

Project factsheet information

Project title	Chuuk State Solar Server Education Hub
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Country where project was implemented	Federated States of Micronesia
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Partner organizations	Inveneo CalPoly Institute of Technology iSolutions Micronesia Akoyikoyi School Chuuk High School WolrdTeach
Total budget approved	
Project summary	This project proposes to establish a solar powered content and communications hub in Chuuk to improve educational opportunities and build information and communications technology (ICT) skills among Chuukese citizens. An intranet that will be established between the Department of Education, the College of Micronesia, and remote island primary and secondary schools will provide for enhanced communications capabilities, creation of localized content, and teacher training and certification opportunities. Our goal for the solar powered data centre/educational server hub is for it to serve as a replicable model for other small-island nations that wish to power ICT with renewable energy.

Table of Contents

Project factsheet information	1
Table of Contents	2
Project Summary	3
Background and Justification	4
Project objectives	4
Users and uses	5
Indicators	6
Project implementation: understanding the chain that leads to results	7
Narrative - project implementation	7
Project outputs, communication and dissemination activities	9
Project outcomes	11
Project management and sustainability	11
Impact	12
Overall Assessment	12
Recommendations	13
Bibliography	13

Project Summary

Tips: It is recommended to **complete this section once you have finalized the text of the report**. It will be easier to go back through to build the summary based on the highlights of the report the project team just put together.

The Project Summary can be up to **one page long**.

It should include a brief justification; an outline of the project objectives to be achieved; the project real timeline and the main activities conducted.

The abstract of the project written when ISIF Asia initially approved the project and the objectives listed in the Grants Agreement signed by APNIC and your organization should be useful inputs when preparing this section of the report.

There are numerous benefits to be realized in the educational sector by connecting schools to the Internet, in terms of access to information and the ability to have increased communications. However, in island nations that lack undersea fiber-optics cables, satellite-based Internet remains the sole option for connectivity—albeit an expensive and slow proposition that is also susceptible to inclement weather. Hence, reliable communications between islands and access to educational and other useful information over the Internet is prohibitively expensive for those who need it most, particularly in remote locales. The Chuuk State Solar Server Education Hub project proposes to move relevant educational content and communications capabilities from a bandwidth-constrained satellite connection where all information is stored off-island in a remote data centre, to an on-island location and to connect schools—whether on the main island or in the Chuuk lagoon—to an intranet where they can access this information.

The benefits of having an on-island intranet are numerous. Doing so:

- Places educational information at the fingertips of students, educators and the Department of Education.
- Builds ICT skills, as well as a culture of ICT use, despite bandwidth constraint.
- Builds a culture of sharing and collaboration through content localization.
- Facilitates organizational learning through increased communication capabilities (such as through distance learning and instant communication).
- Puts local users and teachers in control of educational content available, which is important for new and/or young Internet users.
- Builds local skills of the team maintaining the intranet and associated technology.
- Significantly saves on logistical costs associated with inter-island travel for training, reporting, etc.
- Increases the speed of communications and information access by 10-fold. Current satellite-enabled download speeds are 15 megabits (mbps) for the entire state of Chuuk. (For comparison, the average American or Australian has a 3 mbps Internet connection for their home/personal use.)

The proposed intranet will allow for a 50 mbps connection reliably, and our initial test over a 19-km inter-island connection yielded a 137 mbps connection.

Improves productivity for educators and administrators. To provide but one example, the logistics involved with planning a teacher in-service or training session are considerable as the vast majority of teachers live on islands other than the main island of Weno, and must take a boat to the main island for the organized sessions. The ability to offer training sessions over a high-speed intranet would save a considerable sum of money, and would not make such sessions weather-dependent. An identical argument may be made for teacher certification, which is a serious challenge for the state of Chuuk: the College of Micronesia could be. Offering long-distance online courses to teachers, which would allow teachers to complete their teaching certification, if there was sufficient bandwidth. The intranet would allow a sufficient speed for the college to be able to offer such classes to teachers even on remote islands.

The second issue addressed by this proposal is the energy situation. Chuuk is no different from many island nations where current island energy demands have outstripped (grid) capabilities, so power outages have

become commonplace and the cost of electricity continues to rise. The second goal of this project is to demonstrate how renewable energy can reliably and cost-effectively provides power to a small server farm, or a “Solar Server Education Hub.” This proof-of-concept project will serve as a model for other island nations for how to harness renewable energy to power, and grow their ICT sectors, and indeed, will demonstrate that renewable energy can, in fact, completely meet the electricity needs of such projects.

The third issue addressed in this project is local capacity and skills building. Our approach builds local skills in terms of designing, building, and maintaining:

- A large-scale intranet infrastructure.
- A small server farm/data centre.
- A renewable energy system for ICT.
- A repository of educational content that is locally relevant.
- An IPv6 network.

Background and Justification

Tips: The reader should be reminded of the **context** your organization is working, and where the project has been developed in.

This section provides a window to **understand the challenges** faced by the community you are working with.

Include a detailed description about the situation **before the project start**, describing any relevant aspects that make the project relevant in such a particular scenario.

The reader should be provided with a clear description about the problem(s) to be addressed through this project and the motivation from your organization and team members to get involved and offer a solution.

This project builds upon the success of the 2012-2013 PISCES Project in Chuuk, FSM. Under the auspices of the PISCES Project, it was demonstrated that low-cost and reliable long-distance Wi-Fi links could be established to connect lagoon island schools, and that these connections could be used either for Internet or intranet connectivity. The original plan was to establish an Internet connection and place a localized server at each school. However, upon testing the speed of the long-distance Wi-Fi link, it became apparent that we could build an extremely high-speed intranet, linking the island schools to a centralized content server on the main island, while also supporting better inter-island communication, even at the level of video-based communications. A project to create a server with localized educational content was also launched by Professor Laura Hosman from the Calpoly Institute of Technology. The server has been set up in Chuuk, but the project’s original design had been for one-server-per-school. It is anticipated that dozens of schools, as well as the DoE, would begin utilizing this server’s content, accessed over the intranet, within the next calendar year. This means that a significantly upsized server—or a small-sized data centre server—will be a far more appropriate solution for housing content for this intranet.

Project objectives

Tips: Please include here the **original objectives** as listed on the Grant Agreement.

If any objectives were modified, added or removed during the reported period this should be explained/justified.

1. Design and engineer solar-powered small data centre/server education hub
2. Carry out local skills training on solar powered technology
3. Carry out local skills training on server educational hub

4. Investigate and implement communications software for intranet installation across network
5. Training for end-users
6. IPv6 training for intranet and Internet
7. Network operations management software training
8. Baseline and ongoing project monitoring and evaluation
9. Provide pilot project results
10. Work documented and disseminated over Internet through blog reports and other digital formats
11. Project report
12. Video documentation

Users and uses

Tips: Discuss with your project team who would be the future users and how they would use the findings throughout the project lifecycle. The uses identified should relate to the theory of change that you have discussed with your project team. The discussion about theory of change, users and uses, will be a very important input to your communication strategy: depending on who the user is and of what use will be the findings, a communication strategy can be developed. For example, if the users of the findings are policy makers and the use is to influence a change in the regulatory framework, which communication approach will work the best?

Who will be the user of these findings?

What are the more relevant things the project team wants to learn about or evaluate through the lifecycle of this project?

We envision the users for the findings of this project will be the Government. Today, in the age of data driven decisions, Chuuk has struggled to keep current data and statistics on its people, the environment, demographics etc. With the rising need to deploy and provide database services to hospitals, education, NGOs, municipalities, environmental agencies, the need also rises for a robust self-sustained database. This project will be a guide for any entity that wants to preserve/disseminate local contents, using a data centre. If the interest is there, we hope that this project can help us find a way for it to work well in the islands and create a guideline for any future references.

Xavier High School, a private school, is now a current user, as it is installing a digital content library.

Indicators

Tips: Indicators help to measure project's progress.

Indicators help the objectives that were set by the project team to be affordable, tangible, and measurable.

They help to verify the success and rewrite the course in case we are not achieving it.

An indicator could be quantitative (percentage, amount) or qualitative (perception, opinion).

The ISIF Asia secretariat suggests the SMART approach to indicators:

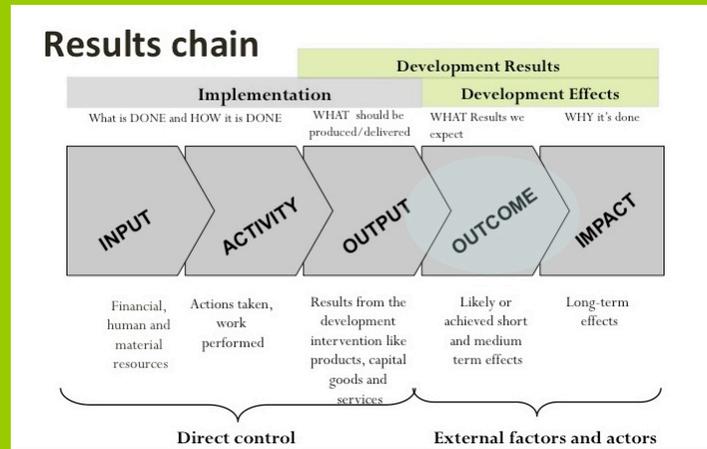
- S** **Specific**
- M** **Measurable**
- A** **Achievable (acceptable, applicable, appropriate, attainable or agreed upon)**
- R** **Relevant (reliable, realistic)**
- T** **Time-bound**

Baseline	Indicators	Progress	Assessment	Course of action
Refers to the initial situation when the projects haven't started yet, and the results and effects are not visible over the beneficiary population.	How do you measure project progress, linked to the your objectives and the information reported on the Implementation and Dissemination sections of this report.	Refer to how the project has been advancing in achieving the indicator at the moment the report is presented.	Descriptions should be clear and ideally contain operational terms where needed. Please describe the quality dimensions.	What is the project team planning to do next is very important to document, specially if changes to the original plan have to be implemented for the success of the project.
No certified solar technicians, only technicians from the utility company are trained, no one from the DoE and no one at local schools.	To what extent is there local capacity to install and maintain solar installations?	Sent local technician to get certified training on solar installation and system maintenance.	Certification Awarded	Local Technicians to Design and install Solar System and train iSolutions technician to maintain the solar system powering the micro data centre.
Limited accessibility to existing local content and educational resource from schools.	To what extend is there localized information available for students to study, as well as teachers to prepare their lessons?	Local content curate and digitized by project partner Dr. Hosman and her CalPoly students.	Three remote schools (Eot Elementary, Udot Elementary, and Udot Jr. High School) accessing solar powered micro data centre at iSolutions to access and retain information locally through long distance point-to-point intranet connectivity. 4 remote schools (Akoyikoyi School, Onoun Elementary, Northwest Jr. High, & Moch Elementary).	Collaborate with DoE and remote schools to update/modify/remove content to ensure appropriate contents are used.
Data collection system limited to a spreading sheet, accessible to single user to input data; bottleneck on data entry.	To what extend does the educational system in Chuuk use technology to assist on school administration, resourcing, reporting, etc.	Install SchoolTool at the Solar powered Micro Data Centre.	Local SchoolTool Server at Micro Data Centre accessible by three remote schools.	Collaborate with Chuuk High School and DoE Data Clerk to populate SchoolTool with Chuuk State DoE's student/school data and present to DoE at State level and National Level.

Project implementation: understanding the chain that leads to results

Tips: This is the most important section of the report. Here, the reader will **understand the processes and operational issues** of your project and how they contribute to the achievement of the objectives and the theory of change behind the project implementation.

Is possible that the project team's understanding of the development problems to be addressed with this project will have evolved or **changed** from those described when the project was originally submitted and approved. If that is the case, please share what motivated the change and what course of action has the project team identified.



Results chain diagram provided by In Develop

Narrative - project implementation

Please write a narrative description about the project implementation, starting from the problem statement you develop on your approved proposal. Please use this section of the report to provide context to the work conducted. For example:

1. Describe any **partnerships** with other organizations, researchers and community leaders that have been developed during the project cycle and the usefulness of these in achieving the project's objectives.
2. Describe the **involvement** of project beneficiaries, during all phases of project implementation.
3. Describe any **gender, ethnic and generation gap** issues that have impacted positively or negatively your project implementation.
4. Please take the time to reflect about activities that you struggle to implement during the period reported, along with processes and methods originally planned that might need **adjustment** to achieve your project objectives.

There are numerous benefits to be realized in the educational sector by connecting schools to the Internet, in terms of access to information and the ability to have increased communications. However, in island nations that lack undersea fiber-optics cables, satellite-based Internet remains the sole option for connectivity—albeit an expensive and slow proposition that is also susceptible to inclement weather. Hence, reliable communications between islands and access to educational and other useful information over the Internet is prohibitively expensive for those who need it most, particularly in remote locales. The Chuuk State Solar Server Education Hub project proposes to move relevant educational content and communications capabilities from a bandwidth-constrained satellite connection where all information is stored off-island in a remote data centre, to an on-island

location and to connect schools—whether on the main island or in the Chuuk lagoon—to an intranet where they can access this information.

This proposed project has helped us continue building our partnerships with Bruce Baike from Inveneo, Laura Hosman from Calpoly University, and Paul Haddik from Department of Education Chuuk. One of the benefits of our partnership with Bruce and Inveneo is access to technical support and consultation. With Bruce’s help, announcement was made for a design challenge was any interested groups enter to design and build a Micro Data Centre Server. The design Challenge by was sponsored Inveneo in partnership with ARM in which ARM will present \$10,000 winning Prize plus installation of the winning design. The design challenge start date was delayed due to funding delays. This pushed our installation date back as the design is to be used at the Micro Data Centre. In July, when all entries were submitted, it was evident that we still need to improve the designs to meet our requirements for the data centre. This led to us taking key features of the submitted designs and putting together a Clustered Server using Banana Pis, running MicroSD Cards and storing on SSD Hard Drives. Laura Hosman and her Calpoly students helped with collecting, designing and updating content for the Micro Data Centre. Our partnership with Paul Haddik gives us a direct contact at DoE and provides us with knowledgeable person on the department of education and its efforts in school reform as well as coordinates any collaboration between the team and DoE.

With all the partnerships formed, survey, research, design and implementation of the Solar Powered Micro Data Centre was possible.

Input	Project activities	Outputs	Outcomes	Timeline	Status	Assessment
Financial, human and material resources	Actions taken, work performed.	Result and/or deliverable produced as a direct result of the project activity. Outputs are under direct control of the project team.	Likely or achieved short and medium term effects. Focus on the changes facilitated by the project for its beneficiaries. Outcomes tend to be under the influence of the project team but not under direct control.	Dates where the listed activity was developed.	Indicate when the activity started, ongoing or completed.	Assessment indicating how the activity has been conducted. Describe technologies implemented, methods and techniques used and any challenges that have been identified.
Partnered with Inveneo to coordinate a “Micro Data Centre Design Challenge”	Developed Cluster server setup with combine key features on the best-submitted designs.	Solar Powered Educational Learning Library (SPELL) Clustered Edition	Remote Schools now have a self-sustainable and centrally managed Data Hub that provides universal access to local content.	Started March 2014, Tested August 2015 Rolled out August 2015	Completed	The finalists for the Design Challenge did not meet all expectations. The project team members combined key features of the submitted designs to come up with a DC powered clustered server system running on banana pis, linux and using MicroSD memory and SSD drives.
Capacity building for solar powered technology	Training on Solar Systems – Certification Hands on Installation of Solar Power System installation	Three technicians at iSolutions to install and maintain Solar System One Certified Solar Technician	iSolutions now have the capacity to provide local support and consultation services on solar systems to schools and rural communities.	Certified local installer – September 2014; Hands on training for iSolutions Staff -July-September 2015	Completed	The project sent a technician (Hiro Mori) off island to get certified in solar installation and maintenance. The team feels it is important that there is local expertise to support and maintain the solar system. After certification, Hiro trained and supervised three more iSolutions Technicians to install and support Solar System.

Equipment to test software and content for Micro Data Centre	Collect content and test hardware. Deploy three test servers at three schools	Digital Library Version 2	Three schools accessing digital content in rural schools; Access to research data for a solar powered version of the server.	Deployment August-September 2014;	Complete	The research and design stage compromised of Updating hardware and content of the Chuuk Schools Digital Library. The Digital Library was a product of a previous project. The goal for the upgrade is to find low cost, low powered hardware that can run on solar power. A Single Banana Pi was used to host an offline website with educational content accessible via a wirelessly broadcasted network. Lesson learned from these activities provided a guide to build a bigger server using Banana Pis in a Cluster setup.
Solar Panels, controller, inverter, batteries, mounting kits, wiring kits.	Design and install Solar powered System. Test and deploy system for operation.	5kw Solar system	Self-sustainable power source for the Micro Data Centre now operational. Scalable design implementable in rural areas.	May 2015 – August 2015	Complete	The solar system tests shows that the system is big enough to power a Micro Data Centre plus a small computer lab.

Project outputs, communication and dissemination activities

Tips: Take into account that the reader of your report has not being involved in project implementation, so readers do not have any further knowledge besides the information you are providing here.

This section of the report will allow you document the communication and dissemination efforts that the project team has conducted, which might be part of a specific communication strategy design as part of the project, or in place for the organization as a whole. When possible, please provide information about strategies in place and the rationale behind them.

Lessons can be learned from many aspects of project implementation, covering a wide variety of aspects such as technical, social, cultural and economical. Taking the rationale behind the project and its objectives can serve as a framework to draw your conclusions. Lessons can be identified by project partners, beneficiaries and general staff from the organization. A project diary and other activity records can serve as a tool to reflect during project team meetings and immediately after project activities are conducted.

Outputs are immediate, visible, concrete developmental change that is the tangible consequence of project activities, under direct control of the project team.

Example of possible outputs to report are:

- New products and Services (software, online platforms, applications);
- Information sharing and dissemination (publications, conferences, multimedia, social media);
- Knowledge creation (new knowledge embodied in forms other than publications or reports, such as new technologies, new methodologies, new curricula, new policies);
- Training (short-term training, internships or fellowships, training seminars and workshops) and
- Research Capacity (research skills; research management capacity and capacity to link research to utilization of research results).

Project outputs	Status	Assessment	Dissemination efforts
Output No. 1 (use the same names as per the listed outputs in the table above, see Project implementation)	Please select the option that better describes the status into the development of this output: - Work in progress - Completed. Please indicate date. - Not started. Please clarify, why? - Not completed. Please clarify, why?	Descriptions should be clear and ideally contain operational terms where needed. Please describe the quality dimensions.	Please specify what dissemination efforts were made, with special attention to those intending to reach target groups by gender, age, ethnic and socio-economic profiles to impact marginalized and disadvantaged groups.
Remote Schools connected to Micro Data Centre via long distance point to point connectivity now have a self sustainable and centrally managed Data Hub that provides universal access to local content	Completed –September 2015	Three remote schools have access to the Centralized Micro Data Centre that is solar powered at hosted at the iSolutions office.	Posters, share on social media, share project summary with Department of Education.
iSolutions now have the capacity to provide local support and consultation services on solar systems to schools and rural communities.	Completed – November 2014	Local experts utilized to install a 5kw solar system to power the data centre.	Shared on social media, solar services listed as an available service from iSolutions. Demo sessions to potential users.
Three schools (not connected to Micro Data Centre) have access to digital content in rural schools; Access to research data for a solar powered version of the server.	Completed – August 2015	Test connectivity from the three rural sites, all tests successful.	Shared on social media, Demo sessions to potential users.
Self-sustainable power source for the Micro Data centre now operational. Scalable design implementable in rural areas.	Complete – August 2015	Testing Solar System - now powering a data centre and 8 laptops	Shared on social media, Demo sessions to potential users.

Project outcomes

Tips: This section should be completed **ONLY** for the final report.

ISIF Asia expects you to report about the **outcomes** of the project as defined in the table below, based on the project implementation section of this report. Project team is encouraged to discuss the questions provided below to guide the reflection:

Can you identify and describe the relationships between the activities implemented and the social, economical, cultural and/or political benefits of your project implementation?

Outcomes can be defined as:

- Medium-term effects
- Effect of a series of achieved outputs
- Should capture the changes for the beneficiaries
- Take place during the life of project/strategy
- Influence but not direct control

The technology and the skills learned and used during the life of the project have already showed some outcomes that we've hoped for. By demonstrating the feasibility of using solar energy to power a micro data centre, we have influenced Department of Education to reach out to our team to request information on building more of the Solar Powered Educational Learning Library (SPELL) to be used at 30 more rural schools. This will assist schools with inadequate learning materials take advantage of the increase number of mobile devices or any wireless device, as well as provide another avenue to engage with the students. Xavier High School has also inquired on how to get a Digital Library Server for the school as well.

The training and installation of solar powered system and its successful implementation has allowed iSolutions to be able to add additional services, providing technical services and support on solar systems. By having trained solar technicians, clients are now requesting support, maintenance and consultation services.

In the end, it is our hope that providing appropriate technology to 'our rural communities, will help us by utilizing the technology to enhance collaboration, data retention and dissemination, and communication within Chuuk State without the need to travel open ocean, and decrease dependency on import and use of fossil fuel.

Project management and sustainability

Tips: Please comment on the general project **administration, staffing, procurement**, etc. specially those aspects contributing to the fulfilment of the project objectives as well as those that have delay project implementation.

Indicate **how the project team has strengthened its capacity** and work towards sustainability with the support provided by ISIF Asia? (new equipment, training, improved administrative skills, lessons learned from the project). Has the organization increased its research or administrative skills of the team involved? Has the project allowed for a particular contribution to capacity building of women or marginalized social groups? Special attention should be paid to the expected or unexpected impact on marginalized social groups.

Have you done **anything different** to provide administrative support for this project **besides your "business as usual"** processes and procedures? Has the project inspired change inside your organization?

Sustainability is to be examined not only in terms of staff retention and financial stability of the organization supporting the project but about the communities' appropriation of benefits perceived from project implementation.

The ISIF Asia Secretariat is very interested to learn if this project has generated opportunities for future development (new funding from partnerships, sponsorships, investment or other funding mechanisms), please provide details.

Please explain if the ISIF Asia grant has helped to consolidate your organization and how. If any of the project activities will continue after the end of the ISIF Asia grant, please describe how your organization is planning to support future developments.

There are many lessons / skills learned throughout the life of the project. The ISIF Asia Grant has helped iSolutions Micronesia build capacity in managing grants and project by mentoring and experiencing the management of this project. Skills learned from research, test, and implementation of a scalable design for a self-sustainable Micro Data Centre. By training and using locally solar technician's we have built the capacity to install and service such as solar system installation and support services. By having locally trained technicians, communities will be more encouraged to buy and use solar power.

Now that we have a running solar power system, it is now more cost effective for us to increase the power storage capacity and migrate our core equipment at iSolutions. This will help us decrease our dependency on fossil fuel.

Chuuk State Department of Education, through our partnership with Paul have requested for 30 Solar Powered Digital Libraries to be built and installed at 30 rural schools. These have less environmental footprint thus promoting sustainability.

Xavier High School has enlisted iSolutions to provide technical services to design upgrade network infrastructure and install a digital library.

Impact

Tips: *This section of the report does not refer to the project activities, but about the “bigger picture”. It will be desirable if the project team can reflect on the **impact that the project has contributed to as part of other actions implemented by your organization and/or your partners.***

Impact refers to the influence the project may have had on the way people do things through the use or adoption of the project outputs; changes in the context the project was implemented; changes in the community the project has been working with; and/or changes inside the organizations that have participated in the implementation or the relationships established through the project's implementation.

Impact is often impossible to measure in the short term and is rarely attributable to a single activity. Impact can be linked to a vision or long-term development goal that your organization might be working towards.

It can be identified as a logical consequence of achieving a combination of outputs and outcomes.

Impact is usually measurable after the project life and is outside the direct control of the project team and the organization.

With the centralized data centre, the long distance point to point connections, and appropriate services running we hope to impact the way schools collect, assess and disseminate information instantly rather than the normal way of which, if you lived on the outer islands, you'd have to travel by outboard boats or ships to get from island to island which is very costly. Utilizing technology to communicate, collect and disseminate data will greatly reduce fuel consumption for 40 plus islands that need to travel to the main island for at least every two weeks.

Overall Assessment

Tips: *This section of the report is extremely valuable for the ISIF Asia secretariat as it provides evidence*

about the role and relevance of ISIF Asia contributions in the Asia Pacific region.

Tips: Briefly provide **your own views** on the value and importance of the project relative to the proposed innovation, investment of time, effort and funding involved. Include the strengths and weaknesses of the project and the steps taken to strengthen the credibility and reliability.

This is your opportunity to conduct a **team reflection about the value of the project for the organization**. The following questions might help you to prepare a substantive overall assessment.

- To what extent the project meet its objectives?
- What were the most important findings and outputs of the project? What will be done with them?
- What contribution to development did the project make?
- Were certain aspects of project design, management and implementation particularly important to the degree of success of the project?
- To what extent the project help build up the research capacity of your institution or of the individuals involved?
- What lessons can be derived that would be useful in improving future performance?

With the success and completion of the project, as an organization, we now have a foot in the door in going green. We have a solar system in place. We have the capacity to support, maintain and upgrade the system. It is now up to us to continue to upgrade the solar system in order to cut our electricity bill by more than half. This is what we want to do.

The management and implementation of the project helped build our capacity in managing grants, and strengthen existing partnerships and creating new partnership opportunities.

Recommendations

Tips: Include any recommendations in this section that you and your project team, the organizations supporting the project and the community you worked with, would like to make to other practitioners or researchers on the field facing similar problems or implementing similar solutions.

Please take a minute to share recommendations with the ISIF Asia secretariat that might help to improve the support provided.

Visit by ISIF Asia Rep was particularly helpful for me personally to understand and complete this report. Having experts/specialist on your team to consult with or just bounce ideas off is good idea. Sometimes, what you think' makes sense might not' or vice versa. It was helpful to have a technical person and a person who sees through the user's point of view.

Bibliography

Tips: Include complete bibliographic references to all sources (printed, on-line, quotes, etc) used to prepare the different sections of this report. The APA style guide offers examples about how to reference a variety of sources. <http://www.apastyle.org/learn/quick-guide-on-references.aspx>(as accessed on 3/7/2013).

<https://ict4dviewsfromthefield.wordpress.com/2014/08/27/akoyikoyi-school-in-chuuk-fsm-receives-rachel-server-for-offline-educational-content/>

<http://www.inveneo.org/2015/03/inveneo-launches-arm-micro-data-center-design-challenge-2015/>

<https://www.facebook.com/isolutions691>

<http://www.kpress.info/index.php/site-map/1089-akoyikoyi-school-in-chuuk-fsm-receives-rachel-server-for-offline-educational-content>