
ENVISION
远景能源


ENVISION
TO SOLVE
THE CHALLENGES
FOR A SUSTAINABLE FUTURE

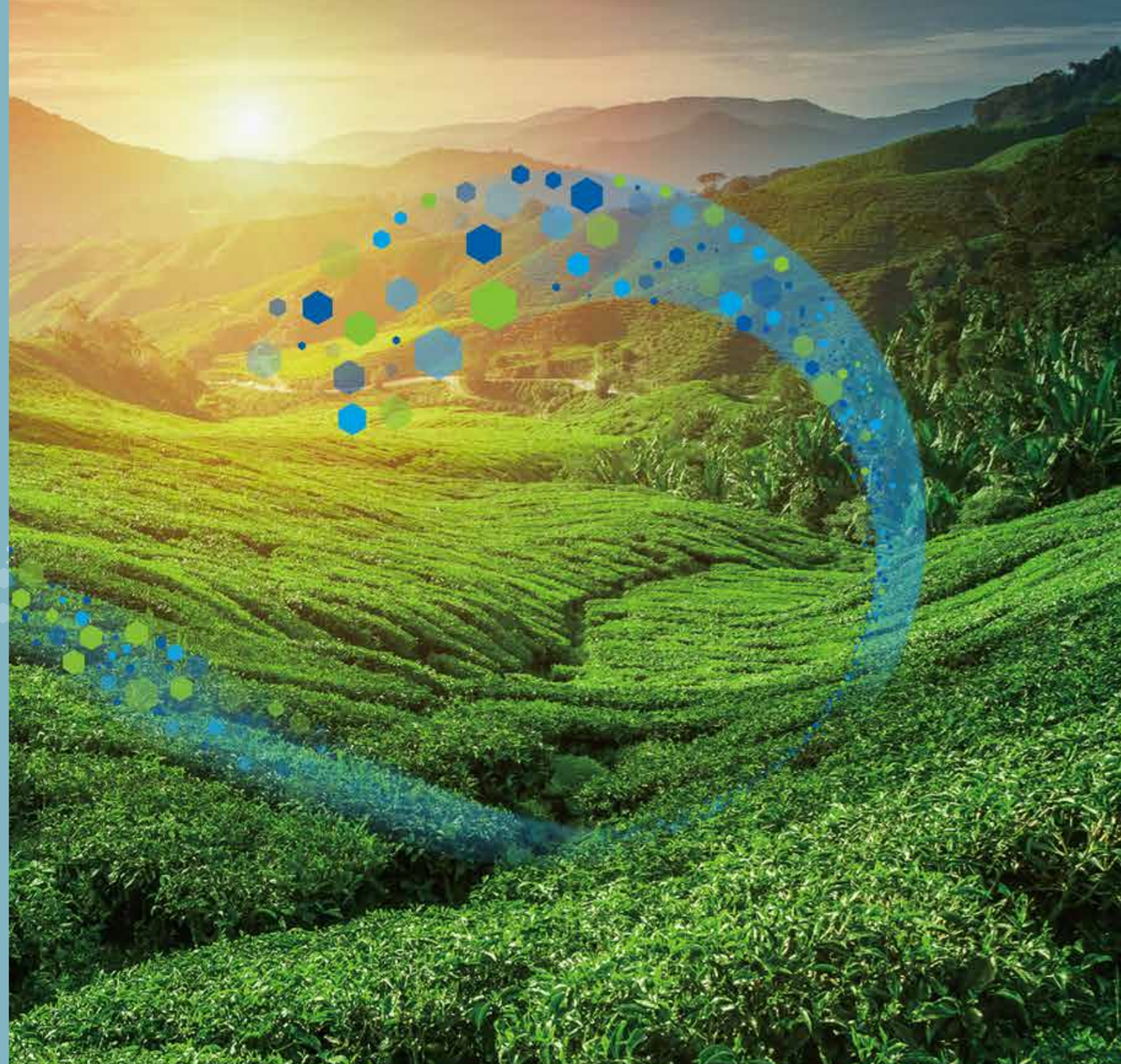
ENVISION

Envision's mission is "to solve the challenges for a sustainable future ". The company is committed to developing a sustainable future by innovation in the energy industry through advanced technologies.

Established in 2007, Envision is the second largest wind turbine manufacturer and the largest offshore wind power solution provider in China. Envision launched the EnOS™ in 2016, the first-of-its-kind and the largest Energy IoT platform in the world, which helps manage over 100GW renewable assets globally. The customers of company include Pattern Energy, North America's largest independent renewable energy operator, China General Nuclear Power Group, the leading renewable energy developer, Trina Solar, the leading solar energy service provider and so on.

EnOS™ is now building an energy IoT ecological system with ecological partners by making strategic investment in CHARGEPOINT, the world's largest electric vehicle charging network company, AUTOGRID, the world's leading smart grid big data technical company, SONNEN, the largest energy storage company in Europe, and BAZEFIELD, the leader in European renewable energy fleet management software market.

Since its foundation, Envision has been maintaining a constant growth in its business operations, including smart turbines, smart wind farm solutions, the Apollo solar platform and its energy IoT platform EnOS™. Envision has set up 8 global technology innovation centres respectively in Denmark, the USA, Germany and other countries. The group has 1400 employees approximately with 20% of them based internationally and over 70% holding masters or doctoral degrees. The R&D personnel and technicians account for 70%.



INTERNATIONAL PERSPECTIVE
GLOBAL EXPERTISE

GLOBAL BUSINESS FOOTPRINT

ENVISION
BUSINESS FOOTPRINT

CORE BUSINESS

CURRENT PRODUCTS AND TECHNICAL SERVICES

01

SMART
WIND TURBINES

02

SMART
WINDFARM™

03

APOLLO SOLAR
PLATFORM

04

EnOS™

ENERGY IOT
AND SMART CITY
PLATFORM
& ECOSYSTEM

SMART WIND TURBINES

Envision turbines are precisely engineered for performance and reliability. Sensor built-in turbines optimize wind farm performance and financial return by means of machine learning. The 2MW, 3MW, and 4MW turbine platforms are dedicatedly designed for a full range of wind speeds onshore and offshore applications.

Envision is the first in the industry to develop "smart turbine" with its exclusive core technology of smart control, advanced measurement method, expert data analysis system, active performance control and reliability-based deterministic turbines. The effective combination and application of these groundbreaking technologies have enabled these turbines to accurately perceive its own status and external environmental conditions. This ensures that the turbine could always function with its optimal working condition for maximum power generation and longer service life. Through a “software-defined turbine” approach, Envision has surpassed the technological limits of traditional wind turbines, and increased the efficiency of wind power generation by 15%.

• In 2016, Envision's New Installed Capacity Ranked Second In China *	NO.2
• Over The Past Five Years, The Newly Installed Capacity Of Envision Has Grown More Than 40% Per Annum.	40%
• Installation Of More Than 10 GW Smart Wind Turbines Globally.	10GW
• Envision Was Selected As The Only Turbine OEM To Develop A Superconducting Turbine With €15 Million Funding From EU's Horizon 2020 Program	
• Ranked The World's Best Wind Turbine Units In 2016 By Global Leading Media "WIND POWER MONTHLY". Four Chinese Brands Selected, Of Which Three Were From Envision.	

* SOURCE: CHINESE WIND ENERGY ASSOCIATION

ONSHORE
SMART WIND TURBINE

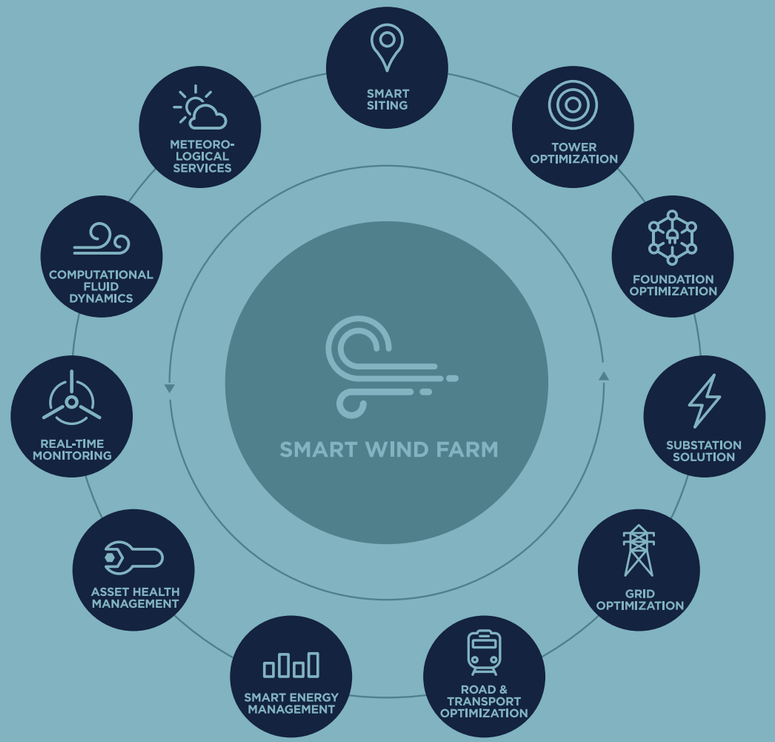
Envision has pioneered development and innovation of "smart wind turbines". Envision's world first smart wind turbine for low wind speed sites has accelerated the strategic realignment of China's wind power industry by effectively tapping low wind speed areas, which account for more than 60% of China's wind resource. So far, Envision has the largest market share in low wind speed turbines in China. In April 2017, the first 140-meter steel tower low-speed wind turbine designed and developed by Envision was installed at Lankao, Henan Province, leading the development of low-wind power in China into a new era.

OFFSHORE
SMART WIND TURBINE

Envision is China's largest provider of offshore wind power solutions, with offshore wind turbines installed nearly 1GW capacity, and Envision is also the world's leading company in terms of offshore electric field integration designing, construction, operation and maintenance. The 4MW turbine uses the world's most robust and reliable transmission chains and parts system and the world's first smart control technology. This makes China's large scale utilization of its offshore wind power resource possible. Envision's 3.6MW offshore wind turbine, known in the industry as "the Game Changer", is the world's first to use partial pitch and carbon fiber main shaft technologies, which deal effectively with typhoon conditions and reduce the construction costs of offshore wind power facilities by 30%.

SMART WIND FARM

Based on Envision's deep technology accumulation in the field of wind power and EnOS™ energy IoT platform, Envision innovates and creates smart wind farm products. It provides full life-cycle management functions covering all wind farm requirements. It includes wind farm smart siting, wind resource assessment, wind farm engineering design, wind farm asset operation, and establishing a verification system of closed-loop analysis of wind farm data throughout the life cycle to support customers' continuous optimization of all business stages and achieve wind farm investment risk accurate measurement and avoidance, constantly improving and promoting the rate of return on wind farm investment. The Guangling smart wind farm, which was independently developed by Envision, had more than 3400 utilization hours in 2016, ranked in Shanxi Province.



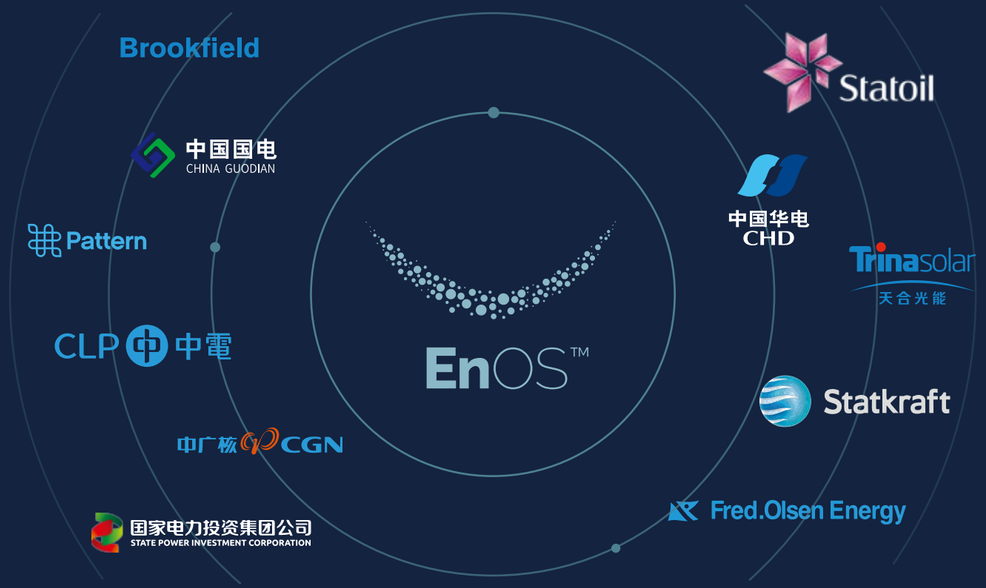
THE WORLD'S LARGEST ENERGY IoT PLATFORM EnOS™

The future energy world will be a fragmented energy system composed of billions of renewable energy power generation, energy storage and smart devices, which needs to be reconstructed and integrated in the digital world. The ENERGY IoT PLATFORM is the key for achieving this.

EnOS™ BUSINESS OVERVIEW

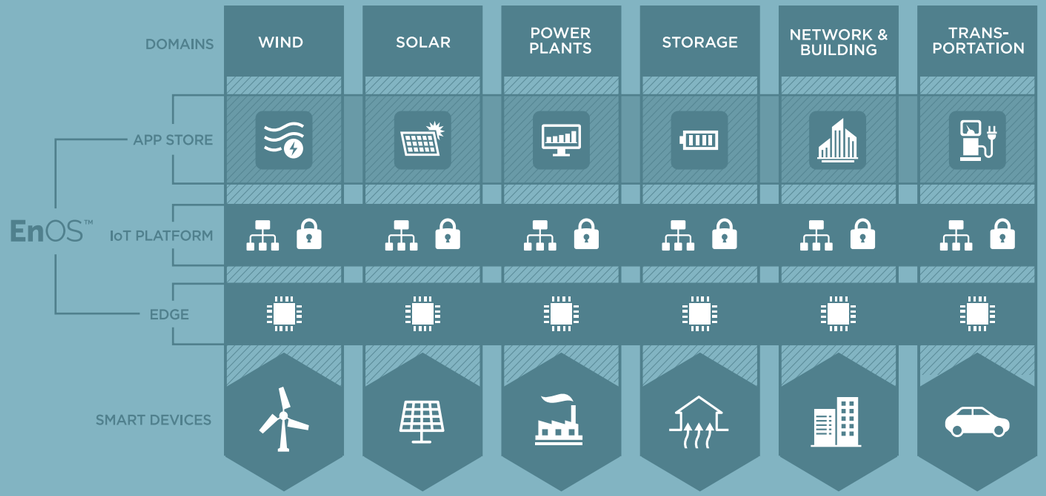
EnOS™ is an energy IoT platform developed by Envision. Currently it helps manage over 100GW energy assets globally, connects over 50 million sensors and smart devices, and is the world's largest energy IoT platform.

Our clients include Hong Kong's largest utility CLP, North America's largest independent renewable energy operator PATTERN Energy, the leading renewable energy developer CGN, and the world's leading provider of total solar solutions Trina Solar, connecting more than 50 million sensors and smart devices.



EnOS™ PLATFORM OVERVIEW

EnOS™ platform currently provides solutions and service for 6 sectors, which includes wind, solar, traditional power plant, I&C parks and distribution network, charging network, and energy storage.

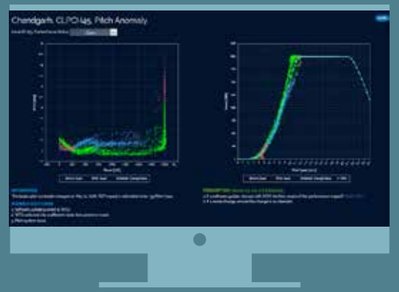


EnOS™ SMART WIND SOFTWARE

IMPROVE PRODUCTION AND REDUCE COST WITH LESS OPERATORS, KPI TRANSPARENCY, PREDICTIVE MAINTENANCE, AND GRID FRIENDLINESS

Centralized Monitor Of Wind Farm And Solar Sites Based On Direct Device Connection

- Reduce local operators by centralized monitoring system
- Replace OEM SCADA to satisfy new standards



Machine Learning To Achieve Predictive Maintenance

The machine learning algorithm based on 2PB high-quality data training enables power underperformance issue identification and equipment sub-health grade alarm.

Accurate Production Loss Analysis, And Data Discovery

- Reveal production loss by various dimensions
- Drive staff and equipment improvement based on transparent KPI

High Power Forecast Accuracy And AGC/AVC Control Services To Improve Grid Friendliness.

- High forecast accuracy: power forecast accuracy is higher than the industrial in average (+5%).
- High control accuracy: active power control error <1%, reactive power control error <1%

ENOS™ SMART SOLAR SOFTWARE

LIFE-CYCLE ASSETS MANAGEMENT SOFTWARE

Envision smart solar software based on the EnOS™ platform provides full life-cycle management and risk management, including smart siting, system design & optimization, engineering management, asset operation and maintenance, asset transaction and etc. Apollo Cloud™ is the largest distributed generation management platform in China.

APOLLO DAT™ → APOLLO EPCM™ → EnOS™ Solar → Enlight™ Solar → APOLLO OM™ → Ensight™ Solar

APOLLO RATING™

'Apollo Rating' has rated and evaluated more than 6GW solar assets, including 3GW distributed generation. Based on 'Apollo Rating', advanced technology, and software products, Apollo Solar Platform has developed, optimized, managed and traded more than 8GW of photovoltaic power assets for financial institutions and power station investors.

招银金融租赁有限公司 CMB Financial Leasing Co.,LTD.
无锡产业发展集团有限公司 Wuxi Industry Development Group Co.,Ltd.
国家开发银行 CHINA DEVELOPMENT BANK
平安信托 PING AN TRUST
中国电力投资集团公司
江苏银行 BANK OF JIANGSU
中信银行 CHINA CITIC BANK
中国康富国际租赁股份有限公司 CHINA KANGFU INTERNATIONAL LEASING CO., LTD.
ENVISION
华润租赁有限公司
ICBC 工银租赁 ICBC LEASING
中国平安 PING AN
招商银行 CHINA MERCHANTS BANK
华能天成融资租赁有限公司 HUANENG TIANCHENG FINANCIAL LEASING CO.,LTD
中建投信托
中信金融租赁有限公司 CITIC FINANCIAL LEASING Co., LTD
安徽省投资集团控股有限公司 ANHUI PROVINCIAL INVESTMENT GROUP HOLDING CO.,LTD.
华夏金融租赁有限公司 HUAXIA FINANCIAL LEASING CO.,LTD.
英大国际信托有限责任公司 YINGDA INTERNATIONAL TRUST CO., LTD.

THE FUTURE ENERGY WORLD DEFINED BY DEVELOPERS

In future, countless developers can develop intelligent applications and services covering renewable energy assets, industrial and commercial parks, charging networks, energy storage systems, smart homes, smart cities and the like based on the EnOS™ IoT platform.

Guanglin Wind farm

- WH01 — power: 730.7 kW; winds peed: 12 m/s
- WH10 — power: 420 kW; winds peed: 12 m/s
- WH19 — power: 721 kW; winds peed: 11 m/s

EBA 99.63 %

TBA 97%

Production 300 GWH

Average windspeed 6 m/s

Power 60 MW

Capacity 100 MW

Xicun Solar Station

Installed Capacity	:	1.225 MWp
Production Today	:	2,733 kWh
Full Hours Today	:	2.00 h
PR	:	80%
Active Power	:	0.8 MW
Irradiance	:	4,000 Wh/㎡

Hongkong

86%

Details

Charged power	Duration	Driving
3.9 kWh	45 min	60 km

Nancy's Home

AIR CONDITIONER	90.00 kWh
WATER HEATER	85.00 kWh
WASHING MACHINE	76.00 kWh
DRYER	45.00 kWh

Panasonic Industrial Park

2017 Scheduled 8,937 MWh

2017 actual 8,577 MWh

Sawing Sheet

Clean Room | Inner

Optical Inspection

Electric Press | lamination | Oil Press

Kowloon, Hongkong

D1 D2

Bldg 51

D1 D2

Bldg 52

Transformer Tx81D1

Predict Load 1.60 MW

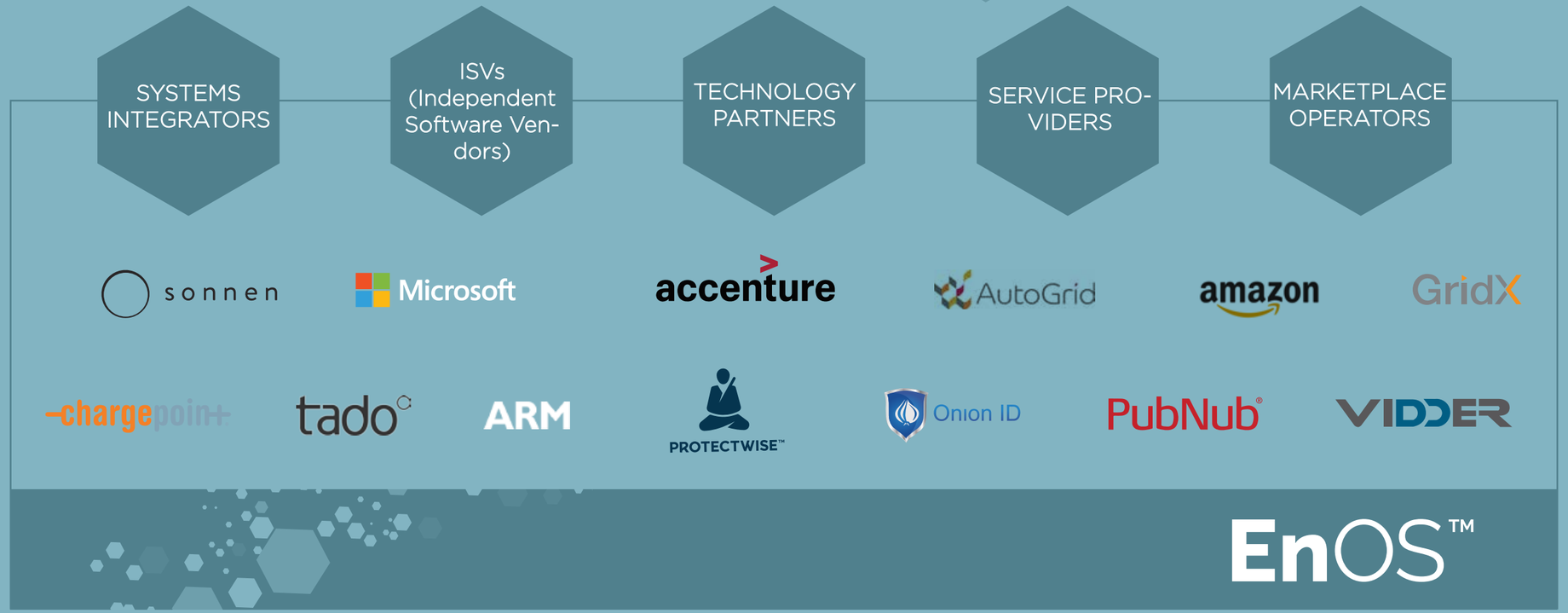
Capacity 1.50 MW

ONE PLATFORM, INFINITE OPPORTUNITIES

GLOBAL SMART ENERGY ECOSYSTEM BASED ON EnOS™

EnOS™ is an open platform, different types of partners can easily contribute their wisdom and expertise to co-build IoT applications for customers and end users.

EnOS™ is now building an energy IoT ecosystem with ecological partners by making strategic investment in CHARGEPOINT, the world's largest electric vehicle charging network company, AUTOGRID, the world's leading smart grid big data technical company, SONNEN, the largest energy storage company in Europe, and BAZEFIELD, the leader in European renewable energy fleet management software.




THE GOAL OF EnOS™ ENERGY IoT PLATFORM IS
TO "ORCHESTRATE BEAUTIFUL ENERGY WORLD"
ENTOPIA

ENVISION
远景能源

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