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ENERGY FUTURE

The Complete Energy Magazine

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COVER STORY

**WOMEN AS AGENTS
OF CHANGE IN CLEAN
ENERGY TRANSITION**

FEATURE

**WOMEN'S PARTICIPATION
IN INDIA'S CLEAN ENERGY
TRANSITION**



VIEWPOINT

**GENDER MAINSTREAMING
IN ENERGY SECTOR**



GREEN AND EFFICIENT POWER TO EVERY HOUSEHOLD



Cygni Energy is an IIT Madras incubated start-up founded by Venkat Rajaraman in 2014 with the aim of providing green and efficient power to every household. Cygni Energy in association with the Indian Institute of Technology Madras has developed 48V inverterless DC technology. The Solar DC Inverterless system, consisting of DC solar generation, the DC powerline, DC appliances, and battery, is a landmark innovation with the potential to be rapidly deployed in every home and office in India as well as in homes across the world. The efficiency of the system eliminates the typical conversion losses by 40–45% associated with the traditional AC devices and contributes to building energy security.

It transforms the lives of ordinary citizens by providing them reliable power supply, energy-efficient appliances, and lower cost of electricity all at the same time. The DSIR certified R&D lab at Cygni gives the necessary traction to the innovation by catering to the requirements of society. The product variants are positioned to ensure universal energy access by particularly focusing on the marginalized section. Our product not only caters to homes that lack access to power but is also

capable of running urban homes and even businesses.

In the tribal areas and remote geographical locations of India, the power eludes households and mainstream development remains a distant dream. And households often fall into the viciousness of poverty. The transformative effect of energy access has been proven to improve the life standard of the people by enabling longer hours of work. Children can now study in a well-lit and ventilated home environment, as well as energy access is creating new job opportunities through rural entrepreneurship. An affirmative step to bring the marginalized section to the mainstream was envisaged and envisioned through the revolutionary DC technology. Our solar solutions ensured energy access a reality to the remote terrains.

Our core product is Cygni Integrated Battery Inverterless System (IBIS). It comes with an integrated Li-ion battery replacing the older lead-acid batteries, making the system both compact and efficient.

The energy efficiency is achieved because we prevent multiple AC-DC conversion that occurs during the normal operation of any equipment.

Most energy-efficient appliances at homes such as LED lights, fans, and even your electronics run on DC power. The solar energy generated and the power backup in batteries are again DC power. Using an inverter and adaptors makes this conversion at each level and even the best of equipment has an efficiency of nearly 85% and with multiplier effect even with just 2 conversion wastes about 28% (about 72% efficiency, which is 85% of 85% energy) of energy. We utilize this by a single large AC-DC conversion at source.

The IBIS system provides connectivity via both Bluetooth and GPRS and real-time consumption can be viewed by mobile app or through the energy management system. Our product line enables the use of energy-efficient DC appliances such as BLDC fans and LED lights. Typically, homes have two distinct lines – 5A and 15A. Our vision is to convert the 5A line into a DC line and keep the high power appliances such as dishwasher and air conditioner (which are typically on a 15A line) intact.

Technical Specifications of the Products

The IBIS 500 includes the following:

- (a) Up to 1.25 kWh Li-ion battery, (b) AC-DC converter DPAU 500 (ensures a maximum load of 500 W), (c) solar panels up to 500 Wp, and (d) dual input – solar and grid (optional).

Special Features of the Product

- » Technology collaboration with IIT Madras
- » BIS Certified IS 16711:2017
- » Provision for solar, battery, and grid (AC) inputs
- » Solar interface for connecting up to 500 W of solar panels

Variant Specification	IBIS Off grid	IBIS Lite	IBIS Standard	IBIS Pro	IBIS Duo
Solar panel capacity	125 Wp/200 Wp recommended	125 Wp/200 Wp recommended	125 Wp/200 Wp recommended	Up to 500 Wp	Up to 500 Wp
Battery pack capacity (usable)	1 kWh	0.5 kWh	0.5 kWh	1 kWh	1 kWh
Total load limit	250 W	150 W	150 W	500 W	500W (includes 500VA AC output)
Nominal output voltage	48V DC	48V DC	48V DC	48V DC	48V DC and 230V AC
Input sources	Only solar	Only solar	Solar + Grid (150 W)	Solar + Grid (500 W)	Solar + Grid (500 W)
AC output	No	No	No	No	Yes
Approx. Weight	18 kg	13 kg	13.5 kg	20 kg	22 kg
Preferred application	Off grid homes	Off grid homes	Near off grid homes	Grid-connected homes	Grid-connected homes and small offices



- » Battery interface for connecting up to 2 kWh of battery
- » Single-home/multi-home design
- » Online DC energy metering and advance remote monitoring
- » Smart DC short circuit protection
- » Advance Bluetooth Low Energy 4.0v interface

Solar inverterless 48 V DC controller comes with the following variants: Inverterless Off-grid, Inverterless Lite, Inverterless Standard, Inverterless Pro, and Inverterless Duo.

All the inverterless controllers come with remote monitoring features: 48V DC appliances include LED light bulb, mixer, DC-powered 21"/24" TV, DC desert

cooler, ceiling fan, computer, cell phone charger/socket, tube light, induction stove, freezer, power loom, and water pump.

Rural productive appliances are moving towards in a big way to DC and Cygni is planning to play a significant role in that market. The price of our products ranges from ₹20,000 to ₹100,000, which changes based on the bundle of appliances that we provide to the customers. This is typically about 40% cheaper than the traditional solar AC system.

Our Projects

With the help of IIT Madras and Rural Electrification Corporation Limited (REC), Ministry of Power, Cygni Energy has successfully implemented installations in remote rural areas of Jammu and Kashmir, Assam, Manipur, and Rajasthan, with overall installations across the country being over 45,000. These IBIS systems currently operate in hostile weather conditions of high humidity in Assam, low temperature in J&K, and high temperature in Rajasthan.

The seamless integration of IBIS, grid, and solar designed to function in the local weather conditions is ensuring uninterrupted power supply to households. Our products have made

remarkable improvement in the living standard of villagers and in savings for our urban customers.

Since our customers are majorly in hard-to-reach rural areas and rough terrains, to handle the challenge of post-installation service, we have a dedicated onsite and online support team for quick serving and all products come with built-in GSM/GPRS, which enables remote monitoring even in such rural areas.

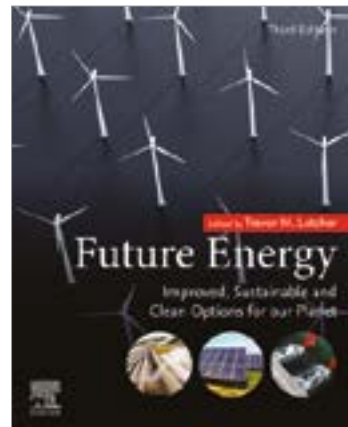
Awards Won

Cygni Energy is the first company to be a part of Startup India campaign, 2015 for its innovative technology. Cygni Energy has won several accolades, such as ASSOCHAM award for Most Innovative SME Company at 6th SME Excellence Awards – 2018, Best Emerging SME Award Dun & Bradstreet India & RBL Bank SME Business Excellence Awards 2017, Millennium Alliance Round 5 Award, CII 19th National Award for Excellence in Energy Management, Best Rural Electrification Projects by Industry during ISGF Innovation Award, and so on. **EF**

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 Founder and CEO Venkat Rajaraman

Future Energy: Improved, Sustainable and Clean Options for Our Planet

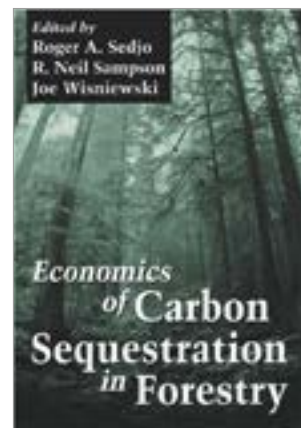
This book provides scientists and decision-makers with the knowledge they need to understand the relative importance and magnitude of various energy production methods in order to make the energy decisions necessary for sustaining development and dealing with climate change. The third edition examines the present energy situation and extrapolates to future scenarios related to global warming and the increase of carbon dioxide and other greenhouse gases in the atmosphere. **EF**



Editor: Trevor M. Letcher
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Economics of Carbon Sequestration in Forestry

Since the 1992 Earth Summit, there have been increased efforts on an international scale to address global climate change. Reducing the increased levels of CO₂ and other greenhouse gases, which are believed to be contributing to this climatic change, will require major effort on the part of the world's governments. This means that the environmental, economic, social, and political consequences of climate change must be understood and that strategies to mitigate climate change must also address these issues. The workshop detailed in this book concentrated on how economic principles and analysis could contribute to the planning of forestry projects aimed at effecting terrestrial carbon balances. More than 30 international scientists came together for one week near Stockholm, Sweden and divided into working groups charged with addressing a specific issue and preparing a paper within this time frame. **EF**



Editors: Roger A. Sedjo, R. Neil Sampson, Joe Wisniewski
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