Optimizing hybrid renewable energy microgrids for off-grid and grid-tied environments

www.microgridinnovation.com/EMEA

The microgrid opportunity around the world continues to grow significantly. One recent report forecasts a compound annual growth rate (CAGR) of 12% between 2016-2022, reaching $35 billion by 2022. The reasons for this expected positive development include the falling cost of solar energy, advances in energy storage, the drive to mitigate climate change, and the cost savings associated with minimizing fossil fuels in remote generation systems. In addition, microgrids will play a central role in bringing electrification to rural and developing regions in which access to reliable, clean and affordable energy is a high priority.

The 10th edition of the Microgrid Global Innovation Forum, September 9-11, 2019 in London, focuses on microgrid advances, case studies and applications in EMEA, Asia-Pacific, and Latin America. The emphasis is on maximizing the effective use of renewable and distributed energy resources, refining the positive business model for a range of microgrid deployments, and sharing real-world case studies in both grid-tied and off-grid/remote environments.

- Microgrid feasibility, design, and implementation
- Refining the business case for off-grid, remote, and island microgrids
- Solar + storage advances
- Project financing and investor perspectives
- Determining the correct technology mix for hybrid energy systems
- Advanced battery, fuel cell, and flow battery technologies
- Microgrid power control, management, and integration
- Integrating distributed renewable energy resources into the grid
- Effective project evaluation, implementation, and management
- Regulatory and public policy advances
- Standards and interoperability issues
- Market drivers and opportunities worldwide
- And more

Sponsors

Organized by
Monday, September 9, 2019

13:00 - 17:00  Pre-Conference Workshop: Microgrid Economics Analysis and Financing

This half-day workshop is intended for project owners, developers and investors who are preparing microgrid projects and need to consider the economic and financial aspects in order to obtain financing or sell projects. It will also be of interest for participants in other sectors, including equipment suppliers and advisors, who may be asked to participate in project financing or for whom project economics are relevant.

The workshop will be a mix of educational sessions and more interactive sessions with participants expected to participate. Participants are encouraged to forward questions, issues or case studies ahead of time for these to be included or covered in the workshop.

Workshop Facilitator:
Arnaud Henin
Managing Director
Gommyr Power Networks

Tuesday, September 10, 2019

07:30 - 08:30  Registration and Continental Breakfast

08:30 - 09:00  Microgrid Global Market Trends

Microgrids are gaining more importance for balancing the grid as more decentralized energy resources proliferate and renewable energy penetrate. Resilience improvement is an urgent task in countries facing high risk of natural disasters and unreliable grid electricity challenges. The world still has a billion people without access to grid electricity. While the global microgrid market is still fragmented, more projects and financing of clean energy-based microgrids were installed or announced in the past year to address these challenges. This presentation will discuss the recent development of the global microgrid market including some regional updates. It will address questions such as how microgrid roles are evolving in recent projects, who are using microgrids, and how the microgrid industry is responding to the market’s development.

Takehiro Kawahara
Frontier Power Senior Associate, London
Bloomberg
09:00 - 09:30  Business Model Forecasts for Microgrids

Peter H. Asmus  
Associate Director, Utilities & Energy  
Navigant Research

09:30 - 10:00  Sustainable Microgrids: Market Drivers and Opportunities Worldwide

This presentation will focus on the tremendous global opportunities for microgrids as well as key business drivers critical to the performance of these systems. The majority of developing and under-developed nations primarily in Asia & Africa face huge "access to energy" problems with millions of people still lacking access to adequate and reliable electricity. Microgrids seem to be emerging as a potent solution to this problem. To arrive at a sustainable microgrid model, key enablers -- including capital financing, government support and technology innovation -- need to come together to assist Energy Service Companies to scale sustainable renewable energy microgrids to meet the growing consumer demand. This could herald an era of renewable energy-driven socio-economic development across developing nations.

Samit Mitra  
Senior Director - Mini-Grid, Demand & Innovation  
Smart Power India, Subsidiary of The Rockefeller Foundation

10:00 - 10:30  Coffee Break

10:30 - 11:00  Transactive Energy within Layered Microgrids for Grid Transformation

Maximizing the use of distributed energy resources and especially hybrid grids requires new approaches to power management and integration with business models. Transactive energy approaches hold promise in unifying these very diverse systems into a single framework. As microgrids become more prevalent opportunities for innovation will increase. Not only will microgrids become more diverse with responsive loads, solar, wind and storage, but also more complex as they become a network of layered microgrids owned by different entities. This will create the need for new technological solutions for transactive energy to play a role in the management of microgrids.

This session discusses the role of Transactive energy and profiles some current research and implementation work in both Europe and the United States. An interactive discussion between the three panelists and the audience will explore the uses of transactive energy to drive grid transformation and next steps required to fully implement a networked and integrated microgrid future.

INTROSPECTIVE SYSTEMS

Kay Aikin  
CEO and Co-Founder  
Introspective Systems
11:00 - 11:30  Building up a Microgrid in an Engineering Company

MTU Friedrichshafen has a plant consuming 4-6MWe base load and 9MWe peak load. For the production of the engines and for heating purpose process heat and cold is additionally necessary. German energy pricing with several taxes and a renewable apportionment is forcing the industry to invest in new technology and reduce grid consumption. In this context and for development purposes the factory has installed a microgrid with all relevant components (e.g. CHP, CCHP, PV) and energy storage (Lithium-Ion). In this presentation each component and the controller will be introduced and several control strategies will be explained. It is a real life example of how European Industry is challenged by a changing energy market and taking the opportunity to make renewables a success.

Friedrich Triftshäußer
Manager, Direct Sales Project Management
MTU Friedrichshafen GmbH

11:30 - 12:00  Private Sector Mini-Grid Business Models: Best Practices from South-East Asia

This presentation draws upon results of an ongoing publication focused on South-East Asia that the Alliance for Rural Electrification (ARE) is developing with the Asian Development Bank, as well as completed ARE Member clean energy mini-grid projects in the region. The presentation will highlight key elements of successful mini-grid business models across different technologies in the context of South-East Asia. It will include case studies from ARE Members across a range of countries such as India, Bangladesh and Nepal.

Jens Jæger
Policy & Business Development Manager (Asia)
Alliance for Rural Electrification

12:00 - 13:00  Networking Lunch

TRACK A: ENABLING TECHNOLOGIES

13:00 - 13:30  Stacking Multiple Grid Services with Flexible Hybrid Energy Storage in an Island Environment

HESStec's aim is to provide a better understanding of the design and modelling of a HESS (Hybrid Energy Storage System) solutions (hardware/software platform based on the combination of several energy storage technologies, along with enhanced power electronics and energy management systems), its sizing and assets optimization methods and how the energy storage lifetimes can be extended at the same time that multiples services are provided, allowing them to capture multiple benefit streams to offset system costs. In order to better understand the design of hybrid energy storage system (HESS) solutions, two case studies will be presented in this session, introducing how to maximize the net economic benefits for utilities and grid operators, and how new business models appear through an appropriate stacking of multiple grid services in the same device or a network of devices.
in a distributed scenario.

Rafael Gonzalez Nieves
Program Manager
Hybrid Energy Storage Solutions (HESStec)

13:30 - 14:00  Learning from Nature: Rural Electrification Using Swarm Power

Nature has an impressive concept that uses the aggregate power of individuals: building a swarm. The swarm helps individuals to improve their chances of survival and is a powerful organism as a whole. The swarm is based on simple rules and does not require central control. Applied in the technical field, this concept was translated to swarm technology or swarm intelligence and describes the collective behaviour of decentralized, self-organized natural or artificial systems. It is based on five principles: awareness, autonomy, solidarity, expandability and resiliency, and was initially introduced in 1989 by Gerardo Beni and Jing Wang from the University of California.

To overcome the challenge of individual solar home systems (SHS) and avoid the large CAPEX costs of traditional micro-grids, swarm technology is an innovative approach to electrify smaller communities. Starting with a limited number of interconnected systems and scaling up according to the actual demand, this technology also reduces the risks for investors.

Alessandro Medici
CTO
Power-Blox AG

14:00 - 14:30  Scalability of Micro-Grids: From Few kW to Multi-MW range

In many regions of the world, energy supply from decentralized solar plants with battery backup is the only meaningful way to establish a sustainable and affordable power infrastructure. However, there are certainly challenges in planning, designing, financing, installing and operating these kind of Micro-Grids. As multiple thousand battery-based Solar Micro-Grids in the kW range have been deployed globally over the last decade, there are not so many of these Micro-Grids in the multi-MW range. This presentation will focus on scalability and gives some best practice examples on how to properly design systems in a way to allow for future expansion both for AC- as well as DC-coupling. Based on real-life experience, several options will be shown on how to improve existing Diesel Genset based Micro-Grids in terms of grid stability, fuel savings, CO2 reduction and financial viability by adding Photovoltaics plus battery storage.

Dr. Jens Eiko Birkholz
Business Development Director
SMA Su
14:30 - 15:00  Coffee Break

15:00 - 15:30  **Enabling Wind to Complement Solar in Hybrid Microgrids**

Many regions have rich resources of both solar and wind energy. In such regions, there is often an inverse correlation between the wind and solar outputs. The majority of the solar energy is generated in the warmer months, and then only during the day, whereas wind energy is generated day and night, with most output in the colder months. By harvesting a combination of solar and wind, these inter-seasonal and diurnal variations in output can be smoothed significantly. However, remote microgrids requiring modest amounts of power (less than 1 MW) face a significant challenge harvesting wind energy alongside solar. Conventional wind turbines achieve a low cost of energy by giant size. Even a single turbine would provide more power than needed, always assuming it could be delivered and installed. Low power versions of conventional turbines suffer from diseconomies of small scale and are not cost-competitive with diesel gensets. Spinetic has designed a modular wind energy system which takes its inspiration from solar panels, in that the economies of scale come from manufacturing huge volumes of small units rather than a small number of giant structures. We describe the underlying design philosophy and present performance data.

**Dr. Nick Goddard**
Commercial Director
Spinetic Energy Ltd

15:30 - 17:00  **Artificial Intelligence for Microgrids**

A microgrid is defined as a cluster of distributed energy resources and loads that has a clear electrical boundary, acts as a single controllable entity, and can operate in either grid-connected or islanded/isolated modes. Microgrids are considered a critical link in smart grids evolution toward decentralization, decarbonization, and digitalization. These systems are typically renewable-penetrated, with most of the resources being electronically-interfaced. In addition, microgrids exhibit novel types of control and stability issues due to their unique characteristics such as small size, low-impedance feeders, low system inertia, etc. In view of these characteristics, control and optimization techniques developed for conventional grids have shown to be inadequate for microgrids stability, reliability, and optimality.

This session discusses data-driven techniques, in particular artificial intelligence (AI), in control and optimization of microgrids. The session presents state-of-the-art research and implementation projects in United States, Canada, Europe, and Australia. An interactive discussion between the panelists and the audience will explore the uses of data to drive microgrid transformation.

**Dr. Mostafa Farrokhabadi**
Director, Grid Analytics & Technology
BluWave~ai

**Thomas Kalitzky**
Managing Director
Qantic GmbH
13:00 - 13:30  New Approaches for Microgrid Deployment in Remote Areas

Paul-François Cattier  
Vice President, Electrification & Economic Development - Africa  
Schneider Electric

13:30 - 14:00  Locating and Designing Minigrids for Rural Electrification

Village Infrastructure Angels and Illustreets, both UK companies, have collaborated to create new software for locating and designing minigrids for rural electrification. In previous years, creating a rural electrification masterplan was often simplified to representing the connection of village points that presented aggregated demand, then only at construction time forming plans for actual poles and wires for the connection of every house.

Now, using household point data from satellite imagery, we can process millions of household points from the start into a much more detailed initial rural electrification plan, and compare the costs of minigrids, solar home systems and grid extension for every single house, quickly and at low cost. Using the power of Illustreets cloud-based GIS mapping platform and electrical engineering design algorithms in R, system optimization of system voltage (DC or AC) and conductor sizing (including voltage drop calculations) can be made, allows publishing and collaboration of such data at a scale not previously before possible. Examples from projects in Philippines and Haiti will be presented.

Manuel Timita  
CEO  
Illustreets
Mini-Grids Profitability: Unequal Opportunities Between Rural Electrification Options Lead To Market Distortion

Today mini-grids in rural areas in Sub-Saharan Africa are generally perceived as non-profitable without subsidies as a pure cost reflective tariff wouldn't be affordable. The reality is that mini-grids are not able to charge electricity at the same level as energy as a service SHS companies are doing as the resulting €/kWh would be outrageous compared to the centralized grid. Moreover, when comparing to the main grid, mini-grids are considered a non-mature business model as subsidies are needed but investments on centralized generation continue even though the centralized generation, from coal to gas and including renewable is subsidized one way or another not only in Africa but in the rest of the world. On the top of that transmission and distribution have also benefited for subsidies worldwide without anyone challenging the maturity of those infrastructures. Why mini-grid business model profitability is constantly challenged when compared with other rural electrification options if the conditions of the market are not the same? How could this situation be solved?

Irene Calvé Saborit
Co-founder and Chief Business Development Officer
Sunkofa Energy

Planning Microgrids - From Asset Optimization to Grid Stability Analyses

This presentation will illustrate the possibilities for planning stand-alone microgrids with high shares of renewable energies that arise from available Open-Source software tools. We will demonstrate lessons learned from past projects and the company's workflow with the case study of a Nigerian microgrid. The planning process includes the stages from investment planning or asset optimization to identifying optimal operational strategies with unit commitment modeling and grid stability analyses. For that we use Open-Source frameworks, like PyPSA, that undertake a power-flow constrained minimization of investment costs in the planning process and identifying optimal dispatch scenarios taking into account line loading and voltage limits. To address the issue of low inertia in highly renewable microgrids and the related question concerning the necessary capacity of batteries with grid-forming inverters, we undertake transient frequency and voltage stability analysis. For this we use PowerDynamics.jl, an Open-Source framework that we co-develop and maintain.

Finding Business Opportunities in the Energy Market

Finding opportunities and the right partners is challenging but is key to develop the business of any organization. This presentation will show how to use the Deepbloo system to:

- Identify opportunities and potential partners for these opportunities
Build a pipeline for your business and regions
Access market statistics and dashboards

Alexandre Guillemot
President & Co-founder
Deepbloo

16:00 - 17:00  Talkback Session: Transactive Energy and the Future of the Grid
17:00 - 18:00  Drink Reception at Leaf & Cane Bar, in conference hotel

Wednesday, September 11, 2019

07:30 - 08:30  Registration and Continental Breakfast

TRACK A: BUSINESS ISSUES  -----------------------------------------------

08:30 - 09:00  The Dawn of Economic High-Penetration Microgrids in Africa: Challenges and Opportunities

Reductions in the cost of solar and batteries has led to high penetration microgrids (>70% of power from the solar) being economic relative to diesel and even grid alternatives. This is creating significant opportunities for on-site microgrids in the commercial and industrial sector based on meaningful cost savings for energy end-users. However, many challenges remain on both the technical (such as reliable integration with existing equipment, system control, and long-term reliable operation of all components) and business (such as ability and willingness to enter long-term contracts, how to accommodate and manage load growth) aspects.

Arnaud Henin
Managing Director
Gommyr Power Networks

09:00 - 09:30  Challenges and Opportunities of Local Start-Ups in the African Mini-Grid Sector

Through the beginning of 2018, our organisation, Tree_Sea.mals has been increasing capacity to establish fully renewable mini-grid systems within remote pastoral communities in Northern Rangeland Kenya. Within that time, we have been able to establish a 1kWp prototype PV system that has demonstrated the key functionalities of a micro-grid in terms of funding, design, procurement, implementation, monitoring and remote PAY-Go systems. We have further set-out to produce a feasibility study that showcases the socio-economic development that is likely to arise when a 15kW mini-grid system is introduced to a pastoral community when enhanced by Cold Storage Facilities that enable wealth creation through their milk & dairy value-chains.

Considering the organisation is wholly woman-led and consists of 100% youth engagement (from management to unskilled labour), we believe that we have very interesting findings to share with the world. Our organisation is one of the first of its kind led by local youths that has shown extraordinary progress in terms of our research and
implementation and will be quite influential in the discussions of involvement of local stakeholders within the succession of electrifying Africa.

Tracy Kimathi  
Founder and Developer  
Tree_Sea.mals

09:30 - 10:00  Successes and Challenges of Financing Microgrid Development for Sub-Saharan Africa

We are aggressively pursuing a sustainable rural electrification strategy for sub-Saharan Africa that deploys Renewvia’s Rural Microgrid Development and Operation Model, a blueprint for expanding access to electricity through the construction of solar photovoltaic and battery-powered plants. These are designed to accommodate additional capacity from wind or other sources of electricity, in remote, rural regions and provide an above-market return on investment at scale.

Our approach focuses on four core pillars: (1) prioritizing community engagement upfront and throughout the process; (2) working with national regulators and regional and local government officials to properly secure the rights to own and operate each facility for 20 years; (3) harnessing innovations in clean tech to procure and construct the most efficient power systems capable of scaling with the individual and community needs; and (4) exponentially growing value through exclusive 20-year concessions to serve communities as an independent power producer.

Renewvia’s proprietary mobile payment system is utilized for every unit of power purchased by interfacing with available mobile wallet utilized in the served geography. Commencing in mid-2018 in Lake Victoria, Kenya with the commissioning of 20 kilowatt (kW) and 10kW solar microgrids, Renewvia is providing the residents of Ringiti and Ndeda islands with the opportunity to access their first safe, reliable and affordable source of electricity. These facilities have already generated over 350 connections, serving approximately 2,000 families, schools, clinics, local entrepreneurs and key fishing businesses central to the islands’ economy.

Key Content Focus Areas:

- Lessons learned from Renewvia’s initial capital raise of $2.5 million for six new facilities underway in hard to reach communities, including refugee settlements, in Northern Kenya and the Niger Delta in Nigeria
- Successes and challenges of financing microgrid development through a mix of grants, our own capital and private investment; partnering with government and multilateral aid organizations; and securing the legislative requirements to expand the pipeline of projects.

Trey Jarrard  
Co-Founder and CEO  
Renewvia Energy Corporation

10:00 - 10:30  Coffee Break
Funding and Financial Issues for Microgrids

10:30 - 11:30

**TRACK B: TECHNOLOGY ADVANCES**

08:30 - 09:00  Achieving More Than 50% Savings with a Microgrid Installation in South Africa

In Africa where millions are still without modern energy services, ageing infrastructure and grid reliability continue to be issues across the region, microgrid technology is a solution to address energy poverty. For local commercial and industrial sites, improving grid reliability improves business continuity, minimizes business losses and improves economic growth.

The Wadeville facility located in South Africa produces power management solutions for the industrial and commercial sectors whilst employing more than 400 people. The microgrid uses solar panels and an energy storage system with second life electric vehicle batteries to increase resilience, provide higher levels of energy independence, support grid stability and reduce energy costs. A similar sized microgrid could provide energy for 230 community homes.

This session discusses how the microgrid enables the Wadeville facility to save more than 50% in total cost of operation and lower environmental impact by saving 11,812 Metric Tons CO2.

09:00 - 09:30  Smart Microgrid Controller (SMC) Systems: Advances and Applications
Combining Multiple Renewable Energy Technologies for the Optimization of Microgrids

Renewable energy can reduce dependence on fossil fuel generation and can do so improving the availability of power, grid reliability and making a cleaner and more sustainable environment at the same time. Renewable energy technologies and storage can ultimately produce reliable and clean power for microgrids.

Based on the availability of the renewable sources, the combination of multiple RE technologies such as solar photovoltaics (PV), wind turbines, biomass gasification, small hydro and battery energy systems improves the resiliency of the microgrid, better adapts to the 24 hours load demand and provides an overall system and LCOE optimization.

- Wind and solar microgrids, load based design
- The advantages of wind power deployment
- A small island LCOE case-study
- SWOT analysis for RE microgrids development

Reducing O&M Costs With Advanced Monitoring and Control Tools

Microgrids haven’t reached their potential because of cost and logistics: maintenance is extremely expensive, and deployments require custom engineering to make components and monitoring layer work together.

- Maintenance is necessary to maximize a grid’s lifespan and return of investment (ROI), but is responsible for 50% of variable costs (unexpected/emergency maintenance is half of total maintenance costs). A large portion of that cost is due to the logistics of sending maintenance teams to sites.
- Remote diagnostics and control are difficult because components from different manufacturers don’t have compatible monitoring systems. Developers use different components for each deployment, but must build their own software layer to effectively monitor the system.

This presentation discusses a solution that decreases maintenance costs and simplifies diagnostics and system control, thereby making it cheaper, faster, and easier to deploy new systems and dramatically improve the
performance of current systems. These improvements directly increase the ability of hybrid power system operators to scale. The presentation also includes case studies from around the world showing how the solution is used both in the C&I offgrid and minigrid environments.

Patrick Cousins  
CEO and Co-Founder  
Ferntech GmbH

11:00 - 11:30   Why Lithium Should Be Part of Any Minigrid

Distributed energy solutions - like minigrids - are commercially attractive and successful only if the technology works properly over years. Reducing technology risk reduces customer non-payment risk, and the investors and financiers are more likely getting their money back. How to ensure a well-functioning and cost-effective minigrid over time? One key element is to include lithium. While lead acid prefers to stay fully charged to get a longer life, being perfect for back-up, lithium prefers to cycle deeply and as much as possible. We will present turn-key and standardised lithium-based solutions that can be added to existing lead acid-based minigrids, creating a lead acid-lithium hybrid, with references to completed projects, e.g. in Myanmar and Nigeria. We will also discuss why this is a cost-effective design with low LCOE.

Kjetil Røine  
Partner  
Differ Group

11:30 - 12:00   The Role of Mobile as an Enabler of Microgrid Development in Developing Countries

The GSMA represents the interests of mobile operators worldwide, uniting more than 750 operators with over 350 companies in the broader mobile ecosystem. GSMA's Mobile for Development Utilities Programme promotes the use of mobile networks, infrastructure and payment systems to open new pathways for affordable and reliable utility services to reach the underserved.

More than half of the people who lack access to electricity are covered by mobile networks. This gap can be leveraged to drive energy access. Mobile solutions such as prepaid smart metering not only make access to mini grids more affordable to low-income customers, but also provide mini-grid developers with vital information to improve mini-grid efficiency. For instance, the use of smart meters in mini-grid power generation and consumption is enabling mini-grid operators to make decisions that will increase usage and reliability, including whether to connect new customers, to increase or decrease consumption at certain times of day or to add new generation or energy storage.

This presentation will discuss three key use cases of mobile technology as value-add to micro-grid business models:

- Mobile payment integration
- Anchor-Business-Client (ABC) ABC-models refer to mini-grid deployments, which leverage telecom towers as anchor clients, while also providing energy to surrounding communities
- Mobile operator-led smart metering
Minigrids are an important and growing part of providing energy access to millions across Africa. Despite the promise of minigrids, particularly in rural Africa, to bring electricity to communities that currently have none, several barriers inhibit investment in the segment. The Renewable Energy Performance Platform (REPP), managed by Camco Clean Energy, is providing a variety of financial instruments to help overcome some of these challenges.

Key Takeaways:

- Defining the role of minigrids in electrifying Africa
- REPP’s minigrid strategy
- REPP’s funding products for minigrids
- Minigrid investment case studies

New models for power system procurement have become increasingly attractive to off-grid energy users. The latest offering combines hybridized power solutions with renewable, thermal and storage technologies, packaged as-a-service under short- or longer-term contracts. Such microgrids have proven their performance and cost-effectiveness in places as remote and diverse as Australia and the Amazon jungle. This presentation will highlight system specifications and use cases, as well as review the ease-of-deployment and zero upfront cost advantages of service vs. buying.

- Defining the role of minigrids in electrifying Africa
- REPP’s minigrid strategy
- REPP’s funding products for minigrids
- Minigrid investment case studies

13:30 - 14:00  Hybrid Renewable-Battery-Thermal Microgrids As-a-Service

14:00 - 14:30  Standardization & Products for Microgrid Controls
This presentation will focus on how technology innovations can help bring standardisation in the microgrid space, enabling easy integration with major PV, storage, genset and other equipment providers as well as plug-and-play commissioning of controls systems even in complicated bus configurations cases. The presentation will then focus on practical projects examples where the technology has helped to reduce project commissioning time and costs.

Cyril Colin  
Co-Founder & CEO  
Elum Energy

14:30 - 15:00  
Coffee Break

15:00 - 15:30  
Innovation in Biomass/Waste Solutions for Distributed Power Generation and Sustainable Economic Development of Developing Countries

Of the various technologies for utilization of biomass & wastes, gasification has long been seen as a technology with tremendous potential and promise, particularly for small and medium scale power generation. Of course, the technology is equally suitable for a wide range of thermal / process heat applications. While substantial technology development efforts have been made all over the world during the last three decades (many with extensive international and multilateral funding), substantial progress has only been made in a few countries, with India unquestionably being the leader in the field.

Ashok Chaudhuri  
Vice President, Business Development  
Ankur Scientific Energy Technologies

15:30 - 16:00  
Automation In Microgrid’s Design and Operation

Real estate developers and energy consultants who design and build microgrids face enormous design and development costs due to inaccurate and out of date data. Current solutions are complicated and require knowledge and expertise in many different areas, including technology, finance and engineering, regulatory, and environment -- costing millions. Would a cloud-based expert system that accurately and automatically predicts the performance of microgrid systems solve this huge problem? The platform would have to integrate data sets in one platform and automate decision making by using ranking and optimization algorithms to choose the best components, suppliers and contractors for each project. What is the current state of the art and what does the future hold?

Daniel Schwab  
Founder and CEO  
Brightmerge
Rural Electrification in the Brazilian Amazon: Life on Jaguar Island, Açaí Processing, and Solar Power

It takes 7-12 days by boat to reach some of the isolated communities in the Amazon Rainforest. With natural obstacles and low population density raising the cost of microgrid operation and management, innovative technologies and business models are a necessity. Research lab, GEDAE, has implemented pilot programs all over the region to construct and manage innovative projects using hybrid systems.

Recently, National Geographic sponsored the "DC Solar Home system for household energy demand and domestic Açaí processing" project. A DC-only configuration improves the efficiency of a system by reducing power conversion losses, thus meeting demand with lower PV generation and energy storage needs. At the same time, the market for Açaí in the US and Europe is growing and over 80% of Brazil's Açaí is produced by rural Amazon communities, which could benefit from the formation of cooperatives. These enable larger-scale processing, increase price negotiation power and leverage growth in Açaí income to attract investment in microgrids for long-term electrification of the region.

This presentation explores the complex web of policy, community organization, business models and technology advances necessary for electrification in the Amazon. The discussion is focused on a case study of Ilha Das Onças (Jaguar Island).

Key Takeaways:

- There is a need to educate the community about how systems like solar and other biomass work to avoid business dealings that lead to poor system sizing and installation resulting in community distrust for new technology and preference for conventional familiar technologies like diesel generators.

- Innovative financing models must be developed taking into consideration community norms, behaviour and organisation. Prepayment systems mimic the system of purchasing diesel and kerosene, reducing the risk of non-payment for electricity from improved technology systems like solar microgrids.

- Duo-focus approach for economic empowerment and electrification is essential to ensure the projects are successful enough to attract the attention of large energy utilities for investment and expertise in maintenance and operation. The growing Açaí economy is emerging as a powerful source of revenue and growth for riberinhos (river dwellers) in the state of Pará, Brazil.

Paula Pulido
University of Colorado Boulder

Patience Bukirwa
Imperial College London

Pedro Torres
Federal University of Pará

José de Arimatéia
Universidade Federal do Pará (UFPA/Brazil)
Minigrids enable people to enjoy a wider variety of time-saving and life-changing appliances, and small businesses to power new equipment to diversify, modernize, and become more efficient.

A big challenge for most operators is the inability to attract enough people to sign up, stay committed, and spend consistently. Without effectively addressing these key revenue drivers, mini-grids are at risk of falling far short of their potential impact. In this session, sales consultant Nick Kingsley-Johnson explains how to engage with potential clients, get them to sign up, stay committed, and spend consistently.

Pre-Conference Workshop

Microgrid Economics Analysis and Financing

**Monday, 9 September 2019**  13:00 - 17:00 | Location: Crowne Plaza London - The City

This half-day workshop is intended for project owners, developers and investors who are preparing microgrid projects and need to consider the economic and financial aspects in order to obtain financing or sell projects. It will also be of interest for participants in other sectors, including equipment suppliers and advisors, who may be asked to participate in project financing or for whom project economics are relevant.

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:00 - 13:00</td>
<td>Lunch for Workshop attendees</td>
</tr>
<tr>
<td>13:00 - 13:45</td>
<td><strong>Session 1: Review of Microgrid Economic Concepts and Component Economics</strong></td>
</tr>
<tr>
<td>13:45 - 14:30</td>
<td><strong>Session 2: Economic and Financial Evaluation of Projects</strong></td>
</tr>
<tr>
<td>14:30 - 15:00</td>
<td>Coffee Break</td>
</tr>
<tr>
<td>15:00 - 15:40</td>
<td><strong>Session 3: Case studies -- High Renewable Penetration Village System and Commercial System</strong></td>
</tr>
<tr>
<td>15:40 - 16:20</td>
<td><strong>Session 4: Interactive Session on Improving Microgrid Project Economics</strong></td>
</tr>
<tr>
<td>16:20 - 17:00</td>
<td>Questions and follow-up</td>
</tr>
</tbody>
</table>

**Workshop Leader**

Nick Kingsley-Johnson
Whitten & Roy Partnership, LLC
Arnaud Henin, Managing Director, Gommyr Power Networks

Arnaud Henin is managing director of Gommyr Power Networks, a microgrid and distributed generation-focused advisory firm, where he leads work on distributed renewable generation, energy storage, and microgrid projects. Arnaud brings more than 12 years experience in the renewable energy and finance sectors covering business, economic and technical issues.

Sponsors

Stäubli Electrical Connectors (formerly Multi-Contact) is the pioneer and global market leader in electrical connectors for Photovoltaic solutions. Power-Blox is an award-winning Swiss start-up and inventor of the first modular solar energy system, which offers alternating current (AC) up to the megawatt range based on swarm technology. Stäubli and Power-Blox maintain a strategic partnership for innovative energy storage solutions and jointly offer efficient solutions in the field of energy storage and off-grid systems for rural electrification as well as disaster relief operations. Visit our website

AEG Power Solutions A reliable power supply is one of the most important growth areas worldwide. AEG Power Solutions converters can be used in in on-grid and off-grid installation, including seamless transition between grid connected and isolated mode. Our technology can be used to ensure the supply of electricity to remote areas of the world as well as to use battery storage as green emergency power system. Visit www.aegps.com

Eaton Eaton is a power management company with 2018 sales of $21.6 billion. We provide energy-efficient solutions that help our customers effectively manage electrical, hydraulic and mechanical power more efficiently, safely and sustainably. Eaton is dedicated to improving the quality of life and the environment through the use of power management technologies and services. Eaton has approximately 100,000 employees and sells products to customers in more than 175 countries. visit www.Eaton.com.

Past Attendees Include:

- 3Angle Capital
- Aalborg University
- ABB
- Acciona Energía
- Adaptive Balancing Power
- Akuo Energy
- Alliance for Rural Electrification
- Altairnano
- Ameren
- Anbaric Power LLC
- APESF
- Aquion Energy
- Arelis Group
- Associação de Energias Renováveis
- BC Institute of Technology Centre
- Benoolend
- Black & Veatch
- Boeing Research & Technology Europe
- Boreal Renewable Energy Development
- BU Africa
- Burns & McDonnell
- Canadian Solar
- Catalonia Institute for Energy Research (IREC)
2019 Sponsorship Options:

**Gold Level Sponsor**

- Exclusive logo recognition as Gold-Level Sponsor
- 3 complimentary conference passes
- 20% off additional registrations
- Tabletop exhibit in networking break area

Value: £ 5,000
- Logo positioning in Official Program Guide, event website, and email communications
- PDF presentation included in proceedings, with description + link on website
- White paper or press release posted on event website
- Corporate description with hyperlink on event website
- PDF presentation included in proceedings, with description + link on website
- Top positioning of logo in on-site banners and signage
- Dedicated floor-standing banner (provided by sponsor)
- Attendee List provided one week prior to, and following the event, including contact information

### Silver-Level Sponsor

Valued at £2,500

- Logo recognition as Silver-Level Sponsor
- 2 complimentary conference passes
- 15% off additional registrations
- Tabletop exhibit in networking break area
- Opportunity to place corporate brochure, white paper, literature, etc. on Media Table
- Logo positioning in Official Program Guide, event website, and email communications
- Corporate description with hyperlink on event website
- Logo positioning in on-site banners and signage
- Dedicated floor-standing banner (provided by sponsor)
- Attendee List provided one week prior to, and following the event, including contact information

### Bronze-Level Sponsor

Valued at £1,500

- Logo recognition as Bronze-Level Sponsor
- 1 complimentary conference pass
- 10% off additional registrations
- Tabletop exhibit in networking break area
- Logo positioning in Official Program Guide and email communications
- Corporate description with hyperlink on event website
- Logo recognition in on-site banners and signage

### Supporting Sponsor

Valued at £500

- Logo recognition as Supporting Sponsor on website and in on-site signage
- Logo positioning in Official Program Guide
- Corporate description with hyperlink on event website

To arrange your participation, contact
Daniel Coran, Program Manager – info@microgridinnovation.com | +1-815-310-3343

### About the Organizer

*The Smart Grid Observer* is a weekly e-newsletter serving the global smart energy industry. SGO delivers the latest news and information concerning key technology developments, deployment updates, standards work, business issues, and market trends worldwide. SGO organizes Forums each year in the areas of clean energy, grid modernization, smart cities, microgrids, cyber security, water-energy nexus and more. For full information and a free subscription, visit [www.smartgridobserver.com](http://www.smartgridobserver.com)
**Sample Attendee Feedback**

"We were extremely impressed with the range of critical topics that were discussed at the event. A truly informative, engaging and memorable conference. We are looking forward to the next one!"

-- *Rick Sander, CEO, Rhombus Energy Solutions, Inc.*

"Excellent event to get knowledge about the latest innovations, share ideas and experiences, as well as the opportunity to generate new partnerships. Best part was contacting with so many different areas of business and geographies."

-- *Hugo Silva, Business Development and Project Manager, Enercoutim*

"All the presentations were interesting and very useful. I learned a lot about microgrid projects by networking with other actors with experience in the field."

-- *Loucoi A. Gabin, CEA-INES*

"The conference was great and very informative for me. It was great to see speakers from government and military, as well as speakers working on the modeling software and real projects in rural and remote areas. The technical information was great too."

-- *Samina Ali, Solar Energy Consultant, Boreal Renewable Energy Development*

**Event Venue:**

**Crowne Plaza London - The City**

19 New Bridge Street, London, EC4V 6DB, United Kingdom

---

**Registration**

Register securely online at: [http://www.microgridinnovation.com/EMEA/register.htm](http://www.microgridinnovation.com/EMEA/register.htm)

**Vendors, Consultants, Services Providers**

Main conference only (Sept 10-11) £795.00
Workshop only (Sept 9) £249.00
Conference plus workshop (Sept 9-11) £1,044.00

**Government, Academic, Non-profit Organizations**

Main conference only (Sept 10-11) £695.00
Workshop only (Sept 9) £195.00
Conference plus workshop (Sept 9-11) £890.00