

“eGrid” Solutions

Energy Storage Solutions for Utility Scale, Renewable Energy Power Plants and Industrial Applications

eGrid is a scalable multi-megawatt solution allowing to store large amounts of electrical energy to stabilize the grid, optimize the performance of renewable energy power plants and allow large scale electricity consumers to reduce their energy bill.

With up to 24 hours of continuous discharge capability, immediate response time, and modular construction, eGrid solves the issue of large scale energy storage economically.

eGrid can be scaled and configured to reduce costs and maximize profitability for utilities, renewable and large scale industrial end-users.

S340E

The image is a composite of two scenes. The foreground is dominated by a close-up, low-angle view of solar panels, their surfaces reflecting the warm, golden light of a sunset. The panels are arranged in neat, parallel rows that recede into the distance. In the background, a landscape of rolling hills is silhouetted against the bright orange and yellow glow of the setting sun. Several wind turbines are scattered across the horizon, their tall towers and three-bladed rotors clearly visible against the bright sky. The overall atmosphere is one of clean, renewable energy production during the 'golden hour' of the day.

**“It is Finally
Possible to
Store large
scale of
Solar Energy
Generated
during the
day to supply
it during the
Night.”**

Why eGrid?

Global gap in energy supply

With rapid demographic and economic growth, demand for electricity is ever-increasing, and with it the gap between energy supply and demand. Electricity production from fossil fuels is the largest source of greenhouse gas emissions and will continue to grow as more people are connected to the grid. With the time and resources required to upgrade grid capacity, it is becoming harder for utilities to stabilize the availability of energy on the grid. In some countries, the supply-demand gap, and oftentimes utility mismanagement have led to a situation where utilities must ration available power through regular blackouts.

Global Challenges

Power demand has outgrown supply In some countries the gap between supply and demand has grown so wide, that utilities are forced to ration the availability of power through regular blackouts.

With utilities resorting to financial measures such as Time of Use billing (TOU), Capacity Billing, and Low Power Factor Surcharges (LPFS) to influence consumption, factories' energy bills continue to grow higher.

Additionally, blackouts and brownouts create a burden and added expenses for factory owners. Most of the time, people resort to diesel generators to compensate. Switching from mains to backup generators also poses a risk of damage to equipment and interruptions to critical processes, with a need for uninterrupted power.

Relying on generators to supply peak demand is inconvenient on several levels:

- Costly to buy, refuel and maintain
- Create air and noise pollution and are harmful in residential and commercial environments
- Require space, regular maintenance and repetitive refuelling

A powerful solution

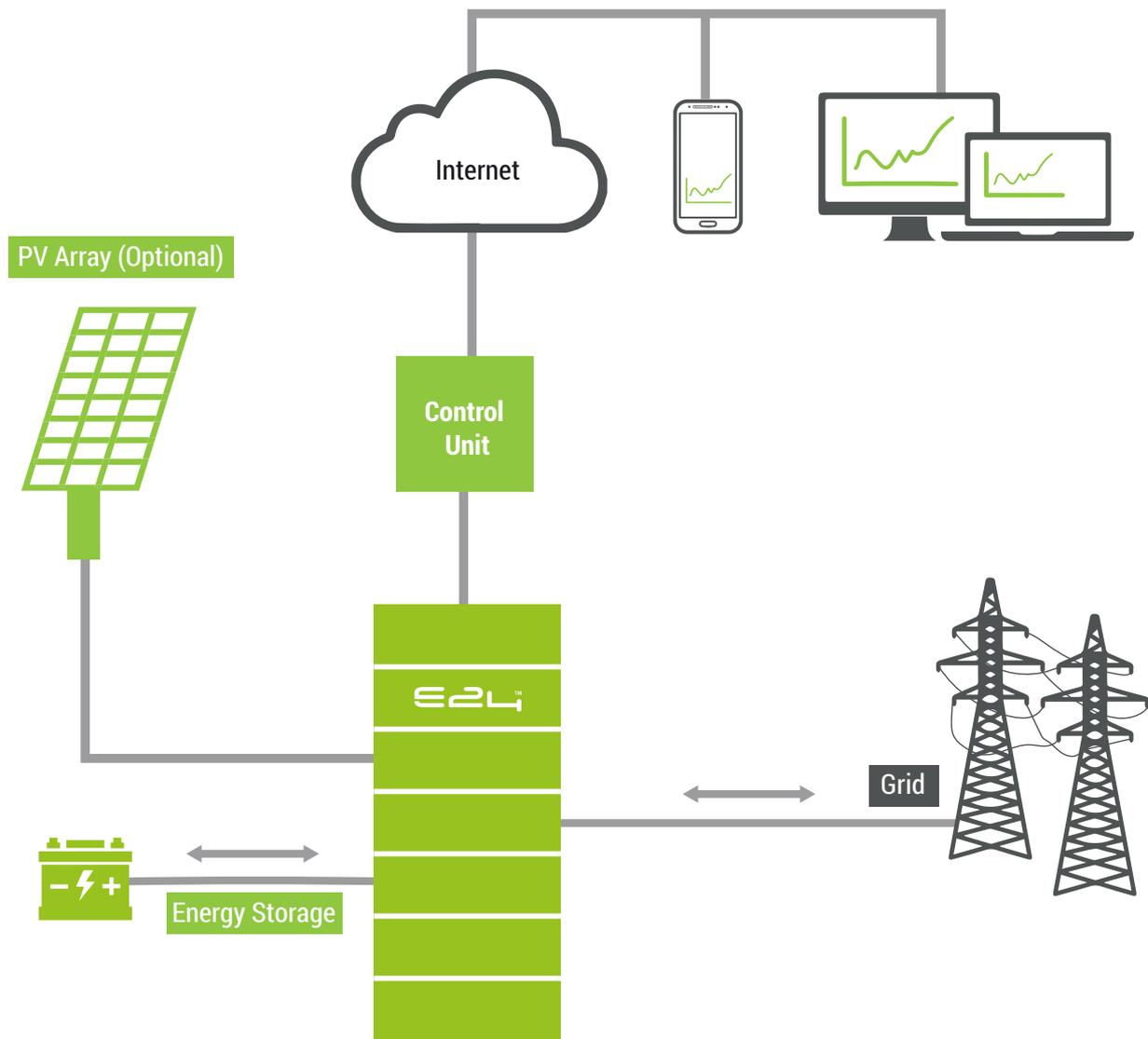
eGrid overcomes the everlasting issue of having to generate the energy needed at the same time when it is requested. It is finally possible to store large scale of solar/wind/hydro energy when available and inject it in the grid upon demand.

eGrid can be used to either stabilize the grid (peak Shaving, frequency and voltage stabilization), or to optimize the performance of renewable energy power plants by storing energy and delivering it later.

For the enterprise customer, eGrid acts as a backup power source in times of blackouts or peak billing periods, or when switching between different power sources. eGrid also corrects power factors, and guarantees substantial savings over any fuel based alternative while improving power quality, removing noise and environmental pollution, and limiting human intervention. eGrid protects your business from power failures, eliminates the hassle and unnecessary costs of generators, allowing production and business to thrive.



eGrid: A Convenient Alternative



eGrid is an energy storage solution that connects to the grid in low, medium or high voltage to either charge from the grid or provide power to the grid when needed. eGrid can be optionally coupled with a solar PV plant to provide power to the grid at lower costs.

eGrid allows utilities to avoid upgrading their cables and infrastructure just to support a momentary peak demand in power. eGrid is totally unattended and may be remotely monitored, making it practical, economical and beneficial for the environment.

eGrid is supplied in pre-assembled containerized form or in kits ready to be assembled onsite.

eGrid offers different battery technologies depending on the application to be powered.

Health Comes First

Diesel generators pose dangers to the health and wellbeing:

- Toxic gases have a direct effect on the respiratory system, posing a variety of diseases
- Fine particle pollution contributes to asthma, emphysema, chronic heart and lung disease
- Exposure to diesel exhaust poses high risks of cancer.
- Engine produces irritating audible noise
- Exhaust contributes to smog creation.



Enhanced Productivity

There are multiple operational advantages that eGrid has over diesel generators

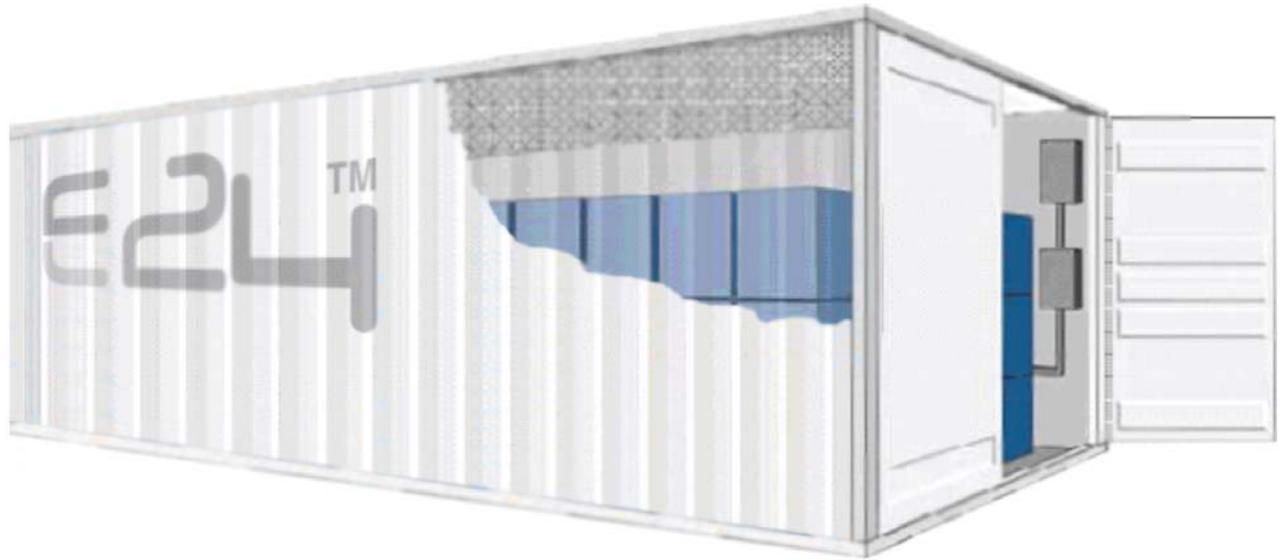
Generator

- High operational cost
- Air & noise pollution
- Continuous maintenance
- Power cut between utility and generator
- Minimum 30% load
- Bulky (fuel tank and exhaust required)
- Continuous refueling
- Narrow temperature operation (deration)

eGrid

- Low operational cost
- Silent and non polluting
- Low maintenance
- Reliable
- Stable voltage and frequency
- Can be installed in any space
- Install once - replace batteries every 6 to 10 years
- Wide temperature operation
- Ready to be coupled with Solar PV

eGrid: Benefits to Utilities



Peak-Shaving and Demand Management

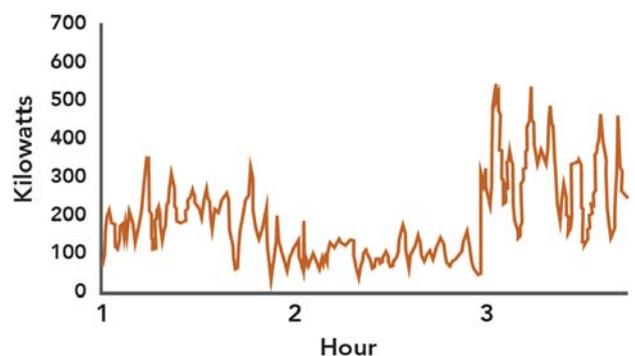
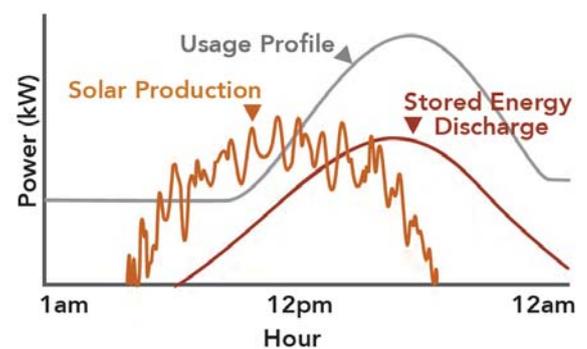
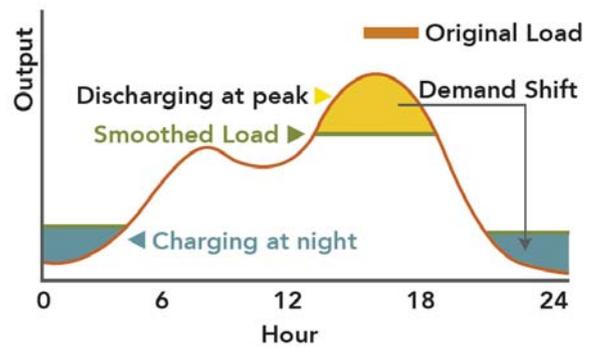
eGrid allows utility companies to store excess efficient base-load generation and renewable energy produced off peak. By discharging during peak hours, eGrid eliminates the need for extra inefficient and polluting peaking generation, reducing costs and carbon emissions.

Renewable Integration Solar/Wind Time-Shifting

Renewable energy is intermittent, potentially introducing instability to the grid and limiting its viability as a reliable, dispatchable power source. eGrid allows utilities and consumers to ensure smooth production and time-shift renewable energy. Solar electricity produced during the day can be stored and deployed as a stable power source at peak demand in the afternoon, or during night time.

Frequency Regulation

E24 batteries can be used to bring revenue to commercial and industrial entities. E24 batteries are eligible for entry into ancillary electricity markets that provide frequency regulation to the power grid. By charging and discharging your batteries to meet grid stability, you can also monetize your asset.





eGrid: Benefit to End-Users

Save by avoiding consumption at peak utility tariff

eGrid can be programmed to inject energy into the grid at times when the utility tariff is high allowing you to substantially reduce your utility bill. eGrid recharges either from your solar panels if available or from the utility at a lower tariff.

Save by Avoiding Utility Demand Charges

Utilities charge demand charges, or penalties on energy drawn beyond a pre-agreed level. Industrial and enterprise customers often exceed their authorized maximum and are charged according to their highest demand. eGrid, automatically detects high consumption and responds by keeping maximum consumption within allowable levels by discharging energy from the batteries.

Save by Avoiding Damaging Brownouts and Blackouts

eGrid automatically compensates a decrease in line voltage by injecting energy into the grid. Brownouts are the main cause of equipment damages. In the case of a blackout, eGrid automatically provides alternative power for your critical load (refer to your authorized reseller for proper sizing).

Uninterrupted supply

eGrid's centralized system provides uninterrupted power during blackouts, keeping you connected.

Calm and Clean

eGrid allows you to avoid the use of noisy, polluting diesel generators that release harmful gases.

Unattended operation and low maintenance

eGrid is remotely monitored and does not require full-time attendance. Having no moving parts, and no need for refueling, eGrid requires virtually no maintenance.

Modular, Scalable and Upgradable

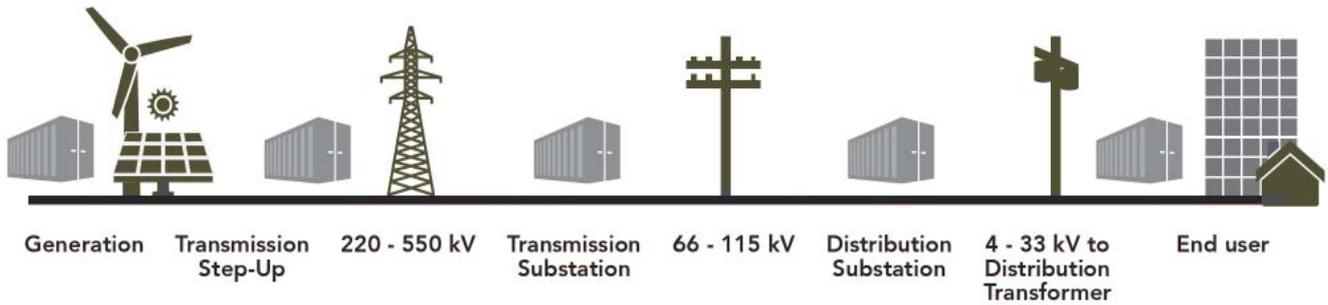
eGrid is modular, and limitlessly scalable allowing to increase energy storage and power at will when needed. Each energy Storage solution includes the batteries and inverters. Simply add more energy storage units to increase both power and energy. eGrid dynamically grows with evolving energy needs.

Plug and Play

E24 technology is supplied in prepackaged boxes allowing systematic assembly without external components. Most solutions are containerized and shipped pre-wired ready to deploy. Other more energy dense units are to be assembled on site by qualified installers.

eGrid Applications

eGrid is specifically designed for markets or areas where input power is particularly unstable and intermittent. eGrid can be connected to solar panels when available allowing to store energy from the sun/wind/hydro or the utility and use it later when needed. eGrid is adapted to utilities that want to stabilize the grid but can also be of great value to enterprises and industrials who are experiencing high demand charges and peak utility tariff billing.



E24 offers multiple energy storage technologies to meet the different applications that require different Energy to Power Ratios.

For example NaS technology is particularly adapted for large scale energy storage (above 5 MWh), where high energy density, and low opex is required).

The below table describes the technical parameters for each solution from the highest ratio to the lowest. Each solution is particularly suited to provides the best technical and economical benefit in retrospect to the goals to be achieved.

You may consult with our energy consultants to optimally select the best suited eGrid energy storage solution to best fit your application and financial objectives.

Solution Ref.#	E340-NAS1-12	E340-NAS2-08	E340-NCK1-01	E340-NCK2-01	E340-LIT1-24	E340-LIT2-44	E340-LIT3-96	E340-LCB1-23
Technology	Sodium Sulfide	Sodium Sulfide	Nickel	Nickel	Lithium	Lithium	Lithium	Lead Carbon
Unit Maximum Power (kW)	1,200	800	1,000	1,000	2,400	4,400	9,600	2,304
Unit Energy Storage (kWh)	8,640	4,800	4,000	4,000	4,800	4,400	3,200	768
Recommended % DOD for optimal performance	90%	90%	90%	90%	80%	80%	80%	80%
Useable Energy Storage (kWh)	7,776	4,320	3,600	3,600	3,840	3,520	2,560	614
Round Trip Efficiency (%)	80%	80%	75%	75%	90%	90%	90%	85%
DC Voltage (Vdc) (°)	640	640	768	768	640	640	640	640
Dimensions (WxHxD) (m)	4.8x10.2x4.4	4x2.25x2.55x6.1	4x3.35x3.35x4.88	4x2.25x2.55x6.1	2.39x2.35x12.0	2.39x2.35x12.0	2.39x2.35x12.0	2.39x2.35x6.1
Volume (CBM)	215.4	140.0	219.1	134.8	67.4	67.4	67.4	34.3
Energy Density (kWh/CBM)	36.1	30.9	16.4	26.7	57.0	52.2	38.0	17.9
# of Cycles	4,500	4,500	5,000	5,000	6,000	6,000	6,000	3,000
Energy Deliver in Lifetime @100% DOD(kWh)	34,992,000	19,440,000	18,000,000	18,000,000	23,040,000	21,120,000	15,360,000	1,843,200
Useable Energy to Power Ratio (KWH/KW)	6.5	5.4	3.6	3.6	1.6	0.8	0.3	0.3
Weight (kg)	132,000	86,000	143,700	144,700	29,000	27,000	22,000	28,800
Deployment	Site Assembled	4x20Ft Container	Site Assembled	4x20Ft Container	1x40Ft Container	1x40Ft Container	1x40Ft Container	1x20Ft Container
Application	Utility Scale - High Density for Large Size applications (infrastructure upgrade deferral, energy arbitrage, renewable energy optimization, load shifting)				Utility Scale - High Density for Peak Shaving & Grid Stabilisation			Multi-Purpose

(°) DC Voltage can be changed if needed

Advanced Control Tools



eGrid includes an optional cloud-based control and monitoring system, allowing you to visualize all energy data in real time.

E24 Proprietary Control & Monitoring System

E24's proprietary control software optimise power generation to increase energy efficiency and cost savings. It actively selects the most affordable source of energy and can return excess solar energy to the grid through net metering.

Smart Management

An advanced battery management system allows up to 5000 cycles of battery life making it the most affordable energy storage on the market. eVilla handles the surges, sags, noise and blackouts while providing a clean energy to the load 24/7 without any interruption.

Remote Cloud Monitoring

eGrid includes a state of the art web management tool allowing you to visualize and closely monitor the sound operation of your energy solution, control energy sources and load consumption.

The control system logs data from solar panels, utilities, loads and optional generators. All data is recorded, and history can be downloaded for analysis, keeping you in control of your energy spending:

- AC Voltage, Frequency, Currents, Power, Power Factor
- DC PV string Voltages, PV string currents, PV String Power
- DC Energy generated per day, week, month...

eGrid is connected to the E24 cloud based monitoring system, allowing the technical support team to remotely manage your system and take immediate preventive action in case of anomalies, keeping your investment safe.



E24 Comprehensive Services

Our turnkey approach is what sets us apart. In addition to our complete solutions, we offer a variety of services, allowing you to make the most of your investment:

- **Site Assessment Visits**
- **Energy Saving Analyses**
- **Feasibility Studies**
- **Structural Designs**
- **Multi-Level Training Programs**
- **Commissioning Services**
- **Financing Services**

E24 works closely with its clients to look at all aspects of their energy-related costs and performance, identifying opportunities for improvement and potential to lower overall costs.

E24 also offers a number of financing services allowing customers to pay for their equipment gradually and partially finance their investments from the savings they generate.

With support centers, regional offices, and knowledgeable personnel, E24 brings an uncompromising commitment to customer satisfaction. Our after sales services include:

- **Warranty Extension Programs**
- **Comprehensive Maintenance Programs**
- **Field Service**
- **Overhaul & Refurbishments**
- **E24 certified parts**

Our services are provided by engineers operating from E24 regional offices, allowing customers to benefit from accurate data based on relevant local field experience.

**Our Energy
Consultants are
here to answer
all your questions.**



Energy Storage Solutions



eHome



eVilla



eBuilding



eBusiness



eFactory



eVillage



eTelecom



eGrid

Energy Generation Solutions



eSolar



eHybrid



eParking



eAgri

Comprehensive Energy Solutions

E24's broad portfolio of successfully completed projects ranges across a variety of sectors including Residential, Commercial, Industrial, Telecom and Governmental. We have built our reputation on our client focus and versatility to solve their problems. Our tailored solutions that place the lifestyle and needs of customers at their core. E24 leverages technology as a problem solver and enabler.

It is in this spirit that E24 develops targeted, personalized, seamless energy solutions for homes, villas, businesses, buildings, factories, villages, telecom and utility operators. E24 is constantly working towards enhancing the economics and lifestyle of its customers while saving on the planet.





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QUALITY STANDARD

