Sun-In-One™
New Electrical Solar Light and Power Products

Sun-In-One™ Micro Grids

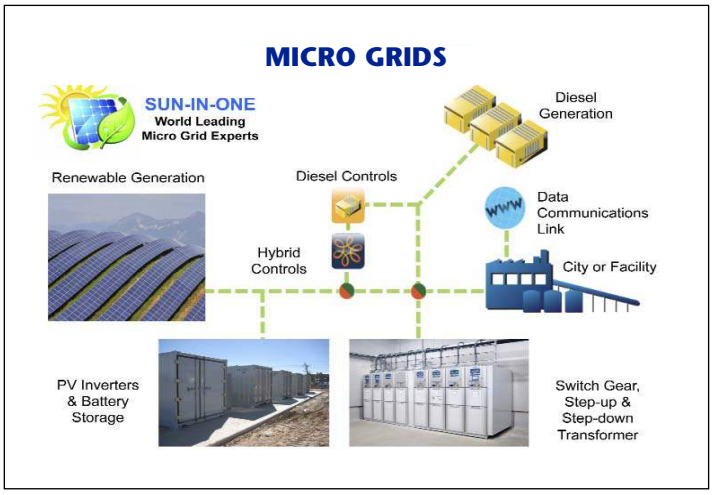
Sun-In-One is a progressive business specializing in design-build solar PV services for commercial, government, utility, and military projects that incorporate our turnkey "containerized" solar micro grid systems with battery storage and generators. With a proven past performance supporting a wide range of over 500 projects, our solar Engineering, Procurement and Construction (EPC) services provide expertise, value, and proven return on investment for the solar micro grid systems installed in remote locations in the U.S. and around the world.

Sun-In-One has years of experience in demand and supply side energy operations. Our expertise and leadership as a technology integrator in smart grid technologies, energy management, and electrical distribution make us a one-stop-shop for your off grid or micro grid project. We deliver a cost-effective micro grid solution that perfectly integrates with your grid-tied or off-grid operation and infrastructure.

What is a micro grid?

Micro grids are autonomous grids that operate either in parallel to, or "islanded" from, existing utility power grids. Micro grids use distributed renewable energy that act like small power plants near the buildings, villages, or islands they supply – not hundreds of miles away like large, centralized power plants. Hence, micro grids experience less "line-loss" – the disappearance of electricity as it moves long distances over power lines, as well as the potential risks of faults that can happen in that distance.

Micro grid deployment in the developing world helps alleviate "energy poverty" in emerging economies for an estimated 2.4 billion people. Micro grids allow everyone to redefine their perception of grid size and characteristics. No longer is it necessary to build kilometers of infrastructure to connect to a large power source. Instead, a micro grid ranging from 1.0 kW to 50 MW size can be deployed or installed almost anywhere.



Sun-In-One™
www.suninone.com
302-762-3100

Sun-In-One™
New Electrical Solar Light and Power Products

Sun-In-One™ Micro Grids

Why install a micro grid?

Micro grids are an economic alternative wherever a stand-alone grid is feasible or even necessary for reasons of geography, infrastructure, or security of supply where fuel costs and production schedules are critically important. They allow consumers to procure power in real-time at significantly lower costs, while using local generation to hedge peak power costs.

In addition to islands and villages in remote and isolated regions, other possibilities include small cell phone towers, governmental organizations, university campuses, shopping centers, and industrial complexes such as mines, manufacturing complexes, fish canneries and construction sites. The high level of availability and power quality as well as the possibility of being able to operate independently of the supply grid make micro grids a viable alternative wherever security of electric supply is the top priority – for example, at hospitals or military installations.

Energy and economic trends are rapidly reducing payback time for micro grid investments – even achieve net zero generation – the point where they can generate as much energy as they consume from the micro grid.

Sun-In-One "containerized" off-grid and micro grid energy solution

Sun-In-One Turnkey Containerized Micro Grid includes control system, pre-wired inverters, battery storage, switch gear, and disconnects for a speedy "Plug-N-Play".

Sun-In-One has engineered a "containerized" off-grid energy system that eliminates expensive on-site installation and wiring of the major components associated with converting solar energy into usable electricity. The customized containers with the inverters, disconnects, and switch gear come pre-wired and pre-tested. They're ready to install and put into place and require only a few auxiliary wires to connect them to the system, essentially making it a "plug and play" system.

Individual components of Sun-In-One's off-grid systems are perfectly aligned with each other and the battery inverter to ensure a reliable power supply, always adjusted to local regulations. The end result is reduced site labor and installation time. In remote areas, speed translates to further cost savings.

The modular, scalable AC based design provides maximum flexibility, allowing additional components to be integrated into the system at any time, step by step, according to the energy demand. Plants of any size can be configured from comparatively small, easy-to-handle components. Transport and assembly are therefore made easy, even in remote locations, especially when there is a "shortage of local labor."

Why install a Sun-In-One micro grid?

With Sun-In-One's custom solutions, flexible approach, and proven expertise, we deliver advanced micro grids that offer ***the advantages of grid independence without forfeiting the benefits of being part of the central grid.***

Sun-In-One™
www.suninone.com
302-762-3100

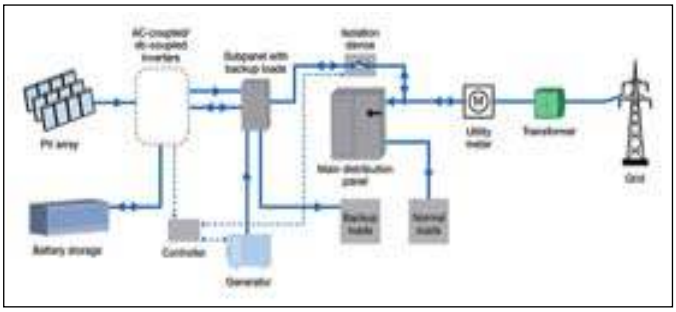
Sun-In-One™

New Electrical Solar Light and Power Products

Sun-In-One™ Micro Grids

Sun-In-One micro grid components

Sun-In-One's team of highly-skilled engineers are experienced to provide a uniquely qualified design of next-generation 100% renewable energy systems that incorporate energy storage, grid support, communications, controls, and micro grid capabilities.



The hybrid micro grid in this figure includes a fossil fuel generator and connects on the supply side of the main service panel, which accommodates higher system capabilities than a load side connection.

Solar Photovoltaics – renewable energy optimized by intelligent software and controls that forecast their expected contribution to the micro grid while also allowing for real-time variations, such as passing cloud cover.

Energy Storage – battery storage is used to enhance stability and efficiency of micro grids by decoupling the generation source from the load and providing power when solar is unavailable. Energy storage also help make renewables more efficient by saving excess energy to use when grid prices are high. Sun-In-One uses inverter building blocks that can support several battery technologies including, but not limited to, sealed lead acid, large-format lithium iron phosphate, and hybrid lead acid.

Generators – highly efficient diesel generators provide backup power whenever solar energy and battery power have reached their designed capability. In the event of extended periods of bad weather, natural disasters, or other unforeseen events, backup generators can serve as a lifeline to power.

Control System – specially designed centralized control system that manages the load flow within the power network with a high degree of reliability, efficiency and cost-effectiveness to ensure balance between supply and demand with the ability to switch between different local generation sources as the cost and availability of fuel changes.

- Built-in system-wide controls, power quality analysis, and compliance monitoring
- System management and event logging for cause analysis of issues and downtime mitigation
- Extensive tools to facilitate energy efficiency programs and power distribution management
- Provides event reporting, trending, remote access and external alarm notification
- Operational tools – dashboards, reports to help manage the micro grid network
- Essential protocols provide superior network integration & interoperability, ensuring all components interact seamlessly.

Containerized System – combination of pre-engineered solar inverters, battery inverters, disconnects, switch gear, battery storage, transformers, and monitoring system in weatherproofed containers with the following characteristics:

- Highly scalable, flexible, and designed with open architecture that evolves with your site to protect and grow your investment
- Unique productivity systems to help speed deployment and lower costs.

Sun-In-One™
www.suninone.com
302-762-3100

Sun-In-One™
New Electrical Solar Light and Power Products

Sun-In-One™ Micro Grids

Designing and building a micro grid

The Sun-In-One team partners with you on every aspect of the project – from site assessment to plant design, engineering, manufacture and procurement, installation, commissioning and grid connection to training and ongoing support and maintenance over the entire service life of your system. The final installed micro grid must maintain system stability – optimally balance supply and demand and respond in real-time to changes in conditions on the micro grid and central power grid. The Sun-In-One solution includes:

Annoban Island – Sun-In-One micro grid consisting of solar panels, battery storage and diesel generators.

Alcatraz Island – Solar panels on the roof of this historic building provide the main source of direct power as part of this unique micro grid.

Audit – Our experts perform a complete technical and economic audit of your location, campus, or facility to help define your requirements.

Design – Our in-house team designs and engineers a micro grid system that perfectly fits your requirements, but allows for scalability as you grow. Included in the essential micro grid design:

- Using and designing Large scale battery storage system 50kva to 20 Megawatts
- Protective device time-current coordination analysis
- Short-circuit fault current analysis
- Load-flow analysis
- Power quality and harmonic analysis
- Switching transient modeling and analysis
- Arc flash analysis and mitigation strategies
- Grounding system design
- Distributed energy resource modeling and energy contribution analysis
- On-grid and island mode stability analysis
- Island mode transition, grounding modification, and black start analysis and procedures
- Systems that change from Solar to battery to generator with no change in electrical output
- Inauguration of verse generation assets (Solar, Wind, Generator)
- Designing systems with multiple back up system for higher reliability.

Engineering and Project Management – Our complete in-house team is capable of designing and managing complex installations with proven track performance with more than 500 solar projects.

Ongoing Support and Maintenance – We ensure you achieve your goals, supporting you in every way possible to secure you are maximiziing every benefit now – and in the future.

Sun-In-One™
www.suninone.com
302-762-3100

Sun-In-One™

New Electrical Solar Light and Power Products

Sun-In-One™ Micro Grids

Benefits of a Sun-In-One micro grid

Reduces use of fossil fuels – which significantly reduces the costs associated with the fuel itself, including transportation, logistics, infrastructure and environmental costs.

Fast installation of electricity supply – no need for expensive transmission infrastructure investments or lengthy development approval and construction process.

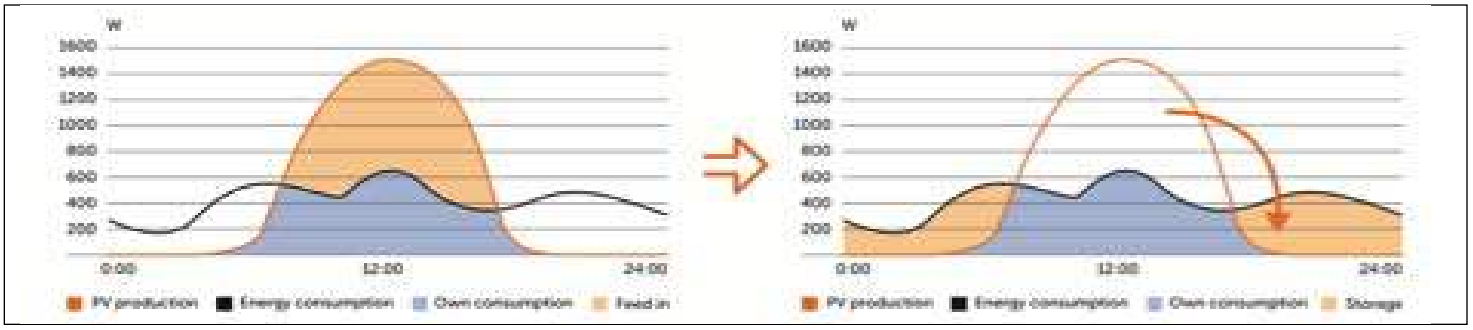


Fig 1. The "orange" shading represents the excess solar energy generated and wasted because it's never used.

Fig. 2. Demonstrates the same excess solar energy being stored in batteries and used when needed.

Reinforce or extend the current infrastructure – efficiently and flexibly meet growing energy demands whether grid-tied or not.

Grid stabilizing technology – controls continuously monitor the feeder load and matches the most economical configuration of solar, battery, and generator sets with the demand.

Trusted expertise

Based on our in-depth knowledge of electronics that interconnect the various loads and generators, as well as our expertise in testing and interpretational requirements, Sun-In-One's designs are well beyond the scope of traditional distributed-generation system designs. While other companies tout 100kW off-grid micro systems, Sun-In-One has designed and installed a world-class 5MW 100% solar micro grid among our 500+ solar projects.

About Sun-In-One

Sun-In-One is a provider of energy storage systems for microgrid, commercial & industrial and utility applications, comprised of a visionary team of scientists, engineers and business leaders who are passionate about creating and comercializing a revolutionary energy storage solution for the commercial seven industrial, micro grid and utility-scale markets.

Contact us

To inquire about having Sun-In-One to engineer, manufacture, and install a customized micro grid at your facility, contact our headquarters:

Sun-In-One™
500 Philadelphia Pike
Wilmington, DE 19809
302-762-3100
sales@suninone.com
www.suninone.com