INDIAHUB
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Strategic Partnership with :

&

Collaboration with :

Farmdo group

Introducing the Community Solar Agrovoltaics with BESS Project.

Concept by: Indiahub E-governance Pvt. Ltd.

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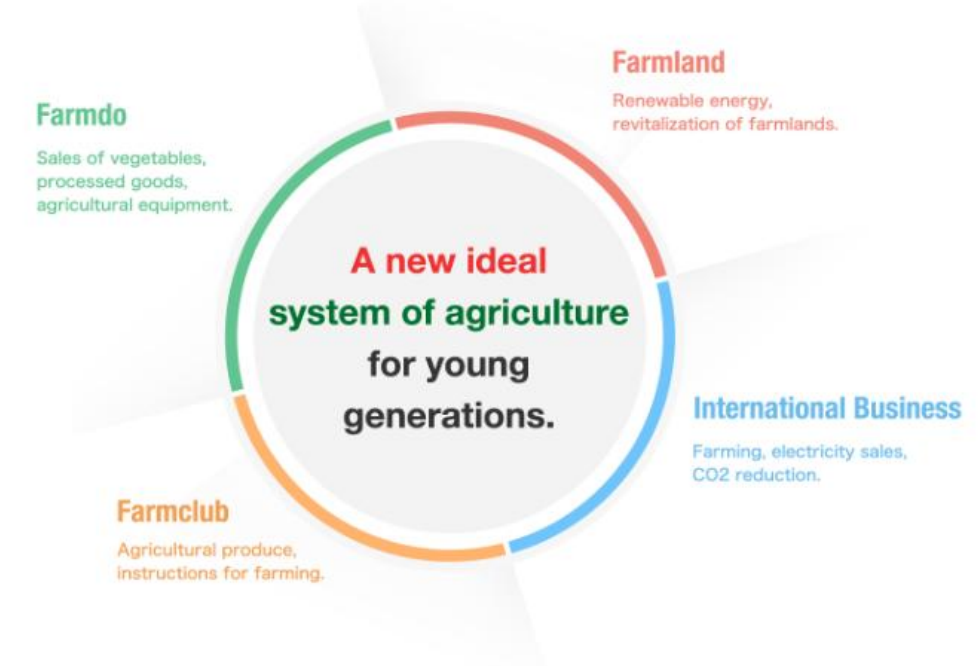
About Farmdo Group

A new ideal system of agriculture for young generations.

Dream and commit innovative and creative challenges.

We, FARMDO GROUP have obtained support from customers under our business policy “Support agriculture; Make efforts towards an increase in farmers’ incomes.”. Since our society is being reformed dramatically day by day, we are pursuing new business models constantly. FARMLAND contributes to people and the global environment by creating and offering safer and enrich life environment. SOLARFARM creates a new ideal style of agriculture for young generations. With our group management system, we strengthen each function and go forward with “dream cycle”. That is the way we contribute to society.

The new system of agriculture for young generations which the Farmdo group aims for.



“IMPROVEMENT OF INCOME, SOCIAL CONTRIBUTIONS, ENVIRONMENTAL PROTECTION”

Farmdo

- **Become the company with the best-selling farmers' market in the Tokyo area.**
  With the purpose to become the best-selling farmers' market in the Tokyo area and increase the number of shops to 100 by 2022, 300 by 2037, by using strategic dominance.

- **Fulfill customers satisfaction.**
  Reforming the shops to meet the customers' satisfaction.
  Collaborating with farmers to increase customers' satisfaction.

- **Maintain food security**
  Providing safe food to customers by growing healthy vegetables and applying GAP (Good Agricultural Practices). Our originality will put additional value to products.

Farmland

- **Contribute to reduce the number of abandoned farmlands and idle lands.**
  Reduce the number of abandoned farmlands and idle lands with the combination of farming and power generating system, so called Smart-agri.

- **To establish 1,000 power stations in Japan.**
  Franchising our Solar Farm system and spreading it to 1,000 locations like markets and shopping malls.

- **The latest technology for environmental protection.**
  We are a pioneer in the carbon business and spread this technology to other countries.

Farmclub

- **Cultivate nature and peoples minds.**
  By keeping clean and neat, people's minds and crops will grow flourish.

- **Yume no nogyo okoku®"**
  (The Dream Kingdom of Agriculture)
  "Yume no nogyo okoku®" is our farmland where we introduced new agricultural technologies to realize our ideal agricultural style. We are also establishing the foundation of Solar Farm system using this facility as a model of this system.

- **Education of the next generation farmers**
  By making double income from farming and power stations under good working environments, we can attract youth to this field and educate them to become new farmers who can make good profits from this business.

International Business

- **To spread the "Solar Farm®" business all over the world.**
  We are aiming to spread our business model of "Solar Farm®" to at least 10 countries.

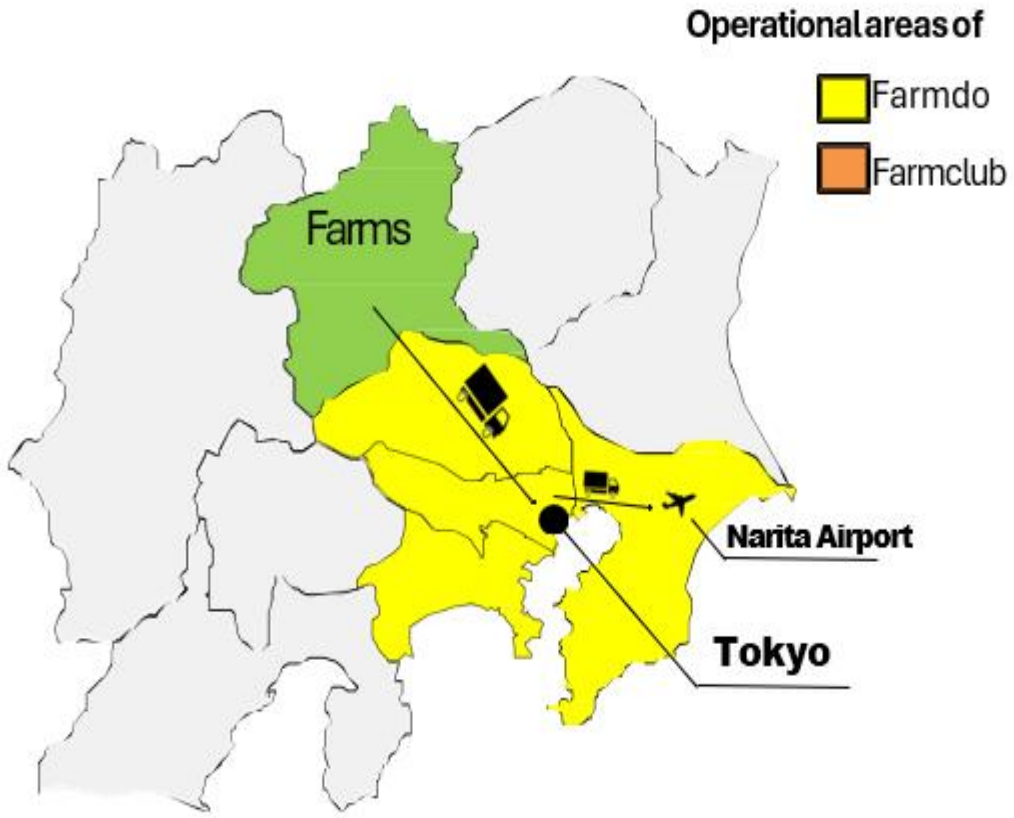
- **To resolve the problems other countries have.**
  We believe our "Solar Farm®" business can untangle the problems other countries and societies might have in these fields.

- **To contribute to the reduction of CO2.**
  We issue carbon credits and contribute to the Japanese government's plan of CO2-reduction.

Cont..

Domestic Distribution Network

- 80 Ha of Solar Farms managed in Gunma Pref
- Produce sent to Tokyo area retail stores Distribution
- center established at Narita airport for export and import



International Experience

In Mongolia

- 2 projects
- Fully operational since 2017 28
- Ha of agriculture land
- Solar farms (greenhouses and open air)
- 12.7 MW DC
- 12,500 tCO2 emission reductions per year

In Chile

- 5 projects
- Expected full operation from Q2 2024 30 Ha
- of agriculture land
- Single Axis tracking technology 15
- MW DC
- 11,700 tCO2 emission reductions per year

In Kenya

- 1 projects
- Rose farm self-consumption 230kw
- solar and 200kw battery
- Plan development 10MW solar in local

About Indiahub E-Governance Pvt Ltd:

- Indiahub e-governance Pvt Ltd is working as a collective of technologists, strategists, and policy professionals committed to solving societal challenges. We are problem-solvers and responsible builders of communities and ecosystems, motivated by a sense of responsibility for making countries better, and the thrill of finding solutions that can improve lives.
- **We work on three strategic pillars:** Sustainable technology enabling platforms as aggregators, enabling government policies on ground, and open working ecosystems for better public goods. We believe that technology is only an enabler. To have a sustainable impact at scale, we tap into the collective energy of the ecosystem to enact enabling policies, understand local needs, and build local capacity to solve local problems. We work with different stakeholders in the ecosystem to catalyze this collective energy. Our impact framework is based on the contribution of digital public infrastructures to transform the experience of living and working for each stakeholder.

Linking communities for holistic solutions

Linking grassroots and upscaling market opportunities

Upscaling and linking Government Schemes

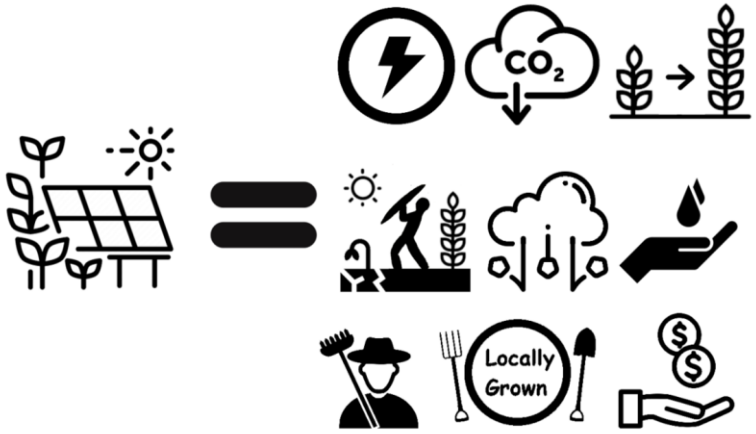
Agorvoltics and Photovoltaics

Healthcare System Aggregators

Sanitation Projects

Strategizing Not-for profit organizations

Community Solar Agrovoltaics +BESS: Need in India, Vision and Statement



Energy Landscape in India in renewable sector the demand is rising by 24% India saw the highest year-on-year growth in renewable energy additions of 9.83% in 2022. The installed solar energy capacity has increased by 30 times in the last 9 years and stands at 72.31 GW as of November 2023. The installed Renewable energy capacity (including large hydro) has increased by around 128% since 2014.

Resulting Environmental Consequences due to dependency on Fossil Fuel:

- Increasing Environmental Degradation
- Creating Climate Crisis and rising temperatures
- And Emerging the urgent need of Transition

Vision Statement of Community Solar Agrovoltaics+ BESS (CSA): Our commitment is to create a collaborative ecosystem where solar panels and agricultural activities coexist synergistically. Through the integration of solar technology into farming practices, we aim to enhance resource efficiency, reduce environmental impact, and bolster the resilience of local communities.

Mission Statement of Community Solar Agrovoltaics (CSA): Our mission at deployed 50% renewable energy goals aligning with national policy of India to create green building by harnessing farmer's potentials along with income generation in rural areas, easing pressure on other various sources of energy and leveraging energy usage diversity for easy, accessible and affordable power to all.

Concept of Community Solar Agrovoltaics+BESS

Indiahub introduced an Agrovoltaic Community Solar project, this innovative project combines solar energy generation with agricultural productivity on the same land. Through this initiative we would be able to leverage the technology transfer benefits in leveraging Farmer's land along with Agriculture practices, which would result clean energy transmission from offsetting through DISCOM to end users (Community), along with controlled temperature farming. This will give dual income enhancement benefits to farmers, clean energy and green building benefits to community and less load on DISCOM to produce power from limited resources. Indiahub E-Governance Pvt Limited will act as developer to solve the issue of uneven distribution of clean energy to the masses. The Major Stakeholders in the entire concept are:

Farmer Producer Organisations (Source)

Energy Management System (Indiahub/ Farmdo)

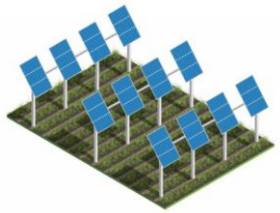
DISCOM/ Grids

Community/ End Users/ varies on nature of usage

Proposed Process-flow Community Solar Agrovoltaics from Indiahub E-Governance Pvt. Ltd.

Renewable Energy Certified

Setting up Agrovoltaics plant through FPOs on lease as Independent Power Producers



Indiahub E-governance Pvt. Ltd will work as Demand Generator and FPO Aggregator as **"Clean Energy Management System" in RESCO Model**

IH will be aggregator of FPOS and channel partner for DISCOM working

PPA Purchase Agreement between Source (FPOs) and Consumers and AI Metering benefits to end users based on real time usages

Participating Consumers

Industrial

Commercial

Residential

Leveraging Community Solar Agrovoltaic Benefits in Digital Offsetting the Clean Energy by AI enable Virtual Net metering

Indiahub E Governance Pvt Ltd will Channelise power as per state norms with DISCOM for further offsetting

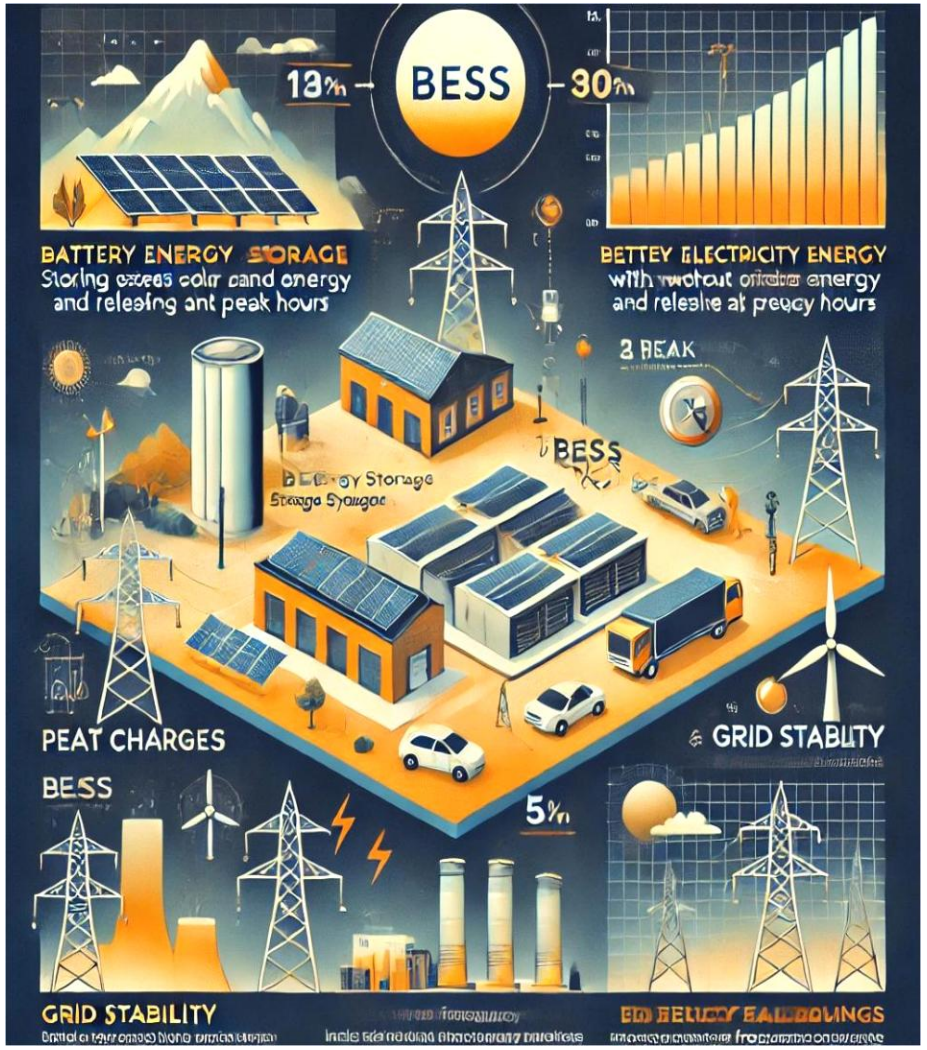
FPO through Agrovoltaic plant will provide Solar Power to Grid

Grid/ DISCOM

Carbon Token and Carbon Credit Benefit Intersection

Benefits Community-Based Battery Energy Storage System (BESS)

- **Reducing Peak Energy Charges:**
- Stores excess solar energy generated during the day.
- Supplies stored energy during peak hours, reducing dependence on costly peak-time electricity.
- Allows communities to **share stored energy**, lowering costs for all users.
- **2. Improving Grid Stability:**
- Acts as a buffer to balance supply and demand fluctuations.
- Reduces strain on the grid by **locally managing power distribution**.
- Provides backup power during outages, improving reliability.
- **3. Enhancing Renewable Energy Utilization:**
- Reduces wastage of solar energy by storing excess power.
- Ensures continuous power supply even when solar generation is low.



How JCM Subsidy Can Help BESS Projects in India

With JCM

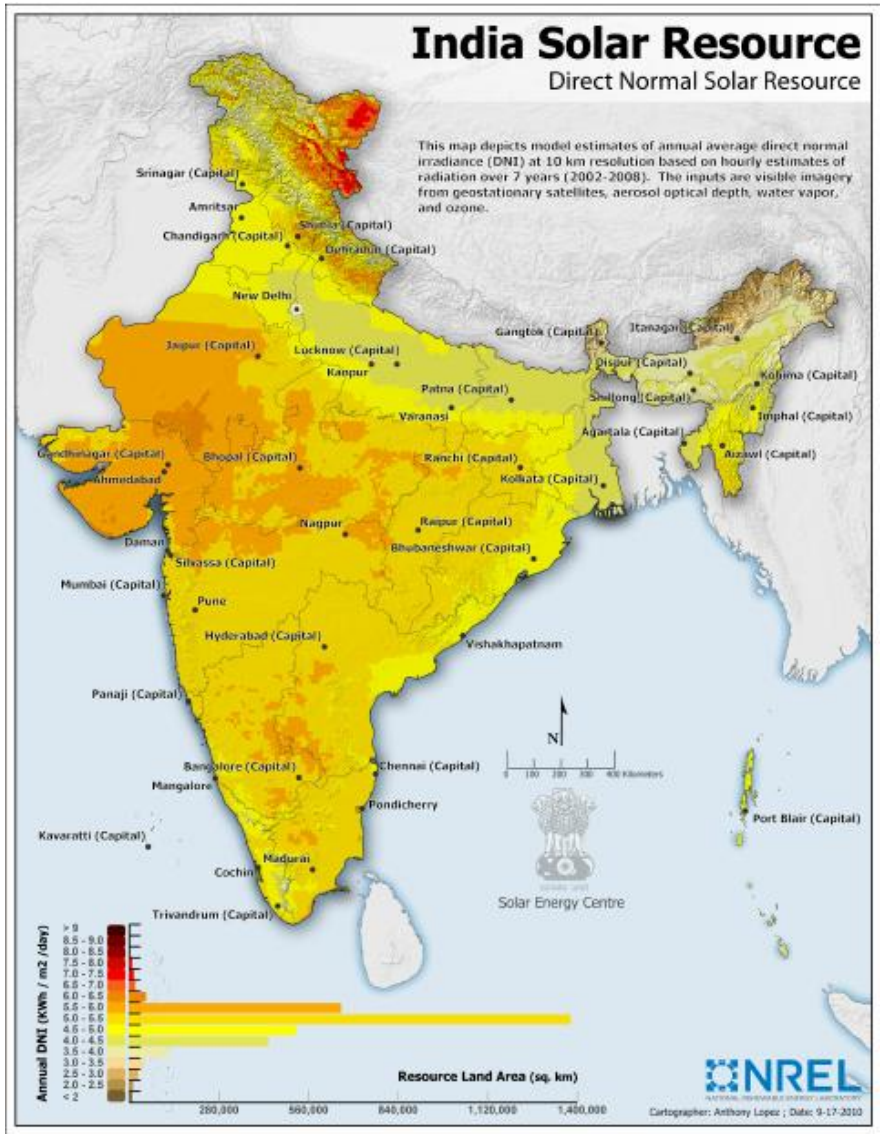
- **Financial Support** – Covers a significant portion of project costs, reducing upfront investment. Up to 40%

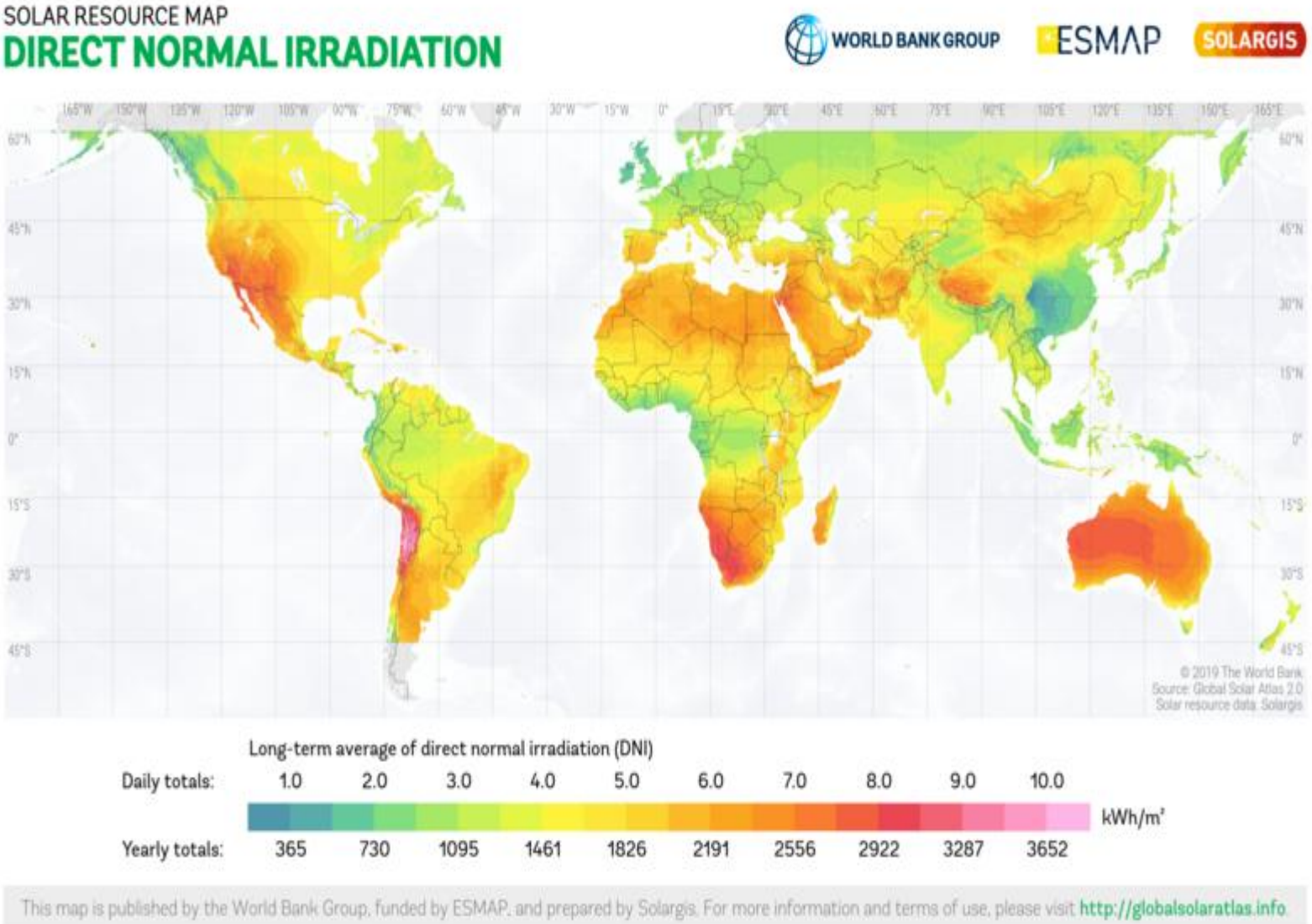
  Technology Transfer – Promotes advanced battery storage tech from Japan.
  Carbon Credit Revenue – Earns credits for reducing emissions, which can be traded for additional revenue and share Japan's SDG goals.
  Accelerated Deployment – Makes BESS projects more financially viable, promoting faster adoption.
  Grid Reliability & Renewable Integration – Supports a greener grid by enabling more solar integration with stable power supply.

Without JCM

- **Financial Support** – Up-front cost would be very high, Which make it expensive for regular market.
- **Technology Transfer-** Higher CAPEX have compromise technology of product.
- **Carbon Credit Revenue-** Without JCM carbon credit price may hit by different factors.
- **Accelerated Deployment-** High CAPEX and technology barriers can delay the growth of BESS in India
- **Grid Reliability & Renewable Integration-** With significant storage we can't make our green power available at need.

How Indian Market is good for Agrovolitcs in comparison to the other countries?





Future Expansion

Project Vision

Introduction of Japanese style Agrivoltaics to India with an energy and agriculture centric approach.

Project Goals

- Engage with farmers
- Demonstrate Farmdo Group and Agrivoltaics knowhow
- Increase resilience of farming in India to climate change

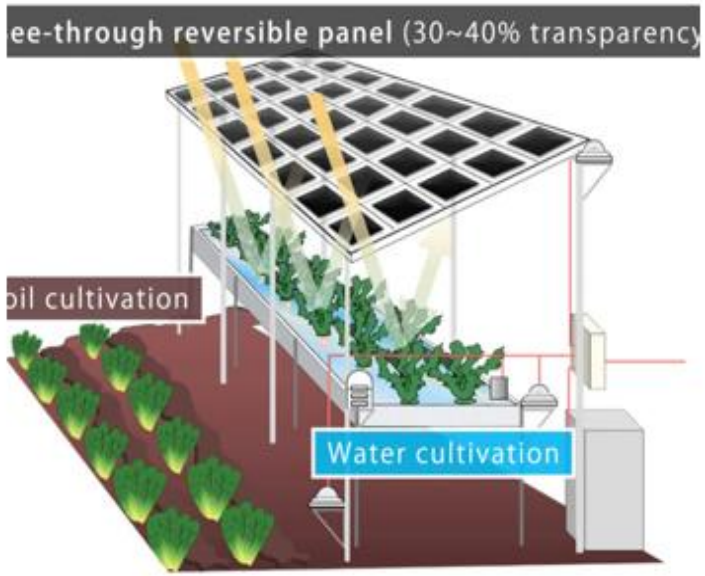
Project Outline

Location	Mumbai Maharstra
Distribution Company	Commercial entities
	5 MW solar+15mw BESS
	10 HA
Project Capacity Land Area	30MWh/ Daily
Estimated Generation (avg.)	15tCO2/ Daily
CO2 Emission Reduction (avg.)	***NR/kWh (0.05 USD)
PPA tariff	

* Emission reduction based on grid efficiency factor is 0.521

Farmdo Group's Solar Farm model

- Bi-facial PV panels
- Increased spacing between cells
- PV panels height 3.5-4.5 meters
- Used in open air, and enclosed systems(greenhouse)
- Compatible with hydroponics, non-soil growing mediums and traditional soil culture agriculture



Solar Farms in Gunma, Japan

Real World Examples

Under construction polyethylene greenhouse incorporating Solar PV roof.

Open air system using white weed barrier sheets to increase reflectivity and reduce OPEX.

Future Expansion

Other GHG (N2O) emission reduction

Granular Fertilizer

- Inefficient, often overused
- Leeches into rivers and ground water
- Undergoes volatilization becoming N2O in the atmosphere

Drip Irrigation with water soluble fertilizer

- Direct application of fertilizer to roots
- Reduces 65% waste of fertilizer
- Conservation of water

Ag-tech to be implemented

- Multispectral cameras and sensors on tractors. Identifying crops nutrient requirement.
- GIS techniques to identify plants transpiration rates affecting change in temperature of panels.
- Image analysis and sensors used to track the live growth of plants helping to understand the ecosystem under PV **panels resulting in**
- **further optimisation of agrivoltaics**. Study using light sensors, humidity sensors, temperature sensors, AI, and automation to understand plant growth and reaction to
- changing lighting and environmental conditions can be further carried out for optimization purposes of agrivoltaics.

Business Model: Assumptions and Calculation Considerations :

Assumptions	Calculations
Land Requirement: Land Required (in acres)	Installed Capacity (in kW)/ Panel Efficiency (assumed)
Land Lease Amount for 10 Years:	Land Lease Amount = Land Required × Land Lease Rate per acre per year × 10
Total Cost of Plant:	Total Cost = Installed Capacity × Cost of Plant per Kw+ BESS MODEL per MW
Energy Production for 10 Years:	Total Energy Produced (in kWh) = Installed Capacity × Sunlight Hours per Day × 365 × 10
Revenue from Surplus Power Sale to DISCOM:	Revenue=Total Energy Produced × Surplus Power Purchase Rate by DISCOM
Commercial Benefits to DISCOM:	Commercial Benefits=Total Energy SAVED × (Commercial Rate to DISCOM−Surplus Power Purchase Rate by DISCOM)
Electricity Consumption and Bill Reduction for End Users:	Calculate the electricity bill reduction for each consumer based on the supplied units and the commercial rate to DISCOM.
Determine Renewable Fraction: Renewable Fraction	Renewable Energy Generated/ Total Energy Consumption
Calculate Renewable Energy Generated	Renewable Energy Generated (in kWh) =Installed Capacity × Sunlight Hours per Day×365×Years
Determine Total Energy Consumption	Total Energy Consumption (in kWh) =Sum of Community Members' Monthly Demand×12×Number of Consumers × Years
Calculate Renewable Power Obligation (RPO)	RPO=Renewable Fraction × Total Energy Consumption

- **Reporting Considerations:**

✓ **Disclosure of Installed Capacity:** Clearly state the installed capacity of the Community Solar Agrovoltaics project.

✓ **Renewable Energy Generated:** Disclose the total renewable energy generated by the project over the reporting period.

✓ **Total Energy Consumption:** Provide information on the total energy consumption of the community over the reporting period.

✓ **Renewable Fraction:** Clearly indicate the proportion of renewable energy in relation to the total energy consumed.

✓ **RPO Calculation and Compliance:** Detail the calculation method used to determine the Renewable Power Obligation. Clearly state whether the project is following the applicable RPO targets.

✓ **Contextual Information:** Provide context regarding the significance of the project in contributing to the renewable energy targets and sustainability goals.

✓ **Social and Environmental Impacts:** Report on any positive social or environmental impacts resulting from the project.

✓ **Verification and Assurance:** Consider obtaining external verification or assurance for the reported data to enhance credibility.

Benefits to Energy Management Company (EMC) Indiahub/ Farmdo (RESCO Model with AI Metering Services in Community Solar Agrivoltaics): In a RESCO model, the energy management company earns revenue from:

- **Energy Sales:** Revenue from selling the generated electricity to the community.
- **AI Metering Services:** Revenue from providing advanced metering services using AI.
- Revenue is generated through O&M contracts, covering regular maintenance, repairs, and system optimization.
- If there is surplus power generated beyond the community's consumption, the EMC can sell this excess electricity to the Distribution Company (DISCOM). The revenue generated from surplus power sales contributes to the overall income.
- Indiahub / Farmdo may be eligible to earn carbon credits or other environmental certificates for the clean energy produced. These certificates can be sold in environmental markets, providing an additional revenue stream.
- The EMC may benefit from government incentives, subsidies, or tax credits aimed at promoting renewable energy projects. These incentives can enhance the project's financial viability and contribute to the EMC's profitability.
- Successful implementation of the project establishes the EMC as a reliable player in the renewable energy sector. This reputation can lead to opportunities for scalability and involvement in future community solar projects.
- By incorporating AI metering services and other innovative technologies, the EMC differentiates itself in the market. This differentiation can be leveraged to attract more clients and secure competitive advantages.
- Creating replicable Green building model keeping underserved communities in consideration.
- AI based virtual net metering will create the retails solar energy exchange from one user to another on battery optimisation basis, so that already produced energy can be consumed on priority basis and can create circular economy benefits ahead.
- Stepping ahead towards Environmental stewardship we will help DISCOMs/ State Authorities in completing the RPO targets.

Offerings of Financial Incentives for Agrivoltaics in India through community solar

Overhead stilted systems are economical if a total Fit of 4 INR/kWh can be paid to the generator. Considering a baseline price of 3.2 INR/kWh, a subsidy leverage of only 25% would be required.

Capital expenditure for KUSUM component. 364.54 lakh INR/MWp. Another suggestion of considering capital requirements as 377.5 lakhs INR/MW has also been received. Cost benchmarks for overhead stilted systems estimate the CAPEX to be between 450 to 590 lakh INR/MWp (24% to 62 %increase).

As O&M expenses may also differ. The currently fixed benchmark at 4.5 lakh INR/MWp should also be raised to 6 to 7 lakh INR/MWp (33 to 56 % increase).

Besides Government support, agrovoltaic projects can be leveraged by decreased capital costs. A decreased cost of debt from 8% to 3% can already reduce the levelized cost of energy (LCOE) by 25 % in case the share of debt is around 70%.

We are looking forward to get a support/ investment under JCM and non-JCM opportunities, to get further support the development of an agrovoltaic sector in India.

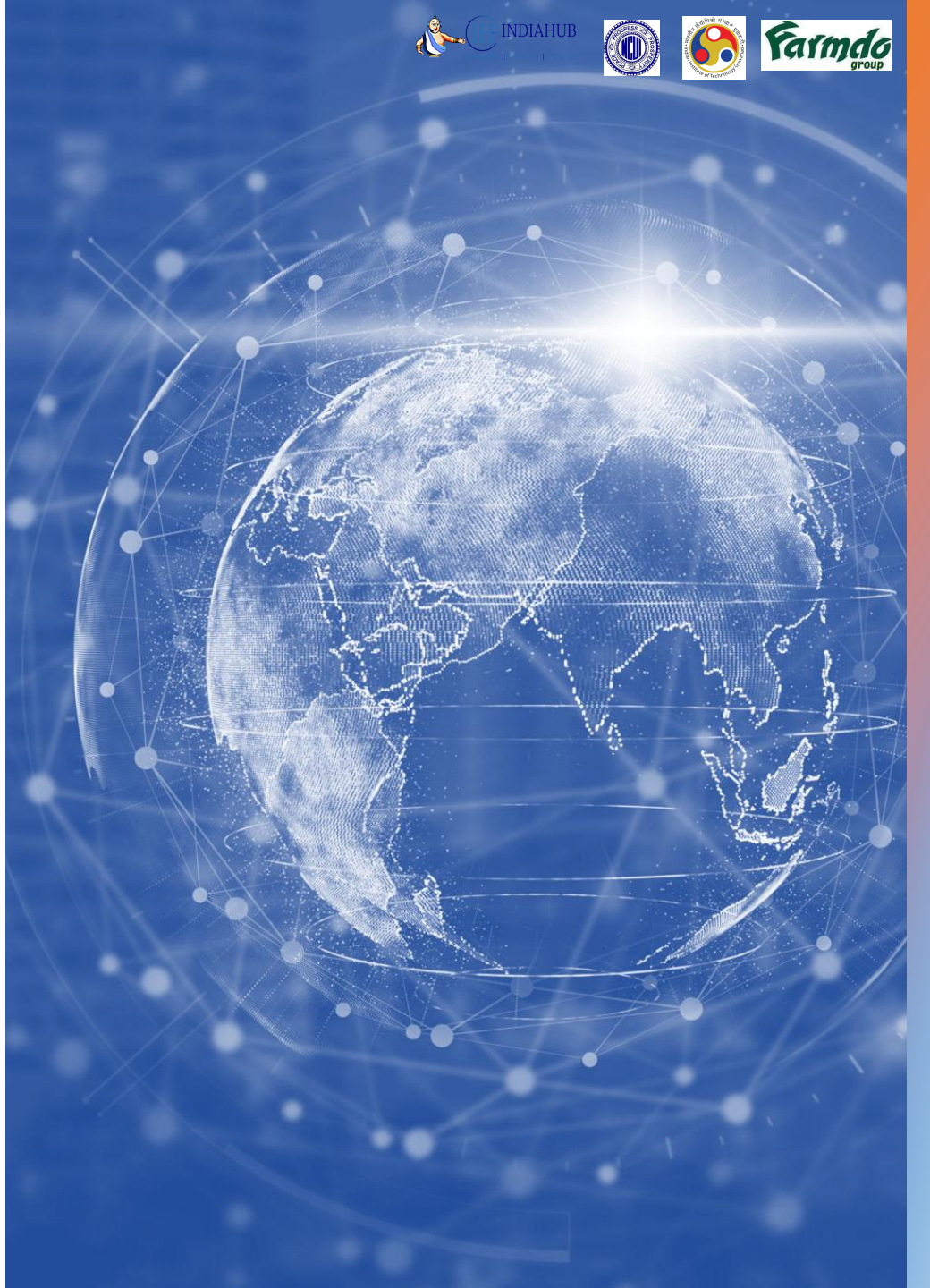
Helping Planet

- Community solar projects are large solar panel farms that generate electricity for more than one property. Community solar empowers more people to access the financial and environmental benefits of renewable energy. Most community solar subscribers save between 5 and 20% annually on electricity costs.

- Solar power produces no emissions during generation itself, and life-cycle assessments clearly demonstrate that it has a smaller carbon footprint from "cradle-to-grave" than fossil fuels.

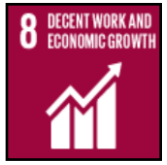
- Modern solar panels offset the CO2 used to create the panel in less than 2 years, and in some cases, less than one year. And, the solar panels are designed to produce energy for 25 years, so they save about 10–20X the CO2 used to produce them.

- Lastly AgriPV with community solar is the ideal solution for high density population areas for better access to energy, affordable solutions for rooftop solar based issues and mainstreaming of the energy for underserved together.



SDG Alignment of Community Solar Agrovoltaics through Cooperatives:

	Positive impact on poor rural communities in term of energy and economic security and improve social security
Increases land productivity and can be used for increase in food production	
	Reduce GHG emissions and other air pollutants in comparison to other energy systems
Enhance water use efficiency	
	Produce clean and green energy and efficient buildings

	Helps in farmer income enhancement in rural areas by crop diversification and off grid the energy revenue model
Promote inclusive and sustainable industrialisation of rural and developing areas	
	Helps in curate better energy efficient rural farming infrastructures
Contributes in GHG emission reduction and carbon sequestration potential through on-site habitat restoration	
	Leveraging partnerships between solar developers , site operators, farmers, and natural resource management communities

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Let’s Cultivate a better tomorrow.

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