



# Integrative Design Solutions Private Limited

172, Indraprastha Apartments, Pocket 3, Sector 12, Dwarka, New Delhi – 110075

**Role in IDSPL:** Sustainable Development Analyst

Family name: **Balasubramaniyan**

First names: **Rajkumar**

Date of birth: **01/01/1990**

Nationality: Indian

Place of Residence: **Delhi, India**

Civil status: **Single**

Education:

Institution [ Date from - Date to]	Degree(s) or Diploma(s) obtained:
University of Petroleum and Energy Studies, Dehradun (2013-2015)	Master of Technology in Petroleum Exploration
Anna University, Chennai (2009-2013)	Bachelor of Technology – Petrochemical Technology

- **Key experience related to the project.**

- Well versed with estimation of GHG emissions associated with energy use in the built environment. Executed assignments on emissions mitigation using computational tools, presentations, and reports.
- Performed several cross-sectoral analyses associated with climate change mitigation programs for sectors including but not limited to buildings, mobility, water, cooling, and industries.
- Experience in application of the essence of sufficiency, efficiency and renewable in the sustainability assessment and integrated planning for carbon neutrality pathways and targets.
- Supported the team in preparation of Minimum Energy Performance Standards (MEPS) for the Eco Niwas Samhita (ENS) Part II (electro-mechanical) for the residential building energy efficiency in India.
- Working on implementation of Passive Cooling Solutions in Cambodia

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through national policy integration, knowledge products and market transformation support activities

- Have executed energy performance analysis of more than 72 commercial buildings including hospitals, hotels, institutions, and offices for ECBC compliance and techno-commercial analysis for implementation of the energy conservation measures, under the ECBC Cell projects across 16 states and UTs.
- Development of National Cooling Action Plan for ASEAN countries – Preparation of data collection frameworks and calculation modules.
- Advisory to UN-Habitat on “Feasibility of Solar Power projects in Smart Cities, India”.
- Execution of Investment Grade Energy Audit report for two buildings, The Chief Secretariat of Puducherry Government and the Central Prison, Puducherry, to achieve 5-Star BEE Label and Net Zero energy certifications, respectively.

• **Specific Professional Experience in the country**

Country	Date from – Date to
India	2015 to present

• **Professional experience**

Place	Date from - Date to	Role of Candidate	Details of the Project
Integrative Design Solutions Private Limited, New Delhi	March 2016 – present	Sustainable Development Strategist	<ul style="list-style-type: none"> <li>• Development of National Cooling Action Plan for Cambodia, Indonesia and Vietnam – Preparation of data collection frameworks and calculation modules; Supported the countries in updating of NDCs with Cooling related targets and recommendations.</li> <li>• Working on the implementation of Passive Cooling Solutions in Cambodia with UN ESCAP and UNEP, delivering technical analysis related to policy development, energy and cooling demand simulation for multiple building typologies to determine effectiveness of</li> </ul>

Place	Date from - Date to	Role of Candidate	Details of the Project
			<p>passive cooling solutions and capacity building to stakeholders.</p> <ul style="list-style-type: none"> <li>• Technical Support to the National Institute of Urban Affairs (NIUA) and the 100 Smart Cities in piloting the Climate Smart Cities Assessment Framework (CSCAF 2.0) for benchmarking urban energy performance and regulations for green buildings.</li> <li>• Working in the UHI Impact assessment in Delhi with School of Planning &amp; Architecture – Delhi for development of three-dimensional forms for mass housing in India.</li> <li>• Managed the energy and environmental audit projects in Manipal University Jaipur and UNICEF India Office at New Delhi, with emphasis on energy efficiency, renewable energy, water conservation and efficiency, waste management and indoor air quality management.</li> <li>• Managed the project for the development of energy efficient housing for armed forces officers developed by Border Roads Organization in the UT of Ladakh, India</li> <li>• Conducted detailed insulation effectiveness study for the wall and roof constructions of the proposed expansion in the airport building of UT of Ladakh.</li> <li>• Worked on the development of I-SEE – Opta – IOT based Cluster level controller for management of HVAC and other energy use appliances</li> </ul>

Place	Date from - Date to	Role of Candidate	Details of the Project
			<p>in commercial building applications.</p> <ul style="list-style-type: none"> <li>• Provided technical support to ADELPHI Germany for evaluation of credit line from KfW Bank for developing energy efficient residential building stock in India. The work involved evaluation of applicable energy efficient strategies for multi-storey residential projects using EnEff tool, life cycle cost analysis and presentation of results to financial institutions and developer community.</li> <li>• Worked on the integration of smart automation components for a Tourist Bungalow in Kausani, Uttarakhand.</li> <li>• Implemented assignment on "Baseline Scenario for Energy Performance of Residential Buildings in the Cold Climatic Zone of India" for Indo-Swiss Building Energy Efficiency Project (BEEP). The work involved performing primary survey of 70 households and analysis of monthly energy consumption data of 150 households in Shimla, Himachal Pradesh.</li> <li>• Supporting the development and implementation of 2000 watts Smart Cities (Self Sustainable urban settlement development concept) in India with Neusch Development India.</li> <li>• Working on the development of guidebook on "Energy and Resource Efficiency Measures and Regulations for the Building Sector in Nigeria". The work was awarded by UN Habitat Nairobi and the draft</li> </ul>

Place	Date from - Date to	Role of Candidate	Details of the Project
			<p>book has been submitted for review.</p> <ul style="list-style-type: none"> <li>Involved in the implementation of Near Zero Energy Retrofitting of United Nation House in Delhi. The work involved implementation of energy efficient strategies related to building envelope, lighting, air-conditioning, electrical systems and rooftop photo-voltaic system. Baseline for the building will be developed by implementing a extensive monitoring campaign of electricity consumption by various end use and through hygro-thermal data logging.</li> <li>Supported 35 commercial demonstration projects across the country to make them ECBC compliant. The work involved analysis of potential of energy efficient strategies using energy and daylight simulation tools.</li> <li>External Evaluator of the assignment "Rural Poverty Alleviation through Organic Kitchen Gardening in Jharkhand, Chhattisgarh, Tamil Nadu states of India" by Bosconet India.</li> <li>External Evaluation of Solar Water Pumps installed by Arunachal Pradesh Energy Development Agency in Papum Pare district of Arunachal Pradesh.</li> <li>Developed and managing the assignment "Sustainable Development of agricultural land through organic farming practices and skill development" in</li> </ul>

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			Visakhapatnam, Andhra Pradesh with Bosconet India.
All India Institute of Local Self Government, New Delhi	October 2015-May 2019	Project Manager - Energy Conservation	<ul style="list-style-type: none"> <li>• Implementation of Energy Conservation Building Code (ECBC) in 17 states; Management of the activities for ECBC implementation through ECBC cells in the states of Chhattisgarh, Kerala, Arunachal Pradesh, Andaman &amp; Nicobar Islands, Lakshadweep, Goa, Daman &amp; Diu, Assam, Meghalaya, Manipur, Nagaland, Mizoram, Puducherry, Sikkim and Tripura;</li> <li>• Amendment of ECBC for 5 different climate zones in 17 states</li> <li>• Energy performance analysis for around 40 buildings in 17 states and 5 different climate zones; Compliance check with ECBC 2007 &amp; 2017</li> <li>• Consultation with state Energy and Urban Development departments for inclusion of ECBC into bye laws.</li> <li>• Redesigned government (PWD, Karnataka) commercial buildings using ECBC Codes and energy simulation software.</li> <li>• Preparation of Investment Grade Energy Audit report for two buildings, The Chief Secretariat of Puducherry Government and the Central Prison, Puducherry, to achieve 5-Star BEE Label and Net Zero energy certifications, respectively.</li> </ul>

Place	Date from - Date to	Role of Candidate	Details of the Project
			<ul style="list-style-type: none"> <li>Supported project preparation and implementation of database structure for ECBC compliant and energy performance with a revision of Government Schedule of Rates.</li> <li>Supported training &amp; capacity building of ECBC professionals to conduct ECBC intensive training programme in the state and training of staff of Chief Architect's Office, PWD Karnataka for ECBC Codes and Energy Simulation Software.</li> <li>Training of ECBC Cell teams on building energy simulation tools</li> </ul> <p><b>Other activities</b></p> <ul style="list-style-type: none"> <li>Advisory to UN-Habitat on "Feasibility of solar power projects in Smart Cities, India".</li> <li>Business Development initiatives in the field of Energy Efficiency</li> </ul> <p><b>Worked on the Smart City Proposal for Karnal, Faridabad cities in Haryana (Round I) and Raipur, Bilaspur cities in Chhattisgarh (Sept 2015- Dec 2015)</b></p> <ul style="list-style-type: none"> <li>Preparation of master plans for Renewable Energy, Solid Waste Management and energy efficiency in the cities of Faridabad, Karnal, Raipur and Bilaspur</li> <li>Co-ordination with the Municipal Corporation and relevant state departments in preparation of new proposals for the city and to</li> </ul>

Place	Date from - Date to	Role of Candidate	Details of the Project
			<p>reach out and guide maximum number of stakeholders and citizens for citizen participation.</p> <ul style="list-style-type: none"> <li>Financial feasibility study on the proposed solutions under the Smart City initiative</li> <li>Preparation of Smart City Proposal Report.</li> </ul>
Environmental Carbon Solutions Private Limited, New Delhi	December 2014 - October 2015	Project Engineer	<ul style="list-style-type: none"> <li>Installation of 52 kWp Solar Power Plant in Samachar Society, Mayur Vihar Phase II, Delhi</li> <li>Preparation of proposal for rooftop solar power plant – System Design and Costing</li> <li>Design and Development of cogeneration concept using low pressure steam turbine for Plywood Manufacturing industry in Yamuna Nagar, Haryana</li> <li>Energy auditing of Westin Hotels, Pune for development of a retrofitting plan for energy efficiency.</li> </ul>

**Language skills:** Indicate competence on a scale of 1 to 5 (1 - excellent; 5 - basic)

Language	Reading	Speaking	Writing
English	1	1	1
Hindi	1	1	5
Tamil	1	1	1

**Membership of professional bodies:**

- Certified Energy Manager (Certificate No. 10032/20) – National Productivity Council India & Bureau of Energy Efficiency
- Associate Member of ASHRAE (Membership No: 8320571)



**Other skills: (e.g. Computer literacy, etc.)**

Software Skills: EnergyPlus (with Design-Builder Interface), ESP-r, Autodesk Ecotect, DIVA, Ladybug, Honeybee, Daysim, Desktop Radiance, Autodesk Revit, Autodesk AutoCAD

**Present position:** Sustainable Development Strategist

**Years within the firm:** 6 years 10 months

**Publications**

- Ganesan K, **Rajkumar B**, Ashish Sharma (2017). Benefits of ECBC Implementation in India: A Case Study of Karnataka, Shashwat: Let Nature Be, Green Rating for Integrated Habitat Assessment, Delhi
- Ganesan K, Rajkumar B, Ankit Anand (2022). Training Manual on Energy Efficient Municipal Water Supply, Climate Centre for Cities, National Institute of Urban Affairs, Delhi.
- Ganesan K, Rajkumar B, Ankit Anand (2022). Training Manual on Urban Fossil Fuel Consumption, Climate Centre for Cities, National Institute of Urban Affairs, Delhi.
- Kumaraguru K, **Rajkumar B**, Sasidhar T (2011). "Optimization of Biosorption of Chromium VI ions using Response Surface Methodology" Journal: 'Poster-Walkway of Discovery' at International Conference "INDIA BIO 2011", Bangalore.
- Kumaraguru K, **Rajkumar B**, Sasidhar T (2012). Removal of Chromium (VI) From Aqueous Solution by Adsorption on Low Cost Adsorbents Using a Response Surface Methodological Approach published in Journal: CHEMCON-2012, Bangalore.