

IEEE PELS Virtual Workshop on Energy Access and Empower a Billion Lives - II (EBL II)



Program and Agenda
30 June 2021

Virtual Energy Access Workshop - Agenda

8:00 Welcome and Stage-Setting

Deepak Divan, EBL Global Steering Chair
Presentations from EBL-I teams: Chetan Singh Solanki - Team SouLS and Olusegun Odunalya - Team Havenhill

8:30 Panel Session 1: Towards universal energy access - barriers and pathways to scale

Moderator: Nana Nuamoah Asamoah-Manu - IFC
Panelists: Divyam Nagpal - IRENA,
Nishant Narayan - SEforALL,
Suleiman Babamanu - Nigerian Rural Electrification Agency

9:15 Panel Session 2: Technologies enabling universal energy access

Moderator: Silard Liptak, Agsol
Panelists: Nick Singh - ESKOM,
Makena Ireri - CLASP,
Claudio Shawawreh - Solaris Off-Grid

10:00 Break

10:15 Panel Session 3: Energy access stakeholders' collaboration and the role of IEEE

Moderator: Jelena Popovic, EBL Vice-Chair, University of Twente
Panelists: Rajan Kapur - VP IEEE Smart Village, Larankelo Ventures,
Sampathkumar Veeraraghavan Global Chair IEEE Humanitarian Activities
Lwanga Herbert - IEEE SIGHT Chair, Logel Science Foundation,
Anuradha Annaswamy, Past-President IEEE Control Systems Society

11:00 Stakeholder's Perspective:

'If we could wave a magic wand, what is the outcome we would want?'

Moderator: Issa Batarseh, EBL Vice-Chair, UCF
Presenters: Olivier Jacquet, Schneider Electric
Bill Nussey, Freeing Energy

11:30 Panel Session 4: Empower a Billion Lives II Global Competition - stakeholder input

Moderator: Deepak Divan, EBL Global Steering Chair
Panelists: Ali Husain - On Semiconductor,
Richard Mori - EBL I Team Xpower, Meshpower,
Nana Nuamoah Asamoah-Manu, IFC,
Silard Liptak, EBL I Project Manager, Agsol

12:15 Next Steps & Open Discussion

12:30 Adjourn

On behalf of the IEEE PELS Energy Access and Empower a Billion Lives Global Steering Committee, it is our honor to welcome you to the 2021 Virtual Workshop on Energy Access and Empower a Billion Lives II, hosted by the IEEE Power Electronics Society and IEEE TV. The Workshop on Energy Access provides a platform for bringing together a diverse community dedicated to solving the challenges posed by equitable energy access.

Our aim is to improve the understanding of the needs and capabilities of various stakeholders, continuing the dialogue on collaboration, and exploring ways to expand the global Energy Access community, and strengthen collaboration among stakeholders.

This Workshop is also announcing the launch of IEEE PELS Empower a Billion Lives II (EBL) Global Competition to accelerate energy access for nearly three billions people who still live with extreme energy poverty. The goal of this competition is to crowdsource holistic and scalable solutions that will be effective in providing energy access to communities that have no access to energy services and live below the global poverty level. This competition will build off the success of Empower a Billion Lives I and take input from prior EBL I teams and the Energy Access community in crafting the next competition.

A special thank you to all the panelists and partners and a hearty thanks to the IEEE volunteers and staff for their dedicated work and to IEEE Power Electronics Society as the workshop sponsor.

Deepak Divan, Global Steering Chair – IEEE PELS Empower a Billion Lives and Energy Access Group



Welcome Presentation



Deepak Divan is Professor, John E Pippin Chair, GRA Eminent Scholar, and Director of the [Center for Distributed Energy](#) at the Georgia Institute of Technology in Atlanta, GA. His research is in power electronics, power systems, smart grids, and distributed control of power systems. He works with utilities, industry and is involved in research, teaching, entrepreneurship and starting new ventures.

Dr. Divan has founded or seeded several new ventures including Soft Switching Technologies, Innovolt, Varentec and Smart Wires, which together have raised >\$160M in venture funding. Dr. Divan is an elected Member of the US National Academy of Engineering, member of the National Academies Board on Energy and Environmental Systems, a Fellow of the IEEE, past President of the IEEE Power Electronics Society, and is a recipient of the IEEE William E Newell Field Medal and was Global Chair of the first Empower a Billion Lives global competition. He has 40 years of academic and industrial experience, 75 issued and pending patents, and over 400 refereed publications. He received his B. Tech from IIT Kanpur, and his M.S. and Ph.D. degrees from the University of Calgary, Canada.

Presentations from Empower a Billion Lives I Teams

Chetan Singh Solanki – Leader Team SoULS



Chetan Singh Solanki, a Professor (on Leave) for the Department of Energy Science and Engineering, IIT Bombay. He received his Ph.D. from IMEC (Ketholik University) Leuven, Belgium. Dr. Solanki was the Team Leader of SoULS which won the EBL I Global Grand Prize in 2019 and he continues as the Principal Investigator and lead of the Solar Urja through Localization for Sustainability ([SoULS](#)) project. Prof. Solanki has published over 100 research papers. He has authored several books. Dr. Solanki has undertaken Energy Swaraj Yatra through a solar bus for 11 years, until 2020. This Energy Swaraj Yatra is designed to create a public movement towards adoption of solar energy – he has been designated the “Solar Man of India” by the Times of India.

Olusegun Odunaiya – Leader Team Havenhill Synergy

Olusegun Odunaiya is a social entrepreneur, renewable energy professional, multifaceted consultant, project manager and a fellow of the Mandela Washington Fellowship for Young African Leaders who is passionate about improving lives. He is an expert in the design, construction and operation of off-grid energy systems (Mini-Grids). He is the founder and CEO of Havenhill Synergy Limited, which provides clean, cost-effective and sustainable solutions in Nigeria.

With a vision of providing electricity to over 1 million Nigerians by 2025, Havenhill is gradually turning on the lights one community at a time.

Team Havenhill won the Empower a Billion Lives Global Prize for best commercial utility solution. Havenhill focuses on rural development by improving access to electricity using mini-grids and providing reliable electricity in the Commercial and Industrial Sector in Nigeria using renewable energy sources.





Panel Session 1: Towards universal energy access - barriers and pathways to scale

Moderated by: Nana Nuamoah Asamoah-Manu



Nana Asamoah-Manu led the joint IFC/ World Bank Lighting Africa program in Kenya from 2009 to 2018. Prior to joining IFC, Nana, an Engineer and Marketer by training, worked for over a decade in various sales and market penetration roles starting in Mobil Oil Ghana Ltd and ended his private sector experience as the Sales Manager for Toyota Ghana Co. Ltd in the Accra, Head Office.

Nana's work with the Lighting Africa/ Lighting Global program focused on deepening the supply chain for quality off-grid solar products. This ongoing effort seeks to address many of the challenges linked with off-grid electrification in Sub-Saharan Africa and beyond. Currently, he works with the Advisory Services team of IFC's Financial Institutions Group, supporting climate finance and energy access programs.



Panel 1: Panelists



Divyam Nagpal is a renewable energy and energy access specialist. He is Programme Officer - Energy Access with the International Renewable Energy Agency's (IRENA) Knowledge, Policy and Finance Centre. Prior to this, he was an independent consultant with the MIT Energy Initiative, International Centre for Integrated Mountain Development and REN21. He has co-authored over 15 major publications and has a strong understanding of global and regional renewable energy technology and market trends. He is a mechanical engineer by training and has an MSc in Sustainable Energy Futures from Imperial College London. He is pursuing his Doctorate in Public Administration from the University College London researching policies to support local innovation systems for off-grid renewable energy solutions.

Nishant Narayan received the M.Sc. degree in sustainable energy technology (specializing in photovoltaic systems) and the Ph.D. degree in developing modular solar home systems and off-grid solutions for improving energy access in low-resource contexts from the Delft University of Technology, Delft, The Netherlands. He is currently a Programme Manager in Universal Integrated Energy Planning at SEforALL.



Suleiman Babamanu is a Renewable energy specialist at the Nigerian Rural Electrification Agency. His work involves managing renewable energy projects and the development of strategies for the deployment of commercially viable mini grids to rural communities and the underserved in order to stimulate economic progress that fosters environmentally sustainable, low-carbon and socially inclusive development. Suleiman received the MSc, Renewable Energy at the University of Newcastle-upon-Tyne



Panel 2: Technologies enabling universal energy access

Moderated by: Silard Liptak



Silard Liptak is an off-grid product development specialist and the CTO of Agsol, a solar agroprocessing startup. He has global experience in 8 countries on 4 continents spearheading R&D programs. Silard has worked with both "on-grid" European and US utilities, and "off-grid" pay-as-you-go system providers in East Africa. Silard was key in designing the structure of the Empower a Billion Lives Global Competition.



Panel 2: Speakers



Nick Singh is the Smart Grid Center of Excellence Manager at Eskom Research Testing & Development. Nick has been at Eskom Research Testing and Development since Jan 1998, specializing in Smart Grids and Control Systems. He leads a team and facilitates laboratories in the Smart Grid domain, equipped to service the requirements of the power utility, which starts at Generation, Transmission, and Distribution ending at the customer. Nick is a member of the Study Committee of Technology Technical advisory Committee (SCOT TC), South African Smart Grid Initiative(SASGI), ISGAN, Global Smart Grid Federation & EPRI. He is an Industrial mentor at a number of Universities local and abroad. Nick is the lead on Smart Grid Collaborations between ERDF (France), ISGF (India), EPRI (USA) in the respective areas.

Makena Ireni is a Manager at CLASP, leading research on the Low Energy Inclusive Appliances programme. She has diverse experience in the energy sector both in utility scale solutions and distributed renewables. Prior to joining CLASP, Makena managed energy access theme prizes and other research effort on pro-poor energy solutions in developing countries. She has authored impact and baseline research on improved institution cookstoves and refrigeration for the rural poor, contributed to research efforts in solar home system market stimulation in Bangladesh, and helped scope energy for humanitarian needs. Makena received her M.Eng in civil engineering from Manchester University.



Claudio Shawawreh is a hardware/firmware engineer for Solaris Off-Grid working as a hardware engineer eager to contribute to build new technologies that can address the evolving needs of the modern society from a social impact perspective. Claudio designs electrical circuits for a broad range of different applications with expertise in embedded systems design and their interface with the external world.

Panel Session 3: Energy access stakeholders' collaboration and the role of IEEE

Moderated by: Jelena Popovic



Jelena Popovic received the Dipl. Ing. degree from the Faculty of Electrical Engineering, University of Belgrade, Belgrade, Serbia and the Ph.D. degree from the Delft University of Technology, Delft, The Netherlands. From 2005 to 2011, she was with the European Center for Power Electronics (ECPE) as a Technology Transfer Coordinator. From 2008 to 2017 she was with the Delft University of Technology as an Assistant Professor. In 2018 she co-founded a start-up in energy access, Klimop Energy. From October 2019, she joined the Power Electronics group of the University of Twente as a part-time Associate Professor to develop an energy access programme. She has published more than 80 publications in scientific journals, magazines and conferences. She has co-authored strategic research agendas, technology roadmaps and white papers in the field of power electronics, energy efficiency, solid state lighting. Her recent interests are bottom-up solutions for energy access, appropriate technology and socio-technical integration.

OTHER PROFESSIONAL ACTIVITIES:

Associate Editor, IEEE Transactions on Power Electronics (2018 -).

Steering Committee Member and Judge of IEEE Empower A Billion Lives; Judge for Global LEAP E-waste challenge.

Panel 3 Speakers



Rajan Kapur started his career at Bell Labs. Since 1985 he has worked exclusively with start-ups, first on mixed signal micro-chip development in the Silicon Valley, and on silicon micro-display systems in Colorado. In 2006, he transitioned to renewable energy and founded and sold a solar microinverter company. Now he runs a sustainability incubator in his garage, working with small dispersed teams on early-stage projects, with participants from academia and the private sector. He is Senior Vice President of IEEE Smart Village, and his current projects include eco-tourism, gem-stone cutting, electrification to combat deforestation, K-12 curriculum development, peri-urban aquaculture and other interests in developing areas. He recently funded a telehealth project in Uganda and facilitated an oxygen plant deployment in Manali, Himachal. He holds Electrical Engineering degrees from the Indian Institute of Technology, Kanpur; Rice University, Houston and the University of Texas at Austin.

Sampathkumar Veeraraghavan is a globally renowned technologist best known for his technological innovations in addressing global humanitarian and sustainable development challenges. As the 2021 IEEE Humanitarian Activities Committee (HAC) Chair, Sampath spearheads the global strategy and portfolio of sustainable development and humanitarian engineering programs to deliver impactful programs at grass root-level. Sampath was the 2019-2020 IEEE SIGHT Chair, leading the program to record-breaking growth benefiting members in 117+ countries. Sampath was an expert in the Broadband Commission working group on school connectivity co-chaired by UNESCO, UNICEF and ITU to drive "GIGA," a Global School Connectivity Initiative. He is the founder and president of "The Brahman," a humanitarian program delivering next-generation social innovations to achieve sustainable development goals and benefit marginalized communities globally. Sampath was recently accredited with the 2020 IEEE Theodore W. Hissey Outstanding Young Professional Award. He currently works as a senior technology and program management leader with Alexa Artificial Intelligence Group at Amazon.





Panel 3 Speakers Continued



Lwanga Herbert is an innovation and technology enthusiast and practitioner inspired by technological solutions to diverse problems and challenges. He is the Co-founder of M/S LOG`EL GROUP LTD, an IT company based in Uganda, and the co-founder of [Log`el Science Foundation](#), a civil society organization that conducts research and development in science and technology.

Lwanga was a beneficiary of the presidential innovation fund in Uganda from 2000-2005, which allowed him to develop a variety of innovations to address corresponding community challenges. These innovations were patented with the support of the [Uganda National Council for Science and Technology](#). He has made several contributions within the IEEE community, which includes co-founding the [IEEE Uganda Section](#) and implementing humanitarian projects and programs in Uganda with IEEE support. Herbert is currently the IEEE SIGHT Chair.

Anuradha Annaswamy received her Ph.D. in Electrical Engineering from Yale University. She has been a member of the faculty at Yale, Boston University, and MIT where currently she is the director of the Active-Adaptive Control Laboratory and a Senior Research Scientist in the Department of Mechanical Engineering. Her research interests pertain to adaptive control theory and applications to aerospace, automotive, and propulsion systems, cyber physical systems science, and CPS applications to Smart Grids, Smart Cities, and Smart Infrastructures. She is the author of a hundred journal publications and numerous conference publications, co-author of a graduate textbook on adaptive control (2004), co-editor of several reports including "Systems & Control for the future of humanity, research agenda: Current and future roles, impact and grand challenges," (Elsevier) "IEEE Vision for Smart Grid Control: 2030 and Beyond," (IEEE Xplore) and *Impact of Control Technology*, (ieeecss.org/main/IoCT-report, ieeecss.org/general/IoCT2-report). Dr. Annaswamy is Past-President of the IEEE Control Systems Society.



Break 10:00-10:15 AM

Video Screenings

Empower a Billion Lives – The Global Final:

<https://www.youtube.com/watch?v=t8G2Fy8IqoE>

Eskom – Solar Powered Micro-Grid:

<https://www.youtube.com/watch?v=8MI8IgvTW4>

IEEE Sight – 2021: New Challenges, Same Mission

<https://www.youtube.com/watch?v=Nljcrkl4flc>

Stakeholder Perspective



Issa Batarseh is a Pegasus Professor of electrical engineering in the Department of Electrical and Computer Engineering at the University of Central Florida (UCF), Florida, USA. He is the founder and director of the Florida Power Electronics Center (FPEC) where his team has been leading the design, development, and commercialization of smart microinverters, and smart EV and industrial chargers. He has supervised more than 100 doctoral, masters and honors students. His research focuses on power electronics and energy conversion systems for smart-grid and renewable energy applications. He has founded and co-founded three start-up companies in power electronics including Petra Systems and ApECOR. Dr. Batarseh is Fellow Member of the IEEE and AAAS. He is a member of the National Academy of Inventors (NAI) and has been inducted into the Florida Inventors Hall of Fame. He received the [IEEE PELS R. David Middlebrook Achievement Award](#), 2019, and UCF Scholarship of Teaching and Learning Award.

Stakeholders Perspective – If we could wave a magic wand what would we want?



Olivier Jacquet, Business Development VP, Access to Energy, Africa, Middle-East and South Africa – Sustainable Development – Schneider Electric

Olivier Jacquet studied electrical engineering at University College, London UK, and at the French High School Centrale-Supélec. After he graduated his MSc, he also studied his MBA at College des Ingénieurs in Paris, France. Since 1998, Olivier holds various positions at Schneider Electric in solution sales, manufacturing, and entered general management roles since 2004, as Factory Manager in Western France, then as Zone Manager in Vietnam Philippines and Cambodia, and lately Senior Vice President for international projects in EMEA region.

Bill Nussey has been a tech CEO for 25 years. Through an IPO and two acquisitions, his companies have created thousands of jobs and billions in shareholder value. Along the way, he spent time as a venture capitalist at Greylock and, later, after IBM acquired his company, he served as their VP Corporate Strategy.

Most recently, Bill left tech for the clean energy industry. He founded the Freeing Energy Project, which includes a late 2021 book by the same name, a popular podcast, 100+ articles, and a TED talk. Freeing Energy's mission is to educate and inspire innovators to join forces and accelerate the shift to renewables through the smart adoption of decentralized generation of electricity. Separately, in 2018, he launched a startup called Solar Inventions to commercialize a breakthrough manufacturing technique for silicon solar.



Bill received a degree in electrical engineering from North Carolina State University and an MBA from Harvard Business School.

Panel Session 4: Empower a Billion Lives II Global Competition – Stakeholder Input

Moderator: Deepak Divan – EBL II Global Steering Chair

Panel 4 Speakers Include: Silard Liptak and Nana Nuamoah Asamoah-Manu

Ali Husain is Marketing Manager in the Corporate Marketing and Strategy team at ON Semiconductor. Ali came to ON Semiconductor during the Fairchild acquisition where he developed gate drivers and other ICs for automotive applications. He spent nine years at International Rectifier working in applications and product management for motor control systems. Ali has a Ph.D. in Electrical Engineering from Caltech and B.S. degrees in Finance and Electrical Engineering from the University of Pennsylvania.



Richard Mori is the co-founder and CEO of MeshPower, an innovative off-grid utility, bringing clean reliable electricity to thousands of Rwandan households via rural solar PV microgrids. Now expanding beyond energy, MeshPower provides customers with internet access and PAYG LPG too. More than just a project developer, MeshPower runs and develops a proprietary hardware and software stack, designed to make running minigrids cheaper and more profitable. Richard was the EBL I X-Power Team Leader

IEEE PELS and Empower a Billion Lives II Organization

❖ **IEEE PELS Energy Access Group and Empower a Billion Lives II**

Global Steering Committee:

Chair – Deepak Divan – Georgia Tech, Director Center for Distributed Energy

Vice-Chair – Jelena Popovic – University of Twente

Vice-Chair – Issa Batarseh – University of Central Florida

Secretary – Sanjib Kumar Panda – National University of Singapore

❖ **IEEE Power Electronics Society (PELS)**

IEEE PELS President – Liuchen Chang – University of New Brunswick

IEEE PELS Executive Director – Mike Kelly

IEEE PELS EBL II Project Manager – Jane Celusak

❖ **IEEE PELS – TC12 Energy Access and Off-Grid Systems**

Chair: Sanjib Panda, National University of Singapore

**Global Energy
Access
Community
(EAC)**

EBL-I Sponsors



Engaging with IEEE Energy Access and EBL

Email: billionlives@ieee.org

Website: empowerabillionlives.org

IEEE-PELS is launching EBL-II and invites your participation and support to ensure that it is organized and executed for maximum impact. EBL leverages IEEE resources and volunteer time to cover administrative and operating costs, realizing a unique funding model where most of the funding received from outside sponsors and supporters is directly used for EBL teams and awards.

To encourage the formation of a global Energy Access Community (EAC), all interested, including IEEE members and non-members, are invited to join EBL-II and TC-12 as EAC Members, so they can become involved and can make a difference. This is a free service provided by IEEE PELS.

JOIN US!

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