



2024

# SWITCH TO SOLAR STARTUP PROGRAM CASE STUDY

This Case Study is produced as part of the SWITCH to Solar Startup Program, an initiative implemented by EnergyLab.

**SWITCH**  
to Solar

**switchasia**



(Energy)<sup>Lab</sup>



## OVERVIEW

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The Cambodian energy sector has grown steadily over the past decade, driven by the Royal Government of Cambodia's (RGC) key priorities to increase energy access, reduce energy price, and enhance energy security for the country. Today, a major proportion of Cambodia's electricity is domestically produced with some imports from neighboring nations. According to the Electricity Authority of Cambodia (EAC), in 2021, 51.17% of domestic energy production came from renewable sources.

Despite the nation's success in expanding access to the grid, its electricity tariffs range among the highest in the region. Businesses and smallholder farmers located in rural areas tend to pay up to double the rates compared to the urban grid-connected areas. The tariff in the capital stands at  $\$0.14$   $kW/h$ , whereas rural businesses relying on diesel-powered mini-grids can face charges as high as  $\$0.25$   $kW/h$ . The high cost, unstable and inaccessible electricity affect farmers and MSMEs' operations by raising their operational costs and exposing them to financial losses.

# SOLAR TECH STARTUPS FOR AGRI-FISHERY

Cambodian businesses have evolved rapidly in recent years across all sectors. In the renewable energy sector, these enterprises make substantial contributions to economic, social and environmental sustainability.

Agriculture remains one of the most significant sectors in the Cambodian economy, which represents a foremost portion of 22% of the Gross Domestic Product (GDP) in 2018. Notably, 61% of the Cambodian population lives in rural areas, with the majority of their livelihoods dependent on agriculture, fisheries, and forestry.

Due to the implications of climate change, including alterations in rainfall patterns, extreme weather events, and rising temperature, many farmers have suffered from lower agricultural yields and decreased income. To bolster climate-resilient agriculture while alleviating the financial burden associated with electricity costs for both smallholder farmers and MSMEs, the integration and adoption of innovative solar-powered technologies demonstrate to be a viable solution. The potential of these technologies lies in their capacity to increase the productivity of farmers and MSMEs, lower operating costs, and accelerate overall economic development. Given the high electricity costs and reliability concerns, some agri-farmers and agri-businesses are transitioning to renewable energy sources, particularly solar technology solutions.

This case study showcases the learning and achievements of the SWITCH to Solar Startup Program over the past four years, consisting of the insights through testimonials from Solar technology startups participating in the program. These participants have not only enhanced their own business management capacity but have also able to contributed back to the community development. They play a part in the growth of the agri-fishery sector, climate change resilience and mitigation through their cutting-edge technological solutions.

# STARTUP SHOWCASE

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Panel Discussion: "Unlocking Capital Through Adapted Financing for Ventures in Climate Resilient Carbon Market"



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CZECH REPUBLIC



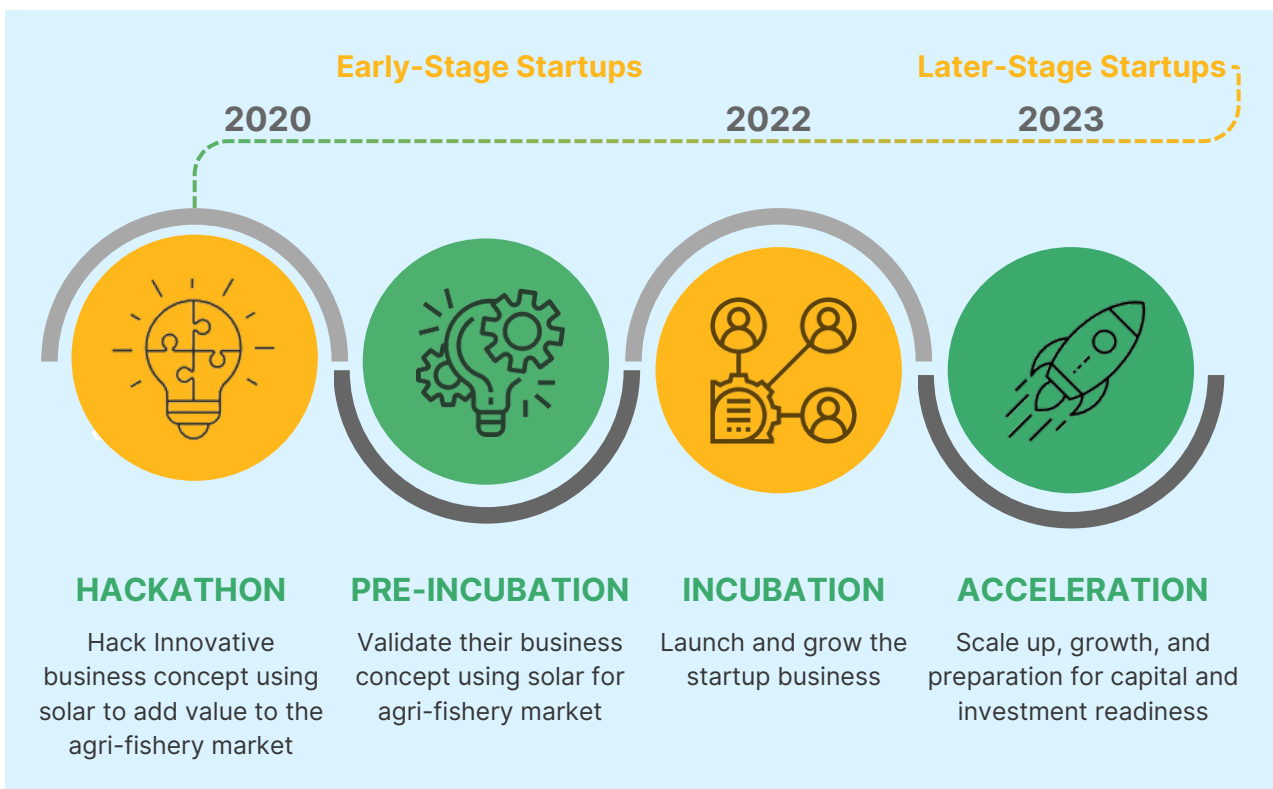
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# PROGRAM APPROACH

The program adopted an innovative capacity development model to nurture entrepreneurs in designing creative and inventive technology solutions, addressing the pressing energy challenges that add value to the agri-fishery market. The program started with idea generation through a dedicated weekend Hackathon. That was followed by concept validation during a 6-week Pre-incubation phase. Subsequently, entrepreneurs tested their solutions and tested them in the market during a year-long incubation period. The final phase involved scaling up their business sides in a 6-month Acceleration Program. The program consisted of a needs-tailored content delivering processes through intensive boot camp training, monthly coaching and mentoring sessions, and master classes.

## Startup Models



This overarching approach allowed the program to empower nearly **200 (35% female)** individuals to explore the business opportunities in the clean energy sector. **20 startups** were assisted to execute their ideas. Within the project period, 2 of them made their **first sales**, and 4 others **increased sales**, and gained new partnerships, and project fundings. Additionally, 18 teams (consisting of 43 individual participants) formed to collectively design a variety of innovative business concepts, such as i) *solar aerators* to improve dissolved oxygen in aquaculture farms; ii) *solar dryers* to dry agri-products, decreasing the post-harvest loss; iii) *solar cold storage* to reduce the post-harvest loss of vegetables, poultry, fishery products, and other items within livestock value chains iv) *smart solar aquaculture system* for lobster and fish farmers and v) *solar smart appliances* to control soil moisture and air humidity in agriculture.

In addition to the capacity-building training provided by EnergyLab, collaboration among program attendees has proven to be crucial in supporting the startups to secure necessary funding and growth. Consequently, 10 startups from the Incubation and Acceleration Programs were successful in acquiring **USD 7.5K** per team as “*Seed Investment Grants*” from Khmer Enterprise, a national enterprise platform that supports entrepreneurial activities.



*Bootcamp Activities in Incubation and Acceleration program*



*Seed Investment Grants Signing Agreement*



Testing a floating platform with a solar water pump by using 3 solar panels accounted for 330 Watts in Kampong Chhnang Province | @Elephant Pump 2022

# SOLAR TECH FOR SOCIAL, ECONOMIC, AND ENVIRONMENTAL IMPACTS

The SWITCH to Solar Startup Program is a pioneering initiative to nurture the growth of solar technology startups in Cambodia, with a primary focus on enhancing the prosperity of agri-fishery in Cambodia. It has demonstrated its purpose to create tangible social, economic, and environmental impacts.

## SOCIAL AND ECONOMIC IMPACT

Startups are one of the key economic drivers. This startup program initiative led to the emergence of 20 startups—introducing solar productive-use solutions for agriculture and aquaculture sectors. Not only the program has assisted them in the know-how in starting up and sustaining their business operation but has also aided them to scale up through access to finance, grants and investment opportunities. In return to the society and economy, these startups have helped a total of 224 farmers and/or MSMEs to reduce operational cost, enhance efficiency, and improve their market competitiveness.

Among the 20 innovative startups, 40% of them were led by women. These inspiring women-led enterprises transformed the lives of other women in rural and marginalized communities, increasing their access to sustainable and renewable energy sources. This, in turn, enabled them to enhance their agriculture and aquaculture practices, increase crop yields, lower labor costs, create job opportunities and improve livelihoods.



# ENVIRONMENTAL IMPACT

Establishing a conducive environment and strengthening startups' capabilities not only bolsters social growth and economic development, but also contributes positively to coping with environmental issues. The rise of solar-powered solution designs and their deployment plays a crucial role in reducing carbon emissions. For instance, upon the adoption of solar water pumps, farmers no longer use the diesel-powered water pumps, which decreases GreenHouse Gases emissions and other air pollutants, fostering good well-being for human beings.



Pepper drying by using a solar dryer dome in Ratanakiri Province  
@EnergyLab Cambodia 2023

# THE JOURNEY OF SOLAR TECH STARTUPS



**KEAT SAVRY**  
FOUNDER

## Elephant Pump

Elephant Pump (EP) is an early-stage startup established within the program, in late 2021. EP provides its solar water pumps solution to smallholder farmers to reduce production costs, particularly on diesel usage by farmers that grow vegetables on small plots of land - specializing in leaf and fruit whose income is **up to 500 USD**. The solar pumps range in price from **1,000 to 2,500 USD** and are estimated to give a return on investment over a two-year period. Essentially, a farmer can save between **150-210 USD per month** by switching from diesel to solar-powered water pumps.

Prior to joining the Incubation Program in early 2021, EP faced financial constraints, human resource challenges, and had an unclear business structure. After participating in the program, EP and their team gained significantly both personal and business development including improved business knowledge, communication skills, and built a wide range of new networks. They also received grants to validate their business idea, and develop a prototype of their solar technology. This enabled them to establish a clear business structure, and define target customers and locations. This has significantly aided their **financial growth at a rate of 50%** per annum.

In addition, increased visibility on social media, and at events assisted by the program, attracted notable interest from consumers for their products and services. Simultaneously, they leveraged connections with fellow startups, mentors, and suppliers, opening up opportunities for collaboration and support.

## Hear From Elephant Pump's Customer



“**Solar water pumps** are very convenient. With only a push-on/off button through the controller, the system will start pumping water from the pond directly to the vegetable farm via a spray tube irrigation system. I don't have to worry about the unstable price of diesel anymore. The solar water pump reduces my production costs by between **\$1,350–\$1,650 per year**. It also helps lower the maintenance cost and minimize labor work.



Staff of Elephant Pump and Mr. DOURNG Phat

**Mr. DOURNG Phat**, a 52 years old small landholder, farms **1-hectare (50m x 200m) farmland** located at Kampong Thom Province, growing fruit and vegetables such as purple eggplant, green round eggplant, tomato, cucumber, and winter melon.

# THE JOURNEY OF SOLAR TECH STARTUPS

## EGE Cambodia

EGE Cambodia participated in the Acceleration Program in 2023. The company was established in 2019 with the vision of providing energy solutions and increasing awareness of benefits of solar energy in Cambodia. Before joining the program, EGE faced several challenges including limited networks. They also wanted to improve their business management skills.

The Acceleration Program provided necessary training, valuable mentorship, and strategic thinking sessions, ensuring the company reinforcement. EGE's **growth** in both internal and external operations was remarkable including human resource management, network expansion, project concept note development, and cash flow management. In addition, they **secured several grants and fundings** projects, thanks to the program support and exposure.

Throughout the program, EGE built around **20 connections**, including fellow startup participants, investors and micro-finance institutions. Their potential customers include farmers, government entities, private companies, garment factories, installers, and end-users who intend to reduce production cost and contribute to climate change mitigation. An estimated **200 households** were supplied with solar panels by EGE across the years. With a firm determination, they plan to supply solar panels to around **1,000 farmers** through existing projects and grants.



**VORN CHANRAKSMEY**  
FOUNDER

# HEAR FROM EGE CAMBODIA'S CUSTOMER



“My monthly production cost dropped from **20 USD** to a maximum of **7.5 USD** per month after installing a **solar water pump system**. I can utilize the remaining cash to hire more workers (particularly widows and women in the community), assisting me with vegetable planting and harvesting.”

@EGE Cambodia 2023

Solar water pump installation for a demonstration site in Takeo Province under the support of Khmer Enterprise through the SWITCH to Solar Acceleration Program



@EGE Cambodia 2023

Mrs. Yan Ry is watering her farmland by using a solar water pump

**Mrs. Yan Ry** is a small landholder farming on a small area of land located in Bati district, Takeo Province. Her main income comes from growing vegetables, including morning glory, cabbage, pig weed, and garlic leaves. A solar water pump was donated and installed by EGE Cambodia to support her daily farming.



A farmer harvests pepper, which is then placed in a solar dryer dome in Ratanakiri Province  
@EnergyLab Cambodia 2023

# The Challenges of Startup Development in the Niche Solar Market

## Time Consuming



Proving the feasibility of solar technologies, developing prototypes, and gaining traction in the market demand considerable time and effort. Startups find it difficult to establish themselves as reliable players because Cambodia's solar industry is still in its infancy.

## Human Resources

The lack of technical expertise is the core obstacle for solar startups in Cambodia. Building a skilled workforce in the industry requires time and resources. Finding individuals with the necessary expertise to design, install, and maintain solar systems can be a difficult task which limits the innovation and growth of startups.



## Competitiveness



Despite a high interest in solar technology, Cambodian consumers and businesses remain reluctant to adopt solar, due to the concerns over market uncertainty. This results in fewer startups because few dare to compete against well-established energy providers.

# The Challenges of Startup Development in the Niche Solar Market

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## Access to Finance



Research and development, as well as prototype development, are crucial for solar tech startups, but is often costly. Limited access to finance and investment for early-stage startups has hampered their innovation in the sector.

## Grant Market Dominance

Older or advanced-stage solar technology providers often win most of the money from the grant market. New solar startup entrants may struggle with bureaucracy and requirements of large grant funders.





# RECOMMENDATIONS

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In order to tackle market barriers, stimulate the expansion of solar tech startups, and to strengthen the agri-fishery sector, the SWITCH to Solar Startup Program offers a number of recommendations, as follows:

## General Recommendations

01

### **Investment in Market Research**

comprehensive market analysis on different types of agriculture value chains, especially the integration of technology innovation, needs to be made in order to provide clear insight on investment direction.

02

### **Sensible and Flexible Funding Approaches**

funding criteria, terms and conditions of support should be more open, allowing the space and flexibility of innovation for entrepreneurs or innovators in the sector.

03

### **Multi-stakeholder Collaboration**

collaboration among solar tech startups, government institutions, financial institutions, as well as non-governmental organizations (NGOs) to be fostered to streamline the solar tech adoption value chain.

# RECOMMENDATIONS

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## To Relevant Government Institutions

01

### **Conducive Business Environment**

Promote solar tech adoption by integrating into national policy, strategic plan, awareness campaigns and encouraging collaborative support from relevant government bodies.

02

### **Enabling Investment policy**

Regularly reviewing and adapting investment policies in response to the needs of private sectors. Simplifying complex tax structures to facilitate collaboration between investors, especially international investors and entrepreneurs to stimulate investment and growth of MSMEs/SMEs.

03

### **Strengthen Foreign Direct Investment**

Enhance diplomatic relations with international players to attract both quantitative and qualitative investors and reduce certain barriers to enable foreign direct investment.

## **Incentive or Subsidy**

04

Accelerate market growth by enforcing investment laws to incentivize solar tech or green tech businesses. And allocating funds to support early-stage solar tech startups.

# CONCLUSION

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With these things, significant strides can be made towards a sustainable energy future for Cambodia.

The SWITCH to Solar Startup Program represents a driving force to stimulate the growth and contribution of private sectors, namely solar tech startups. These start-ups play a significant role in promoting economic development in the agri-fishery sector and beyond. They ultimately contribute to Cambodia's social and environmental sustainability.

# SWITCH to Solar Startup For a Thriving Agri-Fishery Market

This document is produced as part of the SWITCH to Solar Project, funded by the European Union and the Czech Development Agency, and implemented by three partner agencies: People in Need, EnergyLab and Sevea. The goal is to present the results and achievement of the SWITCH to Solar Startup Program that contributes to the growth of agri-fishery sector and climate resilience agriculture in Cambodia.



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