



Smart and sustainable infrastructure for future energy and environmental management

Karthiga Shenbagam Natarajan¹ · Soundara Balu² · Vasudevan Mangottiri¹

Published online: 10 August 2023

© The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature 2023

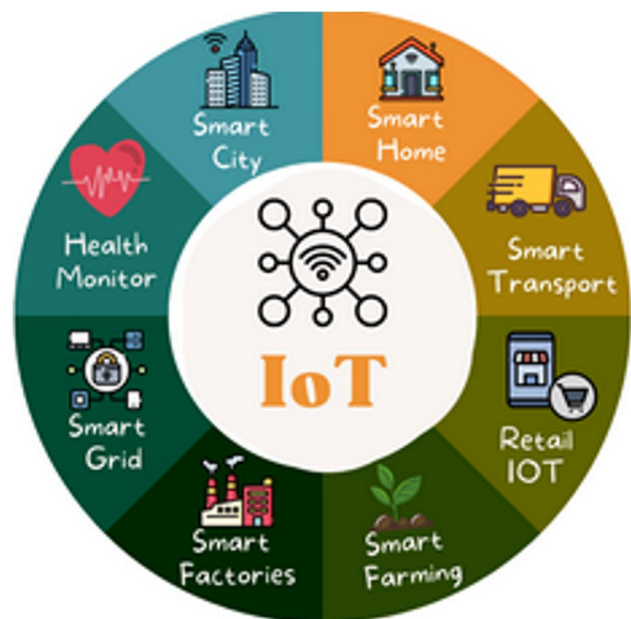
In order to increase the quality of life on earth, smart technology plays a very vital role in the current period. The metropolitan areas improved rapidly as a result of which the standard of living has also been increased rapidly due to the innovative introduction of smart city concept. Digitalization and smart city projects added more value to increase the sustainability and ecological aspects to a very larger extend.

Energy efficient buildings are constructed to reduce the artificial energy sources and use natural energy to the utmost extend. Cutting edge technologies are used to reduce the energy consumption and provide a sustainable environment to live in. Construction of smart buildings and efficient transportation system helps in producing a greener environment with less pollution. Smart city concept balances the energy exchange by converting the electric energy into a final by product that needs minimal interventions.

Smart city is a concept in which all energies such as heat, electric, gas, water, and telecommunications are used in a very minimal extent. The amount of input and the output of all types of energies are controlled at each and every point of time to have a sustainable infrastructure. Urban, national, and international development of cities are all reliant on the consumption of energy. Increased energy consumption will also increase the emission of CO₂ (Karthiga and Praveena 2022; Karthiga et al. 2022a, b) to a larger extent as a result of which the global temperature increases with a rapid change in climate all over the world (Karthiga and Kannan

2022). Increase in urbanization and population increase has made a challenging task to reduce the environmental issues and its impact (Karthiga and Kannan 2023; Karthiga et al. 2023a, b). Apart from that, rapid change in transportation systems increases the use of energy to a larger extent. Various research studies have been carried out to increase the sustainability aspects that use optimal energy for a sustainable greener environment. According to the recent studies from international energy agency in 2030 nearly, half of the transportation emissions will lead to the increase in the energy.

All physical system in the present world requires a need of certain amount of energy. Each and every matter present in the world has some energetic or active field inbuilt in it. Energy in general is nothing the capacity of the system to change from one form to another when there is thermal movement of photos or electrons. As shown



Responsible Editor: Philippe Garrigues

✉ Karthiga Shenbagam Natarajan
karthis47@gmail.com

¹ Department Bannari Amman Institute of Technology, Sathyamangalam 638401, India

² Anna University, Chennai, India

Fig. 1 Smart technology for sustainable environment

in Fig. 1 smart technology is a concept that uses latest technologies in each and every aspect such as in medical, transportation, construction, and business. The purpose of this research presentation is to present an overview on the sustainable energy, development in each and every field of engineering. It also aims in bringing various scholars from different fields with different ideas and solutions for major environmental issues thus providing an eco-friendly environment to live in.

References

- Karthiga SN, Kannan V (2022) Gravimetric weight loss of steel in self-compacting concrete blended with wood ash and silica fume. *Environ Sci Pollut Res* 30(4):9483–9495. <https://doi.org/10.1007/s11356-022-22360-x>
- Karthiga SN, Praveena R (2022) Performance of bacteria on self-healing concrete and its effects as carrier. *Mater Today Proc* 65(2):1987–1989. <https://doi.org/10.1016/j.matpr.2022.05.322>
- Karthiga SN, Kannan V (2023) Effect of fracture and elastic modulus properties on geopolymer concrete reinforced with basalt fibers for an eco-friendly. *Innov Infrastruct Solut* 8:150
- Karthiga SN, Dhivya R, Sushmitha P, Mohanraj A (2022a) Effect on mechanical properties of lightweight sustainable concrete with the use of waste coconut shell as replacement for coarse aggregate. *Environ Sci Pollut Res* 29(26):39421–39426. <https://doi.org/10.21203/rs.3.rs-625366/v1>
- Karthiga SN, Sam IBY, Kannan V (2022b) Strength and durability characteristics of steel fiber-reinforced geopolymer concrete with addition of waste materials. *Environ Sci Pollut Res*. <https://doi.org/10.1007/s11356-022-22360-x>
- Karthiga SN, Saravanan M, Aishwarya M, Vinssilin Joanlia V (2023a) Production, experimental investigation of SCC using fly ash and granite debris. *Mater Today: Proc*. <https://doi.org/10.1016/j.matpr.2023.04.592>
- Karthiga SN, Arun Siddharth M, Kannan V, Dhanusree C (2023b) Experimental investigation of self-compacting concrete (SCC) using fly ash. *Mater Today: Proc*. <https://doi.org/10.1016/j.matpr.2023.04.582>

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Dr. Karthiga Shenbagam N., Associate Professor and Head of the Department, Civil Engineering at Bannari Amman Institute of Technology, India, since June 2011. She completed Ph.D. in Civil Engineering from Anna University in the year 2020, PG in Structural Engineering from Bannari Amman Institute of Technology, and UG in Civil Engineering from Dr. Sivandhi Aditanar College of Engineering. She held several administrative positions from 2011 till date.



Dr. Soundara B., Assistant Professor, Anna University Chennai since 2023. She had per previous academic experiences as Professor in India as well in Dubai. She completed her Ph.D. in Geotechnical Engineering from IIT Madras, PG in Geotechnical Engineering from Anna University Chennai, and UG in Civil Engineering from Alagappa Chettiyar College of Engineering and Technology.



Dr. Vasudevan Vasudevan Mangotiri, Associate Professor of Agricultural Engineering at Bannari Amman Institute of Technology, India, since June 2015. He completed Ph.D. in Environmental Engineering from IIT Madras in the year 2015, PG in Structural Engineering from Motilal Nehru National Institute of Technology Allahabad in the year 2009, and UG in Agricultural Engineering from Kerala Agricultural University, Thrissur in the year 2007. He held several administrative positions from 2015 till date.