

Solar Hydrogen Option to Reach Renewable and Climate Change Targets of Indonesia

Yunus Fransiscus^a, Fitri Dwi Kartikasari^b, Emma Savitri^c, Elieser Tarigan^{d*}

^aCenter for Environmental and Renewable Energy Studies, PuSLET, University of Surabaya, Jl. Raya Kalirungkut, Surabaya, 60293, Indonesia, Email: yunus@staff.ubaya.ac.id

^bChemical Engineering Department, University of Surabaya, Jl. Raya Kalirungkut, Surabaya, 60293, Indonesia, Email: fitri_dk@staff.ubaya.ac.id

^cInformatics Engineering Department, University of Surabaya, Jl. Raya Kalirungkut, Surabaya, 60293, Indonesia, Email: savitri_ma@staff.ubaya.ac.id

^dElectrical Engineering Department, University of Surabaya, Jl. Raya Kalirungkut, Surabaya, 60293, Indonesia, Email: elieser@staff.ubaya.ac.id

*Corresponding author. Email: elieser@staff.ubaya.ac.id

Abstract

This paper discuss energy and climate change situation, as well as future target in Indonesia. Solar hydrogen is projected to be one option for the future solution. Studies were made by literature review and calculation based on the secondary data. Energy fulfillment in Indonesia still depends on fossil fuel source. Data showed that until 2020 three major contributions were from oil (38.8%), coal (33%) and natural gas (19.7%) leaving the renewable sources in minimum share as much as 8.6%. It is stated in the General National Energy Plan (Rencana Umum Energi Nasional), that the proposed energy transition will able to lessen the emission increment level as much as 34.8% from 1,370 Mt CO₂-eq (BAU) to 893.4 Mt CO₂-eq in 2025 and 58.3% from 4,673.3 Mt CO₂-eq (BAU) to 2,726.4 Mt CO₂-eq. Solar energy is one option to reach the target. One of the solar energy applications is solar hydrogen conversion that converts solar radiation into hydrogen as a fuel.

Keywords:

Climate change, solar energy, Indonesia, hydrogen, renewable

1. Introduction

Energy fulfillment in Indonesia still depends on fossil fuel source, data for the year of 2018 revealed that three major contributions were from oil (38.8%), coal (33%) and natural gas (19.7%) leaving the renewable sources in minimum share as much as 8.6% [1]. This picture should be dramatically changed, since Indonesia as well as other countries is bound to the global commitment to achieve sustainable development goals (SDGs) [1], [2]. In regards to the energy transformation, SDGs number 7 is clearly encouraging the utilization of renewable sources to avoid absolute dependency to fossil fuel and more importantly to preserve global environmental quality by reducing greenhouse gas emissions (SDG13) at the same time.

In this study the energy and climate change situation, as well as target in Indonesia is discussed. From various of renewable energy alternative to the fossil fuels, solar energy is considered to be one of the most feasible to consider. Solar hydrogen is projected to be one option for the future solution. The objective of the study is to figure out current situation of energy in the connection to the green house gas emission, and propose alternative solution of using of solar energy conversion to hydrogen fuel.

2. Methods

The study in this preset paper was conducted by reviewing literature including , published papers, reports, and other secondary data [1]–[6]. Energy situation, climate targets, as well as the use of solar hydrogen for several countries are compared. All of the obtained information are discussed to figure out the current situation of energy in the connection to the green house gas emission, and the use of solar hydrogen for the future alternative energy solutions in Indonesia.

3. Results And Discussions

3.1. Renewable Energy and Climate Change Targets

In order to respond the global call and after taking into account national condition, Indonesia has developed strategy to increase the portion of renewables in its energy mix as expressed in the General National Energy Plan (Rencana Umum Energi Nasional) document. However, efforts to uplift the renewable energy share have to be enormously executed. From International perspective, as presented in Table 1, among the countries representative, most of them (especially in Africa, South America and Asia) are hardly achieve the set target, except Denmark (together with Sweden and Finland) that has the highest SDGs index [2]. Meanwhile, progress status for Indonesia reflects an immense gap between the attainment and the stated target. Several reports mentioned differently that the share level of renewable energy was 8.43% in 2016, 8.6% and 13% in 2018 (Renewables 2020 Global Status Report) [7], and 15.05% in 2019, all numbers are still far away from the expected value of 23% in 2025 [2][1][8]. As the second largest greenhouse gas emission contributor, following the AFOLU, energy sector is expected to significantly contribute in changing the national emission profile. The success on replacing fossil fuel to the renewables will directly correspond to the reduction of greenhouse gas emission. As stated in the General National Energy Plan (Rencana Umum Energi Nasional), the proposed energy transition will able to lessen the emission increment level as much as 34.8% from 1,370 Mt CO₂-eq (BAU) to 893.4 Mt CO₂-eq in 2025 and 58.3% from 4,673.3 Mt CO₂-eq (BAU) to 2,726.4 Mt CO₂-eq (Presidential Decree No. 22/2017) [9]. Unfortunately, data recorded by the Ministry of Environment and Forestry depicts a contrary trend. It is noticed that in almost two decades, from 2000 to 2018, greenhouse gas emission from energy sector sharply rose almost double from 317,609 Gg

CO₂-eq to 595,665 Gg CO₂-eq (MEF, 2020). The notable increase may attribute to several factors such as steady population growth, economic improvement and urbanization that will actuate rising living standard. However, that figure gives a very strong indication that the energy transition process in Indonesia did not work smoothly. Based on General National Energy Plan (Presidential Decree No. 22/2017), the total renewable energy potential is about 443.2 GW composed of geothermal (29.5 GW); hydro (75.1 GW); mini and micro hydro (19.4 GW); biofuel (32.5 GW); solar (207.9 GW); wind (60.6 GW) and waves (17.9 GW). From the total mentioned of potential capacity, the utilization of this type of energy source until 2015 only reached less than 2% (MEMR, Indonesia Electricity Power Supply Business Plan 2019-2028, 2019). More specifically, solar energy, which has the biggest potential capacity as high as 207,898 MW, was installed at the level of 78.5 MW or only 0.04% from its total prospect [1]. The low rate of solar energy implementation seems to contradict the proposed report by Hansen et al., 2019 which explained that renewable solar photovoltaic will play significant role in fulfilling the ambition to replace fossil fuel energy. This argument was supported by the fact that technology for this energy source experienced radical cost reduction due to ameliorated efficiencies, raw material cost, economies size, public awareness and continual research and development [10]–[12]. Adding to that, several studies agreed that solar photovoltaic technology is a comparative option for conventional fossil fuel energy generation from the economic perspective [13], [8][3] and this could be more accepted when consider that the reduction trend will continue in the coming years [3].

3.2. Solar Energy and Hydrogen

Despite of its environmental friendly effect, the exploitation of solar energy as the main replacing source has its own weakness. The most challenging in using renewables, including solar is the ability to generate power level in stable condition and storage issue which is also the main concern in economic consideration [14]. Therefore, the modification or combination with other methods should be reinforced. One of prospective schemes is by converting the energy production to hydrogen. Hydrogen is a very simple substance with energy per mass content of 143 MJ/Kg, about three times larger compared to liquid hydrocarbon-based fuels [6]. This valuable substance can be stored in long term period with low maintenance cost [4], [15]. The production of hydrogen with solar energy supply can be done via several processes such as photocatalysis, solar electrolysis, solar thermal and photobiological technique [16]. Photocatalysis utilize sunlight to decompose water into hydrogen and oxygen by using semiconductor materials as those installed in photovoltaics. It is called solar electrolysis whenever solar energy is converted into electricity prior to the water electrolysis process. Solar thermal is a direct method to use concentrated solar energy for a certain level of dissociation to separate hydrogen and oxygen. In relation to this, thermochemical is a cycle of process involving direct thermolysis of water, cracking, reforming and gasification of hydrocarbons. This process is a bit more complex but hydrogen – oxygen separation is simpler since conducted in separate reactions. Meanwhile photobiology is a process involving microorganism, mainly microalgae and cyanobacteria, to decompose water into hydrogen and oxygen in an anerobic condition [17]. Among those methods, thermochemical is considered the best option considering the high yield of hydrogen, competitive operational cost (mainly due to the lower temperature needed for water splitting), feasibility to up-size to industrial scale and more environmental friendly

[14]. In advanced studies on solar – hydrogen process, it was revealed that hydrogen production with thermochemical process achieved as high as 2195 kg/day and in line with the increase of solar intensity (600 W/m² to 1200 W/m²) the hydrogen production rate elevated to more than double portion (986 kg/day to 2248.6 kg/day and 1197.4 kg/day to 2672.1 kg/day, in two different schemes of experiment) [18], [19].

Table 1. Renewable 2020 Global Status Report [7]

Country	Renewable Energy Share of Primary Energy (%), Target			Renewable Energy share for Electricity Production (%)	
	2030	2050	Status in 2018	Target	Status in 2018
Africa					
Angola	7.5% (2025)				
Cote d'Ivoire	20%		3%	42% (2020)	
Egypt	14% (2020)		3.8%	37-42% (2035)	
Liberia	30%		5%	30% (2021)	
Tanzania	24% (2020)		22.3%	100% (2050)	
South Africa				9% (2030)	3.11%
America					
Argentina				20% (2025)	2%
Brazil				23% (2030)	83.3%
Canada				No National target	65.19%
Chile				70% (2030)	22.8% (2019)
Panama		30%			
United States				No National target	18.2% (2019)
Asia					
Bangladesh				100% (2050)	
Cambodia				100% (2035)	
China	20%			35% (2030)	26.7%
India				10% (2022)	9.2%
Indonesia	>23% (2025)	>31%	13%	26% (2025)	12% (2017)
Korea	11%			20% (2030)	6% (2017)

Japan				24% (2030)	17.84%
Nepal	10%			100% (2050)	100%
Philippines				100% (2050)	24.56%(2017)
Thailand				20% (2036)	
Vietnam	8% (2025)	11%		10% (2030)	
Australia & Oceania					
Australia				23% (2020)	24%
Samoa	20%			100% (2030)	
Europe					
EU - 28				57% (2030)	32.1%
Armenia	26%(2025)			40% (2025)	12%
Austria				70.6%(2020)	77%
Belgium				21% (2020)	20%
Croatia				39% (2020)	71%
Denmark				100% (2050)	76%
France				40% (2030)	20%
Germany				80% (2050)	38%
Italy				26% (2020)	39%
Portugal				100% (2050)	52.2%
Lithuania	20%			100% (2050)	83%
Ukraine	18%				

This hybrid renewable energy system has attracted global attention and significantly considered to replace the non-renewable fossil fuels. The European Union has declared EU Hydrogen Strategy while in Japan, several institutions collaborated to initiate the 10 MW hydrogen production from renewable energy, indicating the big potential of this hybrid system in the coming years [20][27]. Moreover, in most recent studies there were mentioned the success story of solar – hydrogen application in various regions such as China, Iran, Turkey, Egypt, France and India[21][15][17][22]. Those studies evaluated the technical efficiency (in term of capacity, storage system, potential hydrogen reduction by time, specific configuration of electrolyser and PV tilt angle) and economic feasibility, which were both aspects found satisfactory confirming that solar – hydrogen can be proposed as the main system for the replacement of conventional fuels. The implementation of solar – hydrogen, or hydrogen in more general, in Indonesia is apparently lack behind compared to the countries in the Asia – Pacific region. Aditya and Aziz, 2021 [23], reported that Indonesia was not seem to eagerly adopt the new hydrogen technology. This opinion was developed based on an evaluation of hydrogen energy potential profiles for several countries in Asia – Pacific. The analysis included techno – socio and economy

parameters to review the countries hydrogen utilization potential has put Indonesia in the low rank. This slow response on the initiation of hydrogen utilization perhaps will shift dramatically in the coming years. Positive signs to that have risen through the established collaboration between Agency for the Assessment and Application of Technology (BPPT) with Toshiba EES for autonomous off-grid hydrogen energy system project (Toshiba, 2018) and the agreed contract between Indonesia Railway Company (PT. KAI) and ALSTOM to deliver hydrogen-powered train project. Another study to confirm the great potential of using solar – hydrogen system in Indonesia was presented by Topriska, et al., 2016 [5]. By using the fuel need for cooking application as a baseline, this study compared the potential solar - hydrogen generation in Ghana, Jamaica and Indonesia. The results indicated that the hydrogen plant sizing and management could meet the annual cooking demand which are 631 kg H₂ for Indonesia. Moreover, the study highlighted that with the given weather and area size, Indonesia has average solar hydrogen potential as much as 133.5 thousand kg/km²/year or in total as high as 254,260 million kg/year. In correlation to climate change mitigation effort, total utilization of solar hydrogen system will significantly reduce greenhouse gas emissions. Calculation based on eia.gov (2012)[3] taking into account the total potential afore mentioned, results in emission depletion as high as 68.31 Gg CO₂/year which is noteworthy to support the commitment of Indonesia Government for mitigation action.

Currently under development are arrhythmia monitors for ambulatory patients which analyze the ECG in real time [24], [25]. Software QRS detectors typically include one or more of three different types of processing steps: linear digital filtering, nonlinear transformation, and decision rule algorithms [26].

4. Conclusions

The three major fossil fuel consumption of Indonesia currently are from oil (38.8%), coal (33%) and natural gas (19.7%). The renewable sources in minimum share as much as 8.6%. It is stated in the General National Energy Plan (Rencana Umum Energi Nasional), that the proposed energy transition will able to lessen the emission increment level. The implementation of solar – hydrogen, or hydrogen in more general, in Indonesia is apparently lack behind compared to the countries in the Asia – Pacific region. Indonesia has average solar hydrogen potential as much as 133.5 thousand kg/km²/year or in total as high as 254,260 million kg/year. In correlation to climate change mitigation effort, total utilization of solar hydrogen system will significantly reduce greenhouse gas emissions. Calculation based showed that emission depletion could reach as high as 68.31 Gg CO₂/year which is noteworthy to support the commitment of Indonesia Government for mitigation action.

Authors' Contributions

Yunus Fransiscus, Fitri Dwi Kartikasari, Emma Savitrin, and Elieser Tarigan contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript.

Acknowledgements

This work was supported by the "Kemetrician Riset dan Teknologi/Badan Riset dan Inovasi Nasional (RistekBRIN)" Republic of Indonesia, Grant Number :1867/E4/AK.04/2021

REFERENCES

- A. Rahman, P. Dargusch, and D. Wadley, "The political economy of oil supply in Indonesia and the implications for renewable energy development," *Renew. Sustain. Energy Rev.*, vol. 144, no. April, p. 111027, 2021, doi: 10.1016/j.rser.2021.111027
- W. G. Santika, T. Urmee, Y. Simsek, P. A. Bahri, and M. Anisuzzaman, "An assessment of energy policy impacts on achieving Sustainable Development Goal 7 in Indonesia," *Energy Sustain. Dev.*, vol. 59, pp. 33–48, 2020, doi: 10.1016/j.esd.2020.08.011
- S. Comello, S. Reichelstein, and A. Sahoo, "The road ahead for solar PV power," *Renew. Sustain. Energy Rev.*, vol. 92, no. December 2017, pp. 744–756, 2018, doi: 10.1016/j.rser.2018.04.098
- J. Andrews, S. M. Rezaei Niya, and R. Ojha, "Electrochemical hydrogen storage in porous carbons with acidic electrolytes: Uncovering the potential," *Curr. Opin. Electrochem.*, vol. 31, p. 100850, 2022, doi: 10.1016/j.coelec.2021.100850
- E. Toprisk, M. Kolokotroni, Z. Dehouche, D. T. Novieto, and E. A. Wilson, "The potential to generate solar hydrogen for cooking applications: Case studies of Ghana, Jamaica and Indonesia," *Renew. Energy*, vol. 95, pp. 495–509, 2016, doi: 10.1016/j.renene.2016.04.060
- K. Mazloomi and C. Gomes, "Hydrogen as an energy carrier: Prospects and challenges," *Renew. Sustain. Energy Rev.*, vol. 16, no. 5, pp. 3024–3033, 2012, doi: 10.1016/j.rser.2012.02.028
- REN21 Members, *Renewables 2020 Global Status Report*. 2020
- A. Rokhmawati, "Comparison of power plant portfolios under the no energy mix target and national energy mix target using the mean–variance model," *Energy Reports*, vol. 7, pp. 4850–4861, 2021, doi: 10.1016/j.egyr.2021.07.137
- "Peraturan Presiden No 22 Tahun 2017 Tentang RUEN," 2017
- G. Kavlak, J. McNeerney, and J. E. Trancik, "Evaluating the causes of cost reduction in photovoltaic modules," *Energy Policy*, vol. 123, pp. 700–710, 2018, doi: 10.1016/j.enpol.2018.08.015
- C. Breyer, C. Birkner, J. Meiss, J. C. Goldschmidt, and M. Riede, "A top-down analysis: Determining photovoltaics R&D investments from patent analysis and R&D headcount," *Energy Policy*, vol. 62, pp. 1570–1580, 2013, doi: 10.1016/j.enpol.2013.07.003
- J. E. Trancik and D. Cross-Call, "Energy technologies evaluated against climate targets using a cost and carbon trade-off curve," *Environ. Sci. Technol.*, vol. 47, no. 12, pp. 6673–6680, 2013, doi: 10.1021/es304922v
- K. Hansen, C. Breyer, and H. Lund, "Status and perspectives on 100% renewable energy systems," *Energy*, vol. 175, pp. 471–480, 2019, doi: 10.1016/j.energy.2019.03.092
- A. Mostafaeipour, S. J. Hosseini Dehshiri, and S. S. Hosseini Dehshiri, "Ranking locations for producing hydrogen using geothermal energy in Afghanistan," *Int. J. Hydrogen Energy*, vol. 45, no. 32, pp. 15924–15940, 2020, doi: 10.1016/j.ijhydene.2020.04.079
- E. Ozden and I. Tari, "Energy-exergy and economic analyses of a hybrid solar-hydrogen renewable energy system in Ankara, Turkey," *Appl. Therm. Eng.*, vol. 99, pp. 169–178, 2016, doi: 10.1016/j.applthermaleng.2016.01.042
- A. M. M. I. Qureshy and I. Dincer, "Investigation of a solar hydrogen generating system design for green applications," *Appl. Therm. Eng.*, vol. 193, no. April, p. 117008, 2021, doi: 10.1016/j.applthermaleng.2021.117008
- S. Singla, N. P. Shetti, S. Basu, K. Mondal, and T. M. Aminabhavi, "Hydrogen production technologies - Membrane based separation, storage and challenges," *J. Environ. Manage.*, vol. 302, no. PA, p. 113963, 2022, doi: 10.1016/j.jenvman.2021.113963
- T. A. H. Ratlamwala and I. Dincer, "Comparative energy and exergy analyses of two solar-based integrated hydrogen production systems," *Int. J. Hydrogen Energy*, vol. 40, no. 24, pp. 7568–7578, 2015, doi: 10.1016/j.ijhydene.2014.10.123
- A. ÖZDEMİR and G. GENÇ, "A comprehensive comparative energy and exergy analysis in solar based hydrogen production systems," *Int. J. Hydrogen Energy*, no. xxxx, 2021, doi: 10.1016/j.ijhydene.2021.07.055
- S. Chen et al., "Recent progress and perspectives on Sb₂Se₃-based photocathodes for solar hydrogen production via photo electrochemical water splitting," *J. Energy Chem.*, 2021, doi: 10.1016/j.jechem.2021.08.062
- R. Daneshpour and M. Mehrpooya, "Design and optimization of a combined solar thermophotovoltaic power generation and solid oxide electrolyser for hydrogen production," *Energy Convers. Manag.*, vol. 176, no. September, pp. 274–286, 2018, doi: 10.1016/j.enconman.2018.09.033
- M. Khemariya, A. Mittal, P. Baredar, and A. Singh, "Cost and size optimization of solar photovoltaic and fuel cell based integrated energy system for un-electrified village," *J. Energy Storage*, vol. 14, pp. 62–70, 2017, doi: 10.1016/j.est.2017.09.011
- H. B. Aditya and M. Aziz, "Prospect of hydrogen energy in Asia-Pacific: A perspective review on techno-socio-economy nexus," *Int. J. Hydrogen Energy*, vol. 46, no. 71, pp. 35027–35056, 2021, doi: 10.1016/j.ijhydene.2021.08.070
- www.ren21.net, "Renewable 2020 Global Status Report," 2021. https://www.ren21.net/wp-content/uploads/2019/05/gsr_2020_full_report_en.pdf
- www.djk.esdm.go.id, "Indonesia Electricity Power Supply Business Plan 2019-2028," 2019. <http://www.djk.esdm.go.id/pdf/RUPTL/03%2520-%252022%2520-%25202018%2520RUPTL%25202018-2027%2520PLN.pdf>
- IRENA, "Renewable Energy in District Heating and Cooling - A sector roadmap for REMAP. 2017," 2017
- Ghosh, B., Panigrahi, C.K., Samanta, S. (2019). Externalities of Clean Energy Technologies: A Study, *Journal of Physics: Conference Series*, Conf. Series 1253 (2019) 012027

Search Results

International Conference on Innovative Computing & Communication (ICICC) 2022 (Archive)



(http://icicc-conf.com/)

ICICC 2022 Tracks:

- Big Data (https://papers.ssrn.com/sol3/JELJOUR_Results.cfm?form_name=journalbrowse&journal_id=3949849)
- Computational Sciences (https://papers.ssrn.com/sol3/JELJOUR_Results.cfm?form_name=journalbrowse&journal_id=3949851)
- Data Analytics (https://papers.ssrn.com/sol3/JELJOUR_Results.cfm?form_name=journalbrowse&journal_id=3949844)
- Data Management (https://papers.ssrn.com/sol3/JELJOUR_Results.cfm?form_name=journalbrowse&journal_id=3949846)
- Innovative Communication Networks & Security (https://papers.ssrn.com/sol3/JELJOUR_Results.cfm?form_name=journalbrowse&journal_id=3949835)
- Innovative Computing (https://papers.ssrn.com/sol3/JELJOUR_Results.cfm?form_name=journalbrowse&journal_id=3949837)
- Internet of Things (IoT) (https://papers.ssrn.com/sol3/JELJOUR_Results.cfm?form_name=journalbrowse&journal_id=3949839)
- Management Studies (https://papers.ssrn.com/sol3/JELJOUR_Results.cfm?form_name=journalbrowse&journal_id=3949853)
- Miscellaneous (https://papers.ssrn.com/sol3/JELJOUR_Results.cfm?form_name=journalbrowse&journal_id=3949855)
- Social Sciences for Computer Applications (https://papers.ssrn.com/sol3/JELJOUR_Results.cfm?form_name=journalbrowse&journal_id=3949842)

Acknowledgement: International Conference on Innovative Computing & Communication (ICICC) has been supported by ICDAM, ICCIT, ICCIDS, ICCDI, Universal Innovators Lab and other prestigious institutes including SSCBS New Delhi, NIT Patna, IICMR Pune, GTBIT New Delhi, GNIM New Delhi, UJW Poland, and UVA Spain.

Editors: Ashish Khanna, Maharaja Agrasen Institute of Technology, Delhi; Deepak Gupta, Maharaja Agrasen Institute of Technology, Delhi; Sameer Anand, Shaheed Sukhdev College of Business Studies, Delhi; Ajay Jaiswal, Shaheed Sukhdev College of Business Studies, Delhi; Moolchand Sharma, Maharaja Agrasen Institute of Technology, Delhi; Deepali Sawai, Director, Institute of Industrial and Computer Management and Research (IICMR), Pune; Preetha Praseedh, Institute of Industrial and Computer Management and Research (IICMR), Pune; P.S. Bedi, Guru Teg Bahadur Institute of Technology, Delhi, India; Maninder Kaur, Director, Guru Nanak Institute of Management, Delhi

[Link to this page](#) | [Subscribe to this eJournal \(requires login\)](#)

Search within papers

Sort By
Newest

< Previous 1 ... 5 6 7 Next >

Displaying 251-300 of 320 papers

**Digital Banking for Rural Transformation a Comparative Study of Andhra Pradesh and Uttar Pradesh (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4037648)***Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022*

Number of pages: 6 • Posted 22 Feb 2022

Smita Dikshit (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=3653765), Gurave Singh (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5082406) and Dr. Akhilesh Chandra Pandey (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5082407)

United University, University of Allahabad and University of Allahabad - Department of Commerce and Business Administration

Downloads
404**Adoption of Cloud-Based Video Conferencing Platform during the Covid-19 Pandemic (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4037638)***Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022*

Number of pages: 8 • Posted 22 Feb 2022

Kharabela Rout (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5082394), Ankita Rath (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5082397) and Sushree Sahoo (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5082400)

KIIT University, KISS deemed to be university and KIIT University

Downloads
202**Learning Prepositions Using Augmented Reality Smartphone Apps (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4035989)***Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022*

Number of pages: 5 • Posted 22 Feb 2022

Deepika Jain (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5079333) and Tuhina Singh (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5079335)

Delhi Technological University and Netaji Subhas Institute of Technology (NSIT) - Netaji Subhas University of Technology

Downloads
100

	<u>Impact of Spiritual Intelligence on Decision Making Style; a Structural Equation Modeling Perspective</u> (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4037665) <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 5 • Posted 17 Feb 2022 Tanmoy Satpathy (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5082415) and Susmita Samanta (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5082417) KIIT University and KIIT University	Downloads 177
	<u>Solar Hydrogen Option to Reach Renewable and Climate Change Targets of Indonesia</u> (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4036003) <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 4 • Posted 17 Feb 2022 Yunus Franciscus (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5079347), Fitri Kartikasari (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5079349), Emma Savitri (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5079350) and Elieser Tarigan (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5079352) University of Surabaya (UBAYA), University of Surabaya (UBAYA), University of Surabaya (UBAYA) and University of Surabaya (UBAYA)	Downloads 115
	<u>Enhancing Accuracy of Industrial IIDS using Robust Machine Learning Techniques</u> (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4035996) <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 7 • Posted 17 Feb 2022 Sunil Kaushik (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5079343) and Akashdeep Bhardwaj (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5079344) University of Petroleum and Energy Studies and University of Petroleum and Energy Studies	Downloads 54
	<u>Brief Review on Mental Stress and Its Identification through the Machine Learning Approach</u> (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4031743) <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 4 • Posted 17 Feb 2022 Diptimoni Narzary (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5079338) and Uzzal Sharma (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5079339) Assam Don Bosco University and Assam Don Bosco University	Downloads 299
	<u>A survey of mitigation techniques of packet drop attacks in MANET</u> (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4031965) <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 5 • Posted 17 Feb 2022 Kamal Malik (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5077161) and Anshu Bhasin (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5077163) CT University and I K Gujral Punjab Technical University	Downloads 70
	<u>Review on Neuro-Fuzzy System</u> (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4033495) <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 10 • Posted 17 Feb 2022 Nishtha Hooda (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5077029) and Meena Malik (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5077069) Indian Institute of Information Technology and Chandigarh University	Downloads 170
	<u>Soldiers Health Monitoring and Position Tracking System</u> (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4031947) <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 5 • Posted 17 Feb 2022 Ayub Khan (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071408), Dr.Sabeenian R.S. (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=3891572), Cindiya R. (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071413) and Deenan R (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071414) Sona College of Technology, Sona College of Technology, Sona College of Technology and Sona College of Technology	Downloads 631
	<u>Generating Educational Questions with Similar Difficulty Level</u> (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4033499) <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 9 • Posted 17 Feb 2022 Saanidhya Sharma (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5074286), Rajat Agarwal (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5074287) and Anushka Mittal (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5074289) VIT Bhopal University, Indian Institute of Information Technology and Raman classes	Downloads 125
	<u>Comprehensive Survey on Devanagari OCR</u> (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4033489) <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i>	Downloads 454

Number of pages: 8 • Posted 17 Feb 2022

Heena Girdher (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=3995679), Harmohan Sharma (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=3995681) and Akant Gupta (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5074277)

Research scholar, Department of Computer Science, Punjabi University, Patiala, Punjab, India, Assistant Professor, Department of Computer Science, Multani Mal Modi College, Patiala, Punjab, India and Punjabi University Patiala



Load Balancing in Cloud Computing Leading Us Towards Green Cloud Computing (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4031990)

Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022

Number of pages: 7 • Posted 17 Feb 2022

Perna Rawat (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5074272), Prabhdeep Singh (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5074273) and Vikas Tripathi (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5074274)

Graphic Era (Deemed to be University), Dehradun Campus, Uttarakhand, Graphic Era (Deemed to be University), Dehradun Campus, Uttarakhand and Graphic Era (Deemed to be University), Dehradun Campus, Uttarakhand

Downloads
165



Alcohol Detection System in Vehicles (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4031961)

Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022

Number of pages: 7 • Posted 17 Feb 2022

Jamuna Rani (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5062354), Gayathri Devi (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071421) and Baskar R (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071422)

Sona College of Technology, Sona College of Technology and Sona College of Technology

Downloads
223



Wireless Sensor Network Based Internet of Things for Precision Agriculture (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4031983)

Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022

Number of pages: 5 • Posted 17 Feb 2022

Arushi Agarwal (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071440), Manish Singh (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071441), Satyam Singh (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071443), Anand Singh (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071444) and Atil Singh (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071446)

KIET Group of Institutions, KIET Group of Institutions, KIET Group of Institutions, KIET Group of Institutions and KIET Group of Institutions

Downloads
241



Trust and Security Model for the Internet of Things (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4031976)

Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022

Number of pages: 5 • Posted 17 Feb 2022

Indu I. (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071435) and Rubesh Anand (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071437)

Cochin University of Science and Technology and Director of Technology

Downloads
69



A Lightweight Secure Information Sharing Plan for Portable Cloud Registering (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4031969)

Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022

Number of pages: 4 • Posted 17 Feb 2022

Varsha Parekh (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071432) and Dr. A. Suresh (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071433)

SRM Institute of Science and Technology and SRM Institute of Science and Technology

Downloads
49



Stress Detection Based on Human Parameters Using Machine Learning Algorithms (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4031942)

Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022

Number of pages: 5 • Posted 17 Feb 2022

Sudha V (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071398), Kaviya S (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071399), Sarika S (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071401) and Raja R (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071402)

Sona College of Technology, Sona College of Technology, Sona College of Technology and Muthayammal Engineering College

Downloads
227



Digital Keypad Security System Based on Arduino with GSM Module, Alarm, and Temperature Sensor (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4031914)

Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022

Number of pages: 4 • Posted 17 Feb 2022

Jishant Singh (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071366), Rashmi Roges (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071367), Sandeep Sharma (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071369), Anuradha Bhasin (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071371), Rishiek Kumar (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071372) and Jatin Gaur (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071374)

Downloads
263

- | | | |
|---|---|----------------------------------|
|  | <p><u>Covid 19 Tracker, an application to save the communities (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4031907)</u></p> <p><i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i></p> <p>Number of pages: 5 • Posted 17 Feb 2022</p> <p>Nayan Agarwal (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071359), Khushi Bansal (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071360) and Ishita Arora (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071361)</p> <p>Maharaja Agrasen Institute of Technology, Maharaja Agrasen Institute of Technology and Maharaja Agrasen Institute of Technology</p> | <p>Downloads
69</p> |
|  | <p><u>Data Exfiltration: Preventive and Detective Countermeasures (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4031852)</u></p> <p><i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i></p> <p>Number of pages: 7 • Posted 17 Feb 2022</p> <p>Anushka Lal (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071311), Ankit Prasad (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071312), Ankit Kumar (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071314) and Shailender Kumar (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071316)</p> <p>Delhi Technological University, Delhi Technological University, Delhi Technological University and Delhi Technological University</p> | <p>Downloads
605</p> |
|  | <p><u>Study and Analysis of Very Clear Weather and Very Light Foggy Weather Conditions for Different Wavelength Bands in Free Space Optical Communication System (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4034873)</u></p> <p><i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i></p> <p>Number of pages: 8 • Posted 17 Feb 2022</p> <p>Kulwant Singh (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5077027) and Kamal Malik (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5077020)</p> <p>CT University and CT University</p> | <p>Downloads
72</p> |
|  | <p><u>A Comprehensive Analysis of Requirement and Design Using Machine Learning (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4034866)</u></p> <p><i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i></p> <p>Number of pages: 8 • Posted 17 Feb 2022</p> <p>Deepika Nagpal (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5077021), Kamal Malik (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5077020) and Anshul Kalia (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5077023)</p> <p>CT University, CT University and Himachal Pradesh (HP) University</p> | <p>Downloads
111</p> |
|  | <p><u>Study of Single Mode Fiber (SMF) and Bidirectional Fiber Cable for Various Bands of Wavelength in Optical Communication System (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4034864)</u></p> <p><i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i></p> <p>Number of pages: 9 • Posted 17 Feb 2022</p> <p>Swarnjeet Kaur (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5077019) and Kamal Malik (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5077020)</p> <p>CT University and CT University</p> | <p>Downloads
101</p> |
|  | <p><u>A Survey of RISC-V CPU for IoT Applications (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4033491)</u></p> <p><i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i></p> <p>Number of pages: 4 • Posted 17 Feb 2022</p> <p>Manoj Sharma (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5074280), Ekansh Bhatnagar (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5074281), Kartik Puri (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5074282), Amitav Mitra (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5074283) and Jatin Agarwal (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5074284)</p> <p>Bharati Vidyapeeth's College of Engineering, Bharati Vidyapeeth's College Of Engineering, Bharati Vidyapeeth's College of Engineering, Bharati Vidyapeeth's College Of Engineering and Bharati Vidyapeeth's College of Engineering</p> | <p>Downloads
1240</p> |
|  | <p><u>Review on Big Data Analysis Tools (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4031901)</u></p> <p><i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i></p> <p>Number of pages: 11 • Posted 16 Feb 2022</p> <p>Vaishali Bhagat (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071344) and Thakare VM (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071347)</p> <p>Sant Gadge Baba Amravati University and Sant Gadge Baba Amravati University</p> | <p>Downloads
205</p> |
|  | <p><u>A Survey on Optical Character Recognition for Handwritten Devanagari Script Using Deep Learning (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4031738)</u></p> <p><i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i></p> <p>Number of pages: 4 • Posted 16 Feb 2022</p> <p>Pragati Hirugade (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071155), Nidhi</p> | <p>Downloads
420</p> |

	Suryavanshi (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071156), Radhika Bhagwat (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071157), Smita Rajput (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071160) and Rutwija Phadke (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071161) MKSSS's Cummins College of Engineering for Women, Karvenagar, Pune-411052, India, MKSSS's Cummins College of Engineering for Women, Karvenagar, Pune-411052, India, MKSSS's Cummins College of Engineering for Women, Karvenagar, Pune-411052, India, MKSSS's Cummins College of Engineering for Women, Karvenagar, Pune-411052, India and MKSSS's Cummins College of Engineering for Women, Karvenagar, Pune-411052, India	
	DRONES : The Smart Technology In Modern Agriculture (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4031732) <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 4 • Posted 16 Feb 2022 Yashika Gupta (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071144), Pooja Mudgil (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071145), Varsha Sharma (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071147) and Zardam Hussain (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071148) BPIT, DELHI, BPIT, DELHI, BPIT, DELHI and BPIT, DELHI	Downloads 1810
	Analysis of Different Image Compression Techniques: A Review (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4031725) <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 4 • Posted 16 Feb 2022 Garima Garg (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071136) and Raman Kumar (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071138) IKGPTU Mohali Campus, Mohali, India and IKGPTU Mohali Campus, Mohali, India	Downloads 977
	Analysis of Message Hiding Method Using Image Steganography (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4031001) <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 7 • Posted 16 Feb 2022 Pragya Sinha (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5070335), Subhashish Banerjee (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=3739579), Rituparna Paul (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5070337) and Preetisudha Meher (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=3739621) NIT,Arunachal Pradesh, National Institute of Technology (NIT), Arunachal Pradesh, Guru Jambheshwar University of Science and Technology - Department of Electronics and Communication Engineering and National Institute of Technology (NIT), Arunachal Pradesh	Downloads 140
	Enhancing Smart Gateway Resources for IoT Constrained Nodes Through VMs (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4031813) <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 5 • Posted 16 Feb 2022 Prabhu Kumar (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071297), Prasanth P (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071301), Thusara Bharathi (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071303) and Neeraja NV (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5071304) Mother Theresa Institute of Engineering and Technology, Jawaharlal Nehru Technological University (JNTU) - NBKR Institute of Science & Technology, Mother Theresa Institute of Engineering and Technology and Mother Theresa Institute of Engineering and Technology	Downloads 58
	Textual Filter for Detecting & Preventing Offensive Content in Social Networks for English Words (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4031865) <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 6 • Posted 16 Feb 2022 Pradeep N. Fale (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=4714954) and Dr. Krishan Kumar Goyal (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5051462) Priyadarshini College of Engineering and R. B. S. Management Technical Campus, Agra.	Downloads 90
	Improvised Security of IoT Through Blockchain (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4027047) <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 6 • Posted 09 Feb 2022 Sonal Pathak (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5062388), Apoorav Jhavar (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5062389), Mukul Sharma (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5062391) and Archit Kohli (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5062392) Manav Rachna International Institute of Research and Studies, Manav Rachna International Institute of Research & Studies, CSE Department, Manav Rachna International Institute of Research & Studies, CSE Department and Manav Rachna International Institute of Research & Studies, CSE Department	Downloads 139
	Performance Evaluations on Various Virtual Machines for different Cloud-Based Workloads (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4029359) <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 14 • Posted 08 Feb 2022 Ishaan Kalra (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5066674) and Parth Ahuja (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5066691)	Downloads 137



Sing It along Using Mern Stack (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4029349)

Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022

Number of pages: 4 • Posted 08 Feb 2022

Mohak Harjani (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5066660), Neetu Singh (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5066662) and Priyanka Behera (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5066663)

Bharati Vidyapeeth's College of Engineering, New Delhi, Bharati Vidyapeeth's College of Engineering, New Delhi and Bharati Vidyapeeth's College of Engineering, New Delhi

Downloads
115



Understanding Climate Change Using AI/ML (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4029356)

Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022

Number of pages: 5 • Posted 08 Feb 2022

Shrey Gupta (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5066669), Archit Kaila (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5066670) and Pooja Gupta (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5066671)

Maharaja Agrasen Institute of Technology, NIIT University, Rajasthan and Maharaja Agrasen Institute of Technology

Downloads
84



Conversational Chatbot for College Management Using LSTM (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4027039)

Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022

Number of pages: 7 • Posted 08 Feb 2022

Divya Udayan (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5062381), Dharani B (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5062382), Naveen Krishna (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5062384), T Reddy (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5062385) and L Dinesh (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5062386)

Amrita Vishwa Vidyapeetham Amritapuri, Kollam - AMRITA VISHWA VIDYAPEETHAM UNIVERSITY, GITAM (Deemed to be University) Visakhapatnam - Gandhi Institute of Technology and Management (GITAM), GITAM (Deemed to be University) Visakhapatnam - Gandhi Institute of Technology and Management (GITAM), GITAM (Deemed to be University) Visakhapatnam - Gandhi Institute of Technology and Management (GITAM) and GITAM (Deemed to be University) Visakhapatnam - Gandhi Institute of Technology and Management

Downloads
319



Integration of Digital Technologies in Financial System (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4027032)

Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022

Number of pages: 7 • Posted 08 Feb 2022

Simran Gupta (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=4695736) and Harikishni Nain (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5062378)

University of Delhi and Bharati College

Downloads
179



Concerning the Node Life Span in the Wireless Sensor Networks – A Review Approach (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4027024)

Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022

Number of pages: 4 • Posted 08 Feb 2022

Baskaran P (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5062365), Karuppasamy K (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5096544), Srithar S (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5092664) and Thillaiarasu N (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5062371)

Easwari Engineering College, rvs college of engineering and tecnology, Koneru Lakshmaiah Education Foundation - Department of Computer Science and Engineering and REVA University

Downloads
87



Honeybee Inspired Load Balancing Algorithm for Cloud Computing Environment (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4025366)

Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022

Number of pages: 4 • Posted 08 Feb 2022

Parul Sharma (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5057697) and Abhilasha Sharma (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=3453151)

Delhi Technological University and Delhi Technological University

Downloads
104



Accuracy and Deviation Analysis of Intrusion Detection System (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4025358)

Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022

Number of pages: 5 • Posted 08 Feb 2022

Abhijit Kadam (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5059796) and Bindu Garg (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5059800)

University of Mumbai - Bharati Vidyapeeth's College of Engineering and University of Mumbai - Bharati Vidyapeeth's College of Engineering

Downloads
92



Cryptocurrency: A Critical Analysis of Embedded Big Data Analytics (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4025347)

Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022

Downloads
602

	Number of pages: 8 • Posted 08 Feb 2022 Kamakshi Mehta (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=3860313), Renu Jain (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5059793), Prabhat Mittal (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=4650210) and Shikha Sharma (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=2248317) Amity University Haryana (AUH), Satyawati College, Satyawati College Eve. University of Delhi and Amity University Haryana	
	<u>Hand Gesture Recognition (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4027056)</u> <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 3 • Posted 07 Feb 2022 Rohan Saxena (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5062394), Romy Garg (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5062395), Bhoomi Gupta (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5062396) and Narinder Kaur (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5062399) Maharaja Agrasen Institute of Technology, Maharaja Agrasen Institute of Technology, Maharaja Agrasen Institute of Technology and Maharaja Agrasen Institute of Technology	Downloads 158
	<u>Impact of Emerging Technologies in the development of smart and sustainable cities (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4024136)</u> <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 8 • Posted 07 Feb 2022 Suneel Kumar (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=2683158), Kamlesh Attri (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5057683) and Varinder Kumar (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5057685) Shaheed Bhagat Singh (E) College (Delhi University), Shyam Lal College, University of Delhi and Faculty of Management Studies , University of Delhi	Downloads 112
	<u>Impact of Soil Degradation on the Durability of Roads and Bridges in Middle Guinea: Synthetic Geoscientific Approach and Geotechnical Perspectives (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4024191)</u> <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 8 • Posted 04 Feb 2022 Ibrahima Diallo (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5057892), Chakib Darraz (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5057894), Diaka Sidibe (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5057895) and Amine TILIOUA (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5057896) Abdelmalek Essaadi University, Abdelmalek Essaadi University, Former Higher Geology and Mines Institute and Moulay Ismael University of Meknès	Downloads 126
	<u>Artificial Intelligence in Food Industry: A Comprehensive Review (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4024154)</u> <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 9 • Posted 04 Feb 2022 Parul Sharma (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5057697) and Abhilasha Sharma (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=3453151) Delhi Technological University and Delhi Technological University	Downloads 857
	<u>Review Paper On Distributed Data Strategies To Support Large Scale Data Analysis (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4021334)</u> <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 6 • Posted 04 Feb 2022 Manan Gautam (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5051467) and Jaspreet Kaur (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5051468) JSS Academy of Technical Education and JSS Academy of Technical Education	Downloads 134
	<u>Automatic Speech Recognition System Using Hybrid Hidden Markov Model and Human Emotion Recognition System (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4021329)</u> <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 4 • Posted 04 Feb 2022 Tushar T (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5051465) Babu Banarasi Das Northern India Institute of Technology	Downloads 154
	<u>Essential Components of Software Framework for Mobile Forensic Tool to Extract and Decode the Mobile Artifacts (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4021324)</u> <i>Proceedings of the International Conference on Innovative Computing & Communication (ICICC) 2022</i> Number of pages: 4 • Posted 04 Feb 2022 Bhushan Manjre (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5051461) and Dr. Krishan Kumar Goyal (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=5051462) Bhagwant University, Ajmer and R. B. S. Management Technical Campus, Agra.	Downloads 92
	<u>Analyzing and Predicting Departmental Trends at ACM MPSTME: Case Study of NMIMS University (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4021322)</u>	Downloads 96

Feedback 

Submit a Paper > (<https://hq.ssrn.com/submission.cfm>)

Section 508 Text Only Pages (<https://www.ssrn.com/index.cfm/en/section-508/>)

SSRN Quick Links

SSRN Solutions (<https://www.elsevier.com/solutions/ssrn>)

Research Paper Series (<https://www.ssrn.com/index.cfm/en/rps/>)

Conference Papers (<https://www.ssrn.com/index.cfm/en/conferences/>)

Partners in Publishing (<https://papers.ssrn.com/sol3/DisplayPipPublishers.cfm>)

Jobs & Announcements (<https://www.ssrn.com/index.cfm/en/Announcements-Jobs/>)

Special Topic Hubs (<https://www.ssrn.com/index.cfm/en/special-topic-hubs/>)

SSRN Rankings

Top Papers (https://hq.ssrn.com/rankings/Ranking_display.cfm?TRN_gID=10)

Top Authors (<https://www.ssrn.com/index.cfm/en/top-authors/>)

Top Organizations (<https://www.ssrn.com/index.cfm/en/top-organizations/>)

About SSRN

Network Directors (<https://www.ssrn.com/index.cfm/en/network-directors/>)

Announcements (<https://www.ssrn.com/index.cfm/en/recent-announcements/>)

Contact us (<https://www.ssrn.com/index.cfm/en/contactus/>)

FAQs (<https://service.elsevier.com/app/home/supporthub/ssrn/>)

 (<https://www.facebook.com/SSRNcommunity/>)

 ([https://www.linkedin.com/company/493409?](https://www.linkedin.com/company/493409?trk=tyah&trkInfo=clickedVertical%3Acompany%2CentityType%3AentityHistoryName%2CclickedEntityId%3Acompany_493409%2Cidx%3A0)

[trk=tyah&trkInfo=clickedVertical%3Acompany%2CentityType%3AentityHistoryName%2CclickedEntityId%3Acompany_493409%2Cidx%3A0](https://www.linkedin.com/company/493409?trk=tyah&trkInfo=clickedVertical%3Acompany%2CentityType%3AentityHistoryName%2CclickedEntityId%3Acompany_493409%2Cidx%3A0)

 (<https://twitter.com/SSRN>)

(<http://www.elsevier.com/>)

Copyright (<https://www.ssrn.com/index.cfm/en/dmca-notice-policy/>)

Terms and Conditions (<https://www.ssrn.com/index.cfm/en/terms-of-use/>)

Privacy Policy (<https://www.elsevier.com/legal/privacy-policy>)

All content on this site: Copyright © 2024 Elsevier Inc., its licensors, and contributors. All rights are reserved, including those for text and data mining, AI training, and similar technologies. For all open access content, the relevant licensing terms apply.

We use cookies to help provide and enhance our service and tailor content.

To learn more, visit [Cookie Settings](#). 

(<http://www.relx.com/>)



Create account

Sign in

Download This Paper

Open PDF in Browser

Add Paper to My Library

Share:

Solar Hydrogen Option to Reach Renewable and Climate Change Targets of Indonesia

4 Pages • Posted: 17 Feb 2022

Yunus Fransiscus
University of Surabaya (UBAYA)

Fitri Kartikasari
University of Surabaya (UBAYA)

Emma Savitri
University of Surabaya (UBAYA)

Elieser Tarigand
University of Surabaya (UBAYA); University of Surabaya (UBAYA)

Date Written: February 16, 2022

Do you want regular updates from SSRN on Twitter?

Follow SSRN

Paper statistics

DOWNLOADS	ABSTRACT VIEWS
23	89

PlumX Metrics



Feedback

Abstract

This paper discuss energy and climate change situation, as well as future target in Indonesia. Solar hydrogen is projected to be one option for the future solution. Studies were made bay literature review and calculation based on the secondary data. Energy fulfillment in Indonesia still depends on fossil fuel source. Data showed that until 2020 three major contributions were from oil (38.8%), coal (33%) and natural gas (19.7%) leaving the renewable sources in minimum share as much as 8.6%. It is stated in the General National Energy Plan (Rencana Umum Energi Nasional), that the proposed energy transition will able to lessen the emission increment level as much as 34.8% from 1,370 Mt CO₂-eq (BAU) to 893.4 Mt CO₂-eq in 2025 and 58.3% from 4,673.3 Mt CO₂-eq (BAU) to 2,726.4 Mt CO₂-eq. Solar energy is one option to reach the target. One of the solar energy applications is solar hydrogen conversion that converts solar radiation into hydrogen as a fuel.

Suggested Citation:

Fransiscus, Yunus and Kartikasari, Fitri and Savitri, Emma and Tarigand, Elieser, Solar Hydrogen Option to Reach Renewable and Climate Change Targets of Indonesia (February 16, 2022). Available at SSRN: <https://ssrn.com/abstract=4036003> or <http://dx.doi.org/10.2139/ssrn.4036003>



**2nd International Conference on
Sustainability and Equity (ICSE-2021)**

This is to certify that Dr./Mr /Ms **Fitri Dwi Kartikasari** has presented a paper titled **Solar Hydrogen Option to Reach Renewable and Climate Change Targets of Indonesia** in 2nd International Conference on Sustainability and Equity (ICSE-2021) held on 17th - 18th December, 2021 jointly organized by KIIT Deemed to be University, Bhubaneswar, Odisha, India and World Leadership Academy (WLA), Bhubaneswar, Odisha, India.

Prof. Prasant Kumar Pattnaik
Secretary, WLA
& General Chair (ICSE-2021)

Prof.(Dr.) Sasmita Rani Samanta
Pro Vice-Chancellor, KIIT DU,
President, WLA
& General Chair (ICSE-2021)