonstrates the effectiveness of SRHU's investment in renewable thermal energy technologies, reducing dependence on conventional energy sources while generating long-term operational cost savings.

Particulars	Status	Details
Existence of Plan	Yes	● Plan for reducing overall Energy Consumption ● Policy for Energy Conservation and Clean Energy Technology since 2019
Evidence Provided	Yes	● Screenshots of the following: - Plan for reducing overall Energy Consumption - Policy for Energy Conservation and Clean Energy Technology - Solar installations - Biogas Plant - Energy-efficient installations ● Certificate-Energy Management System Audit (ISO 50001:2018) ● Photo of Behavioral and Energy Saving Awareness
Is the Evidence provided public	Yes	Available on the University website ● URL of Plan: https://srhu.edu.in/wp-content/uploads/2026/09/Plan-for-Reducing-Overall-Energy-Consumption-2022.pdf ● URL of Policy: https://srhu.edu.in/policies-guidelines/policy-for-energy-conservation-and-clean-energy-technology/

Evidences

Evidence 1:
Plan for reducing overall Energy Consumption





SWAMI RAMA HIMALAYAN UNIVERSITY

PLAN FOR REDUCING OVERALL ENERGY CONSUMPTION

Year of Plan: 2022

Swami Ram Nagar, Jolly Grant, Dehradun – 248016, Uttarakhand, India

1. Preamble

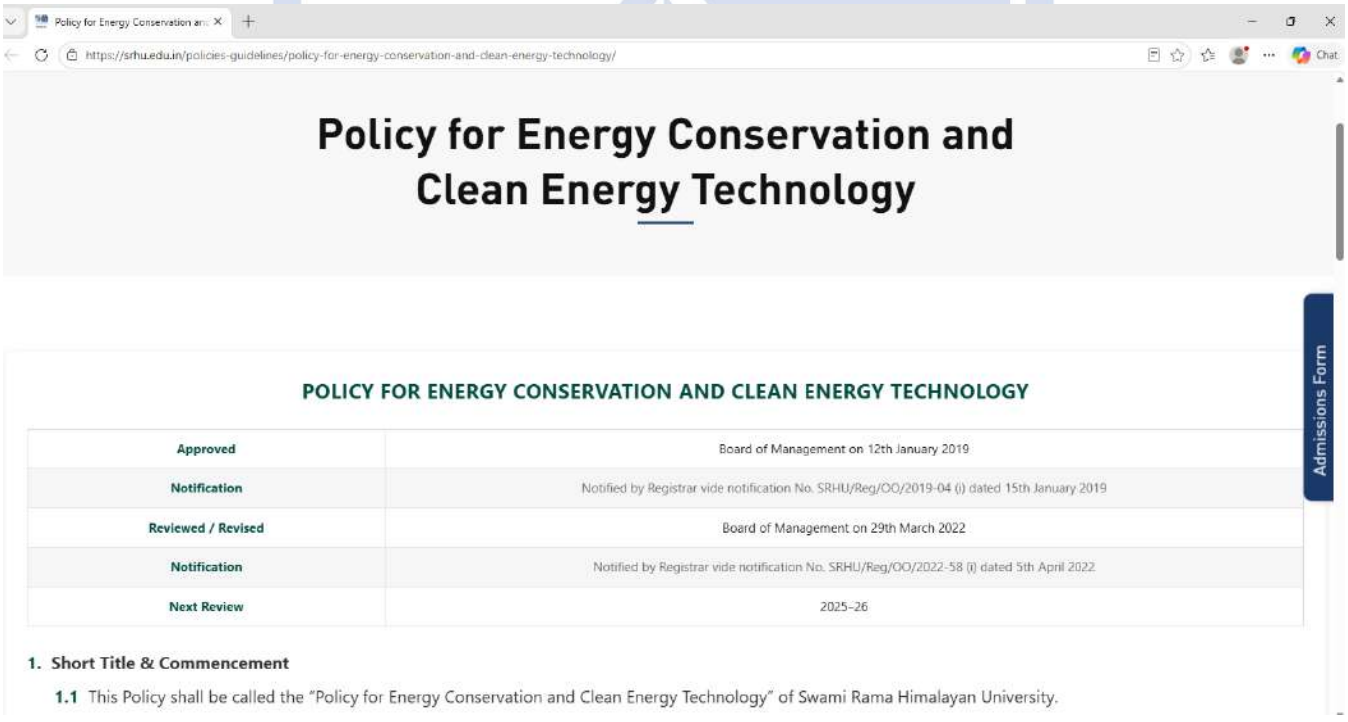
Swami Rama Himalayan University (SRHU) recognises energy conservation and efficient use of energy as important components of responsible campus operations and sustainable development. Reducing avoidable energy consumption requires a coordinated approach covering buildings, electrical and cooling systems, equipment, infrastructure, transportation, procurement, maintenance and the everyday practices of University stakeholders.

SRHU has established an institutional framework for energy conservation through its Policy for Energy Conservation, originally approved in 2019 and reviewed/revised by the Board of Management on 29 March 2022 and notified on 5 April 2022. The Policy establishes a framework for reducing energy consumption, integrating renewable sources, maintaining energy systems efficiently and promoting responsible energy use across University functions.

The University's Climate Action Plan 2022–2030 also identifies improvement in energy efficiency and

Evidence 2:

Policy for Energy Conservation and Clean Energy Technology



Policy for Energy Conservation and Clean Energy Technology

POLICY FOR ENERGY CONSERVATION AND CLEAN ENERGY TECHNOLOGY

Approved	Board of Management on 12th January 2019
Notification	Notified by Registrar vide notification No. SRHU/Reg/OO/2019-04 (i) dated 15th January 2019
Reviewed / Revised	Board of Management on 29th March 2022
Notification	Notified by Registrar vide notification No. SRHU/Reg/OO/2022-58 (i) dated 5th April 2022
Next Review	2025-26

1. Short Title & Commencement

1.1 This Policy shall be called the "Policy for Energy Conservation and Clean Energy Technology" of Swami Rama Himalayan University.

Admissions Form

Policy for Energy Conservation and Clean Energy Technology since 2019

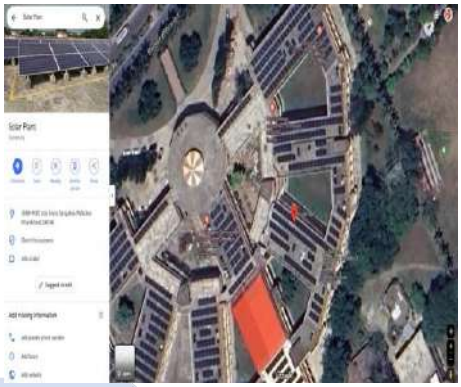
Evidence 3:
Solar installations



Solar panels on the roof of the Himalayan College of Nursing, SRHU



Solar panels on the roof of the Himalayan Institute of Medical Sciences, SRHU



Google map image of the solar plant (Rooftop of HIMS, SRHU)





Solar water heater installed on the rooftop of the working women's hostel.

Evidence 4:
In-house Biogas Plant



Evidence 5:
Energy-efficient installations

LED lighting at the University office as a step promoting energy efficiency









Energy-efficient BLDC (Brushless Direct Current) fans within hospital premises to enhance energy conservation



HVAC system installed in the University to optimize thermal comfort, reduce energy consumption



LED lights in the university premises



Evidence 6:
Certificate of Energy Management System Audit (ISO 50001:2018)



ISO 50001:2018

Certificate of Registration

This is to Certify That
Energy Management System of

SWAMI RAMA HIMALAYAN UNIVERSITY

SWAMI RAM NAGAR, JOLLY GRANT, DOIWALA, DEHRADUN - 248140,
UTTARAKHAND, INDIA

has been assessed and found to conform to the requirements of

ISO 50001:2018

For the following scope :

PROVIDING EDUCATION UNDERGRADUATE (UG), POSTGRADUATE (PG) AND DOCTORAL DEGREE PROGRAMS, RESEARCH, PHD AND HEALTH CARE TRAINING COURSES

Certificate No : 23MEQNA76
Initial Registration Date : 11/09/2023 Issuance Date : 04/08/2025
Date of Expiry : 10/09/2026
Date of Re-Certification : 10/09/2026

Director

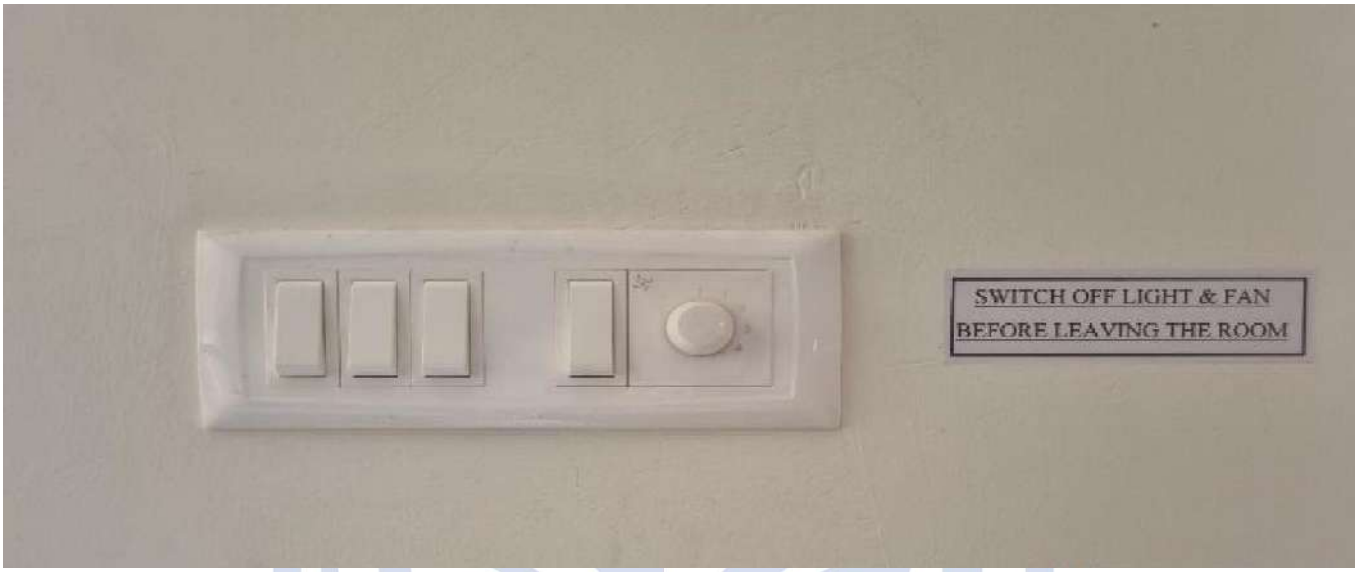
EGAC Accredited
EnMS Certification
CAB #011805

(Scan to Verify)

Magnitude Management Services Pvt. Ltd.

Energy Audit Certificate

Evidence 7:
Behavioral and Energy Saving Awareness



7.2.5 Energy Wastage Identification

Swami Rama Himalayan University (SRHU) implements a systematic approach to identify, assess, and minimize energy wastage across its campus, establishing benchmarks to reduce consumption and costs while fostering a culture of shared responsibility among students, staff, and faculty.

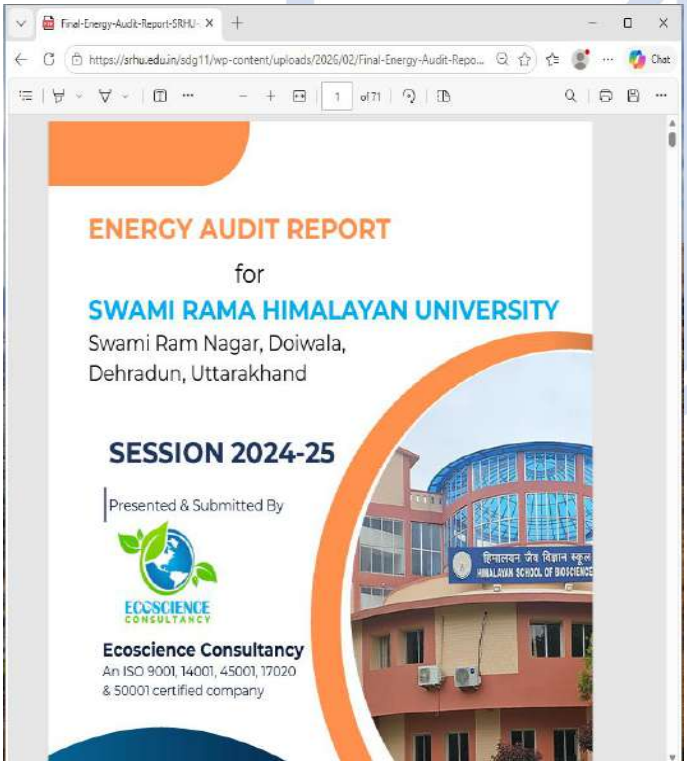
Energy wastage identification relies on a thorough combination of audit-based and observational assessments. This includes preliminary energy audits analyzing electricity consumption data and load profiles across academic blocks, hostels, and hospital units, alongside on-site inspections of lighting, HVAC systems, water pumps, and lab equipment. Facility management engagement and technical analyses help measure load factors, equipment efficiency, and standby energy to uncover hidden losses.

The energy audit identified resource losses across eight operational domains, which were resolved through targeted corrective measures. Traditional lighting fixtures were replaced with energy-efficient LEDs paired with motion sensors and timers, while air-conditioning units were optimized with preventive maintenance, smart thermostats, and temperature limits set between 24-26°C. Buildings were retrofitted with roof insulation, reflective coatings, and double-glazed windows to minimize heat gain.

Equipment and plug loads were managed using smart power strips and BEE 4- and 5-star rated appliances. Water-pumping systems and specialized hospital facilities incorporated variable frequency drives, automated sensors, and strict operating schedules. Finally, campus mobility was improved through clean transportation options and EV charging stations, while an Energy Management Cell and awareness campaigns fostered a lasting culture of sustainability.

Particulars	Status	Details
Existence of reviews	Yes	Energy audit report
Evidence Provided	Yes	Screenshots provided • Energy audit report • Energy-efficient installations
Is the Evidence provided public	Yes	Available on the University website URL: https://srhu.edu.in/sdg11/wp-content/uploads/2026/02/Final-Energy-Audit-Report-SRHU-2024-25-signed.pdf

Evidence 01: Energy Audit Report & Certificate



Energy audit report



Energy Audit Certificate

Evidence 02
Energy-efficient installations
LED lighting at the University office as a step promoting energy efficiency









Energy-efficient BLDC (Brushless Direct Current) fans within hospital premises to enhance energy conservation

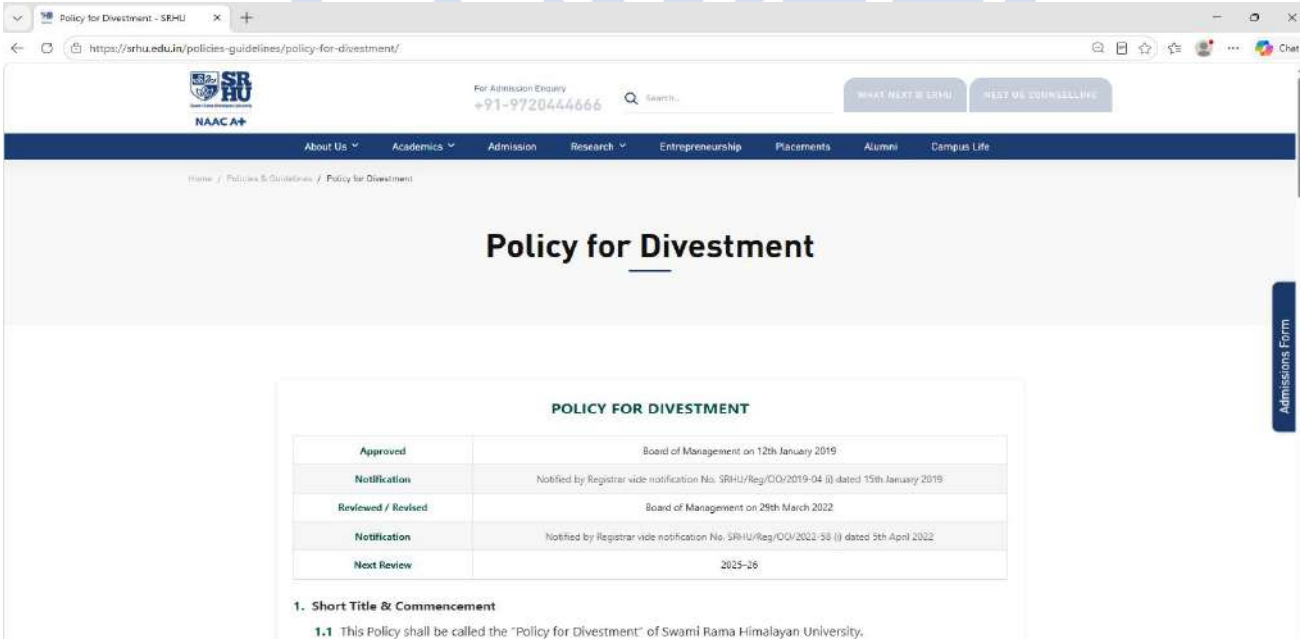


7.2.6 Divestment policy

Swami Rama Himalayan University has a Divestment Policy since 2019 to ensure that institutional investments align with its sustainability and ethical values. The policy mandates divestment from carbon-intensive sectors such as coal and oil, and prohibits funding of industries that negatively impact environmental or social well-being. It emphasizes redirecting investments toward renewable energy, green technologies, and sustainable enterprises, thereby reinforcing SRHU's commitment to responsible financial governance and the principles of SDG 7.

Particulars	Status	Details
Existence of Policy	Yes	Policy for Divestment since 2019
Evidence Provided	Yes	Screenshot of the Policy for Divestment provided
Is the Evidence provided public	Yes	Policy for Divestment is available on the website URL: https://srhu.edu.in/policies-guidelines/policy-for-divestment/
Is policy created or reviewed in period 2022-2026	Yes	Policy reviewed in 2022

Evidence:
Screenshot of Policy for Divestment



7.3 Energy Use Density

The University monitors and evaluates its total energy performance through the Energy Use Density (EUD) metric, representing electricity consumed per square meter of built-up area annually. For the academic year 2024-25, SRHU recorded a total energy consumption of 3828363 KWh across its 256,247.59 m² built-up area. This results in an Energy Performance Index (EPI) of 14.94 kWh/m²/year.

The low EPI reflects SRHU's continuous efforts toward energy efficiency through LED retrofitting, optimized HVAC systems, solar power integration, and robust energy monitoring practices. Spanning 200 acres, the university's infrastructure demonstrates a strong balance between operational functionality and sustainability, demonstrating SRHU's ongoing commitment to energy-efficient campus management.

7.3.1 Indicator: Energy Usage per sqm

Particulars	Values
Total Energy used	13782.10 GJ
University floor space	256,247.59 m²

7.4 Energy and the community

SRH University (SRHU) is actively managing its energy footprint to support global climate goals while expanding its academic, healthcare, research, and residential infrastructure. Despite an escalation in total institutional energy demand driven by physical growth, the university has successfully decoupled its infrastructure expansion from carbon-intensive energy consumption.

7.4.1 Local Community Outreach for Energy Efficiency

SRHU regularly engages with surrounding communities through campaigns and programmes focused on energy efficiency and renewable energy awareness. The University's "Green Campus" initiative has included tree-planting drives, e-waste recycling drives, and solar-energy awareness events which help residents and students alike understand the importance of cleaner energy practices. SRHU received the Renewable Energy Champion Award 2024, Green Practice Platinum Award-2025 by Confederation of Indian Industry (CII), Uttarakhand Pharma & Healthcare AYUSH Samman-2025 by Uttarakhand Government for its eco-friendly practices, including energy conservation and reduction of fuel consumption via electric vehicles on campus.

Particulars	Status	Details
Existence of Programmes	Yes	Awareness programme for local community (Doiwala Municipal Council) for Energy efficiency and clean energy
Evidence Provided	Yes	Letter of Chairman, Doiwala Municipal Council
Is the Evidence provided public	Yes	Available on the https://srhu.edu.in/awards-and-recognitions/

Evidence of pictures 01

Certificates / Awards



7.4.2 100% Renewable Energy Pledge

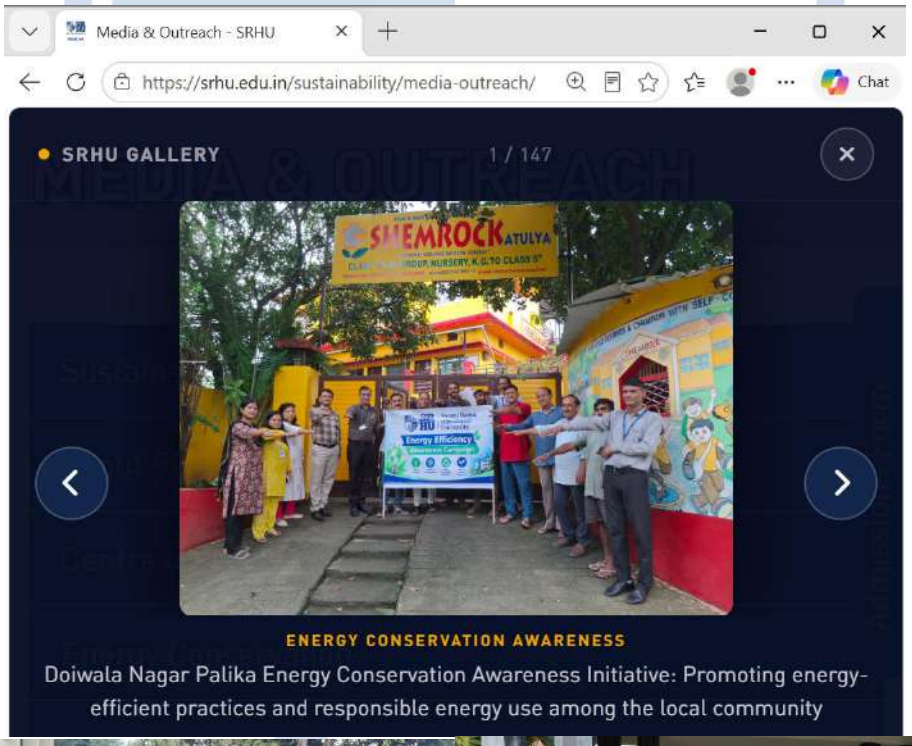
Swami Rama Himalayan University actively advocates for clean and renewable energy adoption within and beyond its campus through awareness programs, community outreach, and institutional commitments. The University has made a public pledge to progressively transition toward 100% renewable energy, aligning its long-term sustainability roadmap with India's National Solar Mission and affordable and Clean Energy (SDG 7).

Through initiatives such as the installation of 2.5 MW rooftop solar power plants, SRHU demonstrates its intent to minimize dependence on non-renewable sources. These actions are complemented by seminars, student campaigns, and collaborations that encourage nearby institutions, local bodies, and communities to adopt renewable energy practices.

Particulars	Status	Details

Existence of promotion	Yes	Event conducted: "SRHU Mobilizes the Community for Cleanliness and 100% Renewable Energy Pledge"
Evidence Provided	Yes	Images of SRHU Mobilizes the Community for Cleanliness and 100% Renewable Energy Pledge
Is the Evidence provided public	Yes	Available on the university website URL: https://srhu.edu.in/sustainability/media-outreach/

EVIDENCE 01:
SRHU Mobilizes the Community for Cleanliness and 100% Renewable Energy Pledge





SRHU Mobilizes the Community for Cleanliness and 100% Renewable Energy Pledge

This public pledge reinforces SRHU's leadership in driving Uttarakhand's transition toward a low-carbon future and creating a culture of sustainability that extends beyond the campus boundaries.

7.4.3 Energy Efficiency Services for Industry

Swami Rama Himalayan University (SRHU) has extended its institutional expertise in sustainable energy and environmental technologies to support industry-oriented innovation. In 2025, SRHU incubated and supported Mirage Energy R&D Pvt. Ltd., a startup working on sustainable solutions for waste-to-energy, biofuels, and renewable energy.

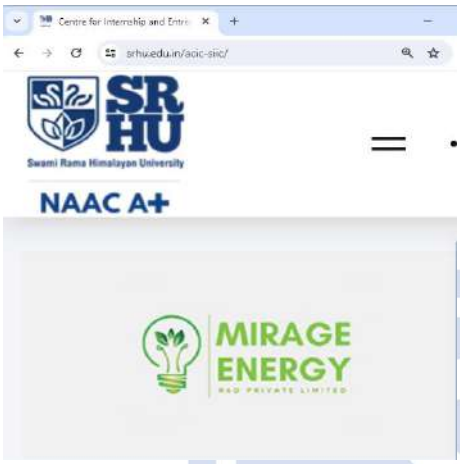
Through its support and services, SRHU facilitated technical guidance, research support, knowledge sharing, and capacity building related to clean energy and sustainable resource management. Mirage Energy R&D Pvt. Ltd. focuses on converting solid and organic waste into clean biofuels and renewable energy, thereby promoting circular economy practices, reducing landfill dependency, and supporting low-carbon energy solutions.

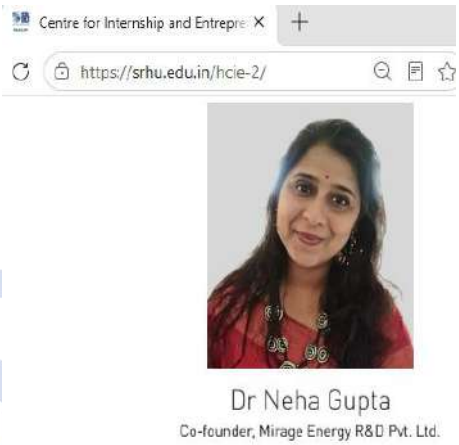
This incubation initiative demonstrates SRHU's engagement with an industry/start-up partner in developing and promoting clean energy and sustainable technology solutions.

Particulars	Status	Details
Existence of services	Yes	SRHU incubates Mirage Energy to serve society by providing sustainable solutions for waste-to-energy, biofuels, and renewable energy
Evidence Provided	Yes	Images provided
Is the Evidence provided public	Yes	Available on the university website URL: https://srhu.edu.in/acic-siic/

Evidence:

Screenshot of the Startups Mirage Energy R&D Pvt Ltd









7.4.4 Policy Development for Clean Energy Technology

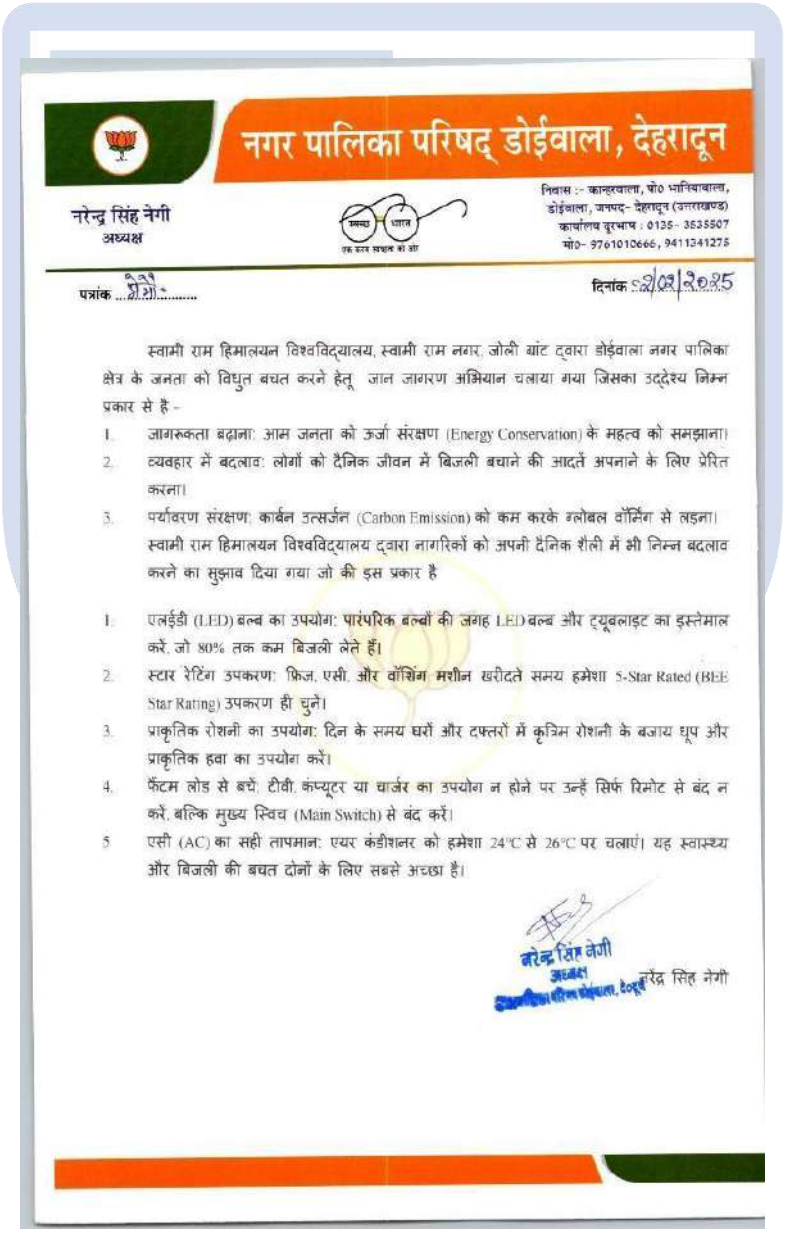
Swami Rama Himalayan University (SRHU) actively supports clean energy awareness and adoption in rural communities. The University provides expert opinions, technical guidance, and knowledge support to local opinion makers and decision-makers, including Gram Pradhans, Mayors, local representatives, and community leaders, on clean energy and energy-efficient technologies.

SRHU's experts provide inputs on the adoption of solar energy, energy-efficient infrastructure, sustainable energy practices, and renewable energy technologies, helping local stakeholders understand their potential benefits and practical implementation. These engagements contribute to informed decision-making at the community level and provide field-based insights that can support future clean energy and energy-efficiency policy development.

Through these activities, SRHU contributes its academic expertise and technical knowledge to local policy influencers and decision-makers, while strengthening collaboration between academia, local governance, and communities for sustainable energy development.

Particulars	Status	Details
Existence of support	Yes	Support to local administration, Doiwala Municipal Council
Evidence Provided	Yes	Letter of the Chairman, Doiwala Municipal Council
Is the Evidence provided public	Yes	Available on the https://srhu.edu.in/awards-and-recognitions/

Evidence



नगर पालिका परिषद् डोईवाला, देहरादून

नरेन्द्र सिंह नेगी
अध्यक्ष

निवास :- कान्हरवाला, पो० भानियावाला, डोईवाला, जनपद- देहरादून (उत्तराखण्ड)
कार्यालय दूरभाष : 0135- 3535507
मो0- 9761010666, 9411341275

पत्रांक ...प्रेस/...

दिनांक 22/09/2025

स्वामी राम हिमालयन विश्वविद्यालय, स्वामी राम नगर, जोली ग्रांट द्वारा डोईवाला नगर पालिका क्षेत्र के जनता को विद्युत बचत करने हेतू जान जागरण अभियान चलाया गया जिसका उद्देश्य निम्न प्रकार से है -

1. जागरूकता बढ़ाना: आम जनता को ऊर्जा संरक्षण (Energy Conservation) के महत्व को समझाना।
2. व्यवहार में बदलाव: लोगों को दैनिक जीवन में बिजली बचाने की आदतें अपनाने के लिए प्रेरित करना।
3. पर्यावरण संरक्षण: कार्बन उत्सर्जन (Carbon Emission) को कम करके ग्लोबल वॉर्मिंग से लड़ना।

स्वामी राम हिमालयन विश्वविद्यालय द्वारा नागरिकों को अपनी दैनिक शैली में भी निम्न बदलाव करने का सुझाव दिया गया जो की इस प्रकार है

1. एलईडी (LED) बल्ब का उपयोग: पारंपरिक बल्बों की जगह LED बल्ब और ट्यूबलाइट का इस्तेमाल करें, जो 80% तक कम बिजली लेते हैं।
2. स्टार रेटिंग उपकरण: फ्रिज, एसी, और वॉशिंग मशीन खरीदते समय हमेशा 5-Star Rated (BEE Star Rating) उपकरण ही चुनें।
3. प्राकृतिक रोशनी का उपयोग: दिन के समय घरों और दफ्तरों में कृत्रिम रोशनी के बजाय धूप और प्राकृतिक हवा का उपयोग करें।
4. फैंटम लोड से बचें: टीवी, कंप्यूटर या चार्जर का उपयोग न होने पर उन्हें सिर्फ रिमोट से बंद न करें, बल्कि मुख्य स्विच (Main Switch) से बंद करें।
5. एसी (AC) का सही तापमान: एयर कंडीशनर को हमेशा 24°C से 26°C पर चलाएं। यह स्वास्थ्य और बिजली की बचत दोनों के लिए सबसे अच्छा है।

नरेन्द्र सिंह नेगी
अध्यक्ष
नगर पालिका परिषद् डोईवाला, देहरादून

नरेंद्र सिंह नेगी

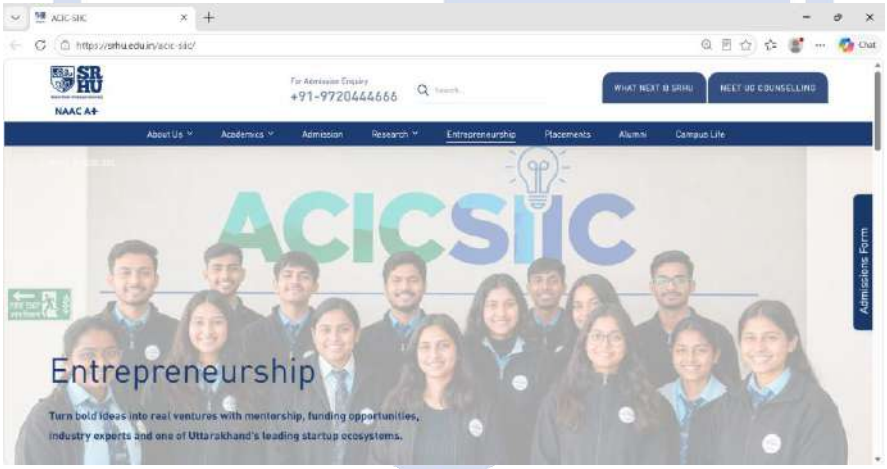
7.4.5 Assistance to Low-Carbon Innovation

Swami Rama Himalayan University (SRHU) actively supports low-carbon innovation through its 'Atal Community Innovation Centre - SRHU Innovation and Incubation Centre' (ACIC- SIIC), which assists to incubates Mirage Energy to serve society by providing sustainable solutions for waste-to-energy, biofuels, and renewable energy.

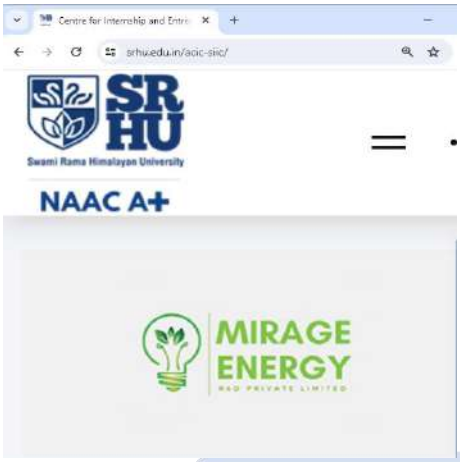
Particulars	Status	Details
Existence of Assistance	Yes	SRHU incubates Mirage Energy to serve society by providing sustainable solutions for waste-to-energy, biofuels, and renewable energy
Evidence Provided	Yes	Images provided
Is the Evidence provided public	Yes	Available on the university website URL: https://srhu.edu.in/acic-siic/

Evidence:

Startup Ecosystem - Supporting innovation



Screenshot of the Startups Mirage Energy R&D Pvt Ltd









Status of Copyright Application:

Enter Diary No.* LD-39781/2026-CO [View Status] [Reset]

Search Results:

Diary Number	Class of Work	Title of Work	Applicant Name	Communication Address	Status
LD-39781/2026-CO	Literary/ Dramatic	SMART SEAWEED INDOOR CULTIVATION SYSTEM	DR. ARJUN SURESH	C/O BHUPENDRA GUPTA, 657 SOLANIPURAM, ROORKEE, HARIDWAR, UTTARAKHAND, INDIA-247667	Waiting
LD-39781/2026-CO	Literary/ Dramatic	SMART SEAWEED INDOOR CULTIVATION SYSTEM	DR. NEHA GUPTA	C/O BHUPENDRA GUPTA, 657 SOLANIPURAM, ROORKEE, HARIDWAR, UTTARAKHAND, INDIA-247667	Waiting
LD-39781/2026-CO	Literary/ Dramatic	SMART SEAWEED INDOOR CULTIVATION SYSTEM	MIRAGE ENERGY R&D PVT LTD	C/O BHUPENDRA GUPTA, 657 SOLANIPURAM, ROORKEE, HARIDWAR, UTTARAKHAND, INDIA-247667	Waiting

*Work Awaited: Work yet to be received.
*Waiting: Payment Accepted,Application in mandatory waiting period of one month(Copyright Act 1957).
*Documents not received, formality check failed: Documents/works not received only after making payment.
*Abandoned: Reply to Discrepancy letter issued not received/works not received after filing.
*Scrutiny: Application is under process.

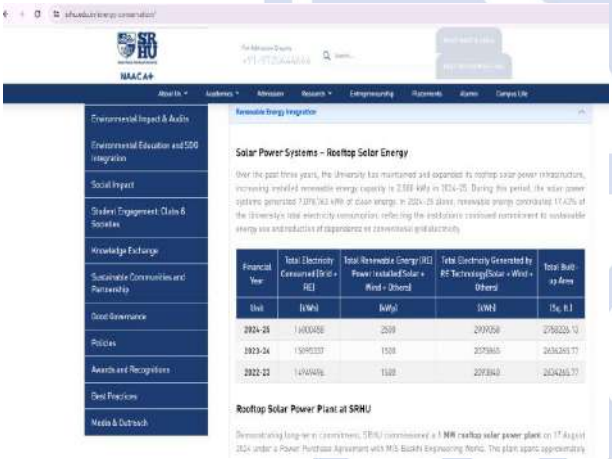
7.5 Low-Carbon Energy Use

7.5.1 Low-Carbon Energy Use

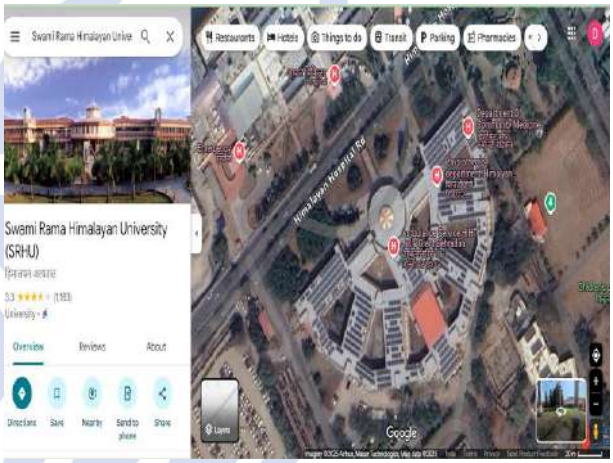
Low-Carbon Energy Used in 2025:

Energy Used in 2025	Value (GJ)
Total Energy Used	13782.10
Total energy used from low-carbon sources (Biogas, Solar)	10472.6

Evidences



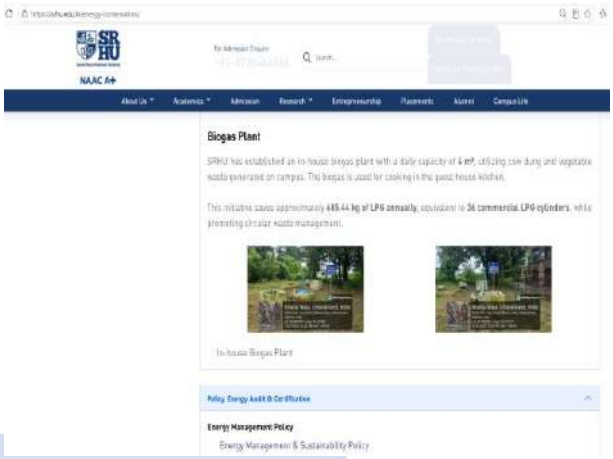
EVIDENCE-1: Snapshot of energy audit reports available on university website



EVIDENCE-2: Aerial View of Solar energy generation facility at SRHU (Google Maps)



EVIDENCE-3: Aerial View of Solar energy generation facility at SRHU



EVIDENCE-4: Evidence of Biogas Plant available on University website

Dr Lalit Kumar Tyagi, Professor
School of Science Technology, SRHU
lktyagi@srhu.edu.in

