UK SPACE AGENCY

Institute for Environmental Analytics

RE-SAT energy analytics platform - Seychelles case study

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The Institute for Environmental Analytics

Founded in 2015, the Institute for Environmental Analytics (IEA) is one of the world's leading centres for big data analytics in the environmental field. The IEA specialises in turning large scale, global environmental data into easy-to-use products for clients in the energy, agriculture and infrastructure markets.

RE-SAT.com Renewable Energy Space Analytics Tool

RE-SAT is an energy planning platform that fuses satellite and in-situ weather data with advanced analytics to provide highly detailed renewable energy information to help users:

- Explore and define the best renewable energy mix.
- Plan where to locate different renewable energy infrastructure.
- Assess the potential financial viability of renewable energy investments.
- Estimate power production and variability, taking into account seasonal weather patterns.

The RE-SAT project is led by the IEA, and funded by the UK Space Agency (UKSA) International Partnership Programme (IPP). RE-SAT Phase 1 was implemented in partnership with the Government of Seychelles from December 2016 to November 2017. Phase 2 aims to scale the RE-SAT platform to 6 other Small Islands Development States to support their transition from fossil fuel electricity generation to renewables. Phase 2 started in January 2018 and will finish in March 2021.

The UK Space Agency International Partnership Programme

The International Partnership Programme (IPP) is a 5 year, £152 million programme run by the UK Space Agency. IPP seeks to use space solutions to make a positive and practical impact on the lives of those living in emerging and developing economies through partnerships with end users in the target countries to increase their capacity and respond to specific challenges. IPP is part of and is funded from the UK Department for Business, Energy and Industrial Strategy's (BEIS) Global Challenges Research Fund (GCRF)

Acknowledgments

The RE-SAT project (Phase 1) acknowledges assistance from the Seychelles Ministry for Environment, Energy and Climate Change (MEECC); Public Utilities Corporation (PUC); Seychelles Energy Commission (SEC); Seychelles Meteorological Authority (SMA) and UNDP Seychelles.

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1. Executive summary

Small Island Developing States (SIDS) are heavily dependent on expensive, vulnerable, petroleum-based power generation and spend 15-20% of disposable income on electricity (versus 5-10% in the OECD). Whilst having abundant renewable energy (RE) resources ranging from solar and wind to geothermal and hydro, the current level of installed renewable capacity is low.

In order to support the planning and installation of more distributed energy resources (DERs), the Institute for Environmental Analytics (IEA) is using UKSA IPP funding to develop an energy analytics platform (RE-SAT) with associated data products and modelling to support SIDS to plan and undertake their transition from fossil fuel electricity generation to renewables.

Phase 1 (2017) of the project focused on developing a proof-of-concept platform for the Seychelles and is the subject of this case study. Phase 2 (2018 – 2021) is scaling the concept to 6 other SIDS.

The RE-SAT platform has three main components:

1. Resource assessment: What are the potential renewable energy resources?
    - Development of solar, wind, wave, Ocean Thermal (OTEC) resource maps, etc.
2. Location assessment: Where best to locate renewable energy assets?
    - Multi-criteria location analysis, using the RE-SAT platform or Geographic Information System (GIS) tool.
3. Power Scenario Evaluation: How much energy can be generated?
    - Scenario builder taking into account environmental constraints such as protected areas.

Satellite data is being used to enhance ground based estimates of environmental factors relevant to the production of renewable energy, such as irradiance, wind speed, wave height and ocean temperature. Satellite data is also being used to validate results from our modelling efforts. Products being used include:

- SARAH-E (radiation products) – used to validate simulated incoming shortwave radiation.
- MODIS (cloud climatology) – used to calibrate clear sky to cloudy radiations conversions.
- Sentinel-2 – expected to be used during Phase 2 to augment limited ground-based observations and validate computer simulations of relevant variables such as for example wind speed.

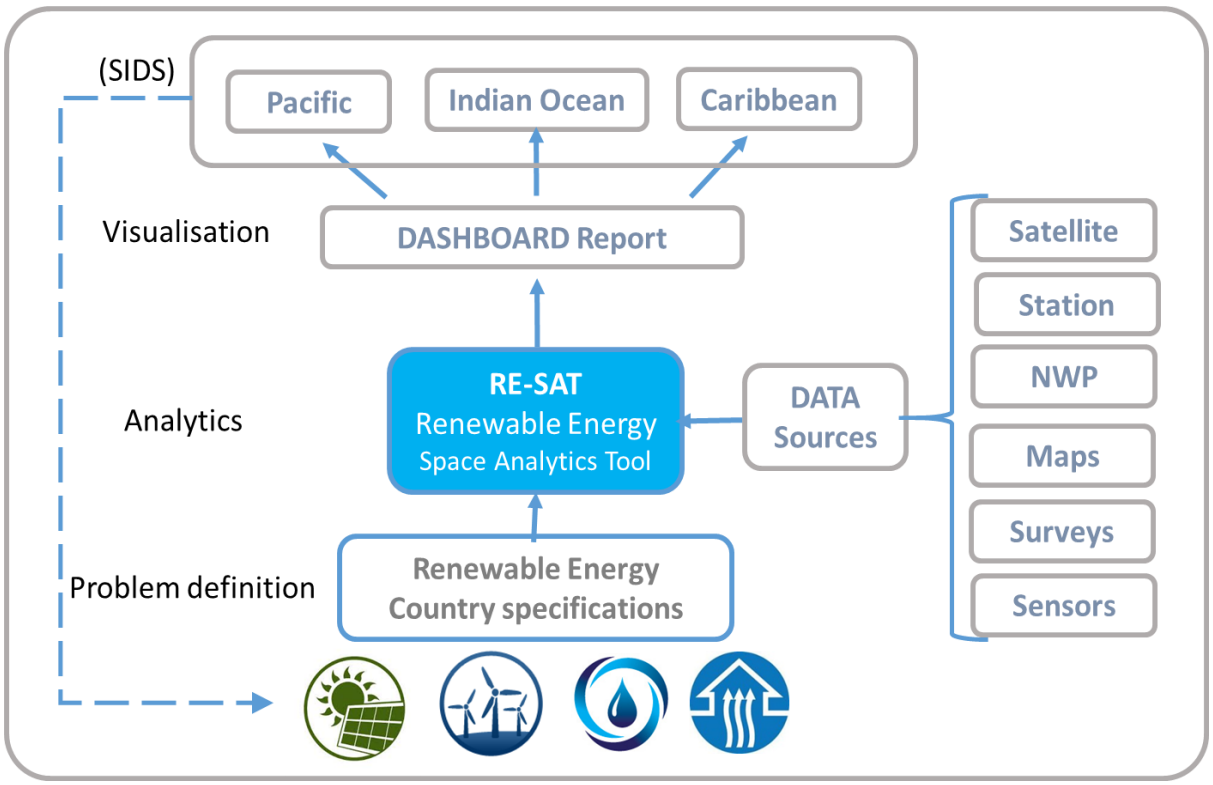
After 10 months of intensive development, the RE-SAT proof-of-concept platform was successfully launched in Seychelles in November 2017. This launch included a week long training course in how to use the platform. Following the launch the different users were all provided with access passwords in order to continue using the software operationally for a further trial period in order to test the system.

A significant early success of the platform has been the identification that the 15% renewable energy target by 2030 would not be achieved with just rooftop photovoltaic (PV) installations and solar farms, as there is not enough land or rooftop area available.

The **benefit and value** that RE-SAT is adding include:

- Improved accuracy of data for decisions about the energy mix, required grid infrastructure and battery sizing – leading to potential government savings on infrastructure costs.
- Better power calculation for a mix of RE developments as based on high quality data – leading to investor confidence and a greater likelihood that RE investments occur, thus reducing reliance on imported (and expensive) fossil fuels.
- Appropriate RE technology capacity building – leading to SIDS being better equipped to plan their future RE infrastructure.

RE-SAT schematic:



The RE-SAT platform concept

2. Project overview

2.1. The energy and data challenges facing Seychelles

Currently, the Seychelles relies on diesel and oil for 97% of its electricity generation needs, which amounts to 408 million kWh of electricity per year (2016). All the oil supplied needs to be transported by sea adding to market fuel prices. In 2014, 5% of the national income had to be used to pay for imported fuel in hard currency. However, in 2008 oil price rises increased the cost of oil imports to 10% of GDP for that year. As well as being a major drain on the economy these fluctuations represent a significant exposure to the risk of uncontrollable rises in oil prices (MEECC, 2014).

As a result, the Government of Seychelles has targets to progress towards energy-independence by exploiting natural renewable energy resources. The government has set targets to generate 5% of national electricity consumption from renewable sources by 2020, 15% by 2030 (Energy Policy, 2010-2030) and is developing a vision to achieve 100% by 2050 (Republic of Seychelles, 2015)1.

Planning and managing renewable energy production requires a good understanding of the variability in the natural phenomena such as clouds, wind, wave etc. In the Seychelles, there are a limited number of weather stations to understand significant geographic variability and records may be interrupted by operational disturbances leading to missing periods of data. These may be supplemented from time to time by specific site surveys or research projects, however these will be limited in location or timeframe.

Satellite based measurements can be used to generate data products that can regularly estimate weather parameters over large areas. However, the spatial resolution (typically in the order of kilometres) and time resolution may not always be suitable for renewable energy planning.

A key consideration in renewable energy planning and management is the need to anticipate short period (within 10 minute) fluctuations in production, as short term drops in renewable production need to be rapidly compensated by backup conventional fossil fuel generation, battery storage or other measures. As renewable energy production is distributed across a region, the risk of 'intensity drops' in renewable output can be lessened as, for example, not all installations will be affected by changes in cloud or wind at the same point in time. This means that a good understanding of the variability in these natural resources by location and time is essential, and this is not always supported by current sources of data.

A lack of confidence in the current data observations can lead to over-conservative assumptions about the requirements for back-up (leading to increased operational costs), or increased perception of risk from investors (leading to increased costs of lending).

[1] See http://www.sib.gov.sc/downloads/legislations/013a%20Seychelles%20energy%20policy%202010-2030_final.pdf, and http://www.mfa.gov.sc/static.php?content_id=36&news_id=1368

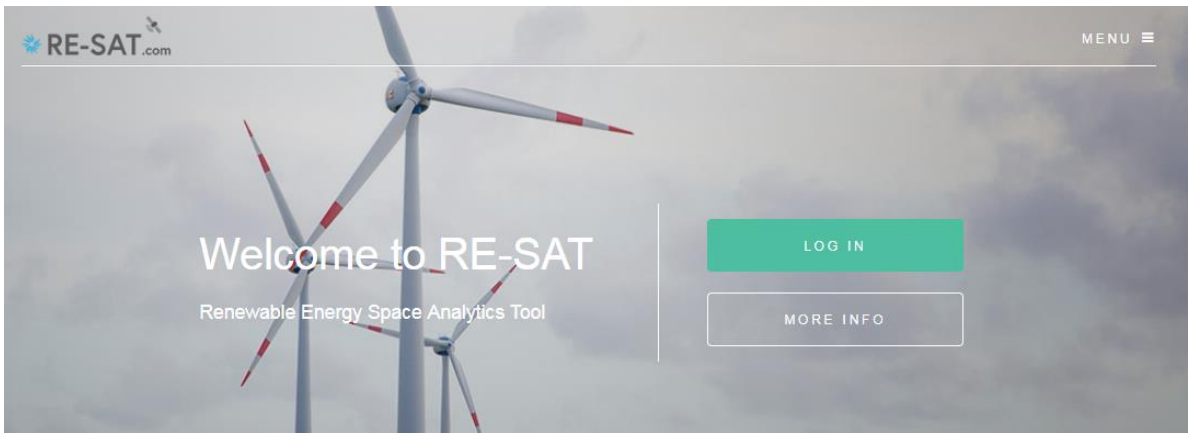
2.2. The RE-SAT solution

The RE-SAT project has addressed these challenges by **developing an energy planning platform** to support Seychelles and other SIDS in its transition to renewable energy and by **using weather observations, satellite data products and modelling techniques** to enhance and fill in gaps in the weather data record. The software platform allows users to access these enhanced datasets and use them to provide improved renewable energy resource estimates for investors and planners.

RE-SAT Phase 1 (December 2016 – January 2017) focused on Seychelles and the IEA engaged with a team of end users drawn from the main energy-related government agencies within Seychelles. Through a series of workshops and training sessions the IEA refined the functional requirements for RE-SAT under four categories of development:

1) RE-SAT platform development,
2) Data and modelling;
3) Power scenario calculation development; and
4) Capacity building and knowledge sharing.

RE-SAT Phase 2 is building on what was learnt and developed in Phase 1 to apply the platform to a range of other SIDS in order to prove its usefulness and commercial viability in different countries with separate renewable energy demands. The ability to expand the concept's geographical scope is a key strength of an Earth Observation based solution.



2.3. Targeting the UN Sustainable Development Goals

RE-SAT supports the transition towards low carbon energy in SIDS and contributes towards two key aspects: energy reliance and climate change mitigation:

- Sustainable Goal 7 – Affordable and Clean Energy - SIDS are heavily dependent on expensive, vulnerable, petroleum-based power generation (~85% across all the SIDS (IRENA2, 2014) and spend 15-20% of disposable income on electricity (versus 5-10% in the OECD). Paradoxically, SIDS have abundant RE resources ranging from solar and wind to geothermal and hydro. However the cumulative RE adoption across SIDS is less than 15% of total capacity (IRENA, 2014).

- Sustainable Goal 13 - Climate Action – Despite emitting less than 1% of global greenhouse gases, SIDS are very vulnerable to the effects of climate change including rising sea levels, seawater infiltration, land erosion and severe storms.

Increasing the use of renewable energy on island states will improve energy security and tackle climate change, leading ultimately to a more sustainable economic growth in the SIDS.
Our programme aligns primary to SDG 7 and the specific target 7.2: "By 2030, increase substantially the share of renewable energy in the global energy mix", with its indicator: 7.2.1 "Renewable energy share in the total final energy consumption".

In addition, part of our work also contributes to SDG 10 Reduced Inequalities (e.g. through better targeting renewable energy projects at low income groups) and SDG 11 (Sustainable Cities and Communities).

[2] IRENA: International Renewable Energy Agency

3. Project partners

Our primary international partners are the United Nations Development Programme (UNDP), the Rocky Mountain Institute (RMI) and the Clinton Climate Initiative. All provide useful links and contacts within the islands we work with drawn from their experience in leading energy transformation programmes for island states.

Within the Seychelles, our main partners are the government departments in charge of energy, the public utilities, the energy regulator and the National Meteorological Service.

Table 1 gives more details of our international partner in the Seychelles

SIDS	Government	Utilities	Regulator	Met Service
Seychelles	Ministry for Environment, Energy and Climate Change (MEECC)	Public Utilities Corporation (PUC)	Seychelles Energy Commission (SEC)	Seychelles Meteorological Authority (SMA)

Table 1: *Main project partners in Seychelles.*

The role of the government is to facilitate access to the findings regarding their roadmap towards renewable energy by providing expert knowledge into the particular RE requirements and potential sources of data. Their role is also to act as a bridge to local energy market organisations, the energy regulators and public utilities, plus the local research community, national meteorological authority and other relevant institutions.

Seychelles project partners at the kick-off meeting of Phase 1 in December 2016 (Seychelles)

4. Developing the RE-SAT platform

4.1. Understanding the user needs: the case for Seychelles

The requirements from the Government of Seychelles, to support their journey from fossil fuel to renewables, were the following:

- Verify and extend the Seychelles National Performance Assessment irradiation map;
- Derive enhanced wind and radiation estimates in the inner islands for historic time periods;
- Create wind and radiation estimates for best and worst case future decadal weather scenarios;
- Develop a method to assess the suitability of locations for renewable energy production; and
- Develop an application to allow the energy production potential of future RE production mixes to be assessed.

Achieving the above objectives would mean that those responsible for RE planning in the Seychelles could:

- Increase the coverage, resolution and precision of estimates of natural resources needed for production.
- Increase the confidence in RE estimates for investors and planners.
- Benefit from more knowledgeable and skilled staff working on RE planning.
- Improve the efficiency and effectiveness of creating estimates of RE production.

Over time these effects will contribute towards improved decision-making, reduced costs of implementation and increased uptake of renewable energy in the Seychelles, helping to reduce the cost of energy production and reducing the economic risks of reliance on fossil fuels.

4.2. Responding to requirements

Through a collaborative process, the IEA team tailored the project to the needs of the Government of Seychelles and developed a set of agreed targeted objectives with short-term benefits for Seychelles' planners as well as long-term benefits. The RE-SAT functional requirements, as developed in consultation with Seychelles partners, were separated into three categories:

Data Products:

1. Weather data products: Analysed and simulated weather data products for coupled wind and solar resources. These weather data products were created based on a bespoke local area numerical weather model configured by the IEA for the Seychelles and they include wind speed, incoming shortwave radiation and temperature. A wave data product was also generated using the EU Copernicus Marine Environment Monitoring Service data.
2. Resource maps: A guide to the abundance of energy available for a particular type of renewable generation by location. Resource maps for Seychelles were developed for: solar, wind, wave and ocean thermal.
3. GIS map layer: These are layers, either provided by SIDS or created by the IEA, including buildings, conservation zones, energy grid, etc.

Platform capabilities:

1. Data repository: A repository for storing and accessing data products was created
2. Location suitability: A capability to use the data products to assess suitable locations for renewable energy installations was demonstrated and partly integrated within the platform.
3. Power scenario: The capability to create future configurations of mixed renewable energy installations and estimate the potential energy production and variability in renewable production from these configurations, using the data products developed.

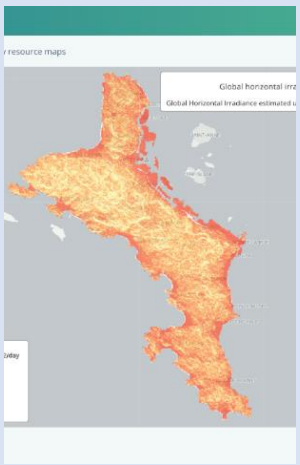
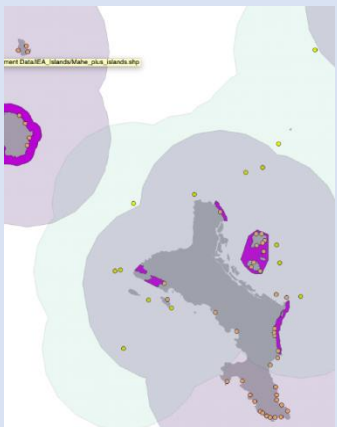
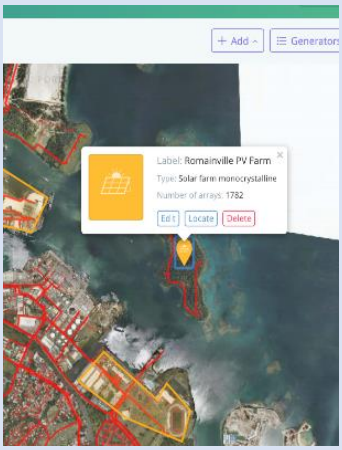
Capacity building:

One of the key aspects of the project is the exchange of knowledge and expertise with our partners regarding the use of earth observation data, environmental modelling and data analysis. At the end of Phase 1 in November we trained 12 nominated users across 5 different government departments and public agencies in Seychelles on the RE-SAT data products and web platform. This took the form of a week-long interactive workshop aimed at operational users of RE-SAT plus a half day high level briefing for CEOs and senior officials from the various agencies and government departments.

"PUC staff have worked with the IEA team and have shared data and expertise to support the development of the RE-SAT platform. Through this collaboration, they have also learnt data analytics skills which have facilitated the development of our projects."
CEO, Public Utilities Corporation

4.3. RE-SAT components

RE-SAT currently has three main components, each addressing a specific challenge involved in the deployment of distributed energy resources:

Resource Assessment: What are the potential renewable energy resources?	Location Assessment: Where best to locate renewable energy assets?	Power Scenario Evaluation: How much energy can be generated?
		

RE-SAT components

4.4. Delivering value and benefits

Resource Assessment

- Improved accuracy of data for decisions about the optimal energy mix, required grid infrastructure and battery sizing – leading to potential government savings on unnecessary infrastructure costs.
- Increased coverage, resolution and precision of estimates of natural resources needed for energy production – providing access to satellite and other sources of data plus analytical techniques specifically designed to evaluate options for renewable energy.

Location Assessment

- Facility within the platform to perform simple locations suitability taking into account protected areas and other constraints – providing a pre-feasibility check without the need for lengthy site surveys.
- RE-SAT natural resource data can also be imported into standard GIS systems to run more detailed location assessment scenarios.

Power Scenario Evaluation

- Better power calculation for a mix of renewable energy developments due to high quality data - leading to investor confidence and a greater likelihood that specific investments actually happen.
- Improved evidence-based quantification of energy network risks and environmental impacts – supporting planners in the management of risks.

Capacity Building

- Comprehensive training in weather and earth observation modelling leading to SIDS being better equipped to plan their future infrastructure needs.
- More knowledgeable and skilled staff working on renewable energy planning – delivering technical support and training to deploy and utilize RE-SAT for enhanced in-country decision-making.
- A knowledge-sharing platform to foster a wider exchange of experiences in the use of the data products and the platform both for in-country and inter-country participants.

4.5. Launch of the RE-SAT proof-of-concept platform in Seychelles

The RE-SAT proof-of-concept platform was launched in the Seychelles in November 2017, with a showcase demonstration for the Seychelles Minister of Environment, Energy and Climate Change, Mr Didier Dogley, and VIP guests in Seychelles including the British High Commissioner Caron Röhsler, Roland Alcindor, Head of UNDP Seychelles, Athene Gadsby of the UK Space Agency, other Seychelles Government officials and stakeholders from the Seychelles Energy Commission, the Public Utilities Corporation, Seychelles Meteorological Authority and representatives from some government-endorsed PV suppliers and installers

"SIDS like Seychelles face major challenges when it comes to providing affordable and clean energy to their people. Although, there is political will to increase the amount of renewable energy in our energy

mix, major investments have to be made to generate scientific data required to overcome technical hurdles and optimise investment in renewable energy. The support from our UK partners has provided us with an excellent planning platform, which will enable us achieve our ultimate goal of 100% renewable energy generation."

Comment extracted from Minister Dogley's speech at the launch of RE-SAT in Seychelles.

"I'm really delighted that the UK, through the UK Space Agency grant and the expertise of the Institute for Environmental Analytics, is at the forefront of helping Seychelles to switch to green energy. As we have heard, this is about gathering and correctly analysing the right data to identify the most suitable mix of renewable energy sources – solar, wave and wind – to provide a reliable supply and build the right infrastructure to deliver it."

Remarks extracted from the British High Commissioner Caron Röhsler's speech at the launch of RE-SAT in Seychelles.

"As the project unfolded particularly with the linkages with the Green Climate Fund, it became clear very quickly that RE-SAT was really useful. It tied in very neatly with the logical progression that we were trying to build through identifying the problem, dealing with the immediate issues and finding solution in the short run. In terms of relevance it became very clear that the project was going to be, particularly in relation to pursuing this renewable energy agenda, extremely relevant"

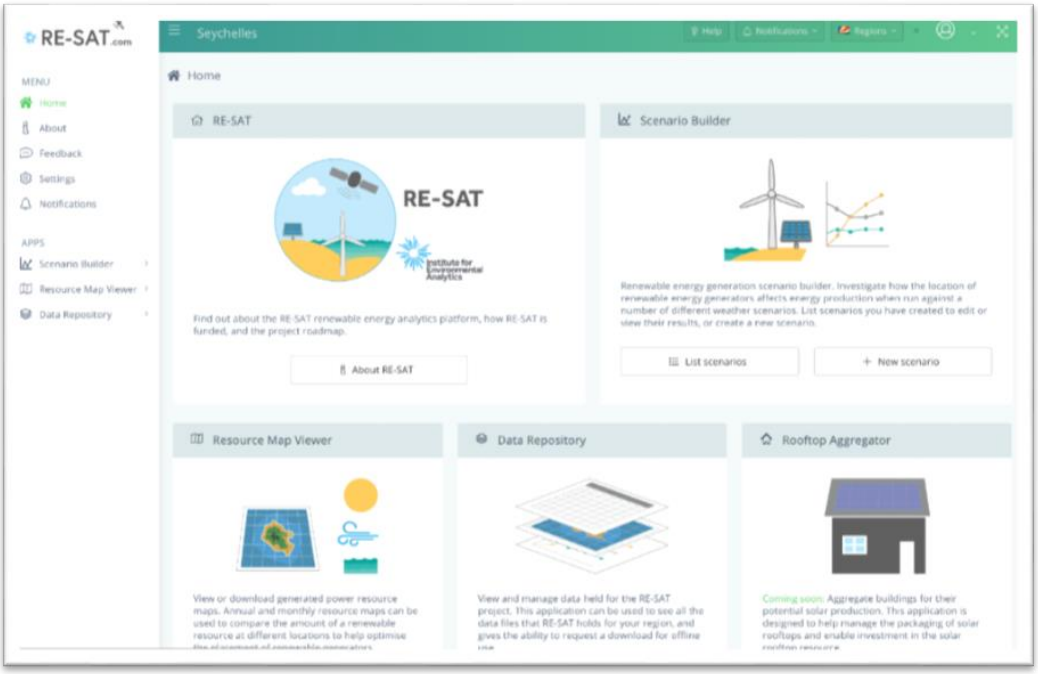
Comment from GOS-GEF-Programme Coordination Unit

A selection of photos taken at the launch and training workshop event in the Seychelles:


DRIVING INNOVATION
AND GROWTH FOR THE UK
Research and Developmen
Demonstrator Applications
Training and Education
Translation and Engagement

5. Sustainability model

The sustainability model focuses on making RE-SAT available to existing and future SIDS via a commercial licensing model based on the development of the platform and data products for each new country. In addition, different user groups in other developing countries and the commercial sector will be targeted.



Snapshot of the RE-SAT software platform Home page

6. Impact

6.1. The difference RE-SAT is making in Seychelles

Despite having rich potential for using renewable energy, Seychelles had insufficient environmental data and relied on incomplete records or limited time-series data to plan their RE strategy. Unsure of the exact extent of RE they could harvest, they overly relied on fossil fuel.

From bespoke high quality wind and solar maps, to tailor-made scenario building, RE-SAT has made significant improvements to the way that the power sector, stakeholders and Seychelles ministries now collaborate to plan for and invest in renewable energy. RE-SAT is providing the Seychelles Government with the quality of data it needs to develop business cases for themselves and for developers to switch to renewable sources to a far greater extent. Without the involvement of the project there would be much less confidence in the renewables estimation and therefore a much smaller take up of RE.

Within a year of the start of the project, RE-SAT has provided the Seychelles Government and public utilities with a cutting edge renewable energy platform that is already helping them towards a climate resilient future.

The three key components of RE-SAT that the Seychelles Government are using to move away from fossil fuels are:

1. High resolution RE resource maps
   For the first time, Seychelles has detailed resource maps covering all three of its main islands (solar map; wind map; wave map; ocean thermal map).

2. Easy-to-use energy scenario builder
   Explores and defines the best renewable energy mix and plans where to locate assets to avoid protected areas (e.g. national parks) - simply by placing different renewable technologies such as wind turbines, wave devices or solar panels, in any location, Seychelles users rapidly calculate the RE power that could be produced. Seychelles now has a common data repository for all stakeholders to use.

3. Assessment of financial viability & investment potential –
   Seychelles can estimate power production and variability, taking account seasonal weather patterns. Multiple users can log-in at one time for efficient and effective collaboration and decision-making in the Seychelles. Seychelles is now able to optimise the location for new RE infrastructure.

6.2. Key achievements in Seychelles

Solar resource maps:

Compared to what existed before, the RE-SAT solar irradiation maps (Figure 1):

- Deliver a reduction of 25% in mean absolute error compared to the original national solar irradiation map when used to estimate power yields at reference sites.
- Increase the coverage of the national solar map to the whole of Mahe.
- Provide the first coverage of Praslin and La Digue.
- Improve the interpolation of estimates between sites used in the previous map.
- Quantify the effect of model uncertainty on the irradiation estimates.

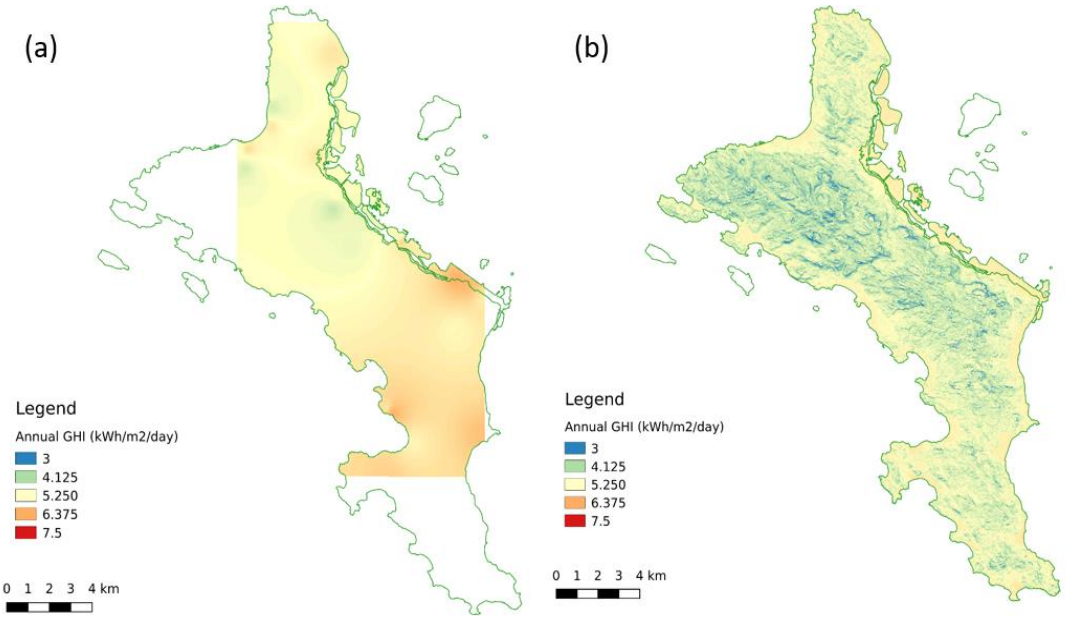


Figure 1: *Comparison of annual average GHI (Global Horizontal Irradiance) products for Mahe: a) original national solar irradiation map; b) the new RE-SAT map combining ground measurements with satellite-derived data.*

"With data gathered from installed rooftop PV systems over a period of 2-3 years…the experts from the IEA have been able to use satellite data to produce high resolution solar irradiation maps for every month of the year. With this improved data, developers can make better decisions on where to site a solar farm and PUC will have a better estimate of how much energy will be produced from renewable sources at different times of the year. This reduces the risk involved in those projects and therefore makes it easier to obtain financing for them". ***CEO, Public Utilities Corporation.***

Power scenario proof-of-concept:

The platform (see Figure 2) is being used by national agencies to undertake mixed renewable energy resource planning (e.g. identifying investment opportunities in aggregated rooftop PV or a future mix of RE technologies). BOX 1 provides an example of a realistic exercise to develop a RE scenario to achieve a 15% RE target by 2030 set by the Government in Seychelles.

"Being the Regulatory authority, SEC could use the RE-SAT platform for the introduction of a Feed-in-Tariff which could be beneficial for encouraging private investors to invest in renewable systems, supporting the Government to reduce its dependence on imported fossil fuels to secure domestic energy supply and therefore reducing CO2 emissions along with increasing local job creation." ***Comment at midline (Phase 1), CEO, Seychelles Energy Commission***

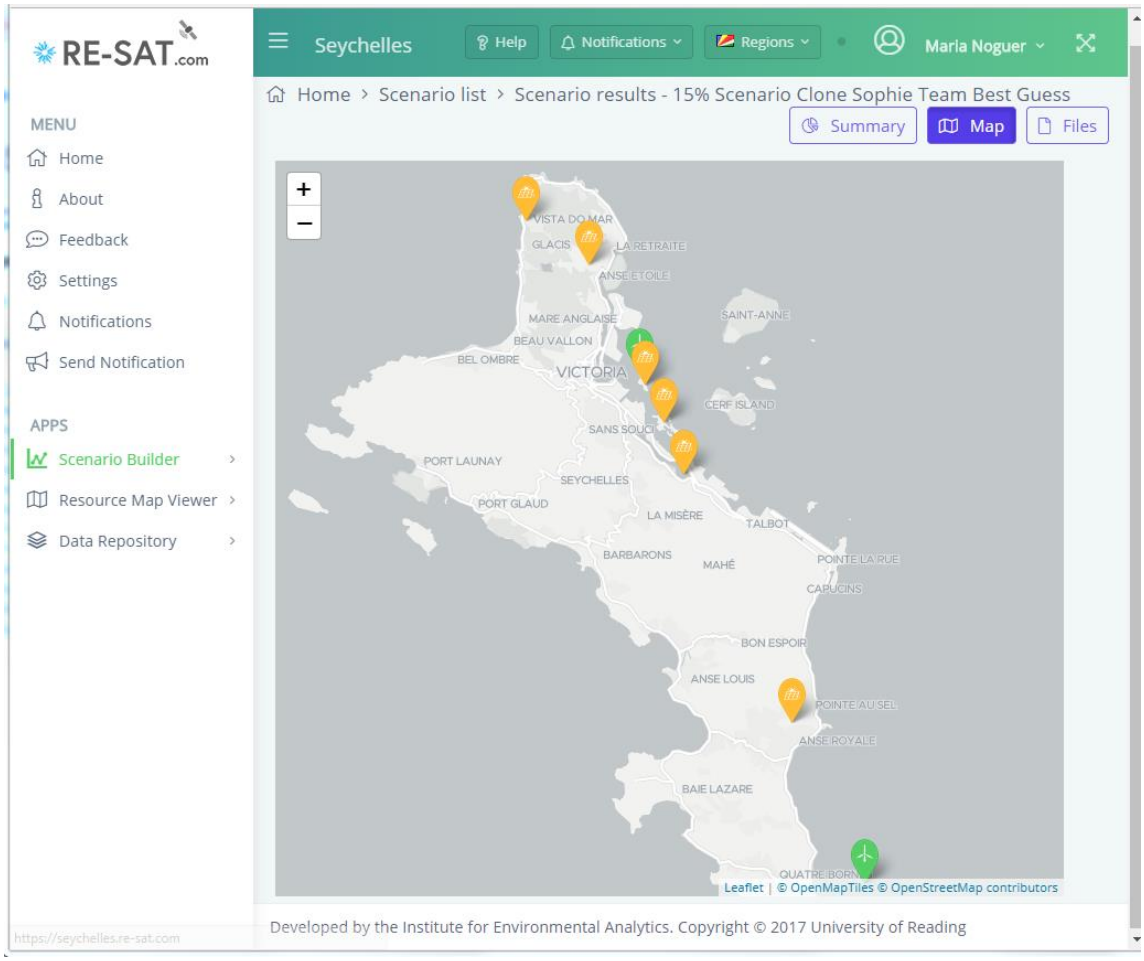


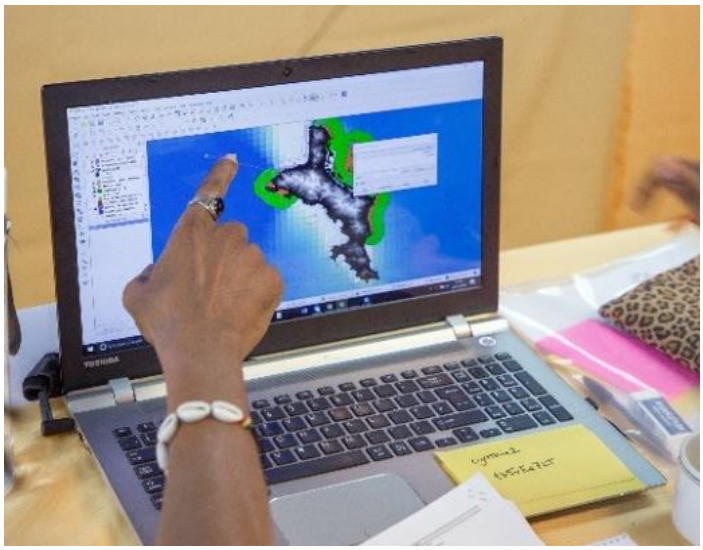
Figure 2: *RE-SAT platform Scenario results page (Map)*

BOX 1:

Simulating realistic Renewable Energy scenarios for Seychelles using RE-SAT

Seychelles has a long-term target to generate all of its energy from renewable sources, with a target of 15% of energy to be met from renewable energy sources by 2030. It has also made commitments to the Paris Agreement to reduce its greenhouse gas emissions by 29% in 2030 relative to baseline emissions. It is also important for the country's energy security to diversify its energy sources. To achieve these goals, Seychelles needs to develop detailed plans to ensure the electricity system can operate reliably.

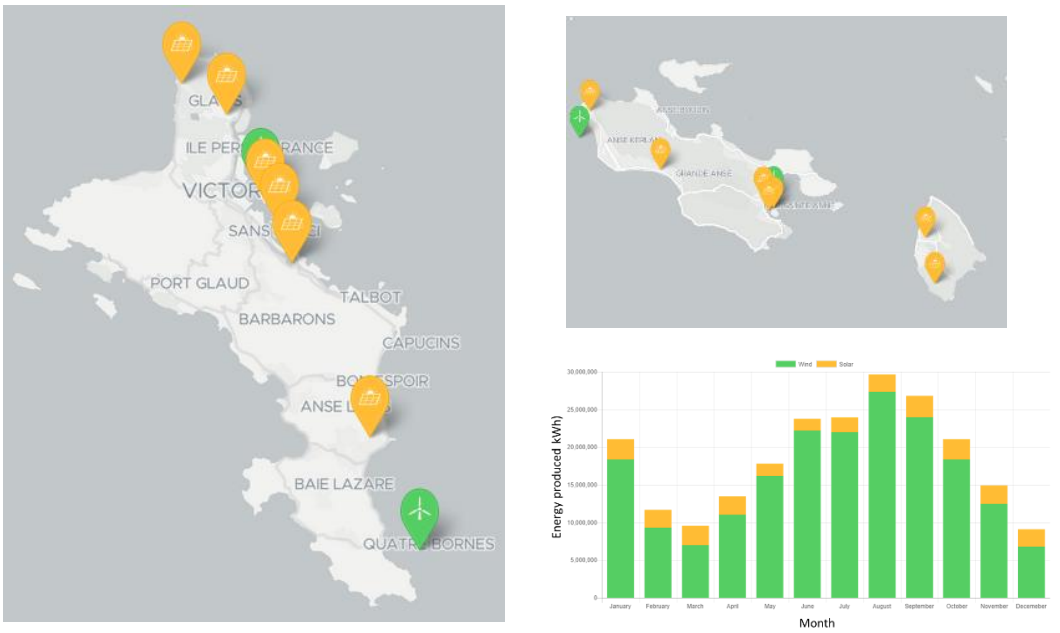
To aid in planning the development of the renewable energy sector, Seychelles has used RE-SAT, an energy planning software application developed by the Institute for Environmental Analytics (IEA) in collaboration with stakeholders in Seychelles. A working group was set up during the development of RE-SAT and is composed of members from the Public Utilities Corporation, Seychelles Energy Commission, Seychelles Meteorological Authority and the Ministry for Energy, Environment and Climate Change in Seychelles. The IEA provided face-to-face training, assistance by video conference and practical workshops on how to use the RE-SAT platform to support Seychelles in its transition towards renewable energy.



Using RE-SAT, the working group modelled scenarios that would enable Seychelles to reach the 15% renewable energy target by 2030 as set by the Seychelles Energy Policy. It was estimated that by 2030, the total energy demand would be 800GWh. Therefore, 120GWh would need to be produced from renewable sources to achieve the 15% target. Using the capacity factor from previous modelling exercises and actual measurements of production on the ground, the installed renewable energy capacity required to produce that amount of energy was calculated. It was found that 90MW of RE would need to be installed to achieve this.

Initially the working group attempted to simulate this amount of energy installing only rooftop PV and solar farms. However, this was found to be very difficult to achieve. To generate that amount of energy using only solar installations would require a total area of approximately 900,000m^2, and it was found that there was insufficient suitable land and rooftop area to install this amount of solar panels.

When offshore wind farms were included into the scenario, it was easier to reach the 15% target. When installed in suitable locations, not too far from the shore, a capacity factor of 40% could be achieved. This is comparable to other offshore wind farms around the world. However, due to the wind profile over a year, the renewable energy production shows some variations throughout a year which would require the operation of diesel generators at higher intensities during certain times of the year.



Maps showing the locations of the renewable energy plants that formed part of the 15% RE scenario, together with the monthly energy production from the 15% scenario (RE-SAT output).

Whilst this can be a good solution to reach the 15% target, as Seychelles aims for higher levels of renewable energy, the generation from renewable sources should be more even to match the demand over a year. This would enable diesel generators and renewable energy plants to operate at optimum capacity factors.

This exercise was the initial attempt to model a potential scenario to reach the 15% renewable energy target by 2030. This scenario can be used as a starting point and adjusted e.g. by considering pessimistic and optimistic input data, or by introducing other types of renewable energy, to reach a better generation mix, and improve on the plant locations.

Using RE-SAT has made it very easy for Seychelles officials to assess different scenarios for potential RE installations, especially the realisation that the 15% RE target would not be achieved with just rooftop PV installations and solar farms, as there is not enough land or rooftop area available.

6.3. Key impacts of RE-SAT in Seychelles

The key impacts of the project according to our in-country stakeholders in Seychelles include:

- Engagement of different government bodies working together towards the same goal.
- The RE-SAT platform will reduce the burden of public queries regarding relevant data as data is now in a centralised repository.
- Positive impact on rooftop PV suppliers as some were willing to share their data and helped the project move forward.
- Provided the 100% renewables agenda a practical software platform with which to develop evidence-based RE scenarios for future investments.
- An energy planning platform that is easy to use and translates data into useable information with a very wide range of outputs and ways for visualising the results.

Unintended impacts:

- A tailored electricity meter analysis study have categorised this data and PUC is now using the data more efficiently. This analysis has been very well received and could be used in future tariffs reform.
- Developed further expertise in GIS tools and space technology in Seychelles.
- Initially the project took away in-country partners from their current work, but it was worth investing resources to have the positive impact that the platform is having.

7. Lessons learnt

Project timing – There was a lot of momentum in Seychelles regarding RE initiatives. RE-SAT was well received partly due to this as they saw an immediate opportunity to exploit the platform to their advantage. A vision, an established agenda and strategy on RE from the international partner are key ingredients for successful implementation.

In-country commitment – From the beginning, UNDP Seychelles facilitated the engagement with the right stakeholders in government and agencies. These group of individuals, through the Working Group and Project Board supported very effectively the development of the project.

Knowledge sharing - The willingness to share data, information, and material was very welcoming and speeded the assessment and data gathering phases.

Organisational structure – The project put in place two key management structures that worked very well in the delivery and sense of ownership of the project. The virtual monthly meetings with 4 face-to-face visits were very effective in maintaining the dialogue with our in-country partners. Having a base and support from the UNDP consultant in Seychelles for local arrangements was very important for the smooth operation of the project.

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