ENcome
ENERGY PERFORMANCE

BECAUSE WE CARE.

ENcome Energy Performance
Global Knowledge. Local Presence.

Klagenfurt, September 2019

CONTENT

ENcome Energy Performance – a leading technical service provider for photovoltaic power plants

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Key Facts

- Pan-European leading and independent service provider for the operation of photovoltaic power plants, headquartered in Klagenfurt, Austria
- Operates photovoltaic power plants with a nominal capacity of about 1.3 Gigawatt
- Subsidiaries and representations in all major European photovoltaic markets and Australia
- More than 100 employees, mainly technicians and engineers ensure the best possible yield for every power plant in any grid environment

Service Offering

ENcome is a „one-stop-shop“ for any technical service over the whole life cycle of photovoltaic power plants

ENcome's service portfolio covers all technical aspects of your PV portfolio

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Operations Management

Monitoring

- ✓ Performance Monitoring
- ✓ Diagnostics / Issue detection
- ✓ Service provider Supervision
- ✓ Security Monitoring

Plant Operations

- ✓ Remote control
- ✓ Forecasting
- ✓ Maintenance scheduling

Performance Control

- ✓ Performance Tracking
- ✓ Trend Analysis
- ✓ Triggering of corrective Maintenance

Maintenance

PV Plant Maintenance

- ✓ Performance Monitoring
- ✓ Diagnostics / Issue detection
- ✓ Service provider Supervision
- ✓ Security Monitoring

Site Maintenance

- ✓ Preventive and corrective Maintenance
- ✓ Module cleaning
- ✓ Vegetation trimming
- ✓ Site surveillance
- ✓ Modules, inverters, wiring and conduits, monitoring systems, tracker, transformers, switchgear
- ✓ Racks, fences, roads, buildings, drain maintenance

Technical Asset Management

- ✓ Technical Controlling
- ✓ Plant Performance Monitoring
- ✓ O&M Provider & Contractor Supervision
- ✓ Reporting
- ✓ Warranty administration

Technical Advisory

- ✓ Technical Due Diligence
- ✓ Yield Studies
- ✓ Plant Design review
- ✓ Owners/Lenders engineering
- ✓ RfP counselling
- ✓ Plant Certificates
- ✓ Process Optimization
- ✓ Expertise for insurances
- ✓ Quality audit / Inspections

Engineering & Projects

- ✓ PV Plant Engineering
- ✓ Repowering Engineering
- ✓ Construction Supervision
- ✓ Performance improving Upgrades
- ✓ Monitoring system install/retrofit
- ✓ Security Concepts

After Sales Service Partner

- ✓ Local Service Partner for Component Manufacturer
- ✓ Warranty/Claim Management

ENcome provides a broad variety of technical services to PV power plant investors, banks, insurance companies, component manufacturers and asset managers.

ENcome operates several hundred PV power plants with a nominal capacity of about 1.3 Gigawatt

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UK
power plants: 64
Installed capacity: ~201 MWp

Germany
power plants: 264
Installed capacity: ~285 MWp

Austria (HQ)
power plants: 72
Installed capacity: ~ 24 MWp

Slovenia
power plants: 23
Installed capacity: ~12MWp

Hungary
power plants: 3
Installed capacity: ~ 2 MWp

Macedonia
power plants: 1
Installed capacity: ~ 1 MWp

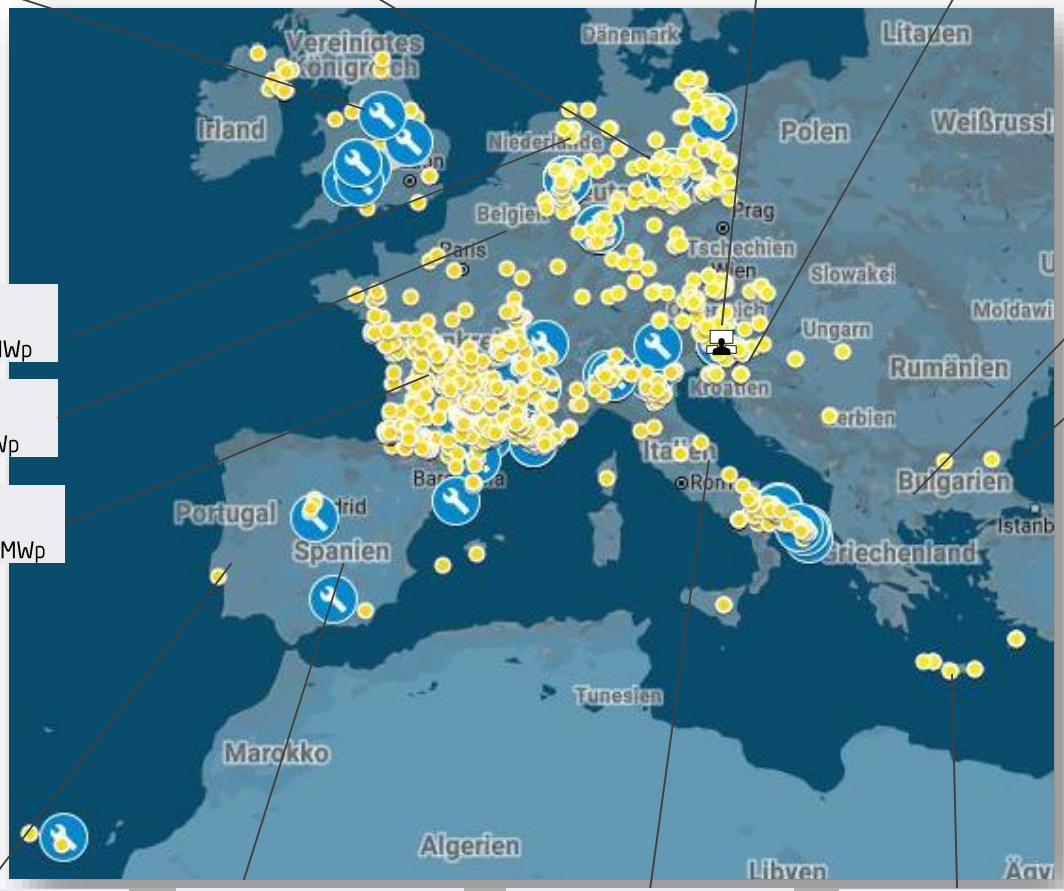
Bulgaria
power plants: 2
Installed capacity: ~ 5 MWp

Iran
power plants: 1
Installed capacity: ~ 1 MWp

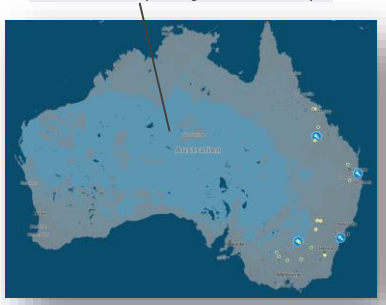
Netherlands
power plants: 2
Installed capacity: ~ 18 MWp

Belgium
power plants: 1
Installed capacity: ~ 1 MWp

France
power plants: 852
Installed capacity: ~ 178 MWp



Australia
Engineering & Support
for > 100MW
power plants: 8
Installed capacity: ~ 370 MWp



Portugal
power plants: 1
Installed capacity: ~ 2 MWp

Spain
power plants: 12
Installed capacity: ~ 24 MWp

Italy
power plants: 125
Installed capacity: ~137 MWp

Greek
power plants: 10
Installed capacity: ~ 1 MWp

The served portfolio includes PV plants of all type, sizes and technologies

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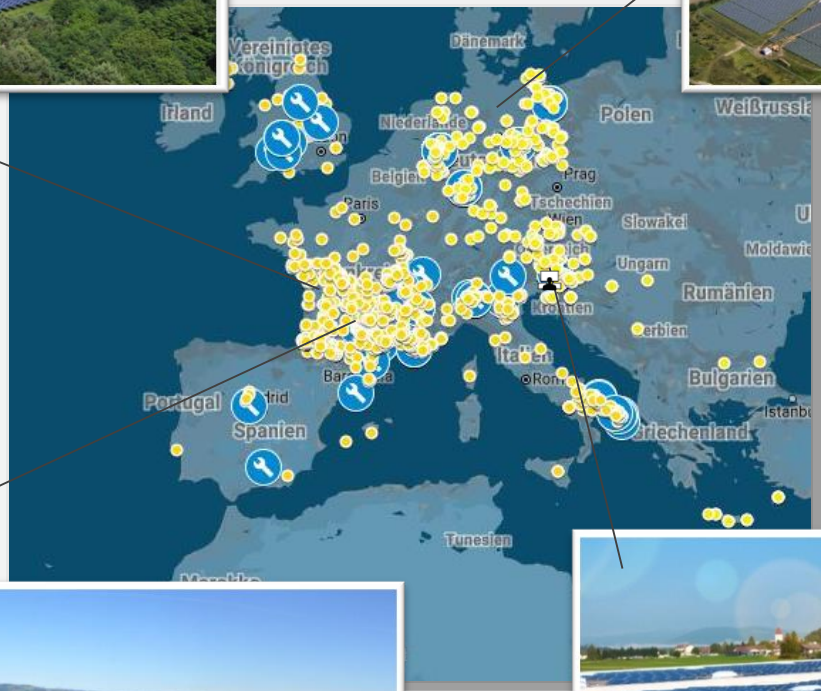
Ground-mounted
3 MWp France

Ground-mounted
50 MWp Germany



Tracker and ground-mounted
4 MWp France

Roof-top
0,5 MWp Austria

ENcome Energy Performance, one of the largest independent technical service providers for PV

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Independence	▪ Independence from EPCs, component manufacturers and investors as well as from the operation of own power plants ▪ No conflict of interest, but unlimited objectivity as a pure service provider
International Presence	▪ Local presence with critical size in major European PV markets ▪ Short distances and local teams allow for quick reaction times ▪ Excellent knowledge of country specifics and high proficiency level in respective foreign languages
Monitoring System	▪ Powerful monitoring system that can be easily customized and tailored to our customers needs ▪ High degree of transparency and better visibility for whole plant portfolios, errors can be detected early and analyzed thoroughly
Technical Outperformance (Track Record)	▪ Far above average performance levels yield higher returns for our clients ▪ Quick response time minimizes down times and, therefore, allows for a better profitability with our clients
Sector Know-how	▪ Extended international sector know-how in the areas of EPC, plant operation, component manufacturing and power generation ▪ Profound know-how for the evaluation of all major technical issues over the whole life cycle of photovoltaic power plants

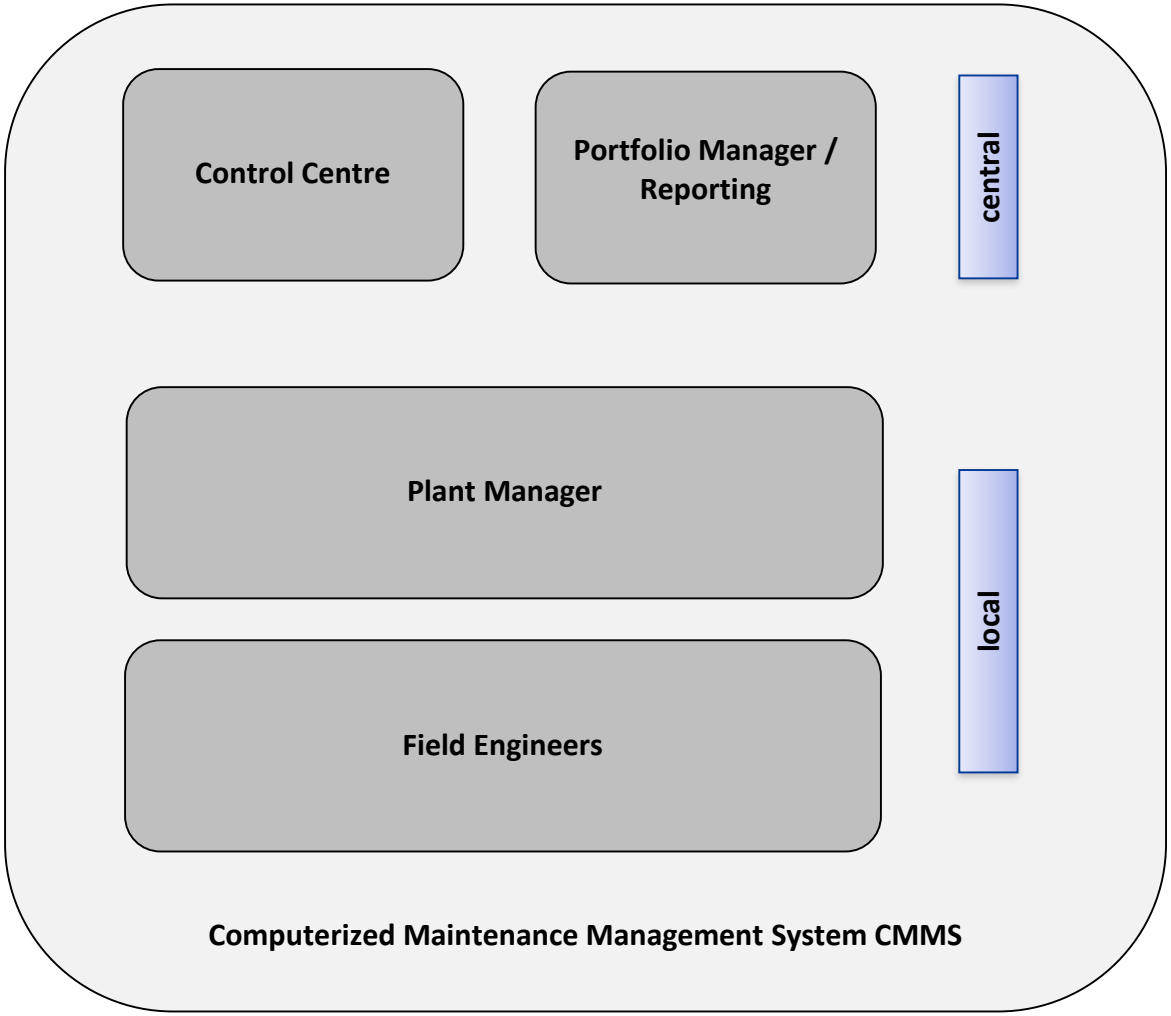
The experienced management has a long track record in the solar industry

Dr. Andreas Leimbach, Managing Director ENcome Energy Performance GmbH

- 10 years experience in the solar sector (development, O&M of PV power plants in France, Germany and Greece)
- co-founder of the SolarKapital group (in the year 2010)
- 20 years experience in corporate and investment banking (Dresdner Bank AG, Dresdner Kleinwort, IKB Deutsche Industriekreditbank AG)
- MBA, University of Wisconsin-Madison and Ph.D. University of Paderborn

CONTENT

ENcome has implemented highly professional structures and process to deliver best-in-class O&M Service



- Plant Monitoring
- First Response
- Long term trends

- Technical responsibility
- Expert on individual plants
- Local Manager

- Preventive Maintenance
- Corrective Missions
- Project Management

Plant supervision and first response is managed from ENcome central Operations and Control Centre

Managing Director Germany
S. Nieding

Control Center
M. Ebner

Operational IT
F. Hirschegger

6 FTE

4 FTE

Control Center Level 1

- Detection of alarms
- Rapid analysis and investigations
- Preparation of tickets / work orders

Control Center Level 2

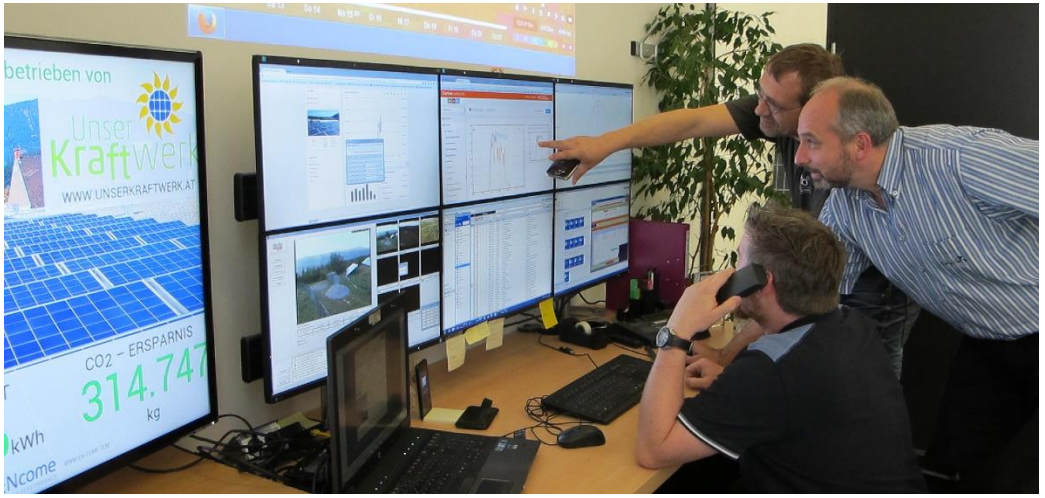
- Handling of allocated alarms
- Definition and complement of processes and documentation
- Comparison of the plant performance

Tasks

- Implementation of plants into the monitoring system
- Definition of necessary hardware
- Improvement of system
- Interface to the system provider
- Set-up of database
- Set-up for proper handling
- Data hardware maintenance

All plants are monitored 365 days per year by the dedicated monitoring center in Klagenfurt / Austria

ENcome Monitoring Centre (24/7 three-shift operation)



Plant Monitoring

- Plant production
- Plant performance ratio
- Inverter performance
- String availability
- Data connection

Auxiliary Systems

- Plant security
- Access control
- H&S compliance
- Metrological conditions
- Weather forecast

Performance reporting and long-term trends analysis is performed by a team located centrally

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Portfolio Manager

- Creation of periodic documentation (performance reporting)
- Consistency check
- Data management of reference values
- Analysis of long-term trends and special issues
- Cross-country portfolio comparison
- International supplier management
- Central support for plant management

Team located in Klagenfurt / Austria

Markus Makula

Nicolas Reisinger

Markus Hilweg

ENcome's client frontend, the Encome Energy Monitor, is particularly tailored for portfolio investors

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Advantages for power plant owners

- Overview of various KPIs for a whole portfolio of plants at a glance
- Can be easily customized and tailored to customers needs (interface & reports)
- Various comparisons (actual/actual, actual/budget, plant/plant, string/string, etc.) possible
- Financial returns in real time
- Operation possible in parallel to existing monitoring solutions/platforms
- Independence from inverters and data loggers
- Low switching costs (if any)

ENcome Energy Monitor

Powerful monitoring system offering a variety of applications that can be easily customized and tailored to customers needs

Customized reports based on standard templates ensure an easy onwards processing of relevant parameters

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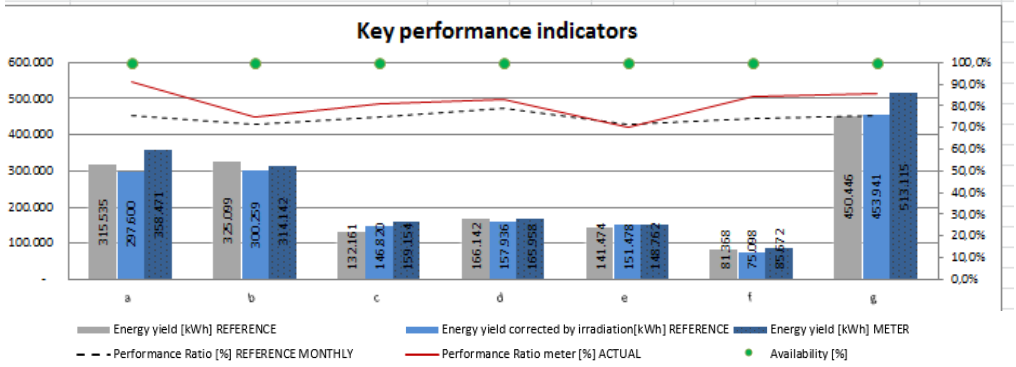
ENcome Report

Jän.16	a	b	c	d	e	f	g
Capacity [kWp]	2.095,50	2.169,04	941,64	996,71	974,61	542,88	2.900,00
Technical figures							
Energy yield [kWh] REFERENCE	315.535	325.099	132.161	166.142	141.474	81.368	450.446
Energy yield corrected by irradiation[kWh] REFERENCE	297.600	300.259	146.820	157.936	151.478	75.098	453.941
Energy yield [kWh] METER	358.471	314.142	159.154	165.958	148.762	85.672	513.115
Variance [%]	20,5%	4,6%	8,4%	5,1%	-1,8%	14,1%	13,0%
Energy yield cumulative corrected by irradiation [MWh] REFERENCE	3.793	4.672	2.719	4.953	1.422	1.162	14.127
Energy yield cumulative [MWh] METER	4.198	5.435	3.257	5.371	1.464	1.321	15.719
Variance [%]	10,7%	16,3%	19,8%	8,4%	3,0%	13,7%	11,3%
Energy yield [kWh/kWp] METER	171,07	144,83	169,02	166,51	152,64	157,81	176,94
Irradiation on module plane [kWh/m²] REFERENCE	198,50	210,34	187,78	211,61	202,31	202,28	205,20
Irradiation on module plane [kWh/m²] ACTUAL	187,22	194,27	208,61	201,15	216,62	186,70	206,79
Availability [%]	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
Performance Ratio [%] REFERENCE YEARLY	78,5%	73,6%	77,6%	77,6%	73,9%	73,6%	77,4%
Performance Ratio [%] REFERENCE MONTHLY	75,9%	71,3%	74,7%	78,8%	71,8%	74,1%	75,7%
Performance Ratio meter [%] ACTUAL	91,4%	74,6%	81,0%	82,8%	70,5%	84,5%	85,6%
Performance Ratio cumulative Meter [%] ACTUAL	87,4%	76,8%	83,5%	83,8%	76,7%	82,3%	86,6%
Commercial							
Tariff [€/kWh]	0,2300	0,2750	0,3300	0,4060	0,3340	0,2950	0,3350
Yield [€] REFERENCE corrected by irradiation	68.448	82.571	48.451	64.122	50.594	22.154	152.070
Yield [€] METER	82.448	86.389	52.521	67.379	49.687	25.273	171.894
Surplus Yield Economically [€]	14.000	3.818	4.070	3.257	-907	3.119	19.823



ENcome's plant managers are locally responsible for the maximum yield of the portfolio they supervise

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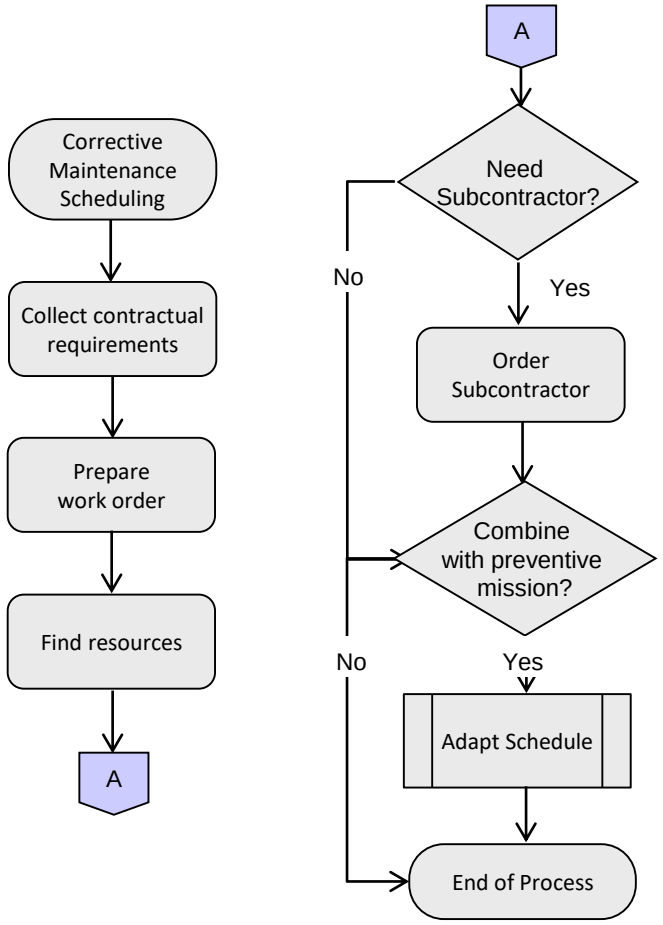
Plant Manager

- PV installation – operation and maintenance responsibility
- Receipt of failure alarms
- Scheduling of preventive and corrective maintenance
- Coordination of on-site services
- Creation of event-based documentation
- (Technical) interface to customers
- Incidence reporting

Sample Process
Scheduling Corrective Missions
Responsibility of Plant Manager



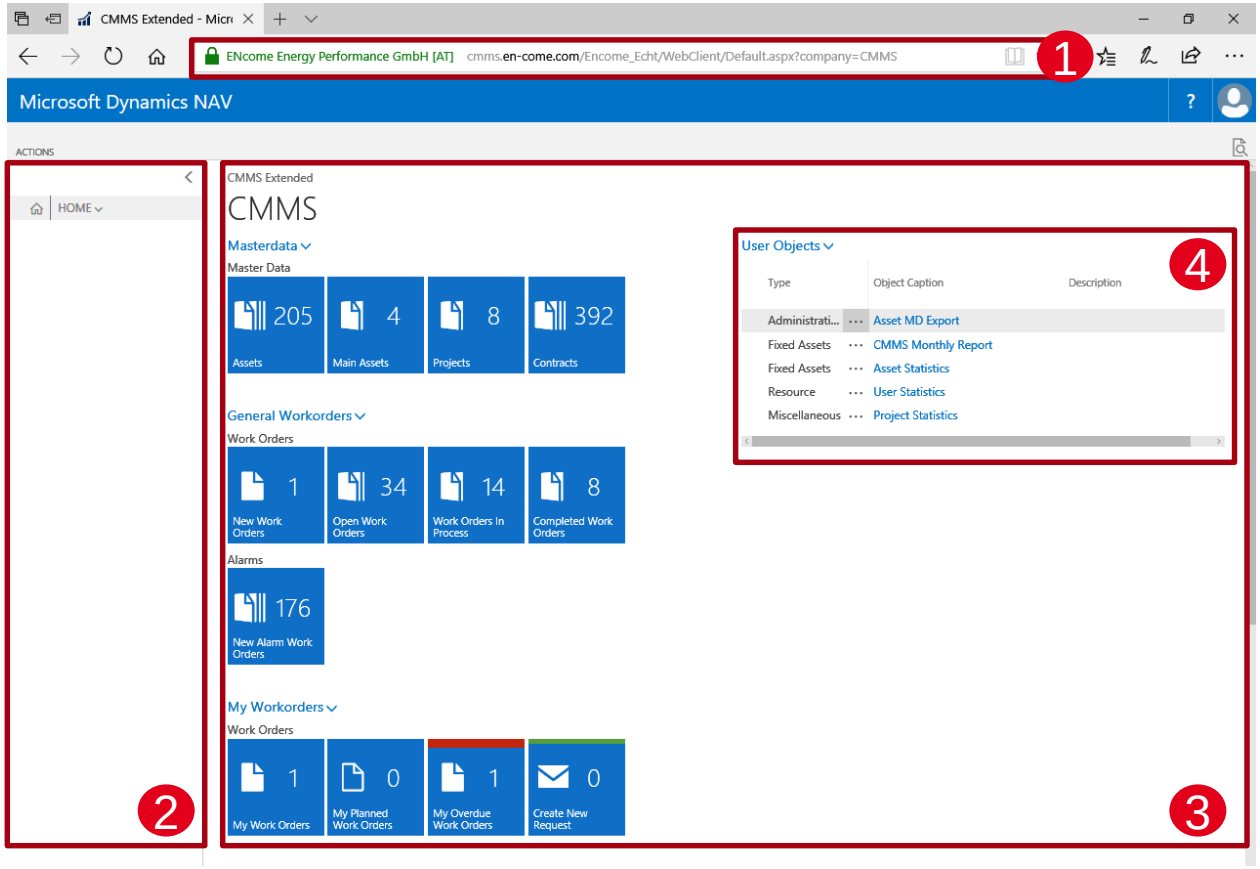
ENcome's field engineers, equipped with state-of the art instruments, perform the local operations

Field Engineers

- Execution and documentation of inspections according to the check list
- On-site measurements for the error analysis
- Error analysis and exchange of monitoring Hardware
- Configuration of data loggers according to instructions/specification
- Performs repairs and retrofits at the PV power plants after pre-planning by the Plant Manager
- Complete documentation of all works
- Independent detection of necessary and useful additional orders and retrofits

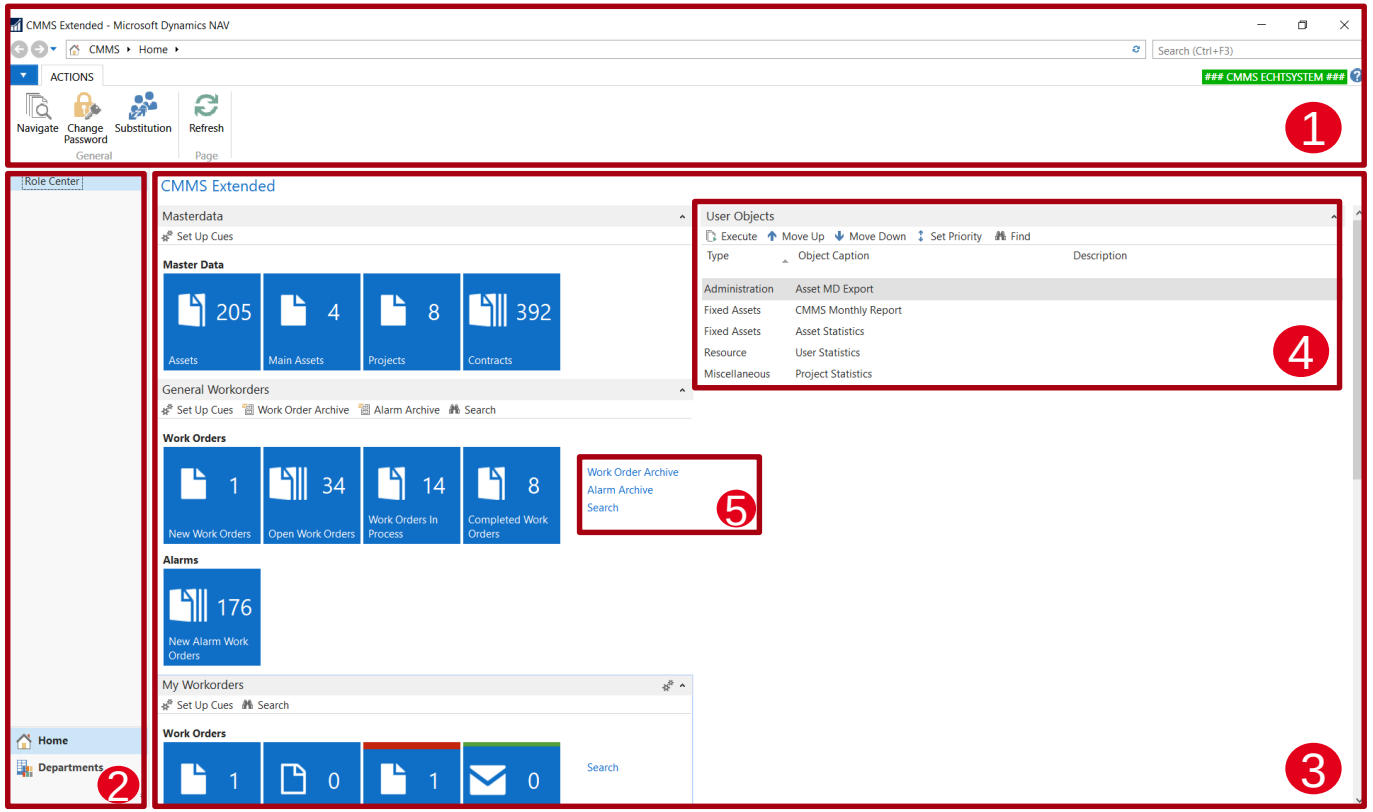
Sample Process
Executing Missions
Responsibility of Field Engineer

ENcome's Navision based CMMS can be accessed through any web browser...



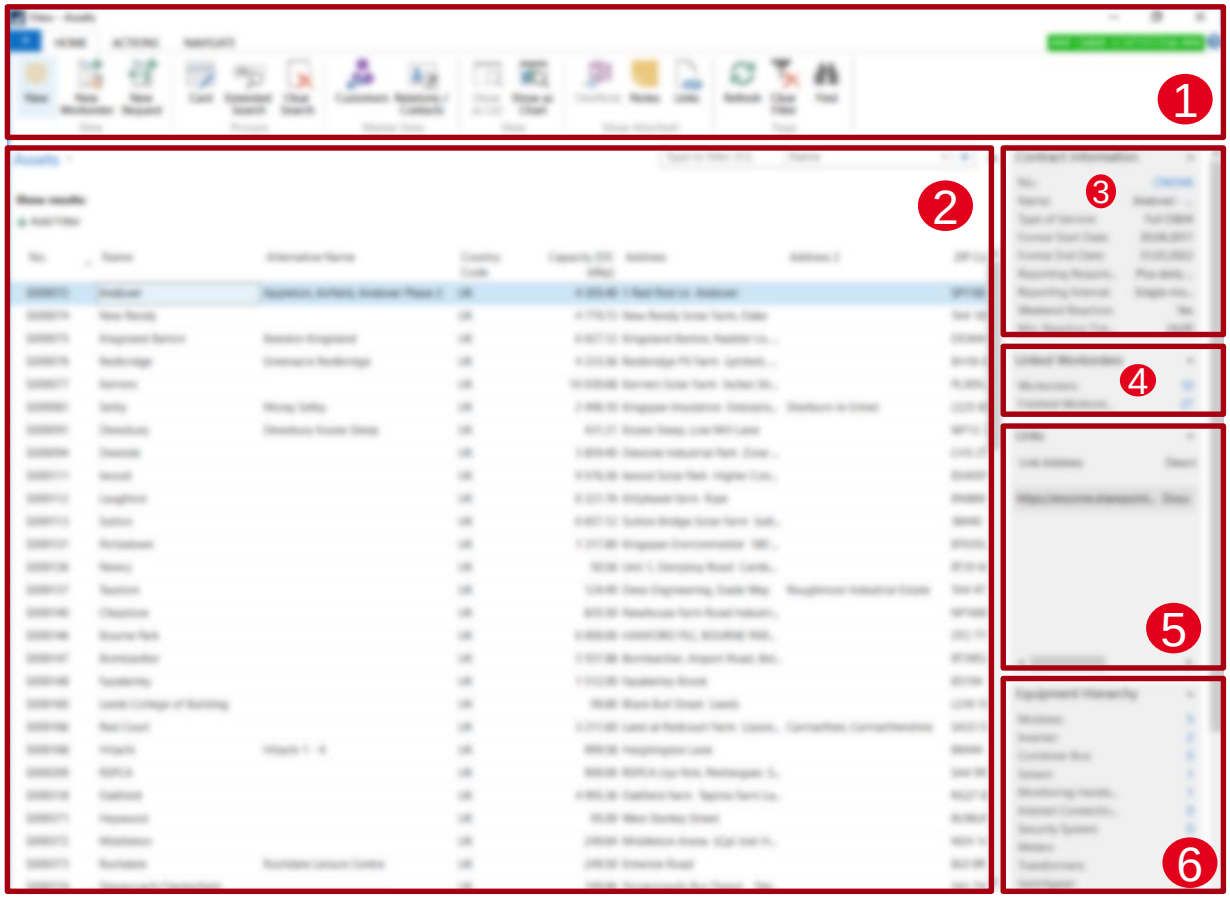
1. Link to enter Web – based Dashboard
2. Navigation Area (Department, Home)
3. Rolecenter (Display Area for Data)
4. Resource Management (Analysis Tool for Assets/Projects/Users)

… or through a separate App, available for Desktop as well as mobile devices



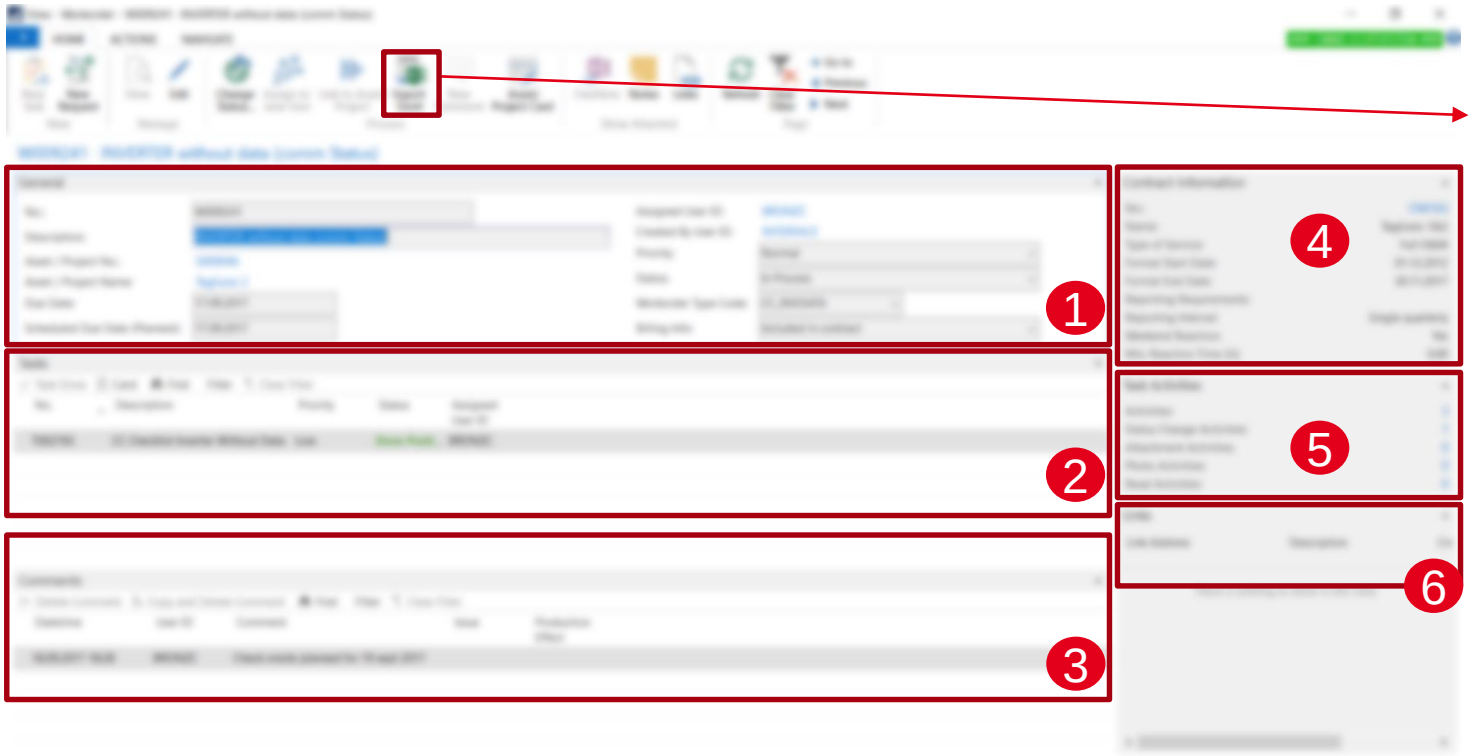
1. Menu Range (Search, Settings, etc.)
2. Navigation Area (Department, Home)
3. Rolecenter (Display Area for Data)
4. Resource – Management (Analysis Tool)
5. Historical Data (Accounting Period)

The Asset register contains the information on every individual PV plant



1. Menu Range (Customer, Contacts, Notes, Filter)
2. List of Assets (General Information)
3. Short Contract Information regarding the specific Asset
4. Linked Work Orders of the specific Asset
5. SharePoint Link for even further Information
6. Short Equipment Hierarchy regarding the specific Asset

Alarm Work Orders (Corrective Maintenance) can be generated directly out of the monitoring system



Excel Export
Contains all information about the Work Order

1. General Work Order Information
2. List of Tasks to operate
3. Comments regarding the Work Order process
4. Related Contract Information
5. Activities that have been taken
6. Links to external sources, e.g. work order report, pictures

CONTENT

ENcome's Country Organizations is led by local competence centres, supported by international expert teams

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ENcome Country Operations

ENcome HQ Klagenfurt (AT)

MD (A. Leimbach)
Technical Director (Ing. Horst Sonnleitner)
Monitoring Center / IT (10+ FTE)

(1) Local Teams from different Competence Centres support each other when needed for preventive and corrective maintenance missions

ENcome Country Organization
Managing Director
Director Country Operations

Christopher Berger,
Managing Director UK and ENcome Engineering

Benjamin Gevelhoff,
Managing Director Australia, APAC

Luca Marcucci,
Managing Director Italy and Spain

Sebastian Nieding,
Managing Director Germany

Morgane Pardini
Managing Director France

Competence Center Cluster 1

(1)

...
Cometence Centre Cluster i#
...

(1)

Competence Center Cluster n

(1)

New Competence Centres

Responsibilities are split by regional levels to guaranty optimal processes and close relationship

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ENcome HQ Klagenfurt (AT)

- 365 days/a Monitoring attendance
- In-depth knowledge and best practice with all major components/type of plants based on more than 500 plants under service
- Plant reporting
- Support of periodic plant inspections
- Failure analysis and maintenance plan improvements
- Claims management (warranties and insurance)
- IT infrastructure
- Observance of international regulations and standards
- Coordination of international suppliers (e.g. alarm reception center)
- Coordination of international component manufacturers (e.g. SMA)

ENcome Country Organizations

- Central contact for local customers
- Commercial plant operation
- Contact with national authorities
- Observance of national and local regulations and adaptation of maintenance plan if necessary
- Contracting of national and regional subcontractors
- Planning of resources
- Special Services (e. g. plant upgrades, law)
- Coordination of claim management

Regional Competence Centres

- Local operation
- Plant attendance within guaranteed periods / response times of lower than 6 hours up to a full resource/FTE on site for multimegawatt plants
- Regular preventive maintenance / plant inspections
- Reactive maintenance
- Responsibility for maximum plant up-time (24/7 re-establishment of full plant functionality within shortest possible time in case of failures)
- Local failure analysis
- Spare parts management
- Coordination of local subcontractors

Responsibilities are well distributed to ensure a most efficient plant operation and highest possible energy yield for plant owners

ENcome Energy Performance is fully compliant to general and electrical health and safety requirements

ENcome H&S Polices

- **All relevant policies and processes, e.g.**
  - Electrical Safe Systems of Work
  - Health and Safety Policy
  - Environmental Policy
  - Working at Height Policy and Risk Control
  - Lone Working
- **Risk Assessment and Method Statements, e.g.**
  - Inverter and Module Replacement
  - Fuse Replacement
  - DC Testing
  - PPM Site Security
- **Standard Forms and Notices, e.g.**
  - Contractor Questionnaire
  - Fire Action Notice
  - PPE Audit

Electrical Level of Competence

- **Senior Authorized Person (SAP)**

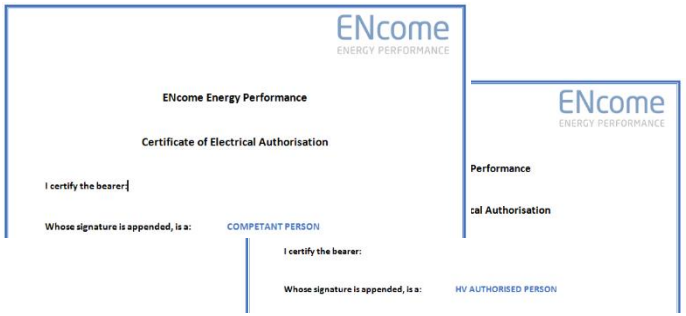
  An Electrical engineer appointed by ENcome Energy Performance Managing Director to be responsible for Electrical Safety within the scope of the Operation and Maintenance works carried out.

- **Authorized Person (AP)**

  An electrically qualified engineer or technician appointed by the SAP to carry out specific tasks and duties on electrical systems or equipment.

- **Competent Person**

  A person who has adequate technical ability, training and experience and who is able to recognise the extent and limitation of their own ability and act appropriately.



New Sites as well as new tasks are checked for their H&S compliance before work commences

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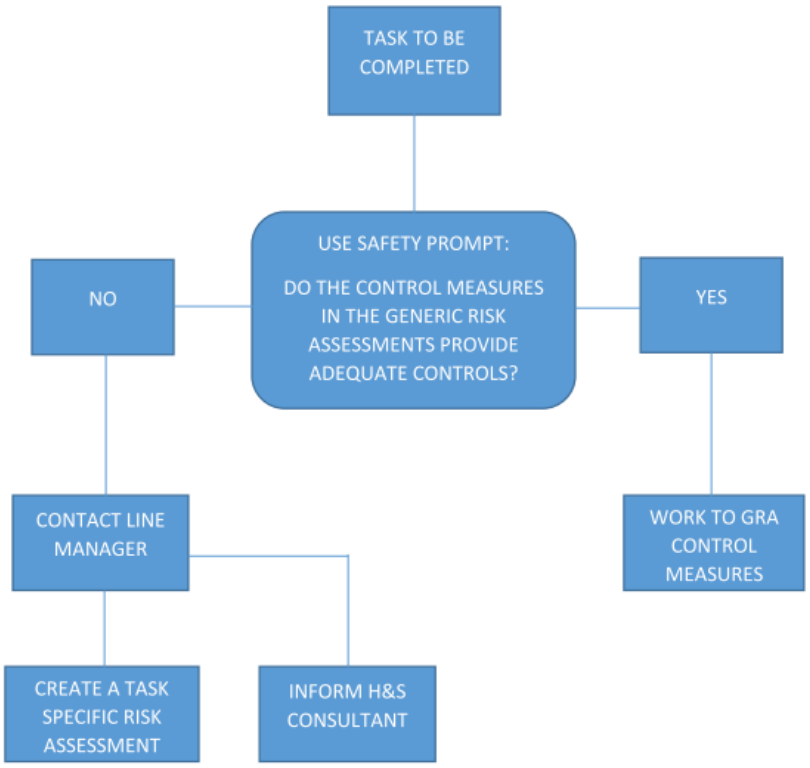
Site Assessment

SITE INDUCTION			
Location:.....Date:.....			
Name/Company:..... .....Task:.....			
An ENcome Energy Performance representative shall ensure that all aspects of this Induction are communicated to Company Employees & Sub Contractors prior to commencing work.			
REF	**CHECK ITEM**	**TICK**	**COMMENTS**
1	Site Access		
2	Site Security Procedures		
3	Work Areas		
4	Risk Assessments / Method Statements		
5	First Aid Facilities and Procedures		
6	Accident / Incident Reporting Procedures		
7	Work Equipment Requirements (PAT / Calibration)		
9	PPE Requirements		
10	Hazardous and Toxic Substances (COSHH)		
11	Storage of Materials and Equipment		
12	Use of vehicles on site		
14	Health & Safety Policy awareness		
Contact Details			
Phone Number:.....Email:.....			
Emergency Contact 1			
Name:.....Relationship:.....			
Phone Number:.....Email:.....			
Emergency Contact 2			
Name:.....Relationship.....			
Phone Number:.....Email:.....			
Signature:.....Date:.....			

Task Assessment



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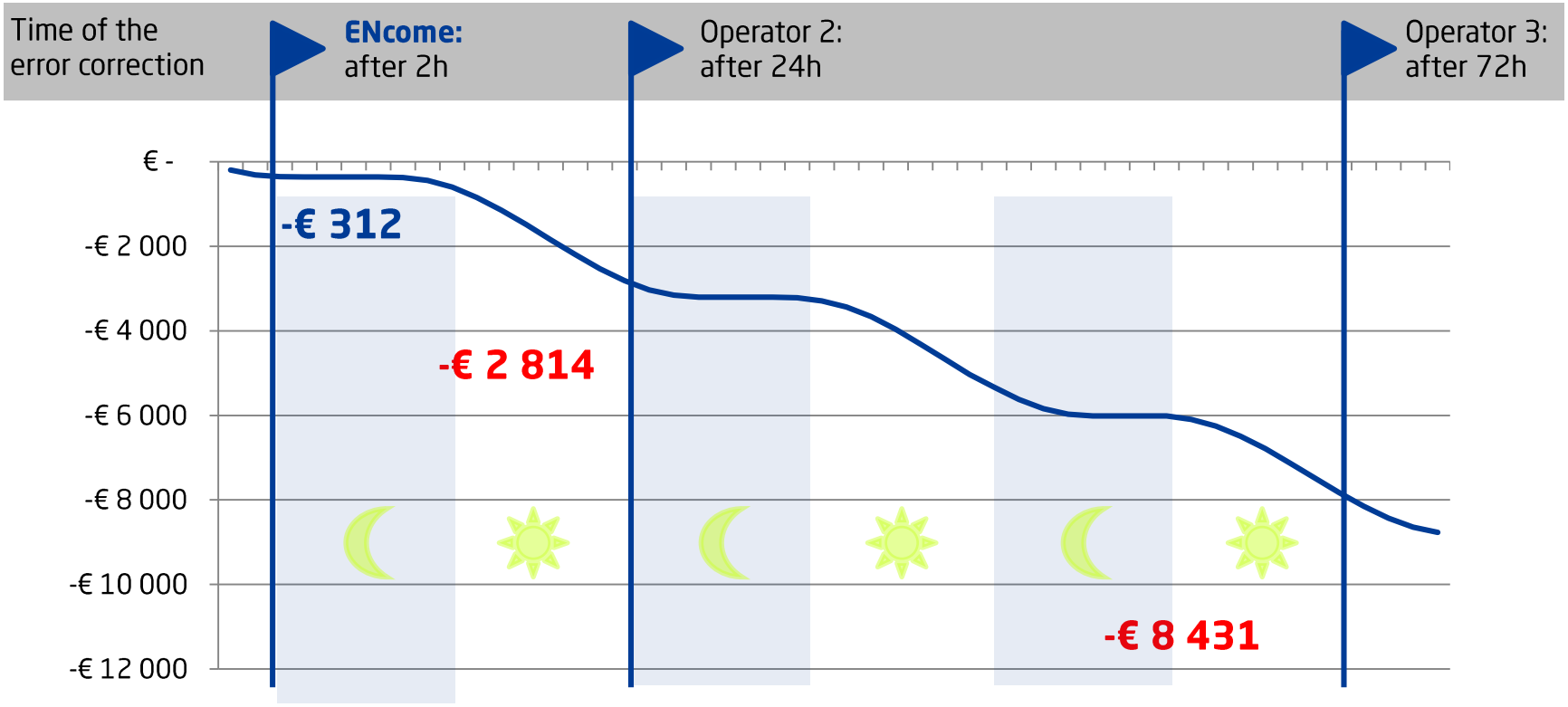
Case Study 1: Tripped circuit breaker



After a complete shutdown based on the tripped circuit breaker every minute counts. ENcome responded in 90% of all cases within two hours and minimized your loss of production. In this example the loss of sales is limited up € 400.

Case Study 2: Breakdown of the inverter ventilation

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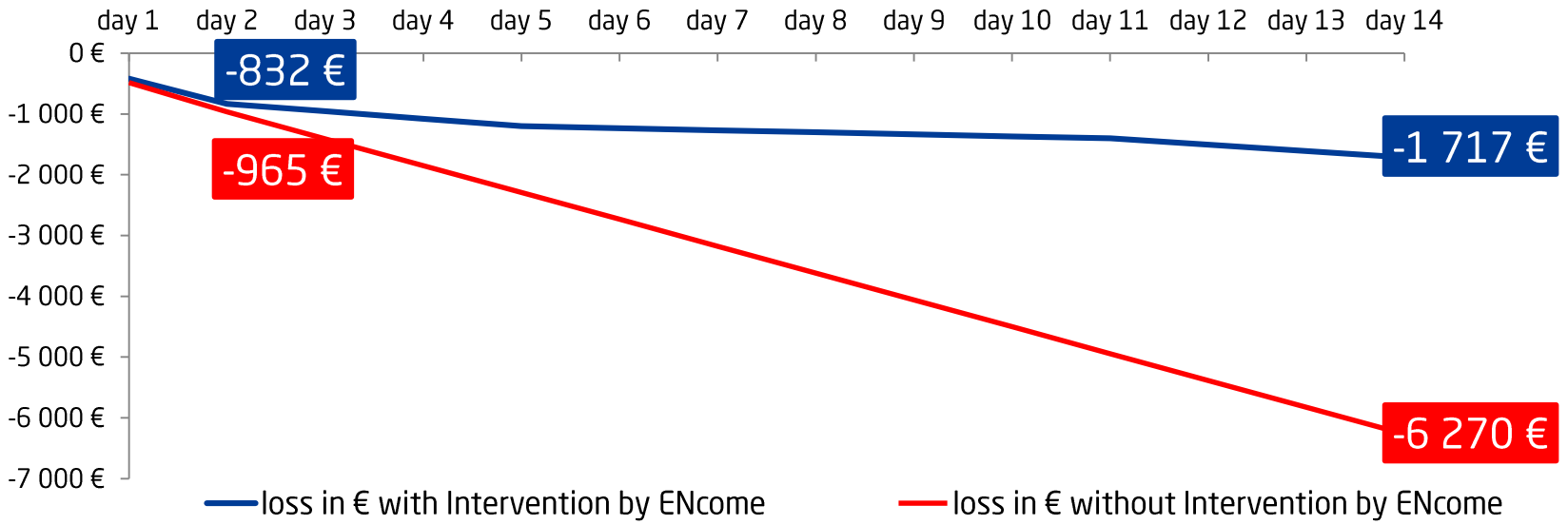
Loss of sales up to damage repair [€]

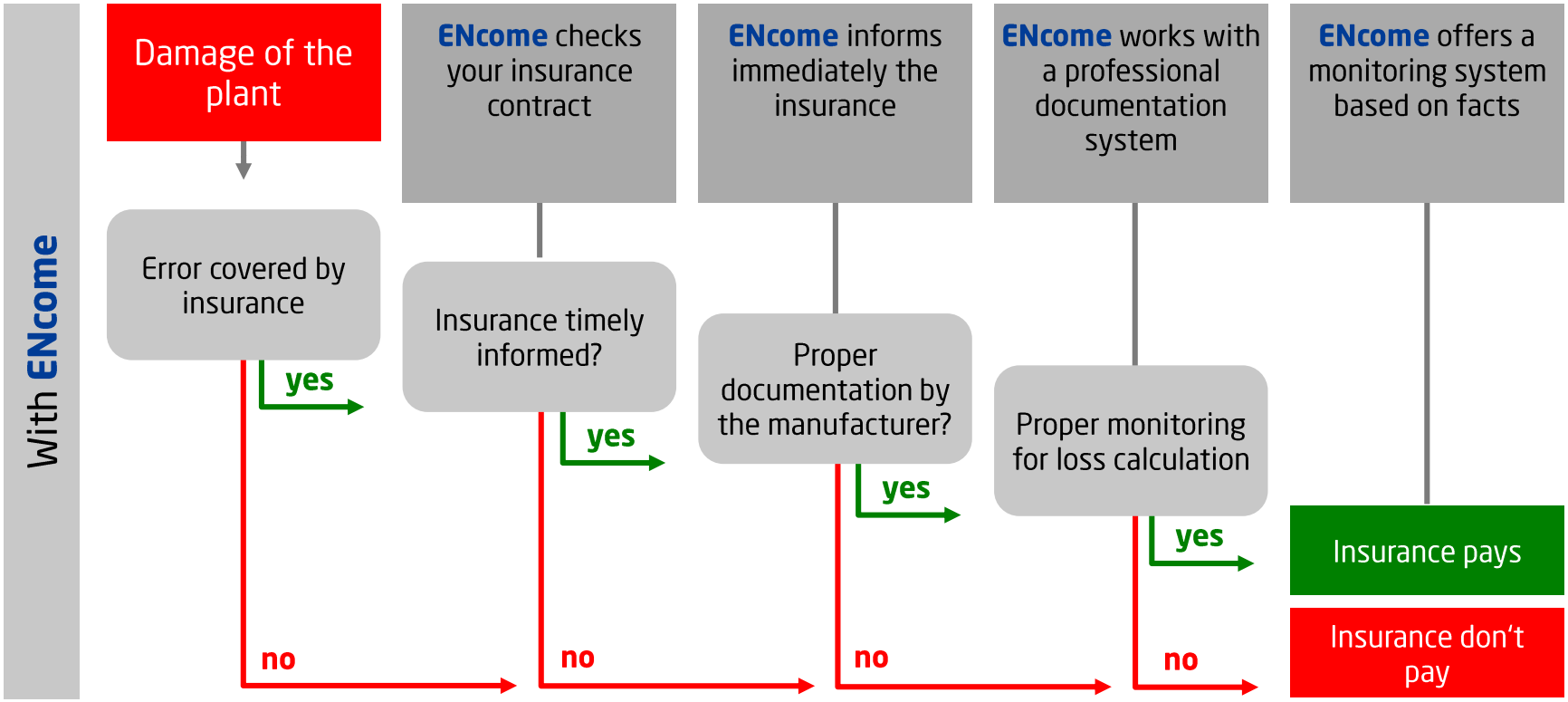
Intervention by **ENcome**

Problem corrected by the manufacturer



ENcome recognises loss of production, intervenes directly and ensures a quick response of the manufacturer and its customer service. In this example the intervention by ENcome leads to a around 4.500€ lower loss of sales.

Case Study 3: Active claim management



If an insurance claim arises, it is necessary to manage your claims professionally and expediently. ENcome provides support with all necessary steps in order to achieve a maximum coverage.

Case Study 4: Superior security system

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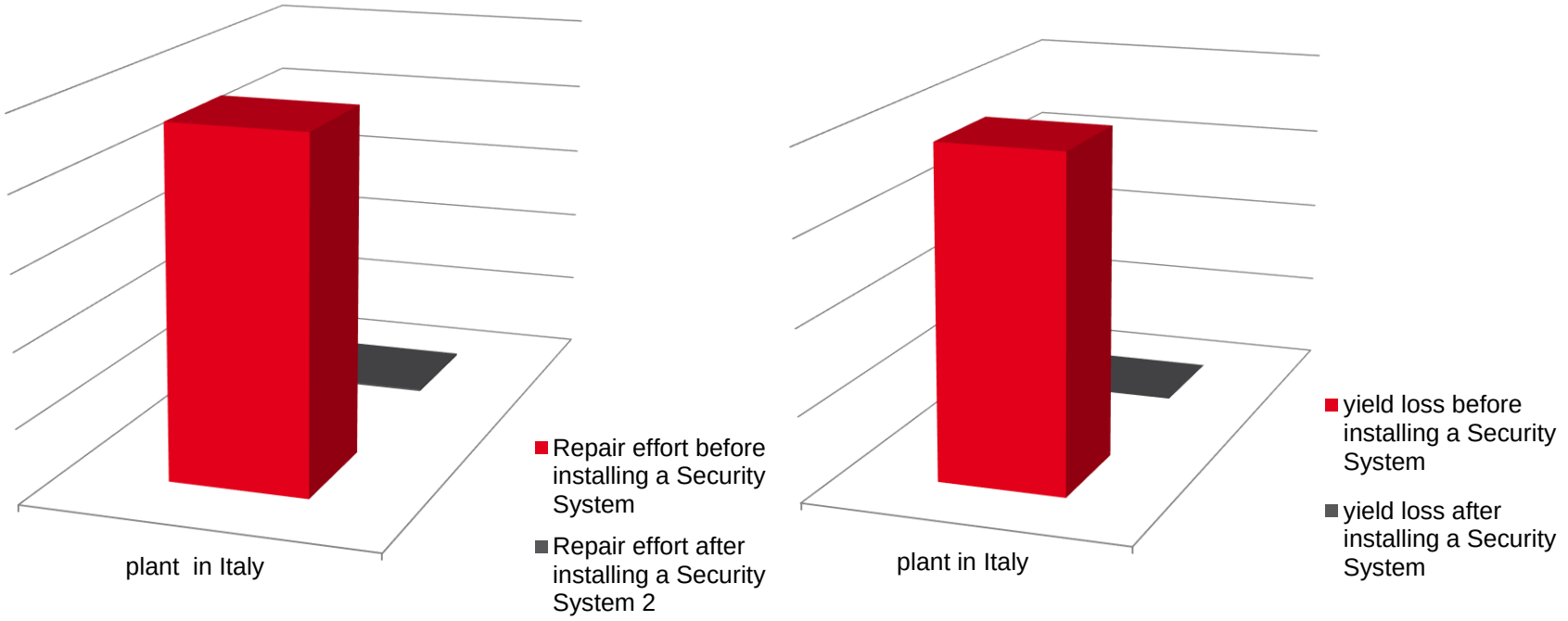
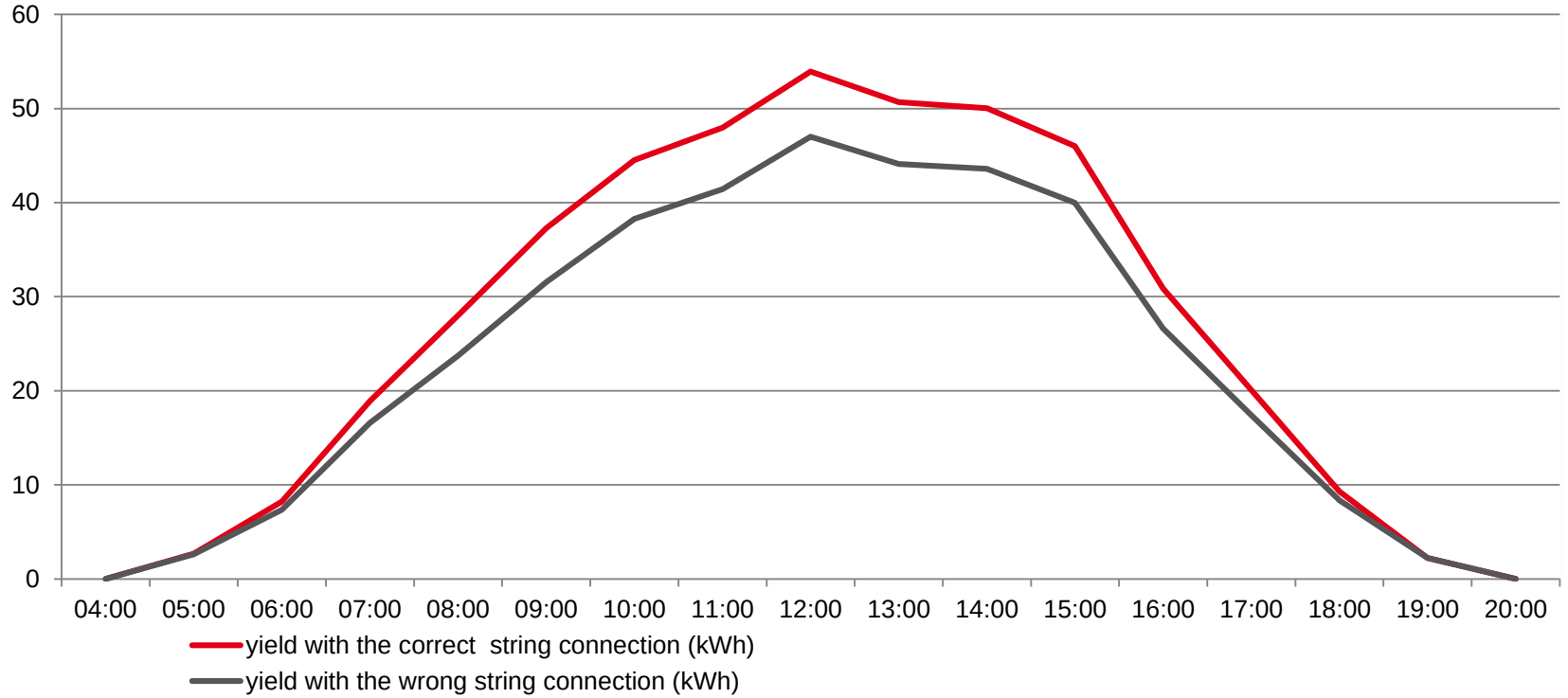
Repair effort or rather yield loss after burglaries before installing a Security System [€]



ENcome responds in case of alarms immediately through an coordinated Alarm handling and prevents bigger burglaries. In this example the installation of a Security system (security fence, cameras, local security company) by ENcome adduces a reduction of the repair effort over € 236.000€ and a reduction of the yield loss over € 58.000.

Case Study 5: Lower yield based on wrong string configuration

ENcome noted on a plant, that the string configuration of an inverter was incorrectly planned and executed



This types of errors are often ignored and could only be found through accurate evaluation and calculation of the plant through an qualified technician. In this example ENcome detected an error which effected a lower yield during sunny days up to 20% per year.

Case Study 6: Services for revaluation of the cadastral earnings to reduce real estate tax (IMU)

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With ENcome

ENcome prepares necessary report for the reassessment of the cadastral earnings

→

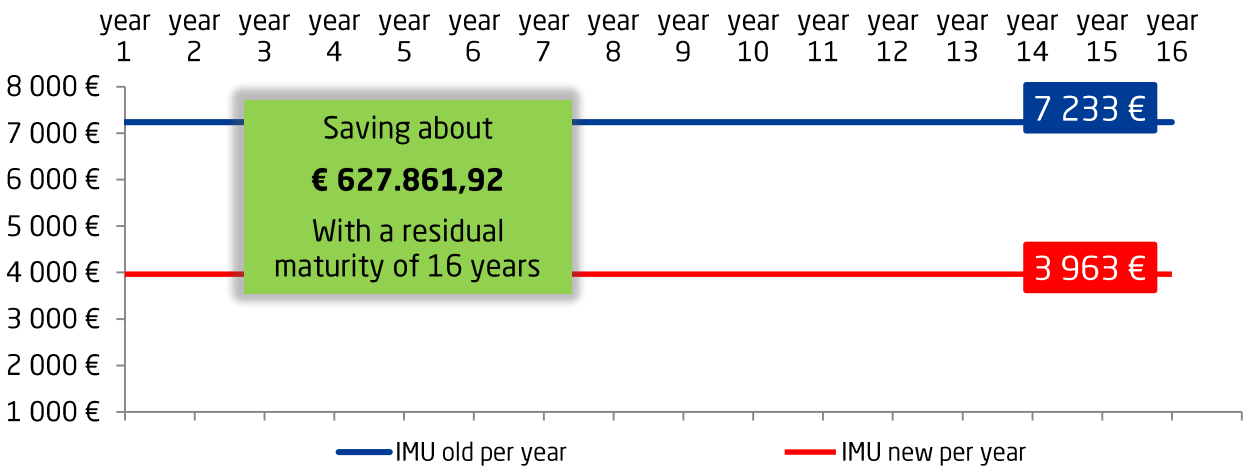
ENcome prepares the new DOCFA for the determination of the cadastral earnings and submit this to the authorities

→

ENcome submits a possible appointment, if the authorities refuses the proposed cadastral earnings

→

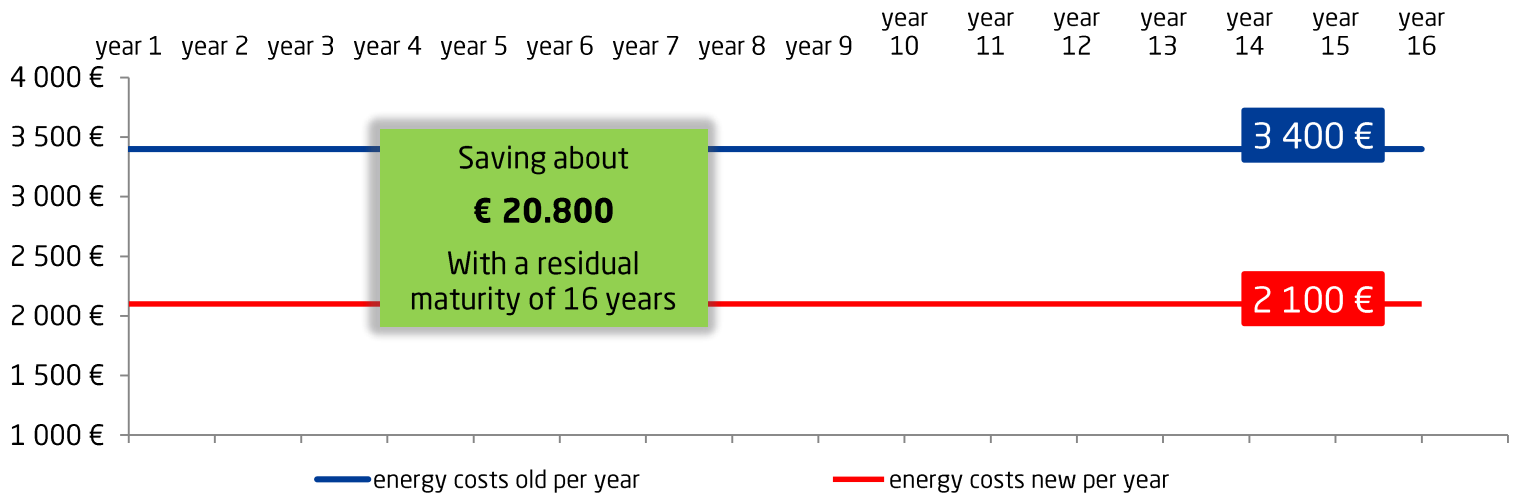
ENcome supports in the filing of an extra procedural agreement in the event of rejection



ENcome starts all necessary actions for reducing the real estate tax. In this example ENcome achieved a saving about € 627.861,92 with a residual maturity of 16 years.

Example 7: Self-consumption for PV plants

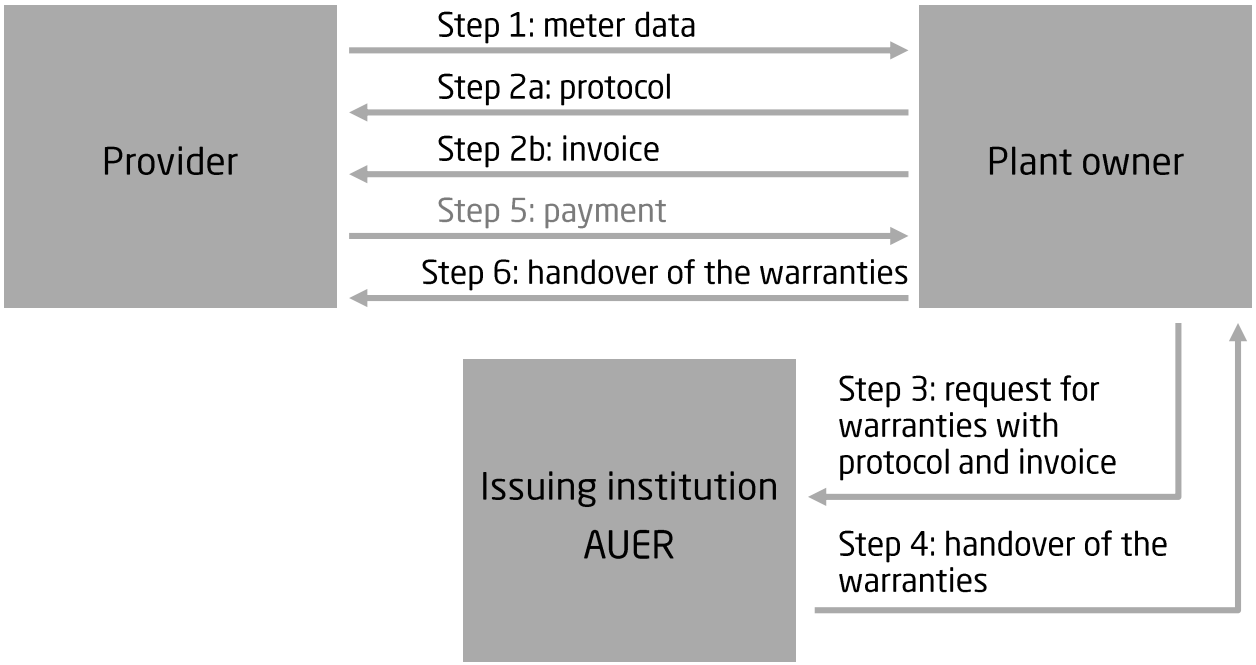
PV plants not also generate a lot of electric energy, but also consume energy. The needed energy can be covered with a separate connection.



ENcome takes care of all technical and administrative tasks to transform your Italian PV plants from „Cession Totale“ into „Autoconsumo“. This example describes a typical 1MW power plant, at which ENcome achieved a yearly saving about € 1.300.

Case Study 8: Invoicing and earnings protection

Diagram of the invoicing of a PV plant in Bulgaria



- Process managed locally by ENcome: payment period ca. 14 days
- Process managed abroad: payment period ca. 45-60 days based on incorrect management of the payment process

~175.000€ loss of interest over 20 Jahre with capital costs of 8%

The processes of the power remuneration are complex and location dependent. Once a year process changes can be expected by the provider or regulator. ENcome minimizes the payment period through local support.

Case Study 9: Prevention of transformer break down through regular and diligent onsite controls

ENcome
ENERGY PERFORMANCE

Transformer showed oil leakage which was communicated to the manufacturer at an early stage

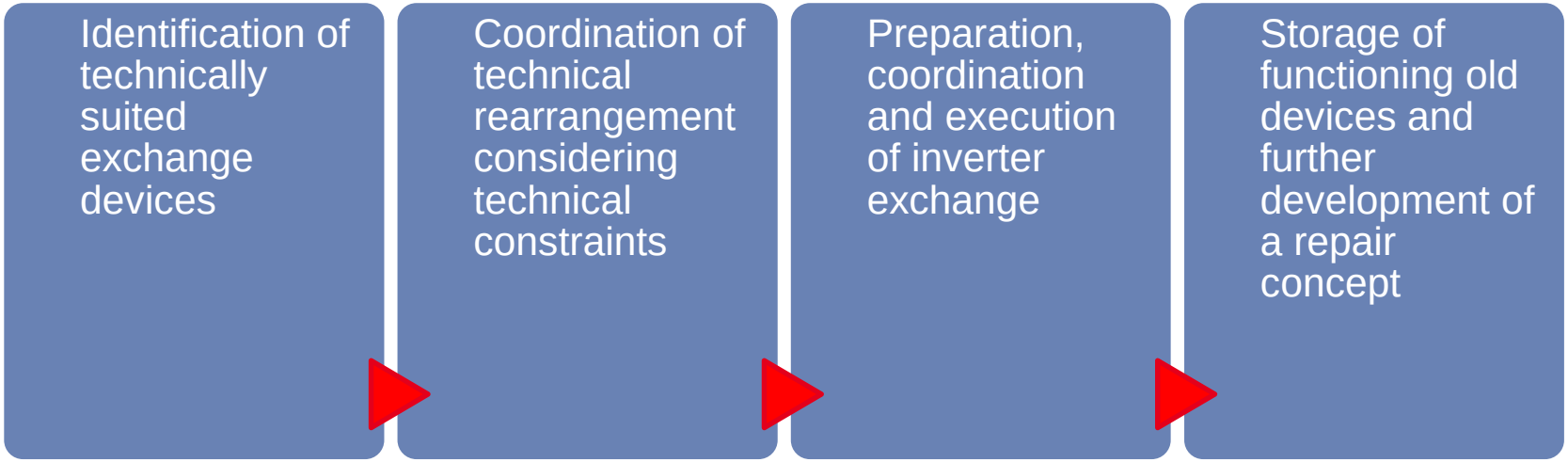
- Overhaul was denied by the manufacturer
- Regular and diligent onsite controls allowed for timely damage recognition
- Extension of damage could thus be avoided

Immediate shutdown in order to protect devices. Documentation, coordination of a rented exchange transformer ongoing coordination of warranty claim process, among others identification of suitable technical experts

Case Study 10: Comprehensive support for inverter service and optimization

ENcome
ENERGY PERFORMANCE

Insolvency of inverter manufacturer; lightning damage and consecutive breakdown of > 50 inverters



Minimal down times albeit extensive rearrangement of inverter configuration >1 MWp (performance losses only below 250 kWh!), minimal and only temporary data loss in the monitoring system

ENcome

ENERGY PERFORMANCE

Because we care.

