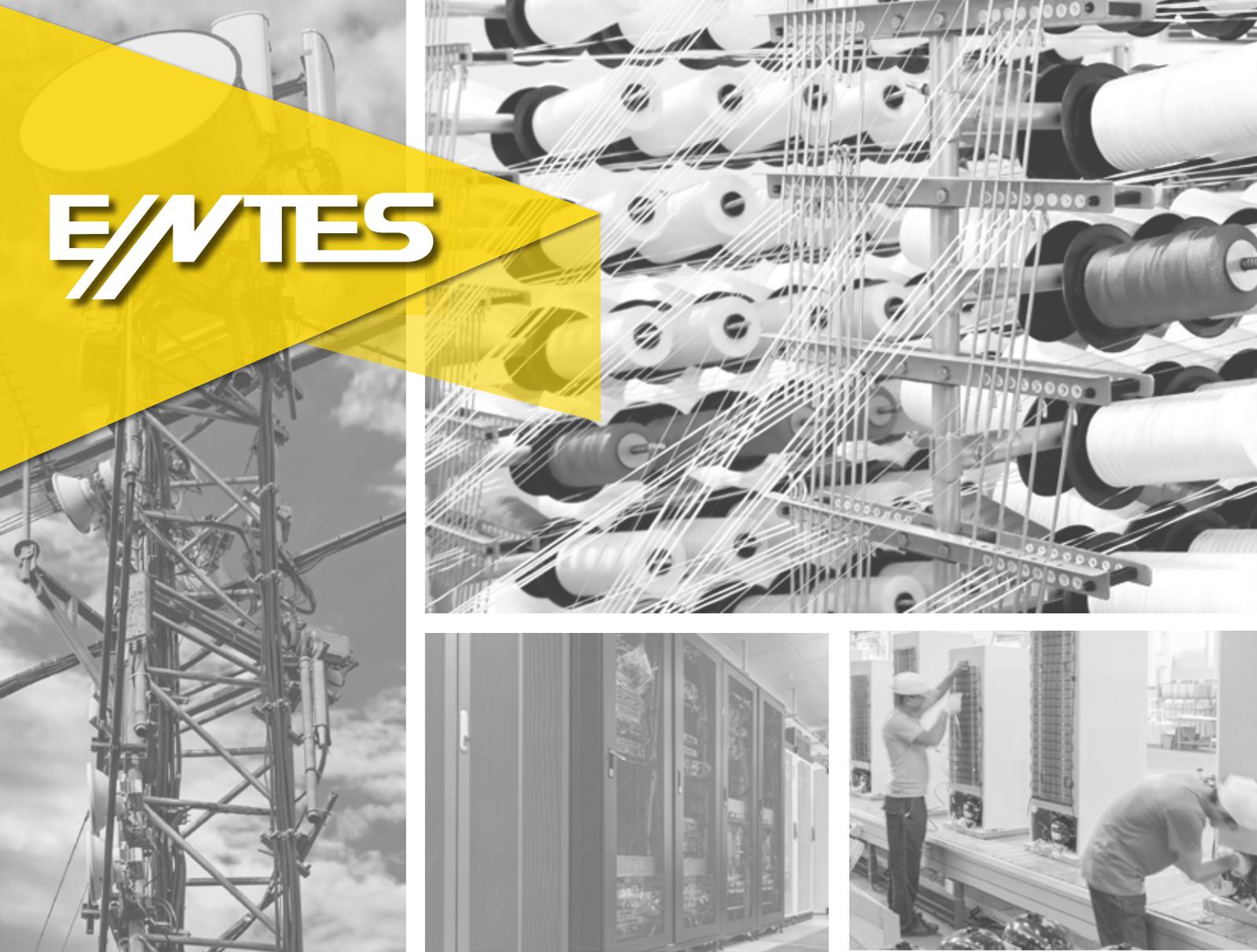


# E/NTES



## SECTORAL APPLICATIONS

- Power Factor Correction
- Energy Management
- Protection & Control



**Problem:** A chain store with 58 branches was paying penalty fee on their electricity bills for excessive reactive power consumption.

**Diagnosis:** Loads were distributed unevenly between phases, current transformer selection was wrong, capacitor selection was wrong, power factor controller were not properly functioning.

**Solution:** 58 Power Factor Controller, 58 Ethernet Modem devices and Monitoring Software were used.

It was determined that the electricity bill of a branch in a shopping mall was calculated with 10% addition for transformer losses. By installing Power Factor Controller, the penalty for excessive reactive power consumption and the 10% addition for transformer losses were avoided, thereby saving the store €8.850 per month.

No technical errors were encountered in the branch in another shopping mall. After closer inspection, it was uncovered that the

shopping mall management was adding 5% to the electricity bill even though no such clause was stated in the written agreement. After this issue was uncovered thanks to the measurements that are done by Power Factor Controller, the 5% addition on the electricity bills was stopped and the shopping mall management paid the store €6.200 by preparing a retroactive payment bill.

It was determined that the inputs of current transformers were connected in reverse to the different branded power factor controller relay in the branch in a shopping mall in Ankara. This issue was resolved by replacing the older relay with a Power Factor Controller which has the feature to detect wrong connections and correct them automatically in the measurements.

It was determined that the electricity bill of a branch in a shopping mall in Istanbul was calculated with a 100% addition because the bill was calculated with the current transformer ratio as 160 instead of 80. The shopping mall management admitted the mistake and paid the store €24.900 by preparing a retroactive payment bill.

**Conclusion:** Thanks to all these measures taken, all 58 branches of stores were saved from paying penalty fee on their electricity bills for excessive reactive power consumption and the store chains cut back 13% of their previous electricity bill. The installed devices paid back themselves in just 1 month.



**Problem:** The lack of a centralized power factor monitoring system for a bank that has 400 branches  
**Diagnosis:** The integration of computer communicable Power Factor Controllers to the network and installing a software that can monitor these from one place.

**Solution:** 400 Power Factor Controller, 400 Ethernet Modem devices and Monitoring Software were used.

Before using the computer communicable devices, limited number of technical team members were traveling the whole country and trying to respond to the failures. This was causing a loss of time and was making it nearly impossible to immediately solve the problems. By installing a monitoring system; it was made possible to monitor energy parameters of all branches and to check if the capacitors, contactors and other components in the reactive power control panels were working correctly from the computer at the headquarters, thereby enabling a quick response time for the technical team in case of a failure in any of the branches.

**Conclusion:** Effective reactive power control was made possible in all 400 branches and the technical support team started to be utilized more efficiently, thereby saving considerable amounts of money. With the project cost at €240.000 the payback period was 8 months.





**Problem:** A university in a large metropolitan city which has 78 different buildings like rectorship, faculties, institutes, libraries, gyms and dorms located throughout the city was paying excessive reactive power consumption penalties in electrical bills because problems and malfunctions kept occurring in power factor control systems of the buildings.

**Diagnosis:** Upon closer inspection, it was uncovered that although the loads were unbalanced in most of the 78 buildings, single phase power factor controllers with older technologies were being used. It was determined that these relays which can only function properly on balanced three-phase systems, were not working properly on the systems of university buildings which have unbalanced three phase loads. It was decided to integrate computer communicable three phase Power Factor Controllers to the system.

**Solution:** 78 Three Phase Power Factor Controller (one for each building), 78 Ethernet Modem devices and Monitoring Software were used.

It was determined that the index tracking of electricity meters and power factor control panels was not being done regularly and swiftly, thereby only being able to see the reactive energy costs after the electricity bill arrived. Thanks to Power Factor Controller which can operate correctly in different phased systems and with inverted current transformer connections, reactive power control faults due to connection errors were avoided. Circuit breakers, contactors and capacitors in power factor control panels were breaking down over time.

The changes in the phase order couldn't be corrected and the reactive power couldn't be controlled correctly due to the unbalance in the phase currents. By installing Power Factor Controller which can measure the capacitor values and warn the user if any of the connected capacitors brake down; the breakdowns of circuit breakers, capacitors and contactors started being determined on time.

The capacitor placements in the panels which contained only three phase capacitors were revised by placing single phase capacitors according to the measurements taken by the relays instead. Thanks to the Power Factor Controller which can control both single and three phase capacitors, the reactive power started being controlled error-free in systems which contain unbalanced loads.

The accuracy of the energy consumption started being controlled by measuring the consumed active (kWh) energy values, reactive (kVAr) energy values and their % ratio for the buildings and facilities with Power Factor Controller and then immediately determining where the energy ratio increased. The technical support was sent to the faulty site and the fault was immediately resolved. This way, the administration saved considerable amount in electricity bills for consuming excessive reactive energy.

**Conclusion:** The electricity bill for the 78 buildings of the university which amounted to €420.000, was reduced 18% to €344.000. Additionally, energy efficiency was assured by reducing the reactive energy consumption throughout the 78 buildings. With the project cost at €65.000 the payback period was 3 months.



**Problem:** The inability of efficient power factor monitoring on the 6 power factor control panels in the factory.

**Diagnosis:** The integration of computer communicable Power Factor Controllers to the network and using a software that can monitor these from one place.

**Solution:** 6 Power Factor Controller, 2 Ethernet Modem devices and Monitoring Software were used.

It was made possible to monitor the reactive energy parameters of the panels and to access the relay settings from the computer in the headquarters.

Because the personnel that were reserved for this task now had time to do other work, the overall work performance increased.

**Conclusion:** Thanks to all these measures taken, effective reactive

power control was made possible throughout the facility. With the project cost at €10.000 the payback period was less than a month.



**Problem:** This municipality consists of 90 regions. The limited number of technical support personnel is traveling to regions with reactive power problems and trying to repair on the spot. This is a time-consuming operation. The municipality would like to have a correct and precise reactive power monitoring.

**Diagnosis:** Considering the number of people involved and the time needed for repairs, the conclusion is that the current monitoring approach is ineffective. A big disadvantage of the current method is that a repair cannot be done immediately, because there is always travel time.

**Solution:** Integrate ENTES system with Power Factor Controllers. The system is available with software and is able to monitor from one central terminal.

Total system for this municipality: 90 pcs Power Factor Controller, 90 pcs Ethernet Modem and Monitoring Software

**Description:** By using the Power Factor Controller and Monitoring Software, all the electrical parameters of different regions were monitored. As follow-up of the measurements the necessary configuration changes have been made. Additionally, faulty energy meters were determined by comparing the meter's values to the values that are stored in the controllers.

**Conclusion:** Thanks to all these measurements taken the power factor at the 90 regions came into control in an effective way and technical support personnel became more efficient at responding to faults. With the project cost at €75.000 the payback period was 5 months.



**Problem:** No insight in the reactive power

**Diagnosis:** There is no reactive power monitoring due to a lack of personnel at most of the wells

**Solution:** Integrate ENTES system with Power Factor Controllers. The system is available with software and is able to monitor from one central terminal.

Total system for this company: 80 pcs Power Factor Controller, 80 pcs Ethernet Modem and Monitoring Software

**Description:** As soon as the system is installed, all the electrical parameters of geothermal wells are monitored.

Furthermore, the configuration of the controllers could be changed. (when necessary) Additionally, cos-phi and power parameters of the well pumps were monitored, this information gave more insight in the efficiency of the well pumps.

**Conclusion:** Thanks to all these measurements taken, the power factor at the 80 wells were controlled effectively and the efficiency of the well pumps became traceable. These measurements resulted in a 20% decrease of the energy consumption of this company. With the project cost at €60.000 the payback period was 3 months.





**Problem:** A monthly electricity bill of €50.000 considered too high when compared to similar plants.

**Diagnosis:** Measuring the energy consumption of steam boilers and boiler room area of the factory in case there is an excess consumption, measuring the energy consumption of fans and submersible pumps, measuring the energy loss occurring on the underground cables and monitoring all of the values.

**Solution:** 40 Energy Analyzer, 1 USB Converter and 1 Monitoring Software were used. The incoming and outgoing energy values were monitored for steam boilers, fans, submersible pump groups and underground cables by connecting Energy Analyzers before and after them.

The measured values were monitored with the communication software on a computer in real-time.

Close inspection of the energy measurements revealed that the 2 x

11.0 kW fans and 5 x 7.5 kW pump groups were insufficient. The pipe diameters were increased in order for these machines to consume less energy.

Submersible pumps were working for 24 hours. The pump power was increased in order to decrease the operating time of the pump system and to adjust the operating periods freely.

It was determined that the 85 meters long 120mm<sup>2</sup> diameter underground cable was overheating. It was replaced with a 240mm<sup>2</sup> diameter cable and a 20% drop in energy consumption was observed via the Energy Analyzers at both ends of the cable.

8 x 22 kW fans were working with star-delta starting configuration. 4 inverters were bought for €5.500. The fans were started with the inverters using soft starting configuration.

An energy saving was achieved by decreasing the frequency of the circulation fans in the machine. It was determined that the water motors were consuming too much energy because there was not a pressure tank. A €910 worth pressure tank was installed to the system saving €35 per day.

**Conclusion:** Thanks to all these measures taken, the electricity bill of the factory was decreased to €36.300, cutting the energy cost by 30% and the energy started to be used this much efficiently. With the project cost at €18.500 (including frequency converters, water tank and cables) the payback period was less than 2 months.



**Problem:** Inability of providing monthly energy consumption of machines and departments for upper management.

**Diagnosis:** Measuring and monitoring the consumed energy values of compressors, chilling towers, tanks, and lighting systems.

**Solution:** 24 Energy and Power Measurement Device, Modems and Monitoring Software were used. The consumption values of energy consuming machines and systems were measured and they were monitored using the Monitoring Software, thereby providing energy consumption reports for the upper management efficiently.

Additionally, an extra energy consumption of 100 kWh in one night was determined in the warehouse lighting system. It was revealed that the security guards kept leaving the warehouse lights on after their rounds in the warehouse. 3.000 kWh energy which amounts to €240 per month was saved by installing lighting fixtures with motion sensors in the warehouse.

The deep drawing presses were being started 2 hours before the start of the shift for warm-up and this process was consuming 280 kWh of energy in one day. A heating system was installed to ensure that the presses do not cool down, thereby saving 7.500 kWh of energy which amounts to €585 per month. It was detected that one of the two identical compressors was consuming more energy. After the faulty compressor was taken into service and repaired, the production rate of that department increased even though the energy consumption decreased by 20.000 kWh, thereby saving €1.565 per month.

**Conclusion:** Thanks to all these measures taken, the monthly energy reports were created correctly, electricity consumption has decreased and energy efficiency was ensured throughout the factory. With the project cost at €4.500 the payback period was less than 2 months.



**Problem:** High energy consumption

**Diagnosis:** Measuring the energy consumption of marble cutting, cleaning and aligning machines in the factory and monitoring the measured values to uncover any undetected excess energy consumption

**Solution:** 23 Energy Analyzer, modems and Monitoring Software were used. 1 Energy Analyzer was connected to the main transformer input in order to measure the total power and energy. A 100 meters long communication cable was installed from the distribution panel to the computer. The energy consumption in the factory was started to be monitored through the communication network by reading measurements from 22 Energy Analyzer that are connected to the machines and departments with high energy consumption. It was revealed that the marble cutting machines draw 150 A currents instead of the nominal load current of 100 A,

that the cutting blades went out of balance sooner than expected because of the excessive strain and that the cutting speed was  $10 \text{ m}^2$  per hour instead of  $12 \text{ m}^2$  like it should be. These issues were eliminated by making the necessary adjustments to the cutting machines. A marble cutting machine (ESTE) has a nominal power of 110 kVA. It consumes about 80 kW of power in one hour. It means that an ESTE consumes 80 kW of power while cutting  $12,5 \text{ m}^2$  of marble in one hour. This amounts to €9 worth of electrical energy consumption per hour. Thanks to the installed monitoring system, energy consumption cost has been added to the product cost calculations and the selling prices were revised. A shift loss of 5 minutes for one worker amounted to a work loss of 26 hours in a year. This factory has the capacity to process 2 containers full of product in 26 hours and this production loss amounted to €20.600. The workers started to follow the shift times more carefully since they knew that the machines were being observed through the monitoring system, thereby eliminating labor loss.

When overtime was necessary, an overtime engineer had to be present even though only 3 workers were working. Thanks to the installed monitoring system, the working hours of machines and their energy consumption values were able to be monitored remotely, thereby eliminating the necessity of an overtime engineer and saving a minimum of €900 per month.

**Conclusion:** Thanks to all these measures taken, the electricity bill of the factory was decreased and the energy started to be used much efficiently. The installed system paid itself in 6 months by increasing the machine efficiencies and by decreasing the cost of the saw balance.



**Problem:** When the ultrasound imaging device was turned on and the display showed a color output, the device kept shutting down. The arriving authorized tech support stated that this shut down was caused because of the sudden voltage rises and demanded a service fee every time that they arrived for that shut down.

**Diagnosis:** Installing an Energy Analyzer at the main distribution line of the hospital and monitoring the energy values periodically.

**Solution:** 1 Energy Analyzer, Modem and Monitoring Software were used. The voltage was measured in 5 minute intervals for 1 week by using the Energy Analyzer. The measured values were saved to the internal memory of the Energy Analyzer. The report that is containing the measured values was presented as an Excel report to the hospital management and to the company that sold the ultrasound imaging device. This report clearly showed that there wasn't a sudden voltage rise as the seller claimed. The seller

acknowledged that there is a problem with the imaging device. The electronics card of the ultrasonic imaging device was replaced with a new one and the problem disappeared.

**Conclusion:** The electronics card which costs €685 was replaced free of charge. The purchase of new regulators that the regulator firm advised to be bought was avoided, thereby saving their cost of €1.120. The amount of cancelled appointments of patients that are caused by the breakdown of the ultrasound imaging device was decreased to zero. With the project cost at €1.000 the payback period was less than a month.



**Problem:** The textile factory is not able to monitor the energy meter that is attached to the main MV line. The factory would also like to monitor the consumption of loads that are connected to the 5 transformers that are connected to the main line.

**Diagnosis:** The factory needs a system that can measure the energy values periodically. The system should also be able to connect to generator outputs, to the loads that are connected to the transformers and to the reactive power control panel.

**Solution:** Integrate ENTES system with Energy Analysers, Energy & Power Meters and Power Factor Controllers. The system is available with software and is able to monitor from one central terminal. Total system for this company: 6 pcs Energy Analyzer, 53 pcs Energy and Power Meter, 3 pcs Power Factor Controller, 1 pc USB Converter, 1 pc Ethernet Modem, 1 wireless Ethernet Receiver-Transmitter and Monitoring Software

**Description:** With the new ENTES system the utility company's energy meter at the main line could be monitored. The Energy Analyzer was also connected to this main line and the energy consumption of the line was double-checked by comparing the utility energy meter values to the ENTES analyzer energy values.

Secondly, the energy consumption of every section in the factory could be monitored. The consumption of the 3 different shifts were compared and the shifts with the most and least energy consumption were determined. After determining the energy consumption of every section, improvement operations were executed in order to decrease the energy consumption and work more efficient. Examples of the operations: bringing in motors with higher efficiency, taking precautions to provide better ventilating and cooling.

Another advantage of the system is that the costs of the generators for the facility could be calculated. Final important change to mention is that the company did not have to pay penalties anymore for the reactive energy. The values measured by the power factor controller were monitored from a remote computer thanks to the computer communication.

**Conclusion:** The possibility to avoid reactive energy penalties already brought a 13% decrease of the energy costs to the company. Thanks to the new energy management system, the sections and devices that consume excessive energy were recognized and the devices were replaced by devices that need less energy. Additionally, the sequence of the shifts was adjusted to avoid too much energy on the peak demand times of the facility. With the project cost at €12.000 the payback period was 3 months.



**Problem:** The energy consumption of the separate machines was done with mechanical energy meters and the mains had harmonic distortion. Measured values were not accurate and the facility expenses increased due to labor costs.

**Diagnosis:** The facility needs to measure energy and power of the machines, take energy analysis from the distribution panels and monitor the values measured. The system should be accurate and have less labor costs. Connecting Energy and Power Meters to the machines, installing Energy Analyzers to the distribution panels and monitoring the values measured by the installed devices from a central terminal

**Solution:** An ENTES Energy Management System with an Energy and Power Meter for every one of the 135 machines, an Energy Analyzer for every one of the 15 distribution panel, 7 Ethernet Modem and

Monitoring Software

**Description:** Measured values from the 150 devices were saved to one central terminal and monitored there. The review of the billing report showed that the electricity consumption of the 32 jacquard looms was higher than the desired value. It was decided that these machines should operate in the off-peak hours; this will seriously reduce the energy consumption of the jacquard looms. By reviewing the power/time graphs of the monitoring software, the moments where machines should be turned off but were working or where machines should be working under full load but were not working could be seen. The operation times of the machines were readjusted according to the power/time graphs and the facility created a more disciplined operation of machines, workers and work-load.

**Conclusion:** The energy consumption values of the machines were observed from one central location, reports showing the accurate energy consumption were ensured and energy efficiency is achieved through the improvements made based on the accurate energy consumption values. With the project cost at €25.000 the payback period was 7 months.



**Problem:** The company was not able to calculate the cost per produced unit. This calculation is very important to find out the company's break-even-point!

**Diagnosis:** The factory produces home appliances like ovens air conditioners and dishwashers. The factory needs to monitor the energy consumption of the production lines; measure the energy cost per machine.

**Solution:** Installing Energy Analyzers at the factory that can be monitored and analyzed on a computer. In the factory 50 Energy Analyzer and Monitoring Software was installed.

**Description:** Measured values from the 50 devices were saved to one central terminal and monitored there. The energy consumption of the production lines was measured and the values were converted to the total production quantity. The selling prices of the products were adjusted after calculating the unit energy cost per product.

**Conclusion:** The unit energy cost per product was calculated by monitoring the energy consumption of the production lines from one central terminal. This allowed the management to revise the selling prices, determine the break-even-point and improve the turnover and profit.

**Problem:** The company was not able to calculate the cost per produced unit. This calculation is very important to come to the company's break-even-point.

**Diagnosis:** The factory needs to monitor the energy consumption of the production lines and save the monitored values. A system with remote monitoring would be a good solution.

**Solution:** Installing Energy Analyzers at the factory that can be monitored and analyzed on a computer. In this factory 47 pcs Energy Analyzer and Monitoring Software were installed.

**Description:** Measured values from the 47 devices were saved to one central terminal and monitored there. The power/time graphs of the monitoring software showed that the PU casting machines – these machines consume high energy because of heating coils - were turned on 2-3 hours before it was supposed to be prepared (heated) for production. The responsible workers have been warned about this issue.

Furthermore, the energy management system showed, that there was energy consumption of 660kWh on Sunday, when no production was done. The responsible workers were warned about this issue.

**Conclusion:** an Energy Management System is a good tool to detect unnecessary energy consumption. Such knowledge can be used for substantial energy savings and for efficient use of energy.



**Problem:** The management would like to measure the energy cost of the casting ladles in the factory

**Solution:** Installing Energy Analyzers in the factory communicate with a PC at the factory, monitoring the energy consumption of the production machines and saving the monitored values. In this factory 127 pcs Energy Analyzer and Monitoring Software were installed.

**Description:** Measured values from the 127 devices were saved to one central terminal and monitored there. The installed analysers made it possible to double-check the energy consumption at the transformer output. The Energy Analyzers measured the performance of the machine lines.

The devices measured also the time and energy needed to melt the metal core at the 56 casting ladles. This information was saved and used to make the energy cost calculations. Based on the above, the

melting times were reviewed. It turned out that some of the casting ladles were losing their melting performance. Necessary replacements of the faulty ladles were done.

The same energy cost calculation and fault detection was done for the ladles at the second section. Where the molten metal is kept hot.

**Conclusion:** The measurement of the energy values in the production process makes it possible to come to a decent energy cost allocation. Another benefit is the possibility to find the machines with a bad performance



**Problem:** The company has the wish to measure the energy consumption of the facility and to save the measured values on a computer

**Solution:** Installing Energy Analyzers that can communicate with a PC at the facility, monitoring the energy consumption of the production machines and saving the monitored values.

Total system at the distillery: 66 pcs Energy Analyzer, Modems, 1 pc Signal Amplifier and Monitoring Software.

**Description:** The newly installed analyzers were connected to the 4 transformer stations and measured the energy consumption at the main line. After this the company could double-check the energy consumption by comparing the separate energy meter values with the total energy meters value.

Further measurements with the ENTES system:

- energy consumption values of the main busbars
- energy consumption values of the machine busbars at distribution
- harmonic values at the main sections of the facility
- generator performance and energy produced by the generators

**Conclusion:** By constantly monitoring the energy values, consumption could be calculated accurately and the facility made considerable energy savings by eliminating energy loss causes with operational improvements. With the project cost at €18.000 the payback period was 4 months.



**Problem:** The institution has the wish to measure the energy consumption values at regional switchboard buildings, to save those measured values on a computer and to monitor the reactive power control system from a remote computer

**Solution:** Installing Energy Analyzers that can communicate with a PC at the facility, monitoring the energy consumption of the production machines and saving the monitored values.

Total system: 11 pcs Energy Analyzer, 8 pcs Power Factor Controller, 1 pc Ethernet Modem and Monitoring Software.

**Description:** Reactive power control panels at microwave relay stations and switchboards couldn't be serviced each month by the technical support personnel because the available manpower was not enough for the total service sites.

By using our Power Factor Controllers that can communicate with a PC, not only an effective reactive power control was achieved but all

electrical parameters also started to be monitored and saved on a central terminal. As a result, operating costs decreased significantly!

Rapid response on problems was insured. If the network voltage at the headquarters dropped below 170 VAC, the system was set to give an alarm and thereby, rapid fault response was insured.

Since the monitored values of Energy Analyzers was stored on a central terminal, power outage times and their durations were identified easily. The customer complaints could now be evaluated easily by using the newly obtained power outage information.

**Conclusion:** By constantly monitoring the energy values, consumption amounts were calculated accurately and the facility made considerable energy savings by eliminating energy loss causes. Additionally, operating costs were significantly decreased by downsizing the technical support department. With the project cost at €10.000 the payback period was less than 2 months.



**Problem:** The internal lighting of the branches were being made with regular time relays and the external lightings for exteriors and advertising signs were being made with regular fotocell relays.

To prevent the deviation in controls with the time relays caused by the lengthening and shortening of the days, a service member was going to all of the branches and controlling the time relays, changing the settings where necessary.

The exterior and advertising sign lightings were being made with regular fotocell relays. These relays were turning the lights on when it gets temporarily dark during the day and turning the lights off when it gets temporarily bright during the darkness because of the ambient reflections. Additionally, the fotocell sensors were not working properly when they broke down because of the rain or dirt, which caused the lights to be permanently on or off. For these

reasons, energy was being used unefficiently and time and work was being wasted in all 500 branches of the bank.

**Diagnosis:** Using Astronomic Time Relay in order to resolve the problems.

**Solution:** 500 Astronomic Time Relay was used in every branch. The 2 contacts of the Astronomic Time Relay was programmed separately. The first output contact which controls the advertising signs closed when it gets dark and opened at 24:00. The second output contact which controls the exterior and emergency lighting closed when it gets dark in the evening and opened at the sunrise. This new application prevented the unnecessary advertising sign lighting after 24:00 when no one was around to see them. Additionally, thanks to the astronomical time calculation feature of the Astronomic Time Relay, the lighting occurs at the exact same time throughout the year, thereby allowing the lighting of the facilities to be more efficient. One advertising sign contains 10 fluorescent lamps. 1 fluorescent lamp consumes 0,04kW per hour, which amounts to 0,50 kWh in 12 hours. 10 fluorescent lamps consume 5 kWh in 12 hours, which amounts to 1825 kWh in a year. If 1kWh of energy costs €0,132 with taxes, It amounts to  $1825 \times 0,132 = €241$  per year. The working hours of these lamps were decreased from 12 hours a day to 6 hours a day by turning them off at 24:00.  $€241/2 = €120$  was saved in one branch, which amounted to  $€120 \times 500 = €60.000$  per year for all 500 branches.

**Conclusion:** Thanks to Astronomic Time Relay, the electricity bill of the bank was decreased €60.000 per year and the energy started to be used this much efficiently.

## **HEADQUARTER**

**Address:** Dudullu OSB; 1. Cadde; No: 23  
34776 Ümraniye - İSTANBUL / TURKEY

**Tel:** +90 216 313 01 10

**Fax:** +90 216 314 16 15

**Sales Fax:** +90 216 365 71 71

**E-mail:** [contact@entes.eu](mailto:contact@entes.eu)

**Web:** [www.entes.com.tr](http://www.entes.com.tr)

**Coordinates:** 40,995852 N, 29,178398 E

## **INTERNATIONAL BRANCH OFFICES**

**GERMANY** : [kontakt@enteselektronik.com](mailto:kontakt@enteselektronik.com)  
Tel: +49(0)7022 931992 -0

**INDIA** : [contact@entes.in](mailto:contact@entes.in)  
Tel: +91 129 2980004

**GREECE** : [contact@entes.eu](mailto:contact@entes.eu)  
Tel: +30 2310 706999  
+30 2310 707296