

Sustainable Energy for Remote Indonesian Grids

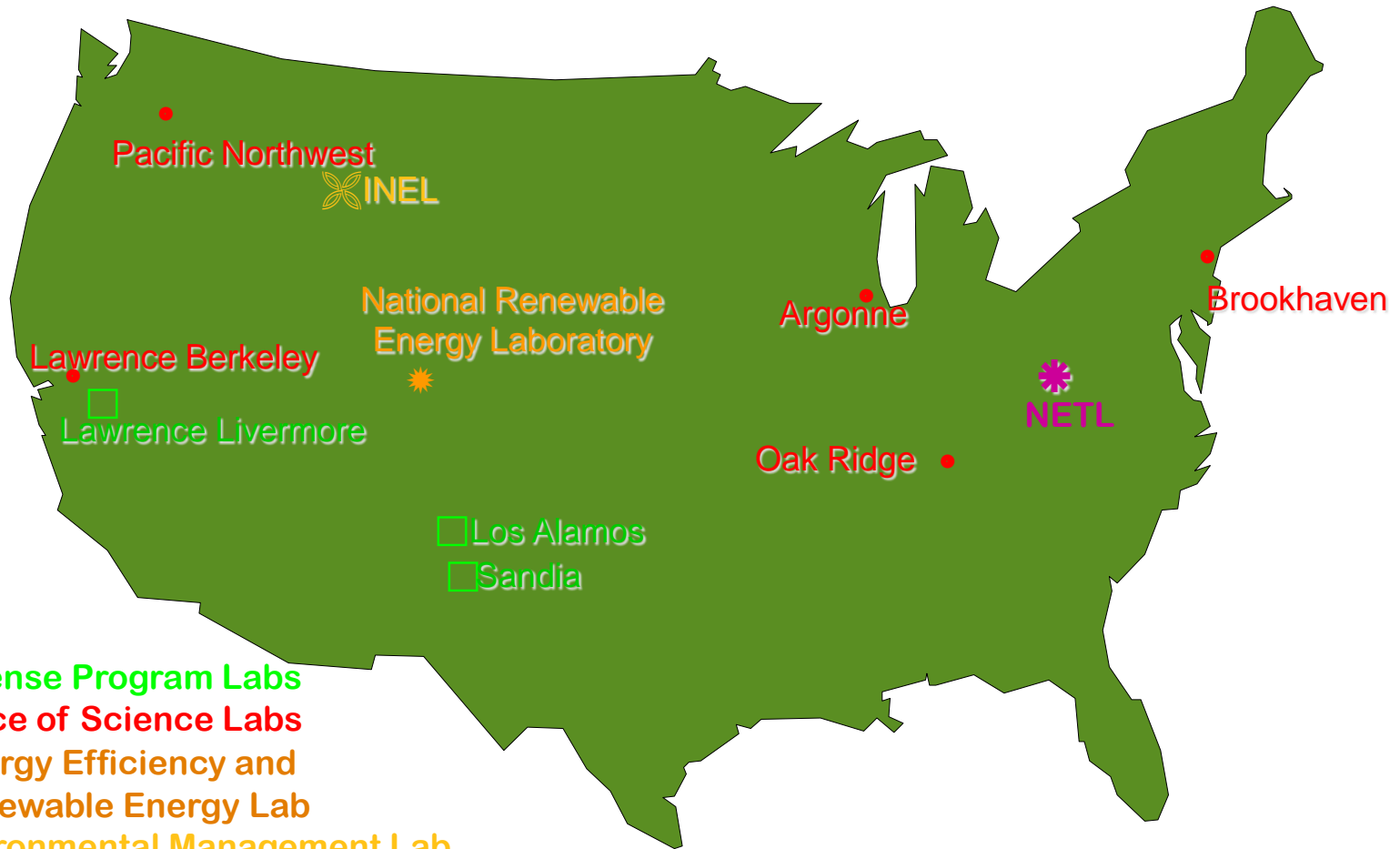


**Stakeholder
Workshop
October 1, 2014
Hotel Mulia
Jakarta, Indonesia**

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Department of Energy National Laboratories



- Defense Program Labs
- Office of Science Labs
- ★ Energy Efficiency and Renewable Energy Lab
- ✂ Environmental Management Lab
- ✱ Fossil Energy Lab

SERIG Project Broad Objectives

Demonstrate business cases for high-penetration renewable energy and energy efficient technologies to replace diesel generation on selected islands and remote grids

- ✓ **Demonstrate the value of RE/EE technology solutions that enable economically sustainable energy market alternatives**
- ✓ **Support the development of a national-level policy framework to foster private investment in RE throughout remote areas**
- ✓ **Mobilize private investment in RE and EE projects, particularly by working to foster market potential for companies**
- ✓ **Leverage and promote further engagement with existing clean energy efforts in Indonesia**
- ✓ **Develop a replication plan for accelerated RE and EE deployment across hundreds of other remote grids in Indonesia.**

Project Rationale and Objectives

Indonesia

Indonesia has the 4th largest population in the world, and a rapidly expanding economy with national goals and policies to increase access to electricity while also increasing usage of renewable energy.

Rationale:

- **High cost of diesel powered electricity esp. for remote island grids and relatively low levels of electrification**
- **Clean energy and energy efficiency and GHG goals**
- **Rapidly expanding market potential for clean energy technologies**
- **Access to renewable energy resources**
- **Significant international investment in RE and EE**

A few of the challenges:

- **National subsidies for diesel fuel**
- **Detailed site-specific resource data**
- **RE technology supply chain and expertise in remote locations**
- **Capacity building – operation and maintenance of RE systems**
- **Accessibility of island grids**

Potential Mutual Benefits US & Indonesia



- Strategic planning and analysis
- Energy modeling
- Workforce development
- EE/RE technical expertise

Leverage US Technical Expertise

Assist Indonesia

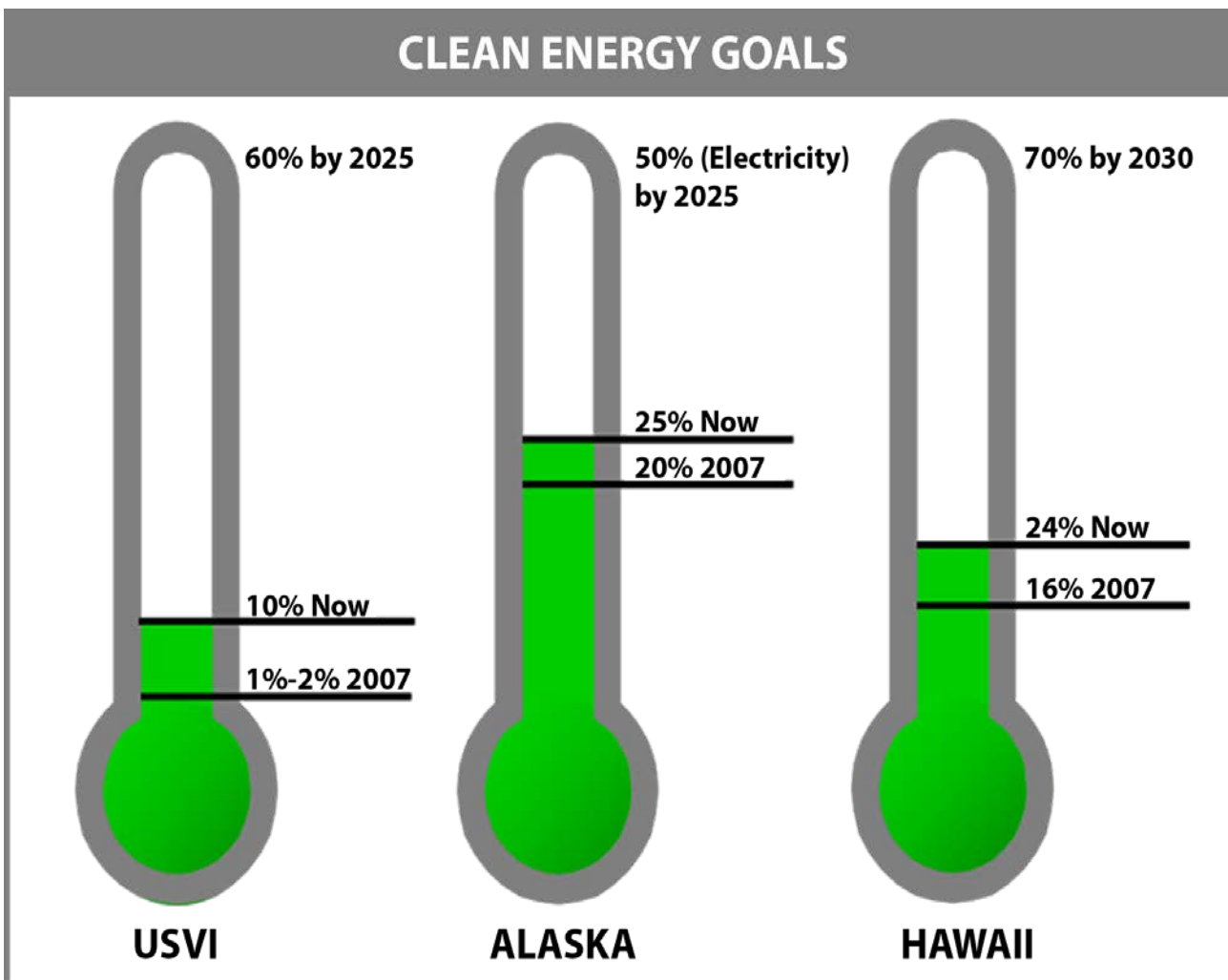
- Increased use of energy efficiency and renewable energy technologies
- Replicable RE and EE models



- Increased exports of clean energy technologies and services
- Data on clean energy policy and program success and challenges

Potential US Benefits

We Are in Good Company...And Can Learn From Each Other



NREL Synergistic Activities

Millennium Challenge Corporation -
Indonesia

NREL support for USAID EC-LEDS
Clean Energy Solutions Center
EE/RE Integrated Deployment

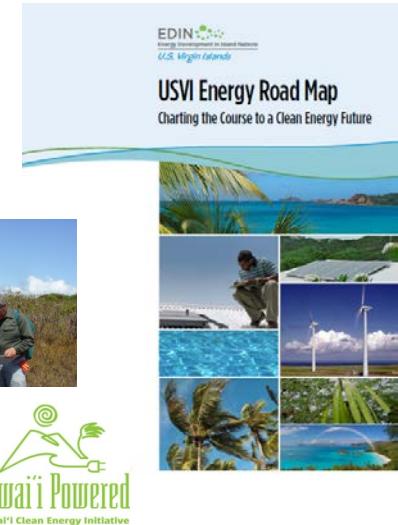
- Hawaii Clean Energy Initiative
- US Virgin Islands
- Alaska Clean Energy

US DOI Pacific Island projects

- Guam, Samoa, CNMI, Palau

Remote Community Renewable Energy
Partnership (RCRE)

Access to RE and EE technology and
energy systems integration expertise
throughout the lab



NRELHeader.jpg
Produced under direction of the U.S.
Department of the Interior Office of
Insular Affairs by the National
Renewable Energy Laboratory (NREL)
under Interagency Agreement IAG-10-
1773 and Task No WFF4.2000.

**Commonwealth of the Northern
Mariana Islands Initial Technical
Assessment Report**

Ian Baring-Gould, Randolph Hunsberger, Charles Visser, and
Philip Voss



Project Team, Partners, Stakeholders



U.S. DEPARTMENT OF
ENERGY

DOE EERE International

- Establish project objectives
- Select project team
- Oversees all activities

PLN & Indonesian Stakeholders

- Assist with project selection
- Provide local guidance and feedback

US Agencies & International Organizations

- Participate in stakeholder events
- review plans and provide feedback on potential collaborations

NREL

- Project management team
- RE/EE tech assessments
- Policy and finance assessments
- Coordination with US agencies

WINROCK

- Project management team
- Leads Indonesia implementation team
- Coordination with Indonesian stakeholders and international agencies

RE and EE Industry

- Participate in stakeholder events
- review plans and provide technical and business guidance
- feedback on project development

Financing Organizations

- Participate in stakeholder events
- review plans and provide business guidance
- Feedback on project development

Winrock's Jakarta Team

Our Team:

- **Non-profit, office open in Indonesia for 8 years; 20 years of experience here**
- **Staff of 17 fulltime and consultants; primarily Indonesian**
- **HQ in the US, with broad international development focus**
- **Indonesia team specializes in renewables technology and financial assessment**

Ongoing project work:

CIRCLE (Capacity for Indonesian Reduction of Carbon in land use and Energy)

- *Leading full cycle development of Palm Oil Mill Effluent to energy projects*

SERIG (Sustainable Energy For Remote Indonesian Grids) – with DOE/NREL

SUMBA ICONIC ISLAND (funded by HIVOS)

- *Assessment and development of grid connected utility scale wind project*

ABD wind resource assessment on Sumba

- *Detailed onsite renewable resource assessment*

US Environmental Protection Agency Global Methane Initiative

- *Economy wide assessment of methane intensive industries and context appropriate technologies*

Project Activities, Timelines, Deliverables

- ✓ **Screening/Selection – COMPLETE**
 - Identify technology & regional opportunities and priorities
 - Detailed data collection & site visit: resources, load profiles, grid, efficiency
- ✓ **Technical and Economic Assessments and Implementation**
 - Lamandau / Sabu site visit reports (3/14) – **COMPLETE**
 - Policy/Finance & Efficiency Opportunities and Barriers Reports (3/14) – **COMPLETE**
 - RE/EE Feasibility studies for selected grids (6/14) – **COMPLETE – Lamandau & Sabu**
 - Stakeholder Outreach (10/14)
 - Integrated Deployment Plan (11/14)
 - Sumba Integration & Wind Analysis (3/15)
 - Project Finance Documents (3/15)
 - Replication Strategies (4/15)

Site Selection

2 provinces selected for Feasibility Analysis: Central Kalimantan and East Nusa Tenggara

Selection Process:

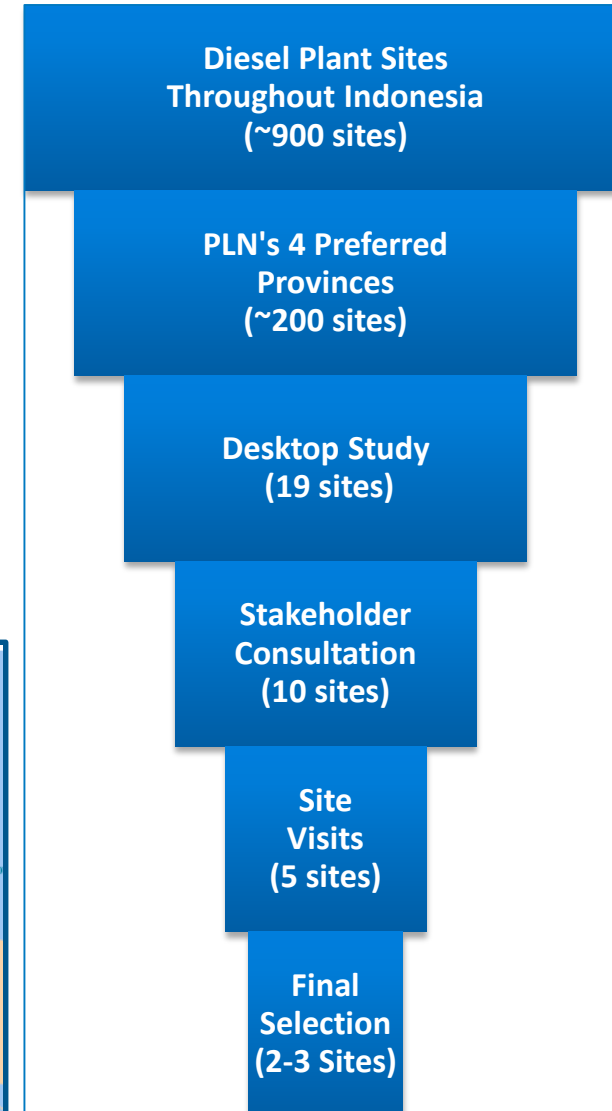
1. PLN priorities
2. Regional desktop study (data availability)
3. Stakeholder consultation
4. Site visit/survey

Sample Criteria:

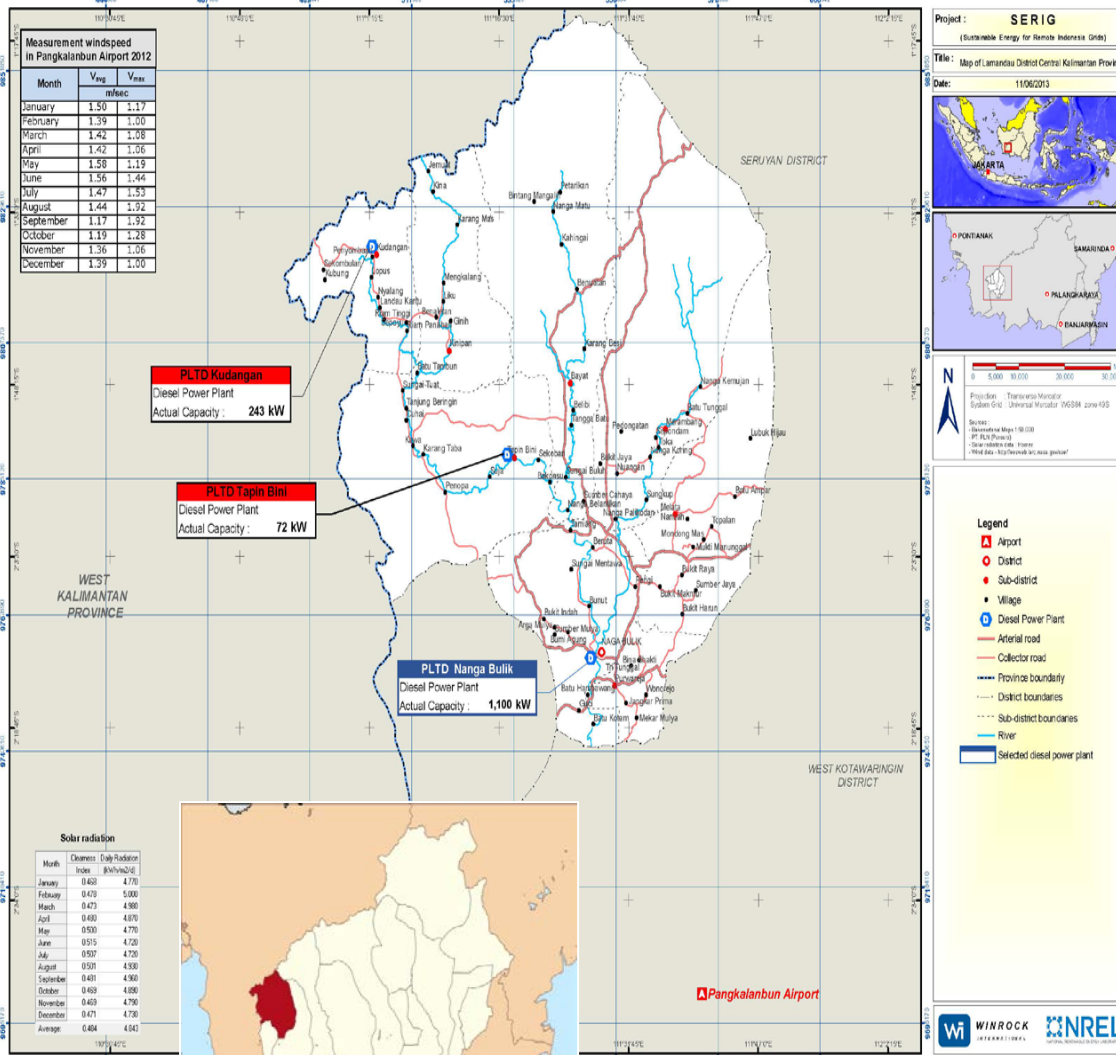
1. Cost of electricity
2. Local government support
3. Potential for replication
4. Electrification Ratio



Selection Process



Lamandau – Central Kalimantan



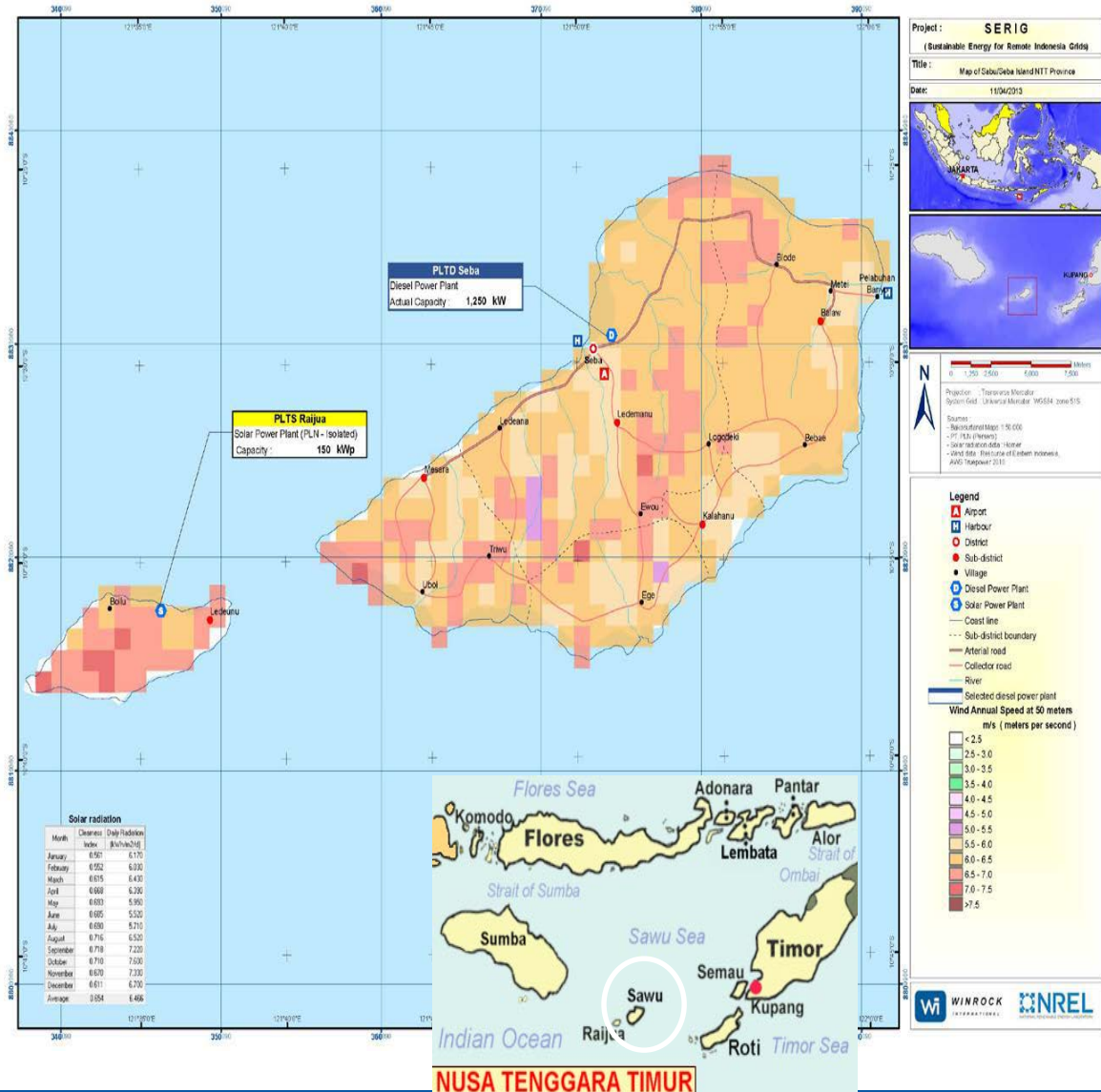
Population: 70,000

Electrification Ratio: 36.4%

Diesel Consumption (PLTD AMP): 4.8 Million Litres/yr

RE resources: solar/hydro/bioenergy

Sabu Island – East Nusa Tenggara



Population: 67,000

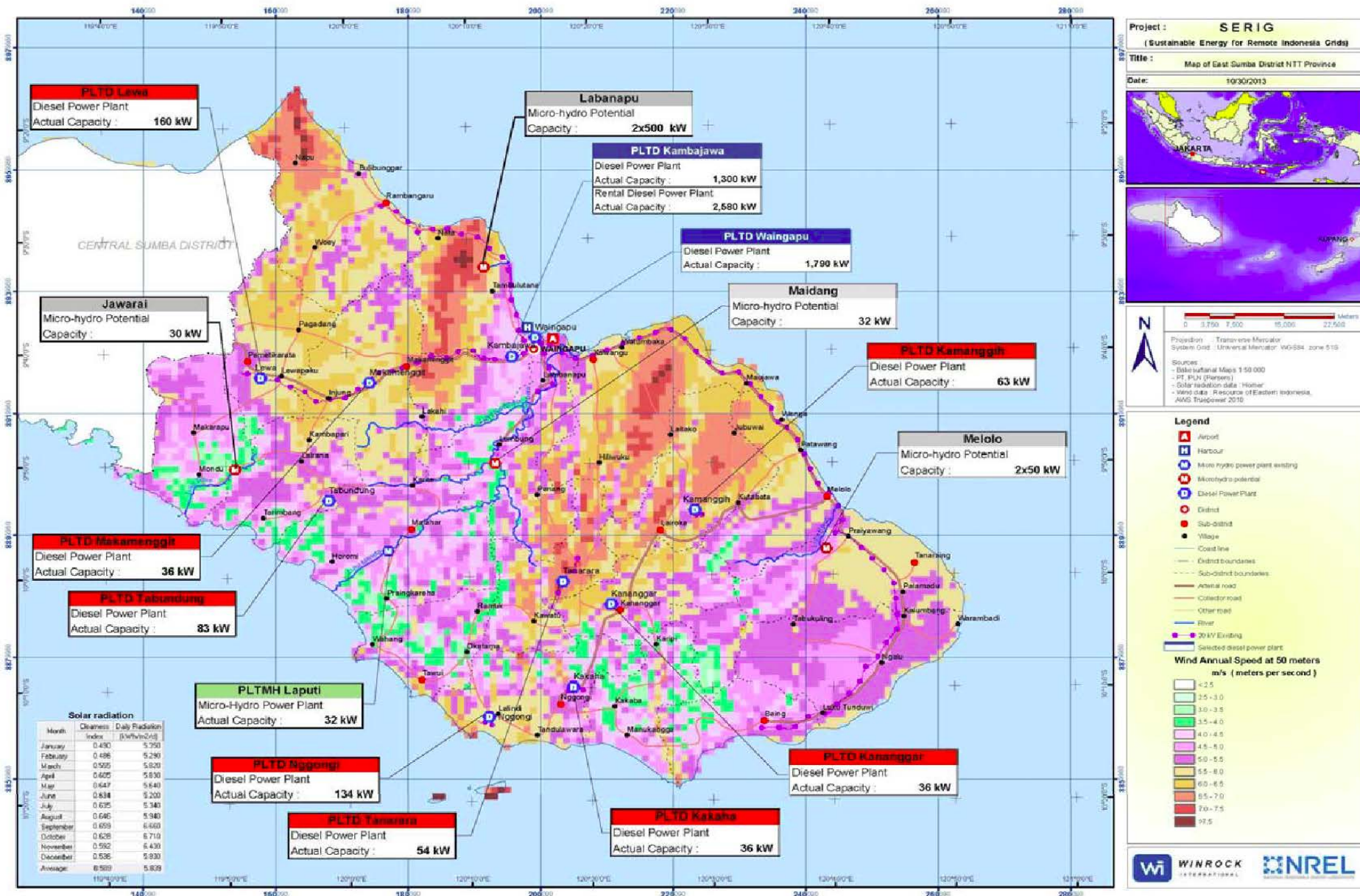
Electrification Ratio: 41.7%

Diesel Consumption: 1.3 Million Litres/yr

Primary RE resources: wind/solar
Substantial off-grid PV

NUSA TENGGARA TIMUR

SUMBA – Iconic Island Initiative



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TERIMA KASIH!



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Putting Ideas to Work