diffused
.energy

Distributed Energy Solutions

Heavy-Duty | All-in-One Utility & Industrial
Hybrid Power Generation & Storage Systems

DEVELOPED BY

Utmost Tech
Research & Development Center

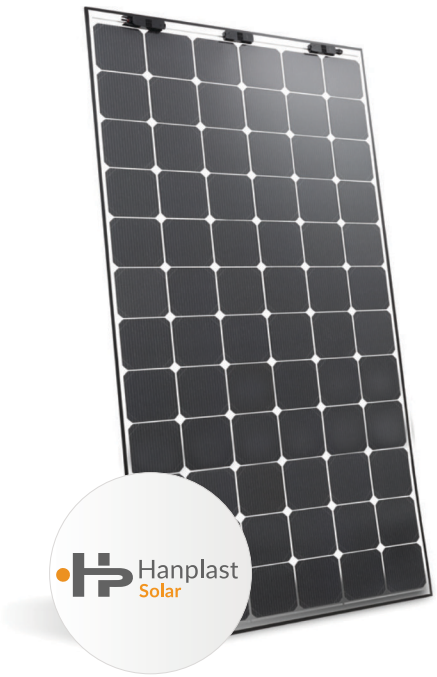
Hybrid power plant

Decentralised production and distribution of renewable energy with the "zero black-out guarantee" energy storage and trading solutions.

Designed for smart grid energy clusters synchronized with the national grid operators as well as off-grid power islands the hybrid mini-pods generate clean renewable energy and manage energy distribution, trading and multiple-source production via hack-proof distributed ledger system (blockchain).

Hybrid Power Pods are the fully stackable modules based on a standard shipping container size (10', 20' or 40'), designed to withstand any weather conditions. The modular design allows choosing the configuration that works best for constantly changing local needs for power.

The pods feature an advanced energy storage system that combined with an integrated power transformator and the clean natural gas gen-set allows for the most efficient balance of the energy generated by the renewable sources and the energy supplied by a national grid operator.



Improved Efficiency Photovoltaics

Diffused Energy systems work best in conjunction with durable and highly efficient photovoltaic panels manufactured with the use of the Heterojunction Smart Wire technology.

Improved Energy Production

- ✓ 285Wp Standard Panels
- ✓ 300-375Wp Bi-Facial Panels
- ✓ up to 24% Efficiency

30-Year Warranty

- ✓ Tempered Glass Protection
- ✓ Corrosion Resistant Aluminum Framing

Full modularity

- ✓ Frameless Design
- ✓ Micro-inverters & Optimizers
- ✓ Installations flexibility with rigging for field, rooftop and building elevations.

Advanced lamination

- ✓ Cells 100% sealed against moisture and dust
- ✓ Glass-Glass bi-facial panels with albedo at 26% average

IMPROVED GREEN ENERGY PRODUCTION

At Diffused Energy, we believe that sustainability can be achieved by generating renewable energy from sun, wind, hydro or natural gas, combined with modern energy storage and advanced power management systems.

ARCHITECTURAL FIT

Use of soundproof all-weather insulation and aesthetic eco-friendly wooden vented elevation makes it possible for a non-intrusive installation of the power pods within the guidelines and style of an existing architecture.

The 16 sq. meters footprint of a single Diffused Energy Power Pod allows for a quick and cost efficient installation near any renewable energy farm.

SIMPLIFIED ENERGY DISTRIBUTION

The integrated transformer station allows for power distribution from nearby solar, wind or hydro power plants to the national grid as well as to the local grid's outputs of up to 630kVA AC of power from one container.

HEVY-DUTY ENERGY STORAGE

The Lithium-Ion Energy Storage System is designed for continous energy storage and power balancing with high performance and long life span even in extreme environmental conditions. One container fits up to 1.5MWh of power banks.

PEAK POWER LNG

The Liquid Natural Gas or Liquid Petroleum Gas powered generator can be optionally provided to assure emergency and peak power generating, with up to 5MW of electric power boost capabilities in one container.

Distributed Energy Solutions

Distributed Computing Platform

Diffused Energy runs on the distributed computing platform with minimal carbon footprint and a fraction of the operating costs associated with the centralised data center solutions.

ULTIMATE SECURITY

- ✓ Ultimate level of cybersecurity through asymetric cryptography of decentralised data registry
- ✓ Neural network acceleration supporting intelligent grid applications
- ✓ Seamless & transparent peer-to-peer transactions running on blockchain technology
- ✓ Designed for large deployments of digital currencies, smart contracts, distributed apps, and more

Distributed Energy Trading Platform

Diffused Energy is the autonomous energy trading platform that uses deep-learned efficiency predictions of the renewable energy generating sources and energy consumption profiles, monitored directly at grid ends by smart metering devices.

The trading platform runs on smart **[e]**rrency™ contracts supported by Energy Efficiency Monitoring and Demand Side Response systems allowing for the most balanced and cost-efficient transactions within the Local Distribution Grid and beyond, through an exchange interface for trading on energy markets and with the national grid operators.

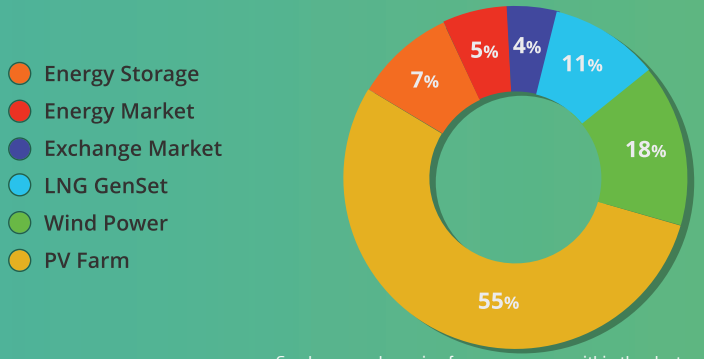
Smart metering

- ✓ Advanced energy metering and real-time power efficiency analytics
- ✓ Supervisory Control And Data Acquisition over LoRA, WiFi, and GSM

Virtual Power Plant

Diffused Energy system provides an autonomous Virtual Power Plant functionality that include the best energy price guarantee with an insurance of contracted energy, storage surcharges, and power distribution costs optimized for all consumers within the cluster of the Local Distribution Grid.

SAVE 20% AND MORE ON ENERGY BILLS WHEN YOU JOIN THE diffused.energy LOCAL DISTRIBUTION GRID CLUSTER.



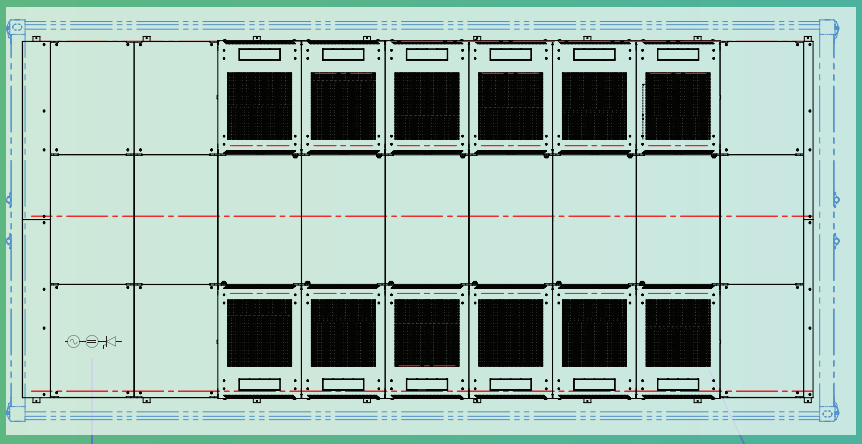
Graph - exemplary mix of energy sources within the cluster.

Energy Storage Solution

Diffused Energy designs are arguably the most durable long life energy storage systems for utility scale and industrial applications.

Build to last 30 years, the heavy-duty design features fully insulated container modules with passive air conditioning system, that makes it possible to installl these storage systems anywhere on the planet. Diffused Energy storage is not only flexible, with its compact size and customizable power output to suit any need, it is also one of the most advanced and cost-efficient storage systems available on the market today.

The longer lifespan of the system has been guaranteed by the use of power cells of different chemical configuration and an advanced charging and load control by the **Battery Management System**, that provides a continous power rating of 1C, and even up to 2C for short periods, supported by supercapacitors in a hybrid discharge mode. The 0.5-1.0C charging speed guarantees a non-destructive long-life operation for all the cells used in the system configuration.



Power inverter system - depending on the system capacity and the power output requirements Diffused Energy provides all-in-one solution with the premium 96+% efficiency-rated inverters and power transformator installations.

Battery modules in racks. Typical 1MWh system configuration will use only 8 system racks, with up to 10x4U modules per rack. The overall system capacity can be easily upgraded by adding or replacing the battery bank modules.

ESS 1000 HD SYSTEM PARAMETERS (20')

System Max Power [kW]	500
Energy Capacity [kWh]	967,68
Deep Cycle Life (0.5C - 80%) [Years]	16
Combined Minimal System Efficiency [%]	85
System footprint [m^2]	16

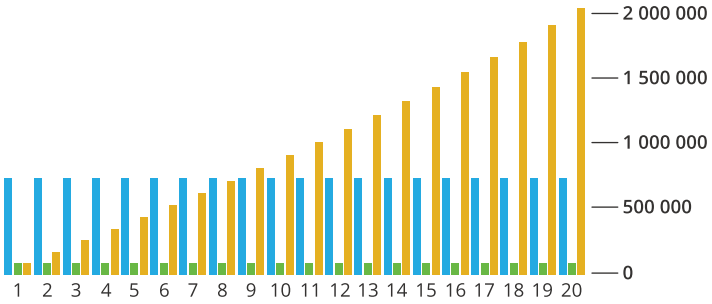
SYSTEM PERFORMANCE

Stored energy turnover value in 1-20 years cumulative

Year	MWh	Euro
1	1068,72	106 872 €
5	5 134,09	551 914 €
10	9 774,90	1 050 801€
15	13 969,82	1 501 756 €
20	17 761,70	1 909 383 €

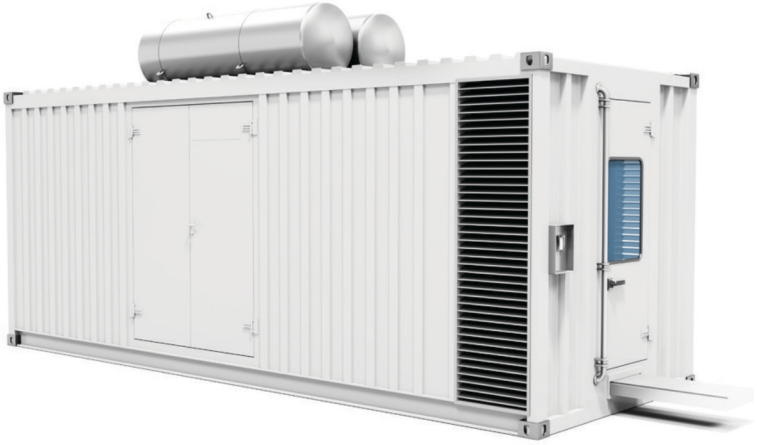
RETURN ON INVESTMENT

Given 7,5% annual increase of energy price and 2% a year degradation of the Li-Ion energy storage, the cumulative turnover earnings continue to grow with slow-down rate corresponding to decreasing system capacity. Based on average energy price of €100,00 per MWh.



SYSTEM COMPONENTS

Inverter Power [kW]	2x 250
Power Bank Racks 19" [pcs]	10
Power Bank Modules 4U [pcs]	90
High/Low Voltage Transformator [kVA]	630
HVAC System [kW]	4,6
Control Panel, CO2 Fire-Proof, Software	Included



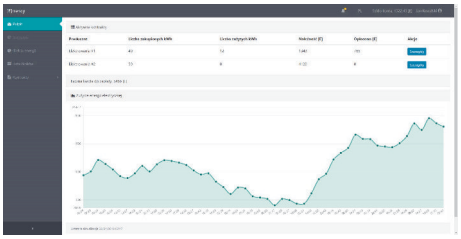
MODULE PARAMETERS (4U)

Single Cell Capacity [Wh]	16
Number of cells per module	672
Module Capacity [kWh]	10,75
Voltage config range [V]	420-706
Module weight [kg]	65
Operating Temperature [oC]	-25 to +65

The Deep Cycle Life of the battery cells varies from 3000 cycles at 2C ratio to 6000 cycles at 1C, to 8000 cycles at 0.5C.
The system runs at 0.5C by default, and its design allows discharging at up to 2.0C ratio, in emergency situations.
The conditions and performance of cells is being constantly monitored by the Battery Management and Charging Systems. The highest quality cells are guaranteed with Columbic Efficiency at >99%, the DC converter efficiency at 98% and the overall efficiency >85% including AC inverters, totaling to 15% loss of energy. The 15% loss in form of heat can be recovered in optional co-generation HVAC systems integrated with the energy storage container.

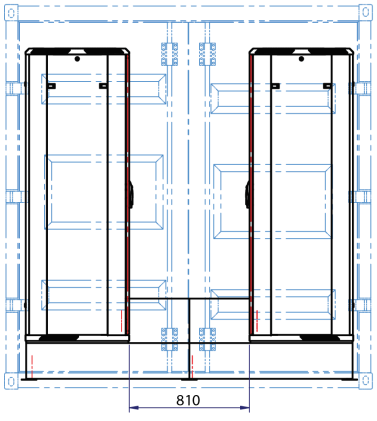
SCADA SOFTWARE

Supervisory Control And Data Acquisition system has been designed with user-friendly graphical interface representing a dashboard consisting of crucial energy efficiency data and graphs. Remote systems monitoring and notification apps are available on iOS, Android, Windows Mobile, and online platforms.



DIFFUSED ENERGY ADVANTAGE

- ✓ Autonomous production and consumption monitoring with energy efficiency balancing leads to low power cost;
- ✓ Green energy certificate for every Watt-hour generated with exact identification of the production source;
- ✓ Seamless & transparent peer-to-peer transactions running on blockchain technology with energy market exchange interface;
- ✓ Zero black-out guarantee with energy supply insurance;



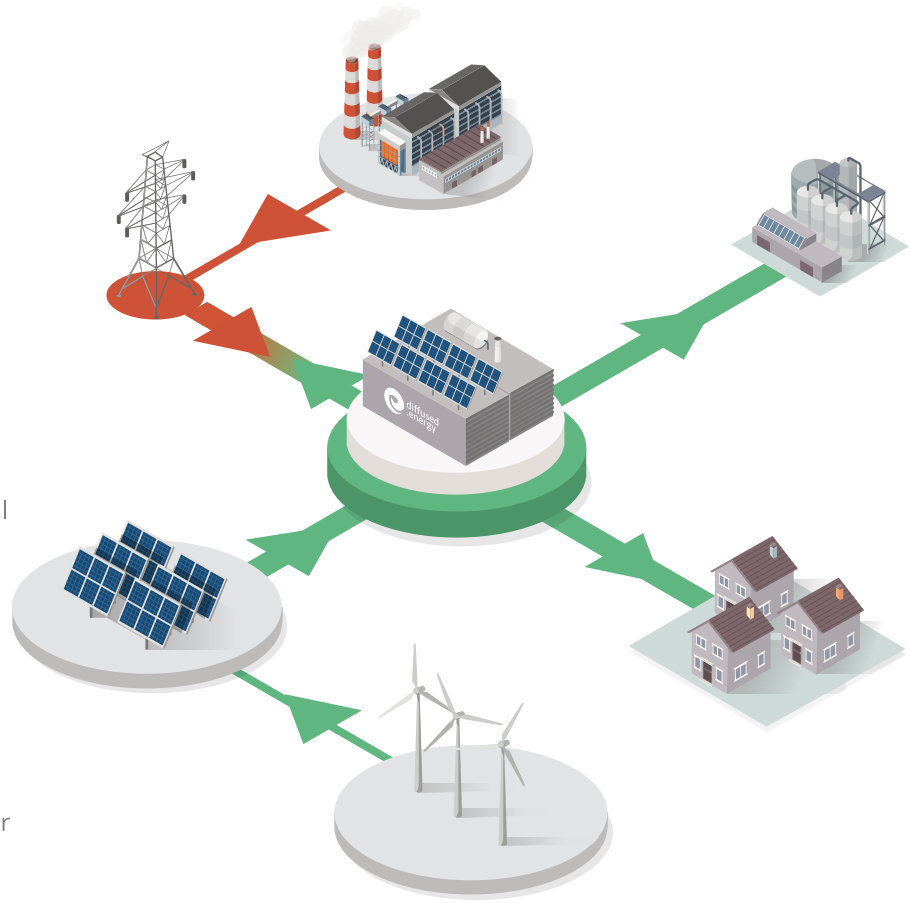
diffused .energy

Applications

The scalability of the Diffused Energy solution guarantees safe, clean, and black-out-free power for virtually any application.

Ranging from a single household to large industrial systems, the Hybrid Power Pods combined with any renewable energy source are the best, proven alternative for all traditional fossil fuel burning power plants.

The energy cluster configuration of the compact Hybrid Power Plant may include 4 MW photovoltaics farm; 2 MW wind turbine; 1 MWh energy storage and 500 kW natural gas peak power generator that combined guarantee continous supply of clean power for up to 3000 households.



GAS STATIONS & EV CHARGING

Hybrid Power Pods can be configured to fulfill all needs for safe and reliable power for any stand-alone power island, such as gas stations, including those locations with developing electric vehicle charging infrastructure. Three default configurations are recommended consisting of one 20' container system for compact gas stations, and two or three modules for larger gas stations with 8x7m and 10x7 meters of footprint respectively.

OFF GRID POWER ISLAND

Whether it's on or off-grid location, the Hybrid Power Pods with Diffused Energy systems can be deployed rapidly and easily moved, that is very convenient for constantly developing urban landscape. The integrated transformator station allows power distribution from nearby solar, wind, biogas or hydro power plants to the national grid as well as to the local grid's AC and/or DC outputs.

RENEWABLE ENERGY PLANT PROFIT BOOSTER

Hybrid Power Pods not only store the electrons produced by renewable energy source - they also use an advanced deep learning algorithms to predict the energy supply levels under constantly changing weather conditions. Diffused Energy software solutions guarantee added value for the renewable energy industry by increasing business efficiency while reducing costs far beyond savings on energy bills.

INDUSTRIAL POWER EFFICIENCY OPTIMIZER

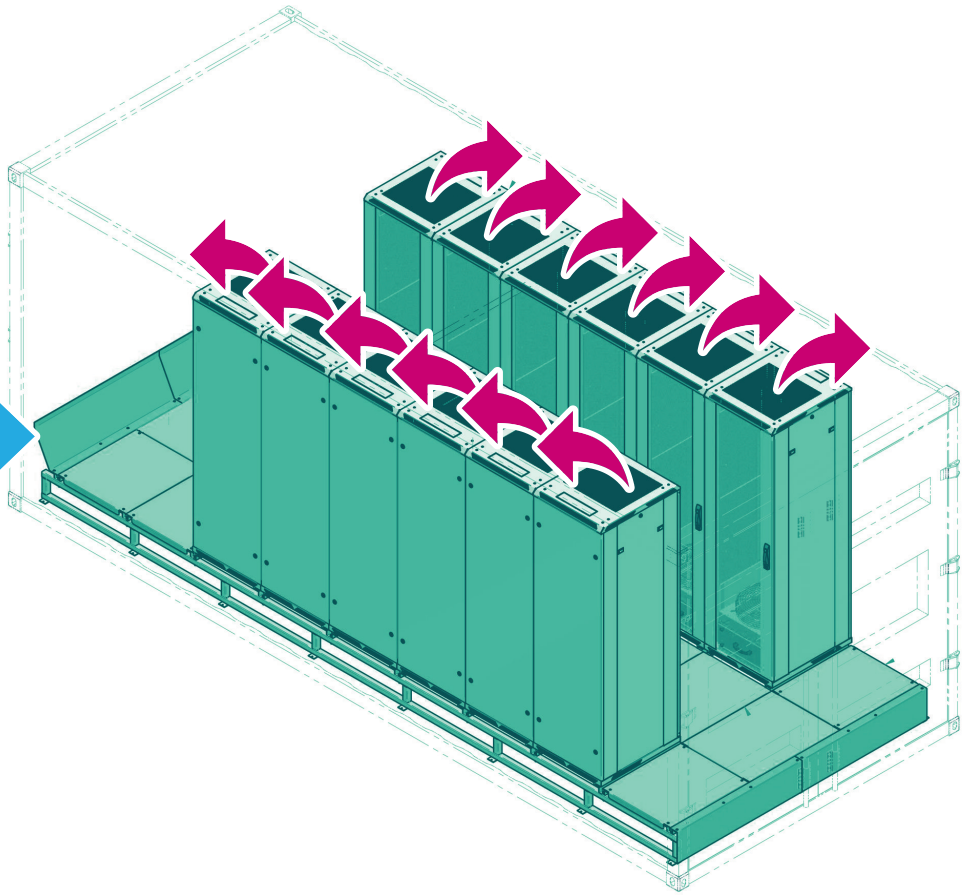
The Energy Management Systems integrated with Diffused Energy platform are based on advanced deep learning algorithms analysing great amount of data gathered by multiple power sensors distributed along the factory machinery or industrial infrastructure. The deep-learned data in form of the power consumption profiles are crucial to accurately predict the demand for power ahead of time. Stock market analysts know best what happens when one knows things ahead of time.

System Warranty

All components of the Diffused Energy solutions are manufactured to the highest standards for heavy-duty long-term use in any weather conditions.

Depending on the contractual terms of financing and the commercial system exploitation profile as well as an optional green energy incentives, the Diffused Energy solutions are offered with flexible warranty plans ranging from 5 years on installation maintanance to 30 years of product warranty for PV panels and passive components, including lifetime warranty option for the entire system (incl. power cells).

The vertical-cyclone air conditioning system features raised panel floor with air intake filters, animal net and insect membranes, chillers and dehumidifiers, and a passive closed-loop floor-thru-rack-to-ceiling airflow powered with floor-mounted fans and optional co-generation or tri-gen systems.



DELIVERY NOTICE

Manufacturing and assembly of the PV panels and ESS require 90 day turnaround time. Delivery of the ESS system and installation of the PV panels in 120 days after order processing and financial verification.

LEGAL DISCLAIMER

Seller expressly disclaims any liability for consequential, incidental, special, exemplary, or punitive damages. Seller's liability in all circumstances is limited to, and shall not exceed, the purchase price paid for the product that gives rise to any liability. Buyer assumes all risk and liability for loss, damage, or injury to persons or property of buyer or others arising out of use or possession of any product sold hereunder. The information contained in this brochure shall not constitute any commercial offer.

STANDARD LIMITED WARRANTY

- ✓ 5 Year Warranty on system & construction maintenance;
- ✓ 10 Year Warrany on battery modules and active components;
- ✓ 30 Year Warranty on hardware, PV panels and passive compo- nents.

GRID-APPROVED CERTIFICATIONS

Diffused Energy solutions are certified for static electricity discharges up to 16.5kV [PN-EN 61000-4-2: 2011]; for the fast electric transients / burst [PN-EN 61000-4-4: 2013-05]; for the surge voltage resistance [PN-EN 61000-4-5: 2014-10]; for the resistance to conductive disturbances [PN-EN 61000-4-6: 2014-04]; for the interruptions in the supply voltage [PN-EN 61000-4-11: 2007]; and more..

diffused
.energy

Centrum Badawczo-Rozwojowe
Utmost Tech Sp. z o.o.
ul. W. Paciorkiewicza 3,
85-862 Bydgoszcz, Poland

+48 52 511 8900

info@utmosttech.com

http://diffused.energy