

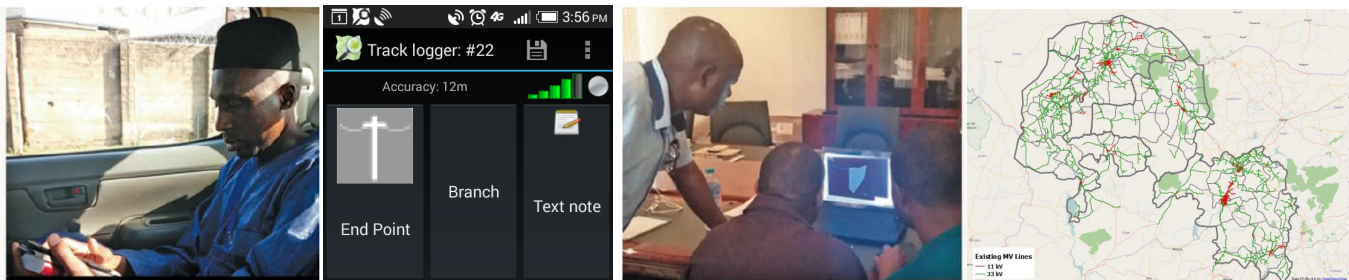
A toolkit for geospatial electrification planning

The ‘Sustainable Energy for All’ (SE4All) initiative was launched by the United Nations in 2011, aiming for universal access to modern energy services by 2030. Hundreds of millions worldwide still lack electricity. The Sustainable Engineering Lab has years of experience and an innovative, inexpensive, and highly practical mix of tools to help with geospatial electrification planning for increased access.

SEL also has more than ten years of field work and project implementation experience in the areas of development planning and geo-spatial data gathering in many countries in Africa, Southeast Asia, the South Pacific and Latin America and the Caribbean (LAC). The SEL team provides training in many technical aspects of geo-spatial data gathering and management, including grid and social infrastructure mapping, algorithmic modeling. The SEL team also has experience implementing and managing innovative smart solar micro-grids.

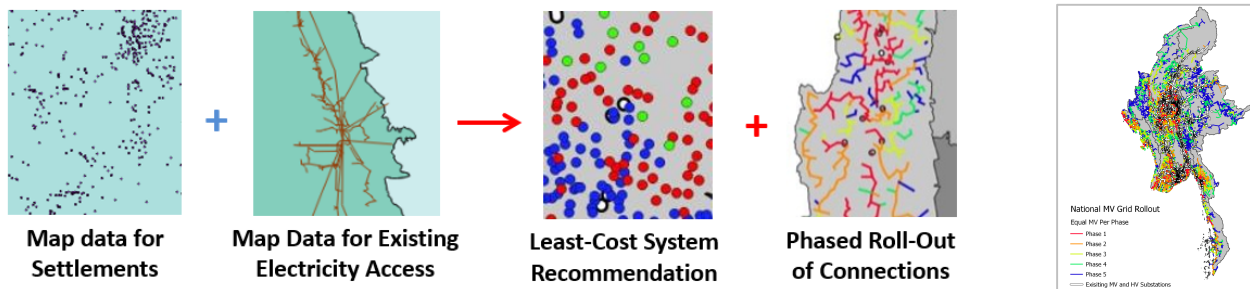
Our approach has several strengths:

- **Tools and techniques for data gathering and management.** Our tools have been used for capturing data in the field for electric grid lines, transformers and other equipment, as well as villages, households, schools and clinics and other social infrastructure. This approach is cost-effective, builds capacity locally, and ensures that datasets can be updated in an ongoing fashion as programs are implemented.



Grid line and equipment mapping (Nigeria)

- **A decision support tool for electrification planning.** The tool can help to select electrification technologies (grid, mini-grid, home systems); estimate costs at local and aggregate levels; address knowledge gaps; and prioritize and plan investments for universal electricity access. This offers electric utilities, energy ministries, and government planners, as well as international donors, development partners, lenders and the private sector, a valuable planning framework for electrification planning. The outputs allow project implementers to integrate, sequence, and geographically and temporally target investments in a manner that achieves more efficient and effective electrification.



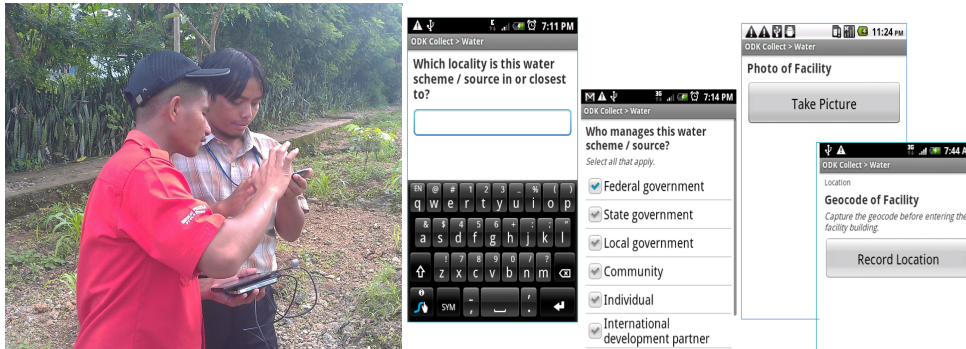
National grid and off-grid electrification cost and technical modeling (Myanmar)

- **Supports off-grid and minigrad planning.** Our approach has been used to plan electrification for off-grid systems awaiting grid connectivity, for rural areas, as well as for isolated and hard-to-reach populations.



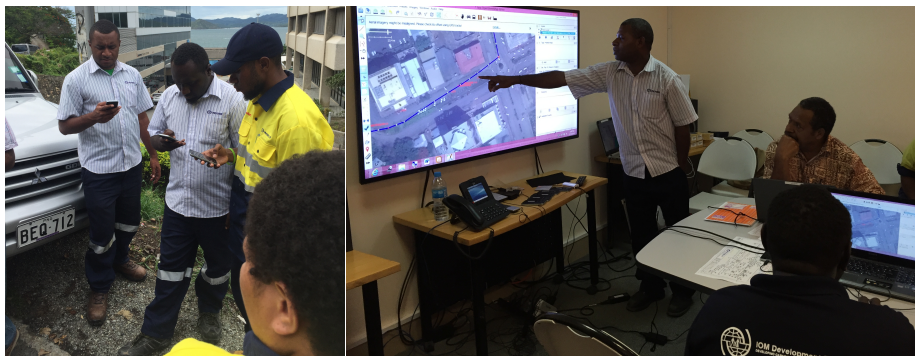
Smart solar micro-grid serves remote, isolated community (Bolivia)

- **Digital field surveying.** qSEL has been a leader in the use of innovative, digital surveying tools and platforms to help improve the speed and efficiency of data gathering programs as part of the shift away from paper-based surveying. The approach helps planners to combine geo-located demands (residential, social infrastructure), data for grid distribution infrastructure (MV lines and transformers), as well as other geographic information (renewable energy resources, environmentally protected areas).



Tools for field surveying (Indonesia)

- **Training is a key part of our approach.** We have a deep background and focus on training and capacity building, including support and instruction for all of our tools and methods to localize data, tools and planning.



Field and classroom training (Papua New Guinea)

Please contact John Peacock at (jhp30@columbia.edu) to request an appointment and to be placed on our mailing list. Periodic updates can be found at qsel.columbia.edu

As of Fall 2016, Sustainable Engineering Laboratory is now Quadracci Sustainable Engineering Laboratory (qSEL) through a generous gift from the Windhover Foundation. The Laboratory Director is Prof. Vijay Modi of Department of Mechanical Engineering, SEAS and Earth Institute, Columbia University.