Sixth Session of the Assembly of the International Solar Alliance
31 October 2023
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Agenda Item 17

Update on the Solar Technology Application Resource Centres (STAR-C) Initiative of the International Solar Alliance

Summary

This working document presents the progress of the Solar Technology Application Resource Centres (STAR-C) initiative. In 2022-23, the STAR-C initiative generated good interest among the ISA Member Countries.

Twelve ISA Member Countries have submitted their official expression of interest through the National Focal Point appointed by the Ministry of Energy of respective countries, highlighting their priorities for STAR Centres to address. The Ministry of Energy of seven Member Countries and the host institution for the STAR Centres signed the Memorandum of Understanding with ISA. The ISA aims to operationalise five centres by the end of 2023. These are being supported by different donors, including GEAPP, CIFF and McArthur Foundation.

The ISA has launched a multiyear project, "Structuring of an International Network of Solar Technology and Application Resource Centres (STAR-C)", with funding support from the Ministry of Europe and Foreign Affairs, Government of France. The ISA and UNIDO are jointly implementing the project activities.

The ISA Assembly is invited to review the progress and provide guidance for enhancing the impact of the STAR-C initiative.

Update on the Solar Technology Application Resource Centres (STAR-C) Initiative of the International Solar Alliance

1. Genesis of STAR C Initiative:

During the First Session of the ISA Assembly, held on 3 October 2018, the ISA agreed to support Solar Technology and Application Resources Centres (STAR C). The ISA STAR-C initiative was further elaborated in the working document ISA/A.2/WD.08, which was considered and endorsed by the Second Session of the ISA Assembly, held on 31 October 2019.

2. Purpose of the STAR Centres:

2.1. To function as the training centre on solar energy applications, technologies and related issues
2.2. To act as a centre of excellence for testing, development of specifications, and standards
2.3. To exchange solar-related information and support the government and private sector on solar energy projects with resource assessments, DPRs, project commissioning, financing, etc.
2.4. To support existing enterprises to integrate solar energy and start new enterprises in the solar energy domain.

3. Outputs:

3.1. Organise 3-4 trainings in the first year, increasing up to 8-10 trainings or more per year by the fourth year on solar energy and related topics for Government officials, Technicians, Engineers, Bankers, etc.
3.2. Collect, synthesise and disseminate solar energy-related policies, information, and best practices in the first year and develop a comprehensive database by the third year to enable the Government, private sector and individuals to make informed decisions.
3.3. Test solar energy components in the first year and develop national standards and benchmark technologies to increase efficiency and transform the market by year 3.
3.4. Mentor at least four local enterprises in the first year on solar energy integration and business development and go up to 10 enterprises or more from year three onwards.

4. Functions of STAR Centres:

The centres have four primary functions: a) Training, b) Information repository, c) Incubation of enterprises, and d) Technology benchmarking and standardisation.
4.1. **Trainings:** The centres train government officials, technicians, engineers, and financial institutions on technical and financial aspects of solar products, applications and services. There are nine competencies identified and five different target audiences identified for training. **Types of training programmes and target groups in Annex**
4.2. **Information repository:** Collects and disseminates information on all aspects of solar energy deployment. A repository of solar energy data, guidelines, best practices, relevant policies and technical assistance to solar developers, decision-makers, and local institutions.

4.3. **Incubation of enterprises: Incubating** enterprises for integrating solar energy with income-generating activities.

4.4. **Testing, Technology Benchmarking and Standardisation:** Undertake testing, benchmarking and achieving standardisation against international standards.

5. Implementation arrangement

5.1. **Country Ownership:** The Ministry of Energy submits a formal expression of interest through the National Focal Point and signs a detailed MoU with the ISA outlining the roles and responsibilities of the Member Country and the ISA with respect to establishing the STAR Centres.

5.2. **Host Institution for Centre:** The National Focal Point appointed by the Ministry of Energy in the Member Country identifies a host institution (mostly an existing technical institute or engineering lab) having the required infrastructure. The institution also becomes a signatory in the MoU with clear responsibilities outlined.

5.3. **Steering Committee:** A Steering Committee represented by the Ministry of Energy and other relevant Ministries in the Member Country, the ISA and the host institution supervises the implementation of the work plan and related activities of the STAR Centre on a quarterly basis.

5.4. **Staffing:** The National Focal Point, in consultation with the Ministry of Energy, identifies the existing Government Officials who will contribute to the functioning of the STAR Centre. In addition, the following staff are hired

5.4.1. One full-time centre coordinator to implement all the activities as agreed in the work plan in consultation with the National Focal Point and the ISA. The ToR is developed and agreed upon with the Ministry before hiring the staff

5.4.2. One full-time support staff to support STAR Centre with logistics for organising training, maintaining equipment and instruments, documentation, etc.

5.4.3. Need-based part-time experts to develop standards, create a repository of information, coaching of enterprises, etc.

5.5. **Technical and financial support from the ISA:** The ISA provides technical and financial support for a maximum of 2 years. The financial support is for hiring staff, procurement of equipment and instruments, training modules, etc. The ISA also develops a self-sustenance plan for the STAR centre to continue its operation after the ISA withdraws the financial support.

5.6. **Sustainability of STAR Centres:** After two years, the STAR centres will generate revenue for their sustenance from 1) training, 2) providing consultancy for project development and implementation, 3) income from testing, 4) income from implementation of projects and schemes on behalf on Government and private sector 5) implementation of project activities and funds from Multilateral and Bilateral funding agencies. The ISA develops a detailed business plan to execute these functions and build linkages with the existing institutions during the 2-year support period.

6.   Steps being followed for establishing STAR Centres in Member Countries:

Initial discussion with the Member Country outlining the functions and benefits of the STAR Centre.

6.1.   **Expression of Interest:** The NFP, in consultation with the Ministry of Energy of the respective country, submits a formal expression of interest to establish the STAR Centre and prioritised functions signed by the Ministry Officials.

6.2.   **Identification of Host Institution:** The Ministry of Energy, in consultation with the NFP, identifies a host institution. The host institution could be an existing University or a technical centre having basic infrastructure.

6.3.   **Memorandum of Understanding:** The Ministry of Energy, the host institution, and the ISA sign a tripartite Memorandum of Understanding with clear roles and responsibilities and identify focal points from each institution responsible for coordination.

6.4.   **Country Assessment:** The country assessment is led by the National Focal Point appointed by the Ministry of Energy. The ISA hires a third-party agency to undertake a detailed country assessment and consultation with the number of stakeholders and documents the needs of the country with respect to training, testing, innovation and knowledge generation; hardware/software requirements; human resources and a detailed business plan for these centres to generate revenue for sustenance.

6.5.   **Training resources:** Based on the country assessment, the ISA develops a list of equipment, instruments and training modules for training and testing and advertises in consultation with the National Focal Point.

6.6.   **Execution of Work Plan:** The National Focal Point, the STAR Centre and the ISA develop a work plan with activities to be implemented in the first year for a) Training, b) Information and data collection, c) Incubation of enterprises, d) Testing, Technology benchmarking and standardisation.

6.7.   **Monitoring:** The Steering Committee meets on a quarterly basis to monitor the progress of the execution of the activities and provide strategic guidance.

7.   Budget and Expenditure:

To implement the STAR C initiative, the ISA is receiving funding support from external donors. Prominent among these endeavours are four projects supported by

Donors	Funding Duration (Year)	Budget (USD)	Expenditure till date (USD)
Global Alliance for People and Planet (GEAPP)-	2023-2025	USD 2.5 Million	0.3 Million
Bloomberg Philanthropy	2023-2025	USD 2 Million	0.2 Million
Ministry of Europe and Foreign Affairs, Government of France	2022-2024	USD 1.1 Million	0.36 Million
McArthur Foundation	2022- 2023	USD 0.2 Million	0.19 Million

8.   Update on the Progress of the ISA STAR-C initiative

8.1.   The interest in the STAR C initiative is growing exponentially among the ISA Member Countries. The ISA is working with more than ten countries to set up the STAR Centres by the end of 2024.

8.2.   In 2022-23, the ISA signed a Memorandum of Understanding with nine countries (**Ethiopia, Cuba, Kiribati, Somalia, Ghana, Uganda, Cameroon, Sudan and Cote D'Ivoire)** for setting up the STAR Centres.

8.3.   The ISA has undertaken detailed country assessments in six countries (Ethiopia, Cuba, Somalia, Cote D"Ivoire, Uganda and Kiribati). The country assessment analyses and highlights the training and equipment needs as per the unique training and testing requirements, existing infrastructure and capacity of the host institution. The assessment also analysed the existing solar training curriculum in the countries for its content, purpose, duration, participants and delivery method to suggest improvements and fill training gaps via the STAR Centres. A detailed project report with a two-year work plan for the STAR C activities is developed based on the assessment.

8.4.   The ISA has also commissioned the country assessment for **Ghana, Cameroon, Venezuela, Bangladesh, Zimbabwe and Benin** to identify the needs of the countries with respect to training, testing, innovation and knowledge generation; hardware/software required for setting up the centre and a detailed business plan for these centres to generate revenue for sustenance.

8.5.   Similarly, the ISA is engaging with **Tonga, Madagascar, Niger, and other Member Countries** to set up the STAR Centres. Initial discussions with the countries have shown immense potential and interest; the ISA intends to formalise the engagement for setting up centres in these countries in the coming months.

8.6.   The STAR Centres in all the countries mentioned above are being supported by majorly three donors: McArthur Foundation, GEAPP and CIFF.

8.7.   Project supported by the Government of France: The ISA is pursuing several initiatives and strengthening existing partnerships to set up STAR Centres across Member Countries. Prominent among these endeavours is the project with the Ministry of Europe and Foreign Affairs of France on "Structuring of an International Network of Solar Technology and Application Resource Centres (STAR-C)", being jointly implemented by UNIDO (United Nations Industrial Development Organisation) and the ISA. The project focuses on strengthening quality infrastructure and standards for PV and solar thermal products and services. It also aims to improve local capacities in countries (Bhutan, Papua New Guinea, Senegal) to provide certified solar curricula and training and strengthen solar networks and knowledge management. The project is being implemented with UNIDO and was launched in June 2022.

8.8.   The ISA and UNIDO have initiated some activities as part of the project. These are;

8.8.1.   A 3-day exposure visit to France was organised for the project focal countries and the GN-Sec centres[1] in February 2023 to enhance the capacity of the project stakeholders on the deployment of solar energy applications, research, innovation, standardisation and testing. The team visited Institut National de l'Énergie Solaire (INES) in France and gained an understanding of testing, training, advanced solar technologies and innovations made across technologies and applications. The team met the private sector companies (HESPUL and KILOWATTSOL) to discuss

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[1] The regional sustainable energy centres (GN-Sec) created by UNIDO aim to accelerate the energy and climate transformation by creating economies of scales, equal progress and spill-over effects between countries.

a broad range of issues pertaining to demand and supply-side barriers, project financing, community-led solar projects, a regulatory framework for solar projects, remote solar potential assessments, etc. The team met the officials from the Ministry of Foreign Affairs, AFD and Ministry of Ecological Transition to understand the priorities of the Government of France on Solar Energy.

8.8.2. The project has recruited country project coordinators and agencies to develop quality infrastructure frameworks for solar products and services in the three concerned regions and a qualification and certification framework.

8.8.3. A webpage for the STAR-C initiative within the GN-SEC framework was created on UNIDO and the ISA platforms, and information is being disseminated to countries and regional centres.

8.8.4. The ISA has initiated discussions with some renowned training institutes to create its library of training resources.

9.   Next steps

9.1.   Through the support from GEAPP, CIFF and the McArthur Foundation, operationalise five STAR centres by the end of 2023 in Ethiopia, Kiribati, Cuba, Cote D'Ivoire and Cameroon. Engage with at least four countries and secure expressions of interest for setting up the STAR Centre.

9.2.   Develop training modules by October 2023 on different competencies for the STAR Centres to conduct training. Equip at least five STAR Centres by December 2023 with required equipment and instruments for training, testing and knowledge management.

9.3.   Under the project supported by the Government of France, implement project activities at the regional and national levels in **Bhutan, Papua New Guinea, and Senegal.** The major activities this year are to a) Develop quality infrastructure frameworks for solar products and services in the three concerned regions and a qualification and certification framework, b) Develop training curricula on Solar PV, solar thermal technologies and more general solar-related topics, c) Develop a sustainability strategy for a network of STAR Centres d) Design and finalise the structure for the solar academy in consultation with the focal country.

Target Group

Technicians	Off-grid and Distributed
	Grid Connected KW Scale
	Grid Connected MW Scale
Engineers/Project Managers	Solar Project Engineers
	Engineers of other industries
	Architects
	Energy and Urban Planners
	Project Managers
Decision Makers	Government Officials - Policy & Decision Makers
	Government Officials- Scientists, Project Directors, ULBs
	Private Sector- Policy & Decision Makers
	Risk Rating Agencies
Financial Institutions	Risk Assessors
	Bankers/ Insurers
	Sanctioners and Commissioners
Individuals	Researchers/ Professionals/ Journalists
	University faculties

Types of Training

For Technicians

- Training of technicians on installation and maintenance of solar PV rooftops;
- Training of technicians on installation and maintenance of Minigrids;
- Training of technicians on the installation of solar panels in MW scale grid-connected solar.
- Training for operators and maintenance staff on maintaining solar mini-grids
- Training of technicians on site assessment, energy demand, solar sizing, load measurement, Specifications, Standards, Performance Benchmarks, Testing and Certification Protocols.

For Government Officials

- Training on General Aspects of solar energy; Different Solar Energy Technologies, operations, costing and Applications; Best practices.
- Training on integrating solar energy with existing rural development schemes and programmes and developing new rural development schemes and programmes.
- Training on developing solar parks- Feasibility Report / Detailed Project Report for Solar Photovoltaic Projects;

For Engineers
- Techno-commercial appraisal of Solar Photovoltaic; Policies and regulations
- Solar project financing and business modelling. PPA, BOO, RESCO, FiT; Power procurement;
- Power procurement- Grid Connected, Trading
- Legal aspects and liability issues (Land agreements, Maintenance agreements, Ownership, Disposal etc.)

For Financial Institutions and others
- Training for bankers on assessing the financial feasibility of solar projects.
- Training of journalists on the importance and prospects of solar energy

Training Competency wise

Competency 1- General	General Aspects of Solar Energy
	Different Solar Energy Technologies, operations, costing and Applications
	Solar Energy Application Case Studies
Competency 2- Electronics (Off Grid)	PV Modules and components
	Radiation measurement, solar path
	Solar power electronics and instrumentation
	Module array, Inverter, wiring, metering etc.
Competency 3- Mechanical	Storage systems, converters, charge controllers, phase selection etc.
	Site assessment, energy demand, solar sizing, load measurement
	Mounting for off-grid and Integration (Rooftop, Mini-grid)
	Specifications, Standards, Performance Benchmarks, Testing and Certification Protocols
Competency 4- Installation (Off Grid)	Solar Installation, Operation, Off Grid (Mini-grid, Rooftop, Standalone and allied use)

	Different solar applications- Residential, Rural Productive Use
	Protection and Maintenance-
Competency 5- Installation (Grid Connected)	Designing Grid-Connected Solar Parks
	Grid integration, stability
	Project Development (Large Scale)
	Grid planning and stability
	Transmission, Net metering and Data Monitoring
	Solar Power Plant Substation and Switchyard. Protection, earthing, lightening etc
	Designing Land-based, Floating, rooftop solar plants
Competency 6- Project financing and insurance	Solar energy economics- Economic Rationale, Market economics
	Project risk assessments for financing and insuring
Competency 7- DPR and Business Modelling	Feasibility Report / Detailed Project Report for Solar Photovoltaic Projects
	Techno-Commercial appraisal of Solar Photovoltaic
	Solar project Financing and business modelling. PPA, BOO, RESCO, FiT
Competency 8- Procurement	Procurement of systems
	Power procurement- Grid Connected, Trading
Competency 9- Legal and Policy	Legal aspects and liability issues (Land agreements, Maintenance agreements, Ownership, Disposal etc.)
	Policies and regulations
	Corporate energy policy, Strategy and roadmap