FUEL SAVE CONTROLLER 2.0

Saving on Fuel and Money the Easy Way

Want to know more about SMA Fuel Save Solution?

Subscribe to **SMA Hybrid News**, our quarterly newsletter that keeps you up to date with technical development, infos and new reference plants.

If you want to receive the newsletter, please just send us an email: FuelSaveSolution@sma.de

Find further Information on the web: goo.gl/hF9bb1

SMA FUEL SAVE SOLUTION

Smart Hybrid Plant Control

Easy Operation

Smart Battery Storage Operation

Easy Commissioning

Smart Monitoring

Easy Planning

Smart Grid Services

Safe due to Testing & Field Experience

Flexible Plant Design

Flexible Genset Support

SMA FUEL SAVE SOLUTION

Smart Hybrid Plant Control

Easy Operation

Smart Battery Storage Operation

Easy Commissioning

Smart Monitoring

Easy Planning

Smart Grid Services

Safe due to Testing & Field Experience

Flexible Plant Design

Flexible Genset Support

SMART HYBRID PLANT CONTROL

- **Reverse Power Protection**
  Prevents energy flow into the genset

- **Minimum Genset Load**
  Ensures that the gensets' minimum load is not undercut.

- **Reactive Power Control**
  Controls reactive power of battery and inverters to reach aa configurable power factor at the gensets

- **Ramp Management**
  Allows to configure the slope of the ramps that may occur during operation

- **Feedin Protection**
  Prevents from feeding too much energy into the grid. Also Zero Export can be realized with this function

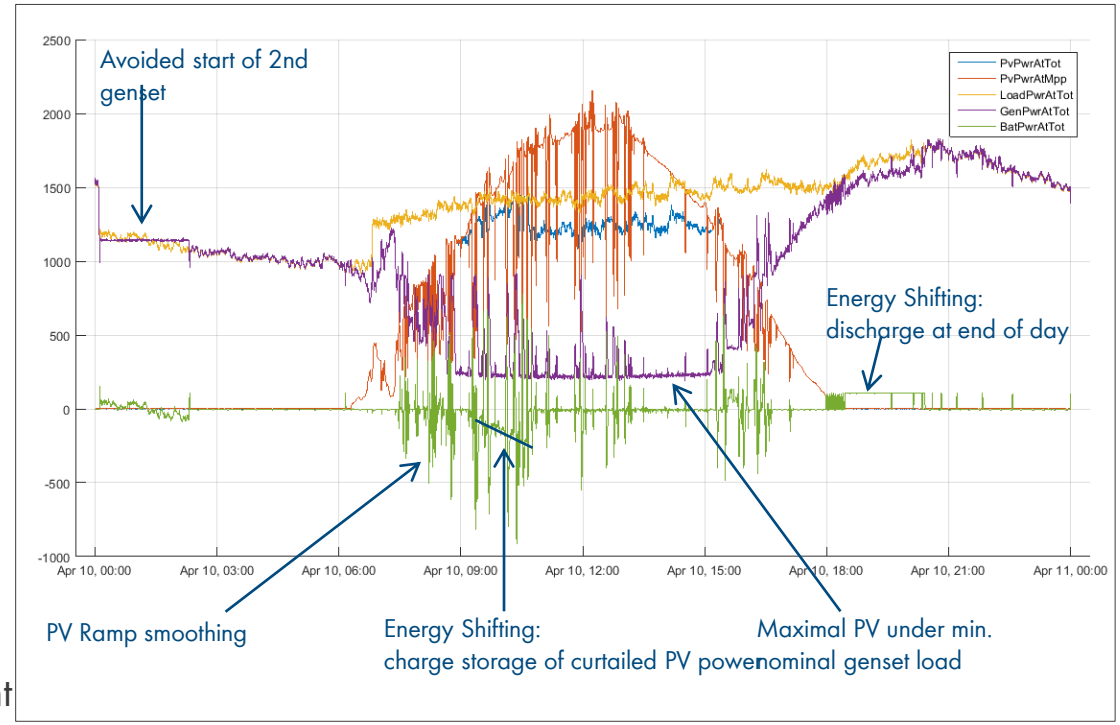
- **Inverter Management**
  Automatically disconnects solar inverters if share of solar inverter power to genset power gets too high

SMART BATTERY STORAGE OPERATION

> **Ramp Rate Control**
Fuel Save Controller uses storage to smoothen fluctuating solar generation

> **Genset Start Avoidance**
Fuel Save Controller detects when treshold for starting next genset approaches and uses storage to avoid genset start

> **Energy Shifting**
Fuel Save Controller uses otherwhise curtailed energy to charge the battery during daytime and discharges at night



> **State-Of-Charge Control**
ensures that the battery's state of charge is always sufficient to fulfill grid stabilizing tasks

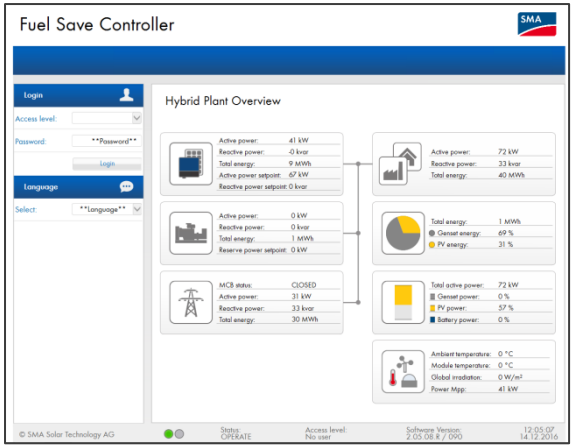
> **Battery for frequency and voltage stabilization**
Battery inverter monitors grid and reacts instantaneously according to preset characteristics

SMART MONITORING

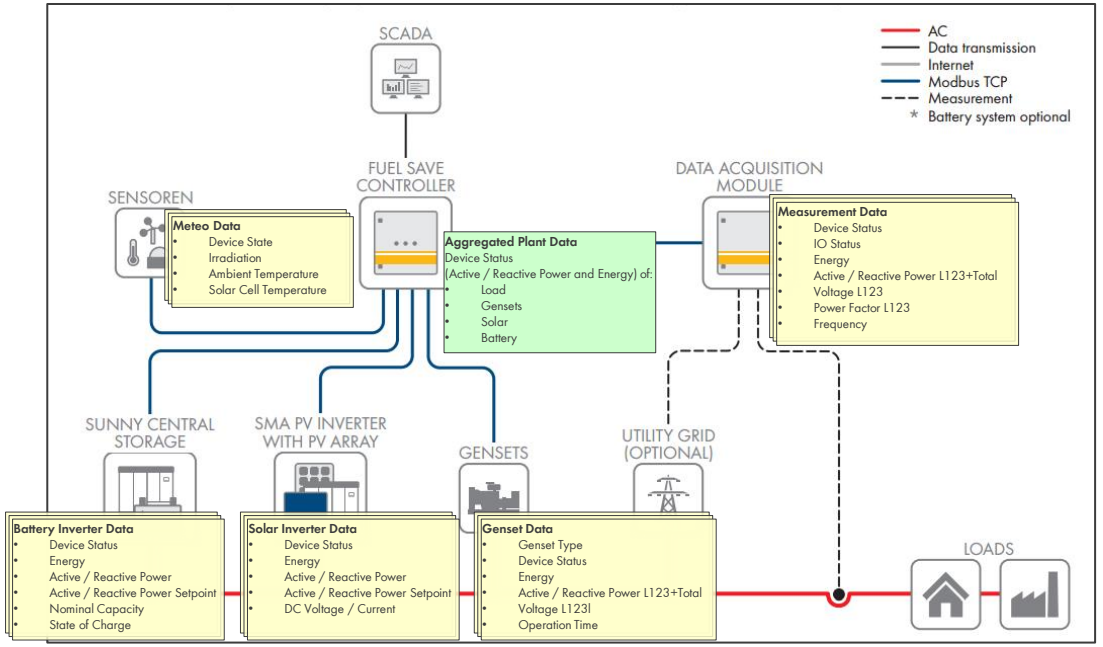
- Fuel Save Controller **Web Interface**
  - Easy configuration
  - Easy maintenance

- **Modbus Interface**
  for integration into SCADA Solutions
  - Easy: Plant level
  - Detailed: Customer Specific

- **Logfile Download via FTP**
  - Fast Log: 1/10s
    (Aggregated Plant Values)
  - Slow Log: 1/5min
    (Aggregated Plant Values)
  - Error / Event Log



Extended Scada Interface



SMART GRID SERVICES

> **Q@Night**
The Fuel Save Controller supports provision of reactive power setpoints to battery storage as well as solar inverters during the day as well as at night.

SMA FUEL SAVE SOLUTION

Smart Hybrid Plant Control

Easy Operation

Smart Battery Storage Operation

Easy Commissioning

Smart Monitoring

Easy Planning

Smart Grid Services

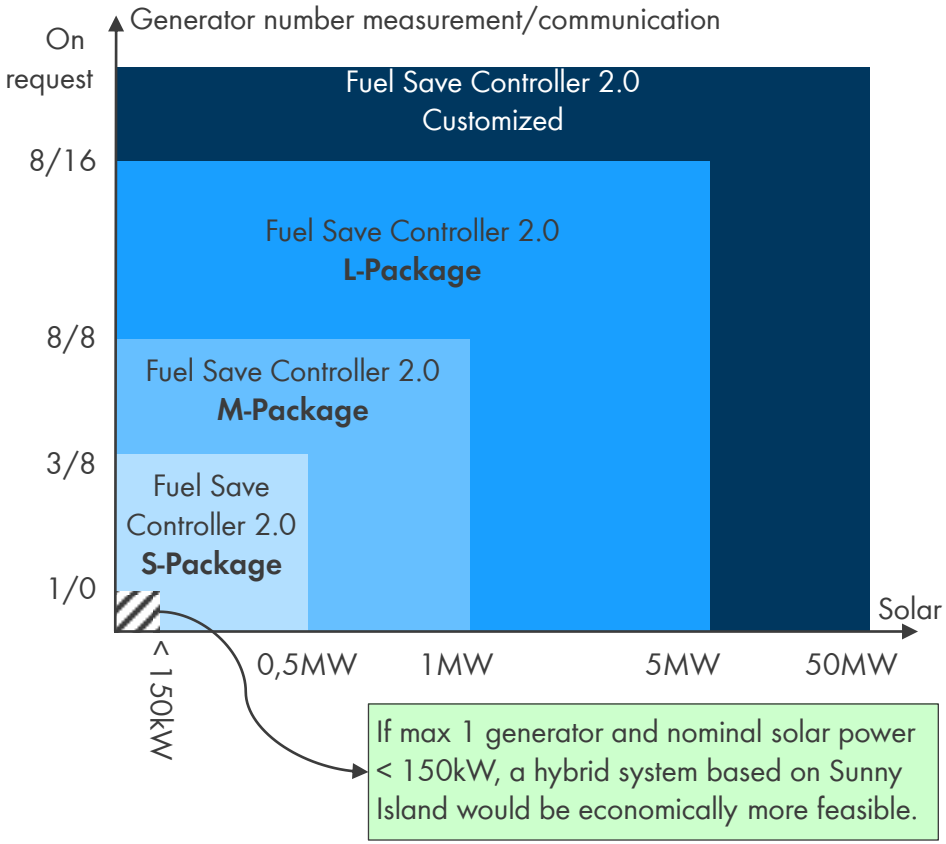
Safe due to Testing & Field Experience

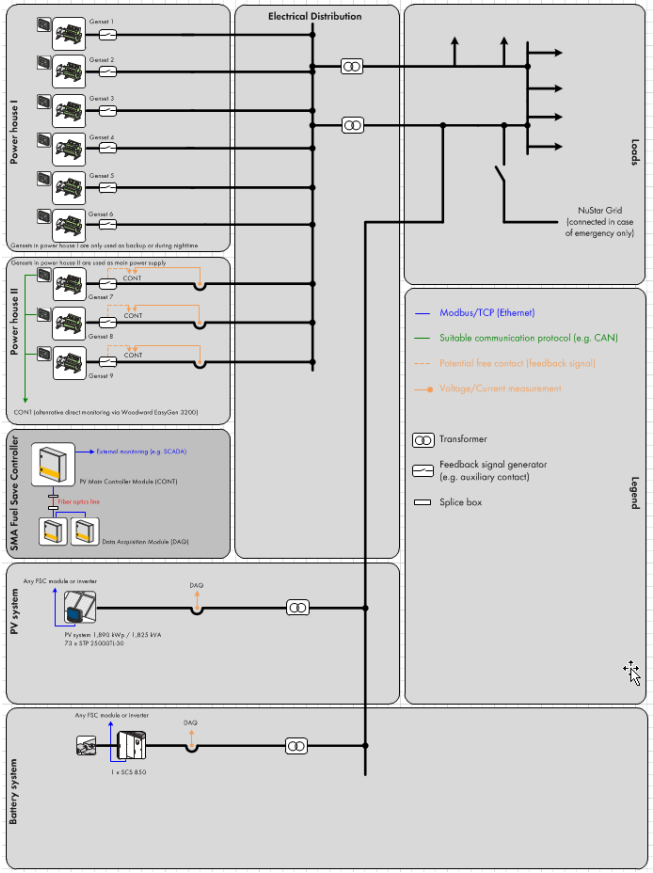
Flexible Plant Design

Flexible Genset Support

FLEXIBLE: SUITS (NEARLY) ANY HYBRID GRID

- > Small (150kW Solar) to large (up to 50MW)
- > With Storage or without Storage
- > On-Grid or Off-Grid (or both as grid is available)
- > Central or distributed architecture





FLEXIBLE PLANT DESIGN

> **Fuel Save Controller 2.0**
The Fuel Save Controller 2.0 incorporates controller, communication and measurement in one box. This allows:

  > Reduction of system costs

  > Easier commissioning

  > Easier configuration

> **Data Acquisition Modules**
If flexibility is needed, a Data Acquisition Module can be used to integrate distant measurement points. With optional Fiber Optics Modules, distances of up to 20km are possible.

FLEXIBLE GENSET SUPPORT

> Gensets have to be exchanged at the end of life
Due to flexible genset support no binding to one genset (controller) manufacturer

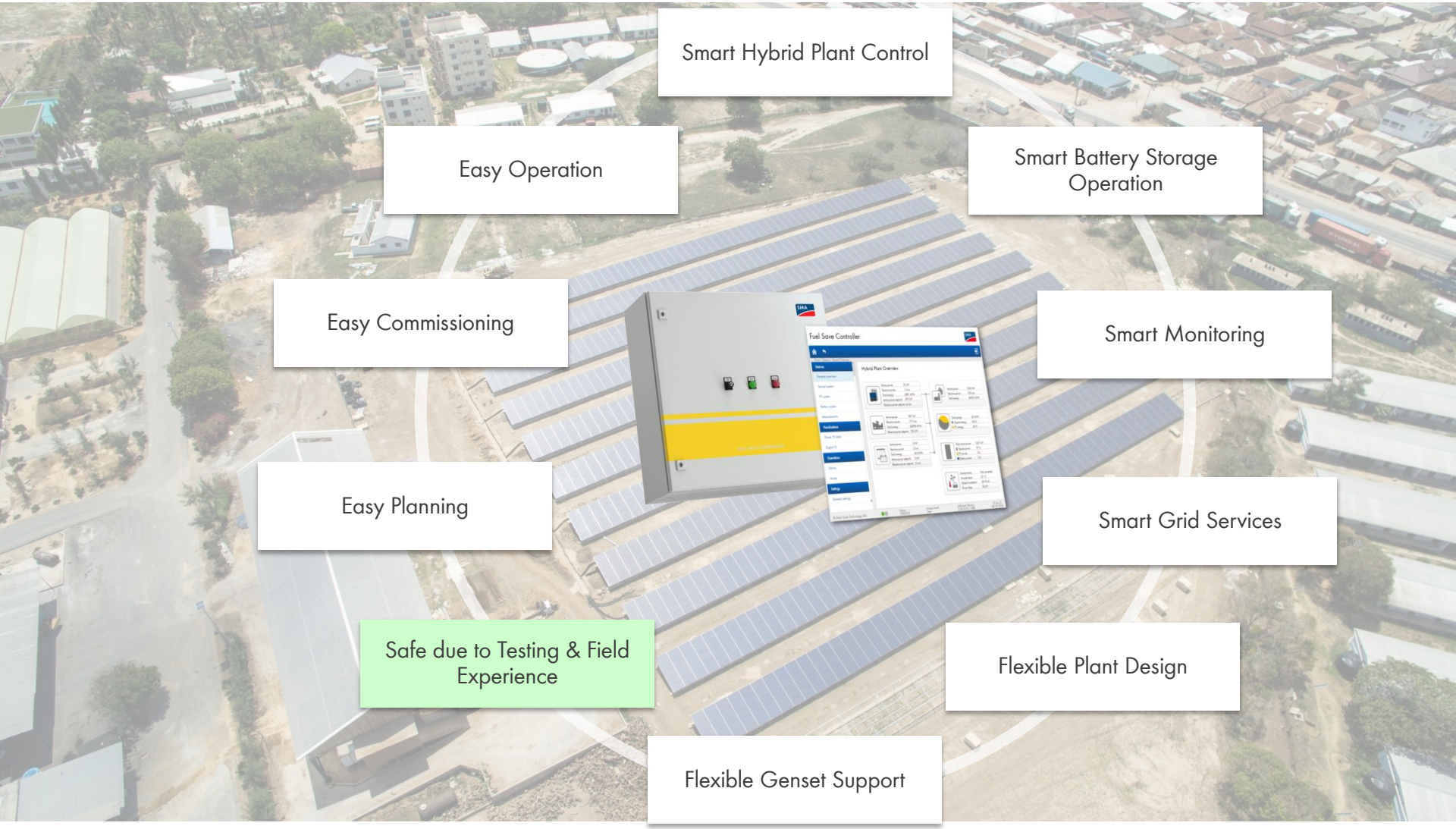
> Supported genset controllers today
Woodward easYgen 3000 (Modbus/TCP or CAN)
ComAp InteliSys-NTC, InteliGen-NTC
DEIF AGC
DeepSeaElectronics DSE 8610

> Genset controllers **without compatible communication can be made compatible** by adding a translator between genset controller and SMA generic genset interface

> Genset controllers **without compatible communication can still be used** as Fuel Save Controller can adapt to many genset controlling mechanisms and influence genset controllers by intelligently using curtailment of solar power to incentivate genset starts and stops

> Finally if **no genset controller is available at all**, it still works. A measurement can be used instead of genset communication.

SMA FUEL SAVE SOLUTION

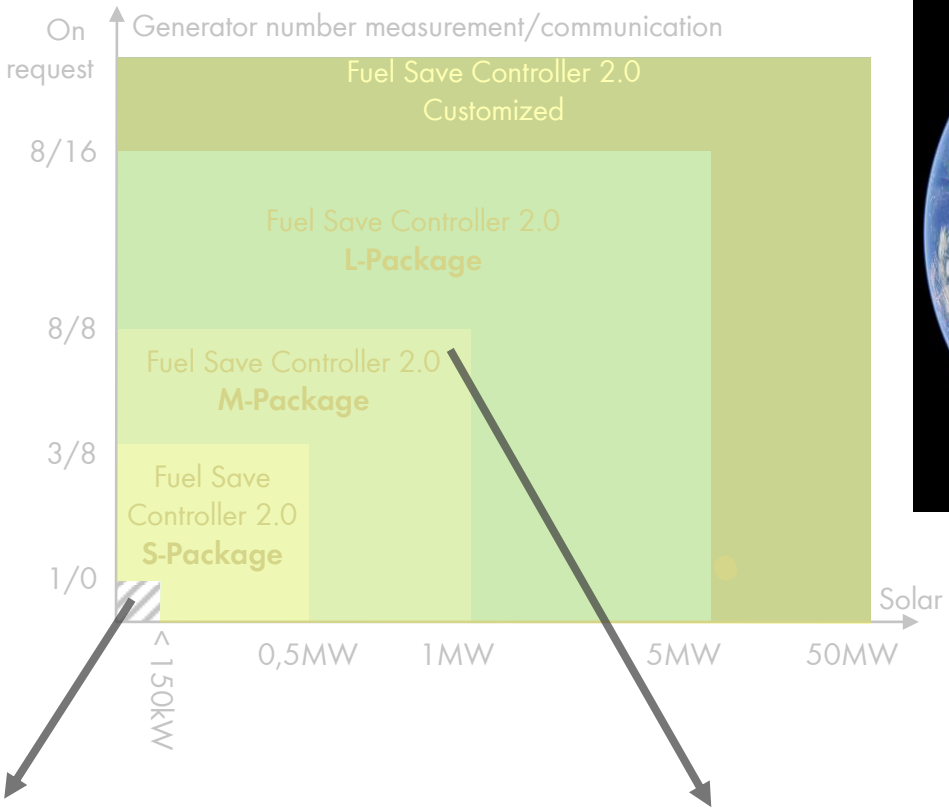


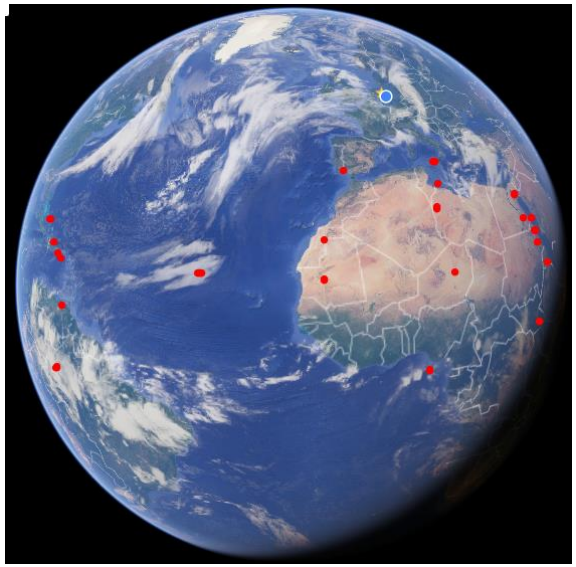
SAFE DUE TO INTENSIVE TESTING

> **Development tests**
All functions are tested extensively in as early as the development stage utilizing simulations and local tests at the developer's workplace.

> **SMA Hybrid Testbench**
Additionally each software release is tested under real conditions in SMA's hybrid power systems test facility, which tests with real power flows of up to 5 MW.

SAFE DUE TO FIELD EXPERIENCE

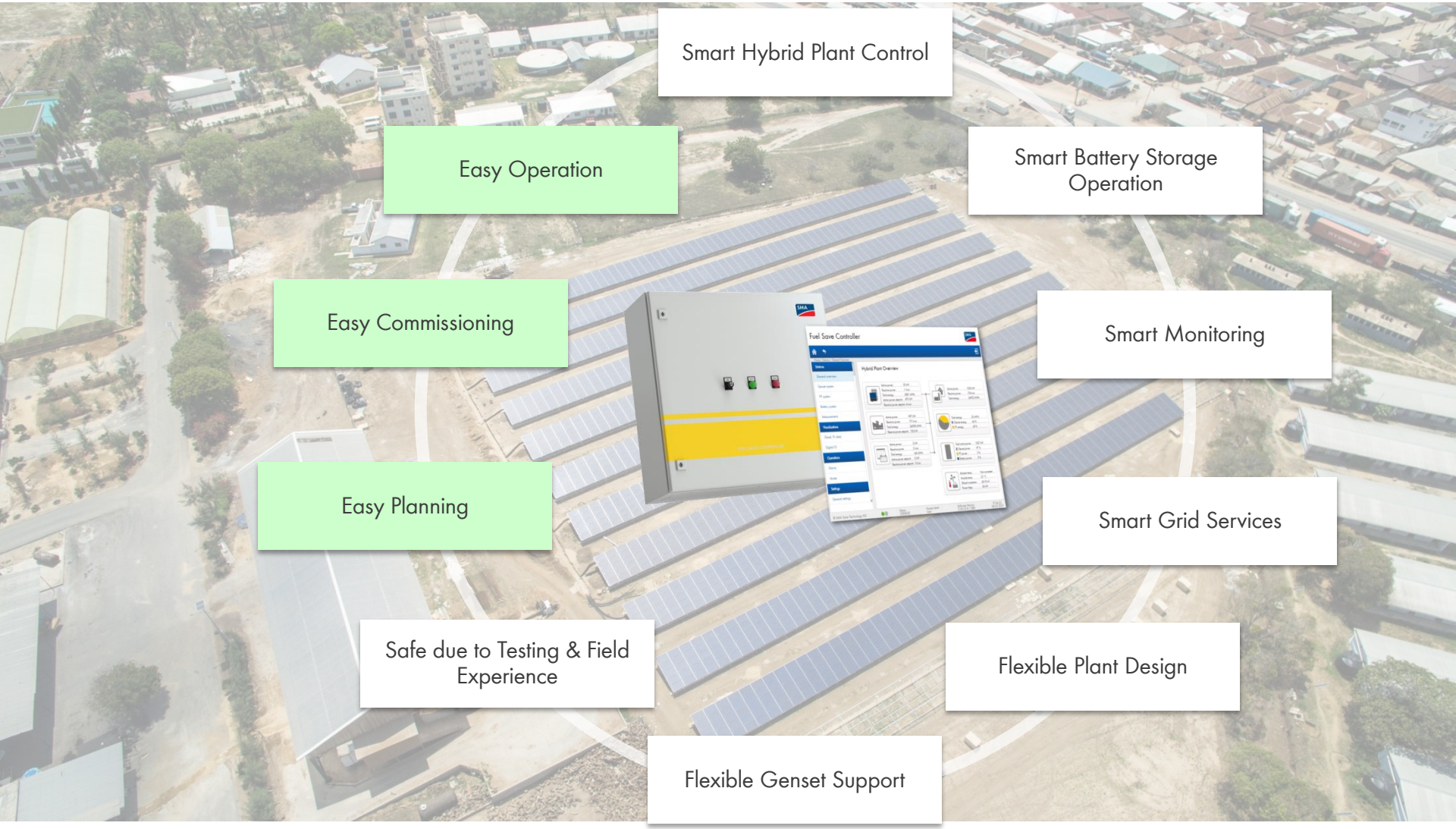




> Field Experience in more than **70.000** small off-grid systems with over **400MW** nominal AC power

> Field Experience in more than ~~100 120~~ **140** ☺
medium and large scale hybrid systems with more than **120MW** nominal AC power

SMART HYBRID PLANT CONTROL



EASY PLANNING

- **SMA Sunny Design**
  - Sunny Design supports hybrid system planning
  - Set your preferences and setup
  - Try out how different setups influence the profitability
- **SMA Technical Sales Support**
  - Need help in plant design? Ask our experts – **its free**! FuelSaveSolution@sma.de
  - Provide info about your project
  - Receive a hybrid system design and a bill of material
- **SMA Solar Academy Hybrid System Design Training**
  - learn to design and realize a hybrid system, which components to use and how to calculate the profitability.

EASY COMMISSIONING

> **Commissioning Training**
Fuel Save Solution is highly standardized. Few and ready-to-connect units.
So easy that you can commission yourself.

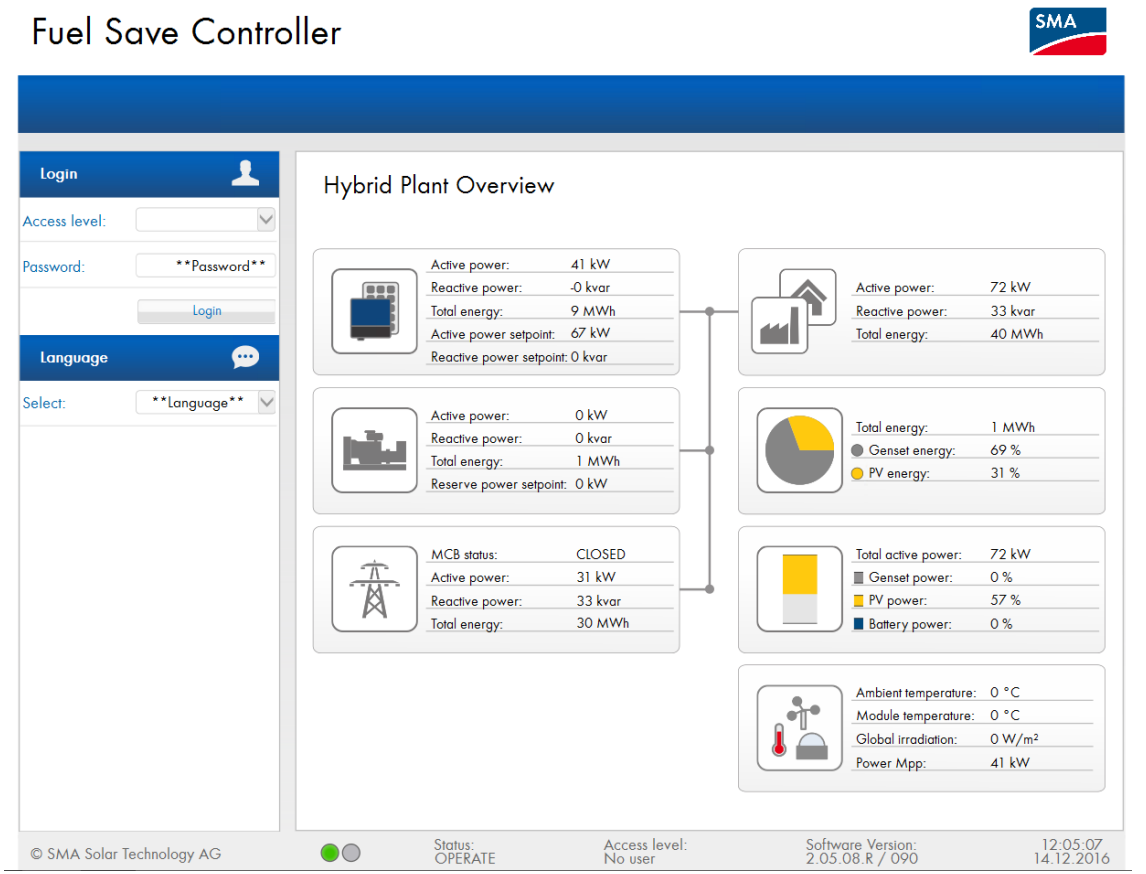
> **Hybrid System Commissioning by SMA Service**
SMA hybrid experts can carry out commissioning on site (if desired)

> **Remote Commissioning Assistance**
SMA hybrid experts can assist you remotely during commissioning.

EASY OPERATION

- **Designed for ease of use**
  - Quick and easy overview of energy flows on plant level
  - Deep information down to each single device
  - Comprehensive plant monitoring makes it easy to track down problems

- **User Roles**
  - Different users for operation and configuration
  - Advanced and detailed configuration possibility during configuration



- Easy and comprehensive user interface with few possibilities to (mis-)configure for stable operation

EASY KEEPING UP TO DATE

> **SMA Blog**
SMA Sunny – the SMA Corporate Blog – is a great source of information.

The Fuel Save Solution Info Package is a good point to start

> **SMA Hybrid News**
SMA also offers a quarterly newsletter that keeps you up to date with technical development, infos and new reference plants.

If you want to receive the newsletter, please send an email to FuelSaveSolution@sma.de


Tags from Fuel save solution

Back to overview

Hybrid Energy Supply of East Africas Largest Salt Factory

Hybrid Energy Supply of a Salt Factory

Krisalline Salt's factory is supplied by 25% of solar energy in grid parallel and in diesel mode. Following their ambitious energy management, the company took solar to a professional scale and sales expenditures for electricity supply.
SMA Sunbelt Energy GmbH as EPC in cooperation with its local construction partner Harmonic Systems build and commissioned the project within 5,5 months.

★★★★★ Continue reading »

5.00 avg. rating (98% score) - 2 votes

How to Design a Solar-Diesel-Hybrid-System Easily by Yourself

Designing a solar-diesel-hybrid-system is quite complex. There are many values that have to be taken into account such as meteorological data, electrical parameters, sizing of the components, profitability and many more. Sunny Design is a free tool that makes designing a solar-diesel hybrid system super easy. This article is a guide on how to design a hybrid system with Sunny Design to easily create offers for your customers, project documentation or suggestions for improvement for your existing diesel grid.

★★★★★ Continue reading »

5.00 avg. rating (98% score) - 5 votes

5 Reasons to choose SMAs Fuel Save Solution

Putting solar power into diesel based grids is easy but maximizing the share of solar is a real challenge. To save on diesel consumption, diesel has to be substituted by other energy sources. Solar energy is a cheap energy source but without intelligent system control it is hard to reach high solar shares in diesel grids. Uncontrolled solar energy feeding into a diesel grid can, even with a small share of solar, lower the diesel workload to a disadvantageous level in solar peak times causing inefficient operation of the diesel

OUTLOOK

> **Integration of Sky Imagers**

Why not employ a very small genset at minimum load when we see that solar production is sure as no clouds in sight?

Currently generic Sky Imager interface in development

> **Integration of demand side management**

Why not map availability of energy to an (maybe virtual) energy tariff and control selected loads accordingly?

Sound experience with load shifting in the european market with some tenthousand SMA Sunny Home Managers

> **Dynamic Genset Shutdown**

Employ a grid forming battery inverter to turn off diesel gensets completely during day and part of the night

REFERENCES

HYBRID ENERGY SUPPLY – KENYA 2016
COMMERCIAL OPERATION OF SALT FACTORY, MALINDI

Krystalline Salt's factory is supplied by 25% of solar energy in grid parallel and in Diesel mode. Following their ambitious energy management, the company took solar to a professional scale and safes expenditures for electricity supply.

SMA Sunbelt Energy GmbH in cooperation with its local construction partner Harmonic Systems built and commissioned the project within 5,5 months.

Project

- Location: Malindi, Kenya
- Commissioning: December 2016
- Specific requirements: Co-generation with generators and grid Costal conditions

Plant information

- Installed PV power: 991 kWp
- Diesel Capacity: 4 MVA
- Annual energy yield: 1600 MWh
- 25 % savings on electricity costs
- CO2 savings: 982 t/year

SMA System Technology

- 1 Fuel Save Controller 2.0
- 35 Sunny Tripower 25000TL-30

SMA system solutions for hybrid applications

HYBRID ENERGY SUPPLY – PAKISTAN, 2016
NISHAT MILLS SOLAR POWER PLANT, LAHORE

SMA successfully completed its first fuel save project in Lahore, Pakistan, within 4 month time from the order entry in August 2016 up to the on-site commissioning in December 2016.
An essential precondition for the project success was the collaboration and expertise in a multicultural team which overcame time differences and distances.
Nishat Mills is a jeans factory located at the suburban area of Pakistan's capital Lahore.

Project

- Location: Lahore, Pakistan
- Commissioning: December 16, 2016

Plant information

- Annual yield: 2179 MWh
- Installed PV power: 1,495 MWp
- Installed inverter apparent power: 1,26 MVA
- Installed genset apparent power: 3,25 MVA
- CO2 reduction: 1526 tons / year

System Technology

- 1 SMA Fuel Save Controller 2.0
- 21 SMA Sunny Tripower 60-10
- 2 Diesel gensets Cummins
- 5750 PV modules Risen SYP260P

SMA system solutions for hybrid applications

HYBRID ENERGY SUPPLY – EGYPT, 2016
JUHAYNA, MARSA SHAGRA, OASIS – 1.25 MW

Three more PV installations provide people in Egypt with free solar power now. They all include a SMA Fuel Save Solution. Successful commissioning took place in 2106. Commissioning was conducted by the customer himself in close contact with an experienced service technician via remote support. Precondition had been his participation in a "Commissioning of Hybrid Energy Systems with the SMA Fuel Save Controller 2.0" training at the SMA headquarter in Germany.

Project

- Location: 2 projects in Marsa Alam and 1 project in El Esseila, Egypt
- Commissioning: 2016

Plant information (3 projects)

- Annual yield: approx. 2,427 MWh
- Installed PV power: 1.25 MWp
- Installed inverter apparent power: 1,225 MVA
- CO2 reduction: approx. 1,941 tons/year

System Technology

- 3 SMA Fuel Save Controller 2.0
- 3 SMA Cluster Controller S
- 49 SMA Sunny Tripower 25000TL-30
- 4900 Suntech 255W PV modules

SMA system solutions for hybrid applications

HYBRID ENERGY SUPPLY – PANAMA, 2016
LUXURY RESORT, ISLA BASTIMENTOS

Located at the border of the Isla Bastimentos National Marine Park, the resort pledged early on to protect the organic land and native culture.

With the integration of a 196 kWp PV system, controlled by the SMA Fuel Saver, the emissions are reduced by approx. 50 % and the dependence on diesel costs is minimized. The system integration was done while the resort was in full operation, causing almost no impact to the operation.

Project

- Location: Isla Bastimentos, Panama
- Commissioning: February 2016
- Coordinates: 9°20'25"N, 82°10'44"W

Plant information

- Installed PV power: 196 kWp
- Annual diesel savings: Approx. 50,000 liters
- EPC: SMA Sunbelt Energy GmbH
- Operator: MGM Innove Energy Services

System Technology

- 8 SMA Sunny Tripower 20000TL-30
- 640 BYD 200 Wp modules
- 1 SMA Fuel Save Controller
- 3 Cummins 455 kW Diesel Generators

SMA system solutions for hybrid applications

HYBRID ENERGY SUPPLY – NL ANTILLES, 2016
LARGE-SCALE ISLAND ELECTRIFICATION, ST. EUSTATIUS

Today, solar energy covers 23% of St. Eustatius' total electricity need. To stabilize the grid, which is influenced by fast power fluctuation related to cloud movement, a Li-Ion storage facility has been integrated to absorb the fluctuations, provide energy shifting and frequency stability functionality also at night. Thanks to the SMA Fuel Solution about 2,240 tons CO2 per year can be saved. The project has been designed, and implemented by the SMA Sunbelt Energy GmbH.

Project

- Location: Dutch Caribbean Island of St. Eustatius
- Commissioning: 2016
- Specific Requirements: Exposure to salty air, hurricanes, fast cloud movement

Plant information

- Installed PV power: 1.89 MWp
- Installed Storage capacity: 1 MW, 570 kWh
- Diesel capacity: 4 MVA
- Annual energy yield: 3,200 MWh
- Annual diesel savings: > 850,000 liters

System Technology

- 1 SMA Fuel Save Controller
- 1 Sunny Central Storage pre-installed in 1 MVPS
- 73 Sunny Tripower 25000TL-30
- Direct modbus connection to genset controller

SMA system solutions for hybrid applications

HYBRID ENERGY SUPPLY – SOUTH AFRICA, 2012
CHROME ORE MINE, THABAZIMBI

The first megawatt-class photovoltaic diesel hybrid system was commissioned in November 2012. The existing diesel generators at the chrome ore mine in Thabazimbi (South Africa) were complemented with a photovoltaic system.

The SMA Fuel Save Solution saves up to 450,000 l diesel per year.

Project

- Location: Thabazimbi, Limpopo Province, South Africa
- Commissioning: November 2012

Plant information

- Installed PV power: 1 MW
- Annual diesel savings: Approx. 450,000 liters

SMA System Technology

- SMA Fuel Save Solution incorporate the SMA Fuel Save Controller
- 63 SMA Sunny Tripower 17000TL

SMA system solutions for hybrid applications

HYBRID ENERGY SUPPLY – INDIA, 2013
COTTON MILL, PALLADAM

The first Indian megawatt-class photovoltaic diesel hybrid system with the SMA Fuel Save Solution was commissioned for the spinning mill operator Alpine Knits in June 2013 in Palladam, in the state of Tamil Nadu in India.

The SMA Fuel Save Solution meets approximately 60% of the mill's total energy demand during peak periods.

Project

- Location: Palladam, India
- Commissioning: June 2013

Plant information

- Installed PV power: 1 MW

SMA System Technology

- SMA Fuel Save Solution incorporate the SMA Fuel Save Controller
- 44 SMA Sunny Tripower 20000TLEE

SMA system solutions for hybrid applications

HYBRID ENERGY SUPPLY – BOLIVIA, 2014
URBAN AREA, COBIJA

The world's largest PV-diesel hybrid power plant system with battery storage was commissioned in December 2014, in the Bolivian province of Pando.

Thanks to the SMA Fuel Save Solution a reduction in fuel consumption of approx. 1.9 Mio liters per year can be reached.

Project

- Location: Cobija, Bolivia
- Commissioning: December 2014

Plant information

- Installed PV power: 5,2 MW
- Installed battery power: 2,2 MW
- Annual yield: 7,500 MWh
- Diesel generator rating: 15,2 MVA
- Annual diesel savings: Approx. 1,900,000 liters

SMA System Technology

- SMA Fuel Save Solution incorporate the SMA Fuel Save Controller
- 6 SMA Sunny Central SC800CP-XT
- 4 SMA Sunny Central Storage SCS630

SMA system solutions for hybrid applications

HYBRID ENERGY SUPPLY – LEBANON, 2015
GHADDAR MACHINERY FUEL SAVER, GHAZIEH

- The PV Diesel Hybrid System will produce free and reliable energy and will reduce the factory's electricity dependence on diesel and grid by about 40 %.
- The integration of the PV Diesel Hybrid System will also result in lower operating costs by decreasing the number of running hours and load demand levels of the generators.

Project

- Location: Ghazieh, Lebanon
- Commissioning: September 2015

Plant information

- Installed PV power: 205.4 kWp
- Annual yield: 335.2 MWh
- Annual diesel savings: Approx. 85,000 Liters
- Annual CO^2 Savings: About 291.46 t

System Technology

- SMA Fuel Save Solution incorporating the SMA Fuel Save Controller
- 12 SMA Sunny Tripower 25000TL-30
- Modules: 684 (Yingli)

SMA system solutions for hybrid applications

HYBRID ENERGY SUPPLY – KINGDOM OF TONGA, 2013
ISLAND, VAVA´U

With its more than 1,500 hours of sunshine annually, the Tongan island chain Vava'u is profiting since November 2013 from its perfect conditions for generating solar power.

The PV diesel hybrid system with the SMA Fuel Save Solution leads to a reduced fuel consumption of approximately 225,000 l per year and lower carbon emissions.

Project

- Location: Vava'u, Kingdom of Tonga
- Commissioning: November 2013

Plant information

- Installed PV capacity: 140 kWp
- Batteries: 120 x 1000 Ah
- Annual energy yield: 695 MWh
- Diesel savings: 225,000 liters

SMA System Technology

- SMA Fuel Save Solution incorporate the SMA Fuel Save Controller
- 21 SMA Sunny Tripower 20000TLEE
- 15 SMA Sunny Backup SBU 5000

SMA system solutions for hybrid applications

ENERGY
THAT
CHANGES

SOCIAL MEDIA
www.SMA.de/Newsroom