24 Summaries of Energy Concepts

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List of Beneficiaries

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No	Name	Short name	Country
"old" countries			
1	Industrie und Handelskammer Nürnberg für Mittelfranken	NCCI	Germany
2	Wirtschaftskammer Österreich	WKO	Austria
3	AHK Services s.r.o.	AHKS	Czech Republic
4	AMMATTIENEDISTAMISLAITOSSAATIO AELSR	AEL	Finland
5	ELLINOGERMANIKO EMPORIKO & VIOMICHANIKO EPIMELITIRIO	DGIHK	Greece
6	ESCAN SL	ESCAN	Spain
"new" countries			
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8	DEINTERNATIONAL POSLOVNE USLUGE D.O.O.	DEint BiH	Bosnia and Herzegovina
9	MTU EESTI KAUBANDUSTOOSTUSKODA	ECCI	Estonia
10	LATVIJAS TIRDZNIECIBAS UN RUPNIECIBAS KAMERA	LCCI	Latvia
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13	AEE - INSTITUT FUR NACHHALTIGE TECHNOLOGIEN	AEE INTEC	Austria

1 INTRODUCTION

The EUREM European EnergyManager Training is an ambitious standardized training programme and a worldwide network for European EnergyManagers, provided in 29 countries worldwide. There are now more than 6,000 EnergyManagers who not only optimise energy efficiency in their companies, but also achieve cost savings and thus increase competitiveness in the long term, by also contributing to global climate protection.

The start of the training programme was in 1999, when the Nuremberg Chamber of Commerce and Industry (NCCI) launched the EUREM initiative. Four years later, in 2003, the EnergyManager Training was introduced in the EU, in the framework of an EU co-funded project, coordinated by NCCI and supported by the German-Portuguese Chamber of Commerce and Industry in Lisbon (DUAL), the Austrian Economic Chamber (WKÖ) and the Energy Institute in London. The follow-up project EUREM.NET was implemented in nine other EU countries between 2006 and 2009. From 2013-2015 the EUREMplus project extended the worldwide network to six new countries: Bulgaria, Croatia, Cyprus, Macedonia, Poland and Romania.

The current EUREMnext project has started in March 2018 with the following overarching strategic objective:

EUREMnext – Taking European EnergyManagers to next efficiency levels by implementing energy audit recommendations

EUREMnext is carried out by a consortium of 13 partners, headed by the Nuremberg Chamber of Commerce and Industry. The aim of this project is the expansion of the already established EnergyManager Training concept in Germany, Greece, Austria, Czech Republic, Finland and Spain to additional six „new“ countries (Albania, Bosnia-Herzegovina, Estonia, Latvia, Serbia and Turkey). The project is funded by the Horizon 2020 Research and Innovation Programme of the European Commission under Grant Agreement No. 785032.

The aim of the EUREMnext project is to contribute to both environmental protection and competitiveness in businesses by increasing the quality of energy audits and thereby the rate of implementation of energy efficiency measures. This shall be achieved by providing trainings and by strengthening the network for European EnergyManagers. The EUREM training modules have the aim to increase the availability of qualified experts with a holistic view both on the technical/engineering and economic/financial aspects of sustainable energy measures in businesses. The practical training should enable all new EnergyManagers to introduce the energy management system ISO 50001 in their companies.

One compulsory element of the EUREM training is the preparation of an energy efficiency project. All participants have to tackle a current practical energy efficiency improvement in their companies or organisations. A few EnergyManagers also address the use of renewable energy sources in their projects. If the training participants work as energy consultants, they have to do this for one of their clients.

The energy efficiency projects include an analysis of the status quo in the described company, a brief description of optimisation measures, the calculation of energy and cost saving potentials, the detection of the CO_2 reduction potential, as well as financial viability parameters, such as project investment costs and the estimated pay-back time.

The EUREM participants are supported in their preparation of their energy concepts by highly qualified trainers. At the end of the training, the EnergyManagers have to present their elaborations to a jury as part of their course examination.

During the EUREMnext project, the goal was to train 72 EnergyManagers in the “new” countries, and 120 EnergyManagers in the “old” countries. Some of the energy concepts were awarded with the EUREM AWARD or the EUREMnext AWARD.

The present report shows a chosen selection of abstracts of 24 energy projects.

2 SELECTION OF 12 APPRECIATING ENERGY CONCEPTS OF THE "NEW" COUNTRIES

Albania

Topic: Renewable Energy | Solar Technology

Project: Installation of a 503 kWp PV plant in three different areas of the factory

Energy Manager Alfred Zeneli TITAN ANTEA CEMENT SH. A. **Company: Antea Cement.sh.a, part of Titan Group**	**Results** Investment in Euro: 387,680 Cost reduction potential in €/Year: 46,000 Pay-back time in years: 10.8 Energy saving potential in kWh/a: 676,300 CO_2- saving potential in t/a: 415.9

Energy concept description:

ANTEA CEMENT S.A. Cement Plant is focusing the construction of the photovoltaic power stations (solar parks) presenting its technical and economic aspects, in comparing the data model between two different photovoltaic panels. The proposed solar park is spread over three different areas with a total of effective surface $S_{effective}$= 2,568 m^2 and will be installed inside the cement plant. The generated electrical energy will be used for personal consumption and will be synchronized to the cement plant 6.3 kV power grid.

For the presented photovoltaic power station, which is proposed to be installed in "Antea Cement S.A" cement plant, the modelling and analysis costs of a 503 kW_{peak} photovoltaic generator network with an annual output of 676.3 MWh/a and initial investment costs of 387,680 Euro were determined. The selected areas for installing the photovoltaic power station are close to the electricity distribution system, which makes the integration into the existing power network much easier. These areas consist of 2 building terrace surfaces and another on flat ground near the electrical substation.

Albania

Topic: Cooling | Green IT

Project: RBAL Data Centre Room Cooling System Optimisation

Energy Manager Ergi Kadiu Company Raiffeisen Bank	**Results** Investment in Euro: 63,500 Cost reduction potential in €/Year: 21,000 Pay-back time in years: 2.7 Energy saving potential in kWh/a: 247,404 Date of implementation: November 2019 **EUREMnext AWARD winner 2020**

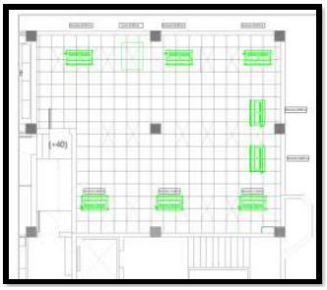
Energy concept description:

The project aims to reduce and optimise the energy consumption for a central data centre cooling system. The existing situation of the cooling system had few issues as airflow direction, capacity of cooling and room organization. The existing system is composed of 4 AC units 48,000 BTU, 3 AC units 42,000 BTU, 2 AC unit 60,000 BTU. The total existing thermal cooling capacity for this room is 125 kW. The airflow and internal units are installed in the wrong way because the air distribution becomes incorrect and this effects energy bills and high amortization of AC equipment. The air distribution in this room is from top to bottom and this directly affects the cooling quality of the IT-equipment. The existing room surface and organization need both optimization and reorganization of the existing equipment. The old IT-technology has a huge impact on cooling and energy consumption of the room.

Optimization potentials / weak points:

- Reorganizing the existing room (optimise the cooling area)
- New inverter technology to be implemented
- Airflow to be reorganized from the technical floor
- The existing equipment will be used in other areas in the bank

Optimization possibilities: The existing room will be optimised with a gypsum and glass thermic wall to reduce the cooling capacity; new AC professional system will be implemented including a backup solution. The new air circulation will be from the bottom (raised floor) with some grills circulation that will be opened for cooling connection with the room.
Effects: New Investment will have a direct impact on electricity bills and general maintenance of AC equipment and IT equipment inside the room. Return of investment will be approximately 2.7 years and the new equipment total depreciation is 7 years.



Bosnia & Herzegovina

Topic: Solar energy | Energy data management | Load management | Energy management systems

Project: Photovoltaik power plant for self-consumption

Energy Manager
Elma Redžić

Company: Elektroprivreda BiH d.d. Sarajevo, Tešanj

Results

Investment in Euro: 101,500
Cost reduction potential in €/Year: 13,510
Pay-back time in years: 8
Energy saving potential in kWh/a (renewable energy): 183,879
Within the energy concept renewable energies new/additionally installed in MWp: 0.125
CO_2- saving potential in t/a: 116.4

Energy concept description:

Aims: Reduction of costs for electricity, reducing the risk of electricity price changes, load management and control of the demand peak-power costs, on-site electricity generation, decrease of transmission losses.

Base situation: The average electricity price is relatively high: 106,5 €/MWh, high monthly costs for peak-demand power.

Optimization potentials / weak points: The peak power demand is reduced and optimized in accordance with the demand curve. If there was law on prosumers, the installed photovoltaic (PV) power plant could be higher in order to cover higher share of own consumption.

Proposals of solution / optimization possibilities: Installation of PV power plant with optimized peak power in order to reduce electricity fed into the grid (there is no law on prosumer/net metering). PV plant reduces load, and there is huge potential for additional savings by load shifting and demand-side load management.

Effects: 30% of the own consumption met by PV production, 20% of the electricity produced by PV plant is exported to the grid free of charge, peak demand significantly decreased and enables more savings by load management.

Bosnia & Herzegovina

Project: Improving the energy efficiency of the clinker production line by drying alternative fuel

Energy Manager
Emir Ćilimković

Company: Fabrika cementa Lukavac d.d

Results

Investment in Euro: 2,5000,000
Cost reduction potential in €/Year: 525,431
Pay-back time in years: 3.4
Energy saving potential in MWh/a: 15,969
CO_2- saving potential in t/a: 10,363

EUREM AWARD & EUREMnext AWARD winner 2020

Energy concept description:

The goal of the energy concept is to reduce the specific energy consumption for clinker production from 3.45 to 3.25 GJ / $t_{clinker}$ and to increase the share of energy from solid alternative fuels from 41 to 57% by substituting fossil fuels with alternative fuels of lower quality (higher moisture content and lower energy value of fuel) and lower market prices compared to the current state by using drying technologies for RDF (refuse derived fuel-derived waste).

The dried RDF would be used as an energy source on the calciner side, where 60% of the total amount of energy is utilized to produce the clinker.
The new technologies would use a part of the hot excess air from the clinker cooler to dry RDF as an alternative fuel, thereby reducing the moisture content of the material and increasing the energy value of this type of fuel, thereby allowing a significant improvement in the energy efficiency of the clinker production plant. Better energy efficiency of the plant has been proven earlier through industrial testing with better quality of RDF.

The RDF drying process is a closed process where the gases after drying are reused in the clinker production process and there is no negative environmental impact.

This project task would also directly reduce CO_2 emissions due to a reduction in specific energy consumption. Also, there is an indirect impact on reducing the environmental impact in a way that reduces energy consumption in waste treatment plants for RDF production, but this is not the subject of this project task.



Estonia

Topic: Heat recovery

Project: More efficient use of residual energy in aerated concrete plant

Energy Manager Vallo Sokk Company: Bauroc AS	**Results** Investment in Euro: 94,600 Cost reduction potential in €/Year: 47,938 Pay-back time in years: 2.2 Energy saving potential in kWh/a: 172,348 CO_2- saving potential in t/a: 1,306.4

Energy concept description:

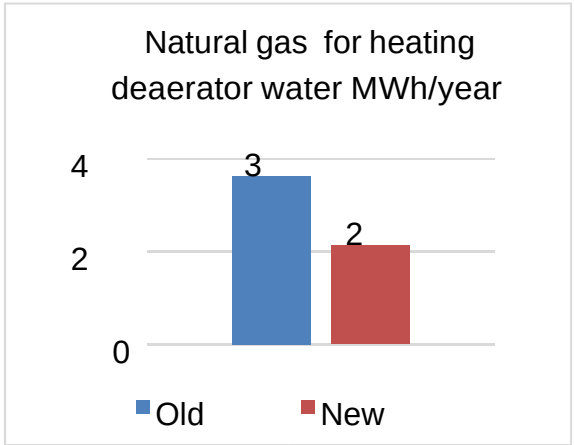
Aims: Primary energy (natural gas) savings of residual energy.

Base situation: Deaerator water heated with a pipe-tube heat exchanger up to 34 °C, with residual energy.

Optimization potentials / weak points: The pumps pump hot condensate (residual energy) through the heat exchanger. There is no water step in front of the pumps, and the pumps generate underpressure and cavitation. Pumps need often repairs, high maintenance cost, low energy transfer efficiency.

Proposals of solution / optimization possibilities: Production of the custom-made tube heat exchanger and the installation in the condensate tank. Allows deaerator water to be preheated up to 65 °C. The pumps pump cold water and do not need maintenance so often − lower repair costs.

Effects: Economic benefits up to € 47,938 per year. An investment of € 94,600 and a payback period of 2.2 years.



Estonia
Topic: Lighting

Project: Lighting energy efficiency project for metal Industry

Energy Manager Marti Arak Company : DeltaE Engineering Office	**Results** Investment in Euro: 58,392 Cost reduction potential in €/Year: 14,904 Pay-back time in years: 3.92 Energy saving potential in kWh/a: 13,188 CO_2- saving potential in t/a: 103.9 Date of implementation: January 2019 – July 2019

Energy concept description:

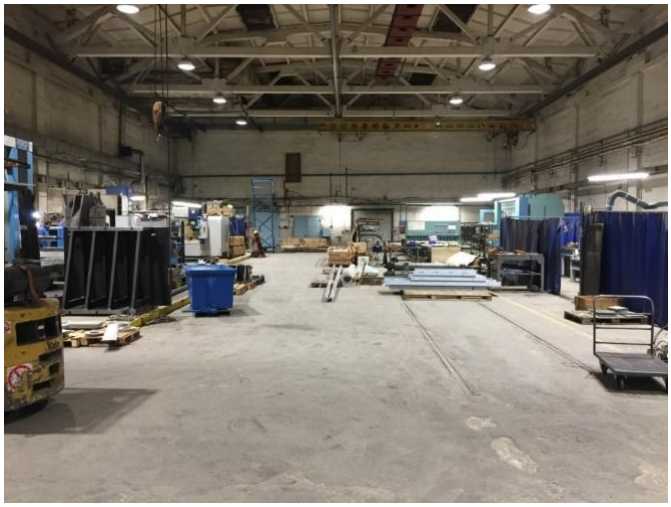
Aim: To achieve maximum energy savings by designing and refurbishing the lighting installation, high quality proper lighting solution that meets the standards.

Base situation: Energy data, on-site mapping, electricity consumption measurements.

Optimization potentials / weak points: The saving potential is about 80-85% and the improvement of the level of illumination is about 50%.

Proposals of solution / optimization possibilities: Design and renovate a new lighting installation with LED lighting.

Effects: Actual results: 83% electricity savings, pay-back time 3.92 years, 2-fold improvement in illumination level, reduced glare, improved uniformity of the light, improved working conditions for workers.



Latvia

Topic: Electrical energy

Project: Reduction of energy consumption in the swimming pool recirculation and filtration system, managing the flow, and reduction of energy consumption for lighting in the pool's user area.

Energy Manager
Pēteris Grundins

Company: Olimpiskais sporta centrs, Riga

Results

Investment in Euro: 27,000
Cost reduction potential in €/Year: 13,700
Pay-back time in years: 2
Energy saving potential in kWh/a: 137,000
CO_2- saving potential in t/a: 14,385
Date of implementation: 2020/2021

EUREMnext AWARD winner 2020

Energy concept description:

Reduction of energy consumption in the swimming pool recirculation and filtration system, managing the flow, and reduction of energy consumption for lighting in the pool's user area. The pool was opened 13 years ago. The system has two 11 kW circulation electric motors with water pumps. Motors are worn out and rebuilt several times each. Filtration media were changed in 2018 with lower flow request for better filtration. The existing system is static and doesn't provide flow management with reduced motor power and old circulation pumps rapidly lose their efficiency. Lighting reflectors are worn out and corroded from the aggressive environment in the users' area, and the base components start to fail. Water pumps work 24/7, the lights – 12/7. Reduction of electricity consumption, without sacrificing filtration speed in open hours and replacement of already worn out equipment, reduction of water flow for more efficient filtration at closed hours. Replacement of old fluorescent lighting with LED. New pump assemblies have different placement – there is a need for rebuilding pipe lines, lighting assemblies have corroded reflectors, so the lightning must be changed as a whole unit.

Replacement of the existing motor/pump assemblies with new and more efficient ones (IE3/IE4/IE5), flow management by night, replacement of old lamps with new compact design lamps. Brightness sensors and dividing the pool area in separate fields for automatic dimming and light intensity balance. After all optimization goals are completed, there is reduced electricity consumption, a reliable and modern system, controlled flow for best filtration effect possible. In the end, lower CO_2 consumption in the environment.

Latvia
Topic: Electrical energy

Project: Energy efficiency optimisation of *Elektrum* Energy Efficiency Centre

Energy Manager
Rūta Liepniece

Company: AS Latvenergo

Results

Investment in Euro: 20,200
Cost reduction potential in €/Year: 1,694
Pay-back time in years: 11.9
Energy saving potential in MWh/a: 16.944
CO_2- saving potential in t/a: 6,727

Energy concept description:

The building of the Energy Efficiency Centre is an office building and its area is 693.1 m^2. The building has two floors; on the 1st floor, there are four exhibition halls with demonstration equipment and an administrator's workplace. On the 2nd floor, there is a seminar hall, IT and communication room, workplaces for seven employees, and a rest room for employees with kitchen equipment. The existing energy sources and the type of their use in the facility are as follows:

1) Natural gas used for space heating during the heating season.
2) Electricity used for the office, computer and demonstration equipment.

During the evaluation process of the energy efficiency activities and energy consumption performed so far, it has been concluded that there are still the following optimisation opportunities:

1) Installation of electricity consumption monitoring equipment to evaluate the electricity consumption of ventilation equipment, computer infrastructure, and exhibition halls. The potential reduction in electricity consumption is 3.173 MWh per year, or 5% of annual electricity consumption. The preliminary payback period is 6 years & 7 months.
2) UPS replacement. The capacity of the existing UPS has been adapted to ensure the continuous operation of a larger number of employees. The preliminary reduction of electricity consumption when the UPS equipment is replaced is 5.256 MWh or 8.3% of the annual electricity consumption. Payback period is 6 years.

Replacement of ventilation equipment. The building has two ventilation units and they have not been changed since the building was put into service. Their automation is outdated; therefore, the pre-set required air exchange is not regularly provided. Thus, the visitors and employees are not provided with a satisfactory level of comfort. The preliminary reduction of electricity consumption, when the ventilation equipment is replaced is 8.515 MWh annually. Payback period is 19 years 6 months, which is high, but it should be taken into account that the level of comfort of visitors and employees is increased by providing the necessary fresh air exchange; moreover, the amount of carbon dioxide emissions is reduced.

Serbia
Topic: Heating

Project: Increasing the efficiency of hot-water boilers in the "Krivi Vir" plant in Niš

Energy Manager
Zoran B. Đorđević

Company: JKP "Gradska toplana" Niš

Results

Investment in Euro: 535,000
Cost reduction potential in €/Year: 220,000
Pay-back time in years: 2.4
Energy saving potential in kWh/a: 5,000,000
CO_2- saving potential in t/a: 1,100

Energy concept description:

Aims: Increasing the usefulness of hot-water boilers in the "Krivi Vir" thermal power plant in Niš by utilizing the heat of flue gases and reducing excess air in the combustion of energy sources.

Base situation: Two existing 35 MW boilers and one of 58 MW have no regulation of excess air for combustion of natural gas in the burners. In addition to the fact that the boilers run most of their working hours in the condensing mode, at relatively low outside temperatures at higher loads, relatively high exhaust gas temperatures were measured.

Optimization potentials / weak points: High flue gas temperature at boiler outlet. Unequal excess air ratio, much higher than optimal.

Proposal of solution / optimization possibilities: Installation of utilizers on the smoke ducts of boilers and regulation of excess air by the installation of new O_2 probes.

Effects / results: Increasing the efficiency of boilers gives an annual saving of 220,000 €. The investment is 535,000 €. The return on investment is 2 years and 5 months. The reduction in CO_2 emissions is 1,100 tones / year.

Serbia

Topic: Cooling machines | Heating | Air conditioning

Project: Installation of thermal pump (TP) in business building (BB) Metalac AD for heating/cooling mode

Energy Manager Velisav Dzokovic  Company: Metalac AD/Metalac Cookware	**Results** Investment in Euro: 48,700 Cost reduction potential in €/Year: 7,000 Pay-back time in years: 6.5 Energy saving potential in kWh/a: 348,400 CO_2- saving potential in t/a: 83.6 Date of implementation: May 2020

Energy concept description:

Aims: Separation of BB from the central heating system, improving the quality of heating/cooling.

Base situation: The heating in BB works very well, but it is connected to the manufacturing plants and is conditioned by the operation of heating with each other.

Optimization potentials / weak points: Independent heating/cooling mode of BB, savings/ a large number of days with a daily temperature lower than -5 ºC (> 15 days) during the winter.

Proposal of solution / optimization possibilities: Installation of TP/ we achieve independent heating/cooling and savings.

Effects: Annual savings are projected at 7,000 €, the investment is 48,700 €, pay-back time is 6.5.

Turkey

Topic: Heat recovery

Project: Waste heat recovery and carbon footprint reduction project in a Large Scale Industrial Company

Energy Manager
Gürhan Dural

Company: SISECAM – Trakya Glass Italy

Results

Investment in Euro: 5,200,000
Cost reduction potential in €/Year: 2,000,000
Pay-back time in years: 2.6
Energy saving potential in kWh/a: 17,791,000
CO_2- saving potential in t/a: 4,163
Date of implementation: 2021

Energy concept description:

Aims: Waste Heat Recovery and energy production (reduce carbon footprint, empower sustainability of environment).

Base situation: Waste heat left the plant by a chimney without any recovery.

Optimization potentials / weak points: Limited water supply because of environmental legacy rules.

Proposals of solution / Optimization possibilities: Waste heat thermal power recovery with organic rankine cycle technology.

Effects : Reduce electrical supply amaunt from grid and empower sustainability of the company.

Turkey

Topic: Lighting

Project: Lighting Efficiency Project for a Supermarket

Energy Manager
Cengiz Ören

Company: CarrefourSA

Results

Investment in Euro: 225,135
Cost reduction potential in €/Year: 55,770
Pay-back time in years: 4
Energy saving potential in kWh/a: 663,098
CO_2- saving potential in t/a: 386.6

Energy concept description:

Main object of this project is reducing the electricity use in one of the biggest supermarkets in Turkey. With energy efficiency, another objective is increasing the lighting comfort of all areas in this facility. In existing conditions, lighting fixtures and lighting infrastructure is very old and neglected. A 49 W electronic ballast fluorescent light is used for illumination from 15 years. All fluorescents have lost its lighting (lm/W) efficiency and it is also old technology. These fluorescent's economic life is too short, which is compared with new generation LED lightings. There are two main optimization potentials in this project. One of these is to provide energy saving and another one is increasing lighting comfort. With this project, facility's lighting infrastructure is also renewed.

Lighting Efficiency Project should reduce energy consumption of the lighting system. In this project, all existing fixtures are removed, and directions of new lighting lines are located parallel to section corridors. Thus, section corridors lighting level is increased. New lighting fixtures will be selected, LED and this new fixture's illuminance level much higher than existing technology. Implementation with this project, facility's lighting energy consumption drops to 61% and illuminance level increases from 400 to 1.000 lux (it's guaranteed for 8 years). All of these fixtures are chosen with DALI ballast. It means, all fixtures are connected to main automation system and will be managed by the automation. This automation system regulates the fixtures taking into account customer density in the supermarket.

Main Results: Lighting comfort; illuminance level increased from 400 to 1.000 lux, all lighting infrastructure is renewed, all lighting systems are controlled by automation, projects IRR is 35.9% and payback period is 4 years.

Existing lighting fixtures

New lighting fixtures

3 SELECTION OF 12 APPRECIATING ENERGY CONCEPTS OF THE "OLD" COUNTRIES

Austria

Topic: Energy data management systems

Project: Base Load Management

Energy Manager
Philipp Hartl

Company: CNH Industrial Österreich GmbH, St.Valentin

Results

Investment in Euro: 1,961
Cost reduction potential in €/Year: 10,534
Pay-back time in years: 0.2
Energy saving potential in kWh/a: 123,929
CO_2- saving potential in t/a: 32
Date of implementation: August 2020

Energy concept description:

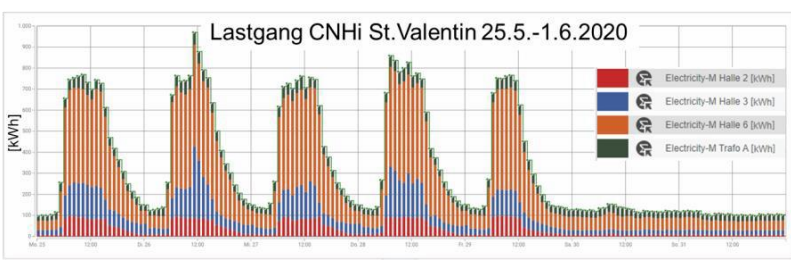
Aims: The aim is to analyse the load profile and determine options for reducing the electrical base load at the St. Valentin location.

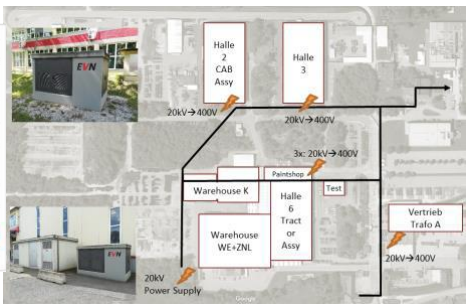
Base situation: A target level for the base load was defined. Deviations were searched for in the 30 available meter values.

Optimization potentials / weak points: 1.) A compressor was not switched off during the production-free period. **2.)** Hall lightings with 25 kW and 50 kW power remained switched on unnecessarily; **3.)** Also, a hall lighting with 10.4 kW power.

Proposals of solution / Optimization possibilities: ad 1.) A lock signal from the building management system switches the compressor off when it is not needed. **ad 2.)** An organizational regulation ensures the shutdown. **ad 3.)** A change in the control cabinet provides a switch-off option.

Effects: With the measures we save **124 MWh** annually. This is 5.1% of the electricity consumption in the production area. The saving is € 10,534 with investments of € 1,961. The project will pay off in 0.2 years. Additionally, 196.3 MWh of saving potential has been recognized. These are focused in further projects.





Austria

Topic: Electrical energy

Project: Replacement of energy- and emission-intensive slag forming agents by recycling materials in the steel industry

Energy Manager
Daniel Janz

Company: Breitenfeld Edelstahl AG, St. Barbara-Mitterdorf

Results

Investment in Euro: 12,475
Cost reduction potential in €/Year: 83,000
Pay-back time in years: 0.15
Energy saving potential in kWh/a: 266,786
Chance of implementation: high

Energy concept description:

Aims: Replacement of conventional slag forming agents in the Electric Arc Furnace (EAF) melting process by on-site-recycling materials, to decrease resource intensity, electrical energy consumption and CO_2-emissions.

Base situation: Currently a mixture of lime and calcium carbonate is used as a slag forming agent in the EAF. It has to be purchased from external producers and contains large quantities of fixed CO_2, which is released during the melting process using high amounts of electrical energy.

Optimization potentials: Since large quantities of calciferous slags are generated on-site, the replacement of conventional slag forming agents in the melting process with these slags presents itself.

Proposals of solution: The calciferous slag is subjected to a special cooling process which suppresses the formation of β-C2S- phases and thereby the disintegration to dust. This way a product fit for reuse is obtained, which can be charged in the EAF instead of the conventional slag forming agents.

Effects: Conventional slag forming agents do not have to be purchased externally, landfill amount, energy consumption und CO_2-emissions generated on-site are decreased.

Austria
Topic: Lighting

Project: Change parts of the light system to LED

Energy Manager
Gottfried Brandstetter

Company: confidential

Results

Investment in Euro: 29,515
Cost reduction potential in €/Year: 9,581
Pay-back time in years: 3.1
Energy saving potential in kWh/a: 28,491
CO_2- saving potential in t/a: 7.3
Chance of implementation: high
Under construction, completion envisaged: February 2021

Energy concept description:

Aims: Change the light system to LED, optimize the energy input, reduce the very high maintenance costs.

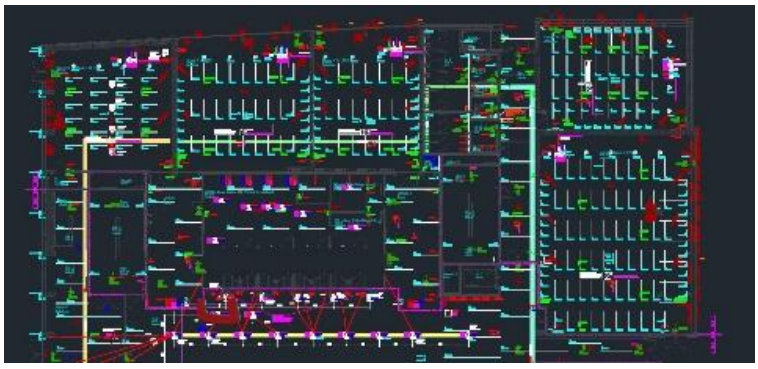
Base situation: Conventional light tube systems, very high maintenance costs due to the spatial situation.

Optimization potentials / weak points: Reduction of energy and maintenance costs.

Proposals of solution / Optimization possibilities: Change to highly efficient LED, install daylight control system and presence detector using the existing KNX-System, reduce the maintenance costs through the lifespan of the LED-System.

Effects: Reduction of the energy consumption by 28,491 kWh/a, costs 3,077 €/a, reduction of the maintenance costs by 6,504 €/a. This results in a payback period of appr. 3.1 years and the greenhouse gas emissions can be reduced by 7.3 tons per year.

(some pictures removed for confidentiality)



Czech Republic
Topic: Process heat

Project: Reconstruction of steam and condensate system at the Kralupy Refinery.

Energy Manager
Agnieszka Dvořáková

Company: **Rafinérie Kralupy, UNIPETROL RPA, s.r.o., Kralupy nad Vltavou**

Results

Investment in Euro: 1,300,000
Cost reduction potential in €/Year: 390,537
Pay-back time in years: 3.25
Energy saving potential in kWh/a: 7,267
CO_2- saving potential in t/a: 1,465
Date of implementation: July 2020

Energy concept description:

The project will include modification and replacement of the pipeline routes, replacement of valves, steam distributors, condensate collectors and installation of a new steam-condensate pump at the refinery in Kralupy.

The aim of this project is the improvement of steam and condensate management. Start of realization is planned in July 2020. The modification of the present condensate system will allow to recover 7 t/h of condensate, which will be used as feed for the boiler water system. The high temperature of the condensate will reduce the cost of heating of boiler feed water. Moreover, modification and reconstruction of the steam and condensate system will reduce steam leaks up to 400 kg/h.

Czech Republic
Topic: Heat recovery

Project: Use of waste heat for preheating process water

Energy Manager
Ing. Jan Lukac

Company: Miele technika s.r.o.

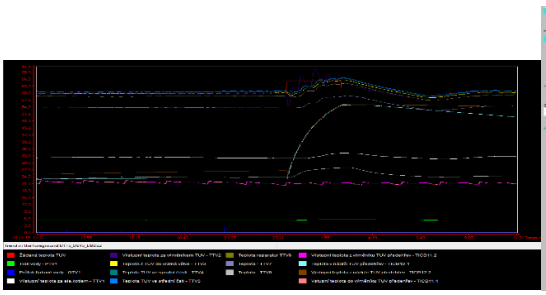
Results

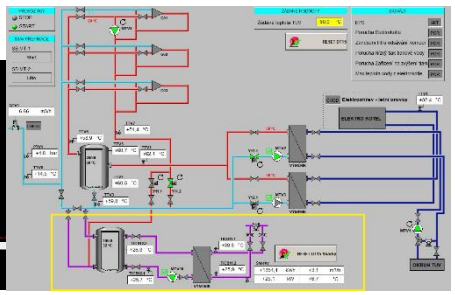
Investment in Euro: 11,540
Cost reduction potential in €/Year: 5,115
Pay-back time in years: 2.16
Energy saving potential in kWh/a: 87,300
CO_2- saving potential in t/a: 3.0
Date of implementation: realized 2019

Energy concept description:

This thesis deals with design, realization and testing of new technology during a test run. The technology is used for utilization of waste heat and for water preheating. The thesis was created in consequence of the constant pressure to reduce the amount of the energy inputs for the needs of the dishwasher production plant Miele technika Uničov and the overall modernization of the dishwasher production line.

Thanks to the complete rebuilding of the whole line, there has arisen a potential for economically advantageous element, which will reduce the company costs for electricity and natural gas by 90 MWh per year. The project was interesting from the beginning, also thanks to the expanding production with increase of the waste heat and the increasing options to use the heat further. The thesis includes also practical measurements and photos of the real state.





Czech Republic
Topic: Air conditioning

Project: AC unit modernization for production hall H1 for electronic production

Energy Manager
Martin Soukup

Company: Continental Automotive Czech Republic s.r.o.

Results

Investment in Euro: 11,540
Cost reduction potential in €/Year: 28,000
Pay-back time in years: 7.7
Energy saving potential in kWh/a: 454,318
CO_2- saving potential in t/a: 531.6
Date of implementation: October 2019

Energy concept description:

Production hall H1 for electronic production had large problems to maintain the microclimate, because the air conditioning (AC) unit was very old. There was no possibilitiy of humidification.

This project solves the replacement of current AC unit by new machines with required performance, economical engines and the possibility of damping directly to the pipeline of the unit.

Savings:
Continental A.G. in Brandýs nad Labem is one of the biggest automotive plants for producing electronic parts in the Czech Republic. The production is located in two buildings with more than 20,000 m² of production space, opened in 1998. Products from Brandýs are distributed to the European, Asian and American market used by more than 30 customers - mostly by car manufacterers.Yearly volume is more than 10 milion pieces.

Increasing customer demands for vehicle comfort requires a higher proportion of electrical, electronic and software solutions. These are transferred to a supplier like Continental and therefore enormously increase requirements for quality, accuracy and speed of delivery. One of the conditions of success and competitiveness is to ensure the appropriate environment - microclimate according to standards for electronic production (microclimate cleanness according to ISO 8). This is why, there is a huge potential for cost-effective solutions in this area. The project will contribute to improving the environment by reducing CO_2 emissions by energy saving.

Finland

Topic: Cogeneration | Combined heat and power plant (CHP)

Project: Reducing district heating auxiliary heat exchanger energy consumption

Energy Manager
Petri Parviainen

Company: Vantaan Energia

Results

Investment in Euro: 20,000
Cost reduction potential in €/Year: 640,000
Pay-back time in years: 0.14
Energy saving potential in kWh/a: 12,000
CO_2- saving potential in t/a: 1,926
Date of implementation: July 2019

EUREM AWARD winner 2020

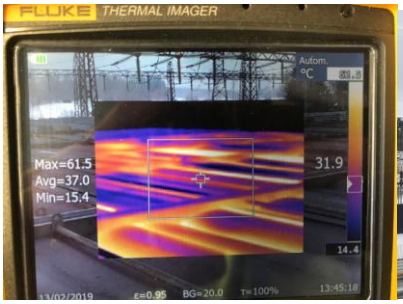
Energy concept description:

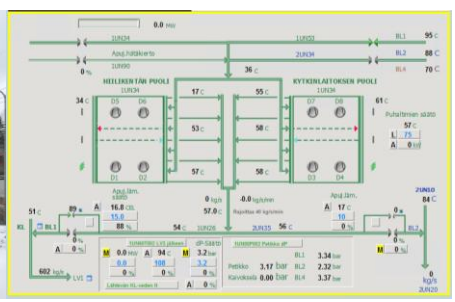
The purpose of the auxiliary heat exchanger is to create district heating demand when needed. For example on start ups or heating grid disorders. Water is used as medium, so on below 0°C temperatures exchanger must be kept warm to avoid freezing.

Setpoint for keeping warm is 15°C, due to leaky valves exchanger surface temperatures were over 60°C during winter time when setpoint was 15°C.
2.46 km^2 of surface area, energy consumption was ~3MW during winter 2019.
Problem was not detected due to flow measurement, measuring range being too high. Leaking valves were fixed, and secondary shut of valves were added to avoid following situation in future.

Other development proposals were considered (adding a circulation pump, changing medium to water/glycol, adding better flow measurement to detect leakages, adding more temperature measurements). Fixing leakages and leakage prevention was considered as most cost efficient option.

Energy consumption during winter 2020 has been 400 kW, although median temperatures have been several degrees higher than usually. Better automation is yet to be implemented to avoid heating on above zero temperatures.





Germany
Topic: Lighting

Project: Decision proposal on the replacement of the existing lighting system with currently installed fluorescent tubes to new energy-saving LED lights of a car park in Fürth, taking into account technical, economic and environmental aspects.

Energy Manager
Georg Rauscher

Company: infra fürth gmbh

Results

Investment in Euro: 26,619
Cost reduction potential in €/Year: 11,330
Pay-back time in years: 2.5
Energy saving potential in kWh/a: 66,646
CO_2- saving potential in t/a: 31.7
Chance of implementation: high

Energy concept description:

At present, a conventional lighting system consisting of 270 LL luminaires is installed in the car park building. These are each equipped with a fluorescent tube, which has an electrical output of 58 watts each. Furthermore, the built-in lights are equipped with an electronic ballast (EVG), which requires another 5.0 watts of electrical energy per lamp (system power about 55 watts). The built-in lighting system is currently operated 24 hours a day, 365 days a year. This results in an operating time of 8,760 hours per year. The fluorescent tubes in the currently installed conventional lighting system are renewed at regular intervals - every three years - since the maximum lifetime or burning time has been reached. This corresponds to an operating time of approximately 26,280 hours. The parking garage has a maximum clear "ceiling height" of approx. 2.60 m and offers 172 parking spaces. Remedy here can only create a replacement of the conventional lighting system in the object. The planned measure should be cost-efficient and future-proof if possible. In particular, the use of modern LED lights should be considered here. Furthermore, the conversion to LED luminaires should develop standards that include warehousing, planning and configuration. Furthermore, the use of LED luminaires is intended to achieve savings in electrical energy and the associated reduction in greenhouse gas emissions.


Germany

Topic: Electrical drives | Heat recovery | Air conditioning

Project: Optimization of the ventilation system in building 220, Siemens

Energy Manager
Vincenzo Quintieri

Company: Siemens AG

Results

Investment in Euro: 1,367,500
Cost reduction potential in €/Year: 669,000
Pay-back time in years: 2
Energy saving potential in kWh/a: 3,460,00
CO_2- saving potential in t/a: 620 gas /905 electricity
Date of implementation: September 2020

Energy concept description:

The four ventilation systems of 100,000m³ / h (1977) in the building have a cold duct and a warm duct. These are used for cooling / dehumidifying in summer and heating / humidifying in winter. They have no heat recovery, only circulating air, controlled by a hygrostat sensor in the cold runner. For optimization purposes, a circuit system and a CO_2 control are installed in each system. The circulating air can be reused in a controlled manner. At the same time, the electric motors are being replaced by new, efficient EC-motors. The steam generator is calculated accordingly to the new design and is replaced. The steam lances are mounted from the cold runner in the warm runner. These measures result in savings of (energy) 3,460,000 kWh / a, (costs) 669,000 €/a, (CO_2) natural gas 620 t/a and electricity 905 t/a per year. The payback period is 2 years for an investment of € 1,367,500.

Germany

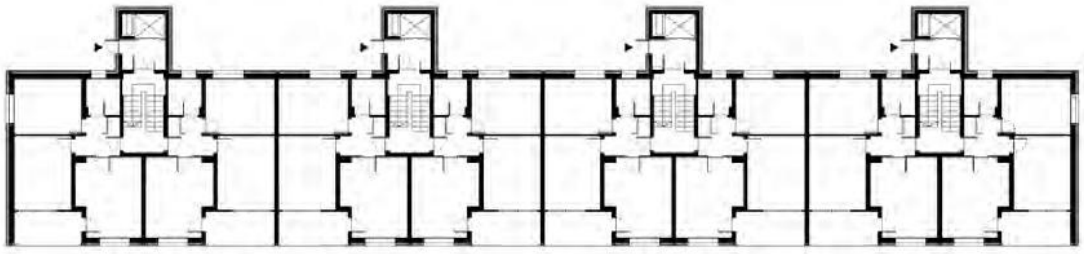
Topic: Insulation | Change of windows | Low-energy-buildings

Project: Renovation concept for rental apartment building 2500 qm

Energy Manager Jürgen Fahdt Company: AUDI AG - Ingolstadt	**Results** Investment in Euro: 1,150,612 Cost reduction potential in €/Year: 52,280 Pay-back time in years: 19.7 Chance of implementation: middle

Energy concept description:

The aim of the refurbishment concept is to achieve the most economical and energy-efficient solution resulting in a passive house standard. This is achieved by insulating the exterior wall (two-layer thermal insulation), replacing windows and doors, and enclosing the loggias. The double-glazed windows are replaced by triple-glazed plastic/aluminium-composite window (U=0.61 W/sqm*K). The windows and the front door are replaced by double-glazed aluminium composite elements. The balconies will be fully glazed. Swivel aluminium external venetian blinds are installed in front of the windows as sun protection and darkening. The elevator shafts to the newly designed living areas are insulated, too. Decentralised ventilation systems with heat recovery will be built-in. The flow temperature of existing radiators can also be reduced. The costs for the energy efficiency improvement for 40 residential units with 57.19 sqm living space each amount to € 1,150,612. The annual savings for heating energy due to the refurbishment amount to 52,280 € at current energy costs. The passive house standard is fulfilled with a heating energy consumption of 11.4 kW/sqm/a. Only the heating energy savings would refinance the renovation in 19.7 years through energy savings.



Grundriss EG

Germany

Topic: Heating | Contracting

Project: Contracting – individual heating concept

Energy Manager **Beate Rußer** **Company: Municipal Utilities Ingolstadt Energy GmbH**	**Results** Investment in Euro: 0, because it is contracting Cost reduction potential in €/Year: 13,000 Pay-back time in years: contract period 15 annual costs Energy saving potential in kWh/a: 660,000 CO_2- saving potential in t/a: 147.8 Date of implementation: September 2018

Energy concept description:

The for 21 years existing contracting (heat supply) contract with the Heizanlagen GmbH for gas with the Municipal Utilities Ingolstadt Energy GmbH for the heating plant in the house number three was terminated by the contracting provider, Municipal Utilities Ingolstadt on 30th September 2018.

The reasons are, besides problems with the boiler, the supply of 5 houses (1,3,5,7,9) by a central heating system in house number 3. This heating system is oversized, the pipes are partly not insulated. This results in high line losses and a huge technical support effort, as well as a lot of annoyance for the houses to be supplied. Often the users in house number 9 get no more warm water. Compliance with the legal regulations, such as compliance with the Legionella limit, is extremely questionable.
The aim is for each house to have its own heating system, in this case district heating, as CO_2 neutral. Comfort is an extremely important premise. The workload and thus the pure consumption-intensive costs are reduced. The system is secured by a carefree package for the next 15 years through contracting.

Greece
Topic: Heating

Project: Energy efficiency applications in a Hotel

Energy Manager
Apostolos Adamopoulos

Company: Athens Hotel

Results

Investment in Euro: 636,808
Cost reduction potential in €/Year: 379,460
Pay-back time in years: 3
Energy saving potential in kWh/a: 3,458,361
CO_2- saving potential in t/a: 2,201
Additional energy generated out of renewable energies in kWh/a: 80,714
Within the energy concepts renewable energies new/additionally installed in MWp: 0.05
Chance of implementation: middle

Energy concept description:

- Hotel's energy footprint recording and proposals for energy upgrade implementation.
- General Building and M&E system characteristics.
- Energy usage (Electrical & Thermal) – Identification of major uses of M&E equipment in terms of Energy consumption & sampling field measurements performed.
- Interpretation of total energy efficiency and monitoring of energy indicators.
- LCCA – Energy Saving actions.

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