

PRESS KIT:

Improving Energy Efficiency of Motor
Driven Systems in Industry:
a Major Contribution against Climate
Change

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Information

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1 – Executive Summary

Motor systems account for more than 60% of the electricity consumed by EU industries. New products and techniques hold great promise for potentially high energy savings. Implementing High Efficiency Motor Systems could save Europe 202 Billion kWh of electricity per year. This would significantly reduce the need for new power plants and hence free up capital and resources.

Nevertheless, insufficient action has been taken to switch to these high efficiency motor systems. Effective regulation and government campaigns should be able to overcome the barriers and bring significant benefits to the European economy and environment.

The benefits can be summarized as:

- ✓ **A reduction of 79 million tons of CO₂ emissions** or approximately a quarter of the EU's Kyoto target and the equivalent of a forest the size of Finland.
- ✓ **A saving of €15-20 billion per year** in operating costs for European business.
- ✓ **A 30GW reduction in the need for new power plants** over the next twenty years. This is the equivalent of four times the cumulative installed wind capacity in the EU.
- ✓ **A saving of €6 billion per year** for Europe in reduced environmental costs.
- ✓ **A 6% reduction in Europe's energy imports.**

The best strategy to overcome the barriers seems to be a mix of information campaigns, financial incentives, and regulation.

1. Implementing Energy Efficient Motor Systems

The best kWh is the saved one. Indeed, saving energy is beneficial for many reasons. Less fuel needs to be burned and fewer power plants and transmission lines need to be built. This saves costs as well as the environment. Motor systems consume more than 60% of industrial electricity in the European Union. The SAVE studies supported by the European Commission [1, 2, 3, 4, 5] identified their energy savings potential as high when using the most modern techniques. Consequently, making it a focal point pays off.

2. Electricity Savings Potential

Total electricity consumption in the EU-15 ⁽¹⁾ in 2000 was 2574 TWh, of which 951 TWh was used in industry [6]. Of this, 575 TWh or 60% was consumed by motor systems. The SAVE studies [1, 2, 3, 18, 5] calculated an economical savings potential on those industrial motor systems ^{(2) (3)} to be 181 TWh, or 31%. ⁽⁴⁾ That means a savings potential of more than 7% of the overall electricity consumption in the EU.

Power: W (watt)

kW (kilowatt) = 1, 000 W

MW (megawatt) = 1, 000 kW.

GW (gigawatt) = 1 million kW.

Energy : kWh (kilowatt/h)

kWh = 1, 000 Wh (watt/hour)

MWh (megawatt/hour) = 1, 000 kWh.

GWh (gigawatt/hour) = 1 million kWh.

TWh (terawatt/hour) = 1 billion kWh

The Motor and the Application

Industrial facilities use very large numbers of motor driven systems. A motor system consists of the electric drive itself, sometimes a Variable Speed Drive (VSD), and the application - in most cases a compressed air, pumping or ventilation system. The table underneath specifies the energy savings potential across EU industry by using High Efficiency Motors (HEM), installing Variable Speed Drives (VSD), and by optimising the application part of the motor system.

Overview of Energy Savings Potential for Motor Systems in the EU and Related CO₂ Reduction Potential ^{(5) (6) (7) (8) (9)}

Savings potential in Billion kWh / year	EU-15	EU-25	France	Germany	Italy	UK
High efficiency motors	24	27	4	6	4	3
Variable speed drives	45	50	8	10	7	6
Application part of the motor systems (pumps, fans, compressors)	112	125	19	26	17	15
Total electricity savings potential	181	202	31	42	28	24
CO ₂ eq savings (million tonnes per year)	79	100	3	27	14	12
% of Kyoto target	24%	-	N/a	11%	42%	13%

3. Environmental Benefits

The Kyoto Target

One of the major current environmental concerns is the CO₂ or 'greenhouse gas' emissions created by the use of fossil fuels. After signing the Kyoto protocol in 1997, the EU committed itself to reducing its overall greenhouse gas emissions over the period 2008 to 2012 by 8% compared to 1990 levels, meaning a reduction of 336 million ton CO₂ equivalent [7]. ⁽⁸⁾ This can not be achieved without serious efforts in all areas of our economy, including electrical energy. There are four ways of reducing CO₂ emissions. One are renewable energy sources. Another could be an increase in the use of nuclear power. A third way is fuel switching and increased conversion efficiency. The final, and most important path, is energy saving.

Today, power generation in the EU results in an average CO₂ emission of 0,435 kg CO₂/MWh [5]. That means that the savings potential on industrial motor systems of 181 TWh (EU-15) corresponds to the saving of 79 million ton CO₂, or 24% of the Kyoto target. This is the annual amount of CO₂ that would be saved by 360 million solar roofs, or that 355.500 km² of European forest transforms into oxygen ⁽¹⁰⁾, i.e. an area larger than Finland.

Over the period 1990 to 2000, the EU has effectively reduced its greenhouse gas emissions by 3.5% [7]. Efficient motor systems could contribute to almost half of the remaining required reduction of 190 million ton.

Non-greenhouse gas emissions

The burning of fossil fuels for electricity generation produces various types of emissions. Along with CO₂, the main offenders are SO₂ and NO_x, which contribute to the acidification of the environment. These pollutants have long range transboundary effects, and so they have become a major concern for most European countries. The Geneva Convention on Long Range Transboundary Air Pollutants is the international body attempting to reduce these pollutants [8]. It is sponsored by the UN and the European Union participates in it.

Additionally, emissions also contain heavy metals (nickel, zinc, chrome, mercury, etc.) and dust. Though these can be seriously reduced by using the most recent flue gas cleaning techniques, there will always be a small amount that escapes into the environment. Burning fossil fuels also produces fly ashes and solid ashes.

The 202 billion kWh that can be saved by optimising industrial motor systems, means a reduction of 7% of the overall European electricity production, so it will lead to a significant reduction of all the above mentioned emissions.

The cost of burning fossil fuel

A research project of the European Commission [8], calculated the cost of environmental impacts of power generation in Europe. Those "fuel cycle externalities" are the costs imposed on society and the environment that are not included in the market price. For instance these include the effects of air pollution, influences on public health, occupational diseases and accidents.

There is a wide range in estimates for external costs, reflecting for example political preferences, or use of different technologies (see N11 for the figures of Italy, Germany, France and UK separately). Costs in euro cents/kWh are:

Fuel Cycle	External cost range	Middle value	% generation in EU-15	Contribution to external cost
Coal	5.0-8.0	7.0	27%	1.9
Oil	5.0-11.0	8.0	6%	0.5
Gas	1.0-3.0	2.0	18%	0.4
Nuclear	0.5	0.5	33%	0.2
Hydro	0.3	0.3	14%	-
Other	0.1	0.1	2%	-
Total				3.0

So the environmental cost of an average European kWh is calculated around 3 eurocents. This needs to be added to the typical market price of 5 eurocents/kWh. Current eco-taxation schemes in the EU do not, by far, internalise the external costs of electricity generation. ⁽¹²⁾

As a result, saving 202 billion kWh/year in electricity means also saving 6 billion euro of environmental costs for society.

Energy Efficiency and energy sector investments

Improving the industrial motor systems in Europe (EU-25) could result in an annual saving of 202 billion kWh of energy consumption. This would eliminate the need to add 30 GW of power generating capacity to the European electricity system. ⁽¹³⁾ This is equivalent to:

- 30 nuclear power units (1000 MW)
- 85 fossil fuel power units (350 MW)

The 202 billion kWh also equals about four times the energy production of all wind power units in Europe (EU-15) in 2000 [9].

EU needs to add 320 GW of new capacity in the next 30 years to cope with increasing electricity demand. This expansion will cost Europe between 200 and 300 billion euro, and a similar amount of investments in transmission and distribution systems. High efficiency motor systems reduce this expansion need by 10%, and save Europe around 50 billion euro. Or 5 billion euro capital cost a year (discount rate 10%).

4. Micro Economic Benefits

The payback periods for most investments in energy efficient motor systems are relatively low, ranging from 3 years to 3 months. The result of such investments is that motor systems enable energy reductions of between 5 and 50%. This is achieved by higher efficiency, better system design, improved operations and better maintenance.

The non-energy benefits of higher efficiency include improved reliability, reduced maintenance costs and increased production quality of the installations. Cost savings related to these benefits are, on average, in the same order of magnitude as the energy cost saving itself [11]. So companies or organisations that invest in energy saving on motor systems improve their competitiveness in a direct way.

5. Macro Economic Benefits

Increase competitiveness

Using energy as efficiently as possible is a crucial requirement to maintain the competitiveness of the European economy. Since motor systems account for more than half of all industrial electricity use, they are the most important area of attention for cutting energy costs. The US and Japan have already created extensive programmes to stimulate energy saving within motor systems. Falling behind them would have long-term adverse consequences for the European economy.

Raise Employment

Investment in high efficiency motor systems has a direct job creation effect in three domains:

- energy service companies, engineering consultants and contractors; many of these are SMEs
- manufacturing companies of motors, variable speed drives, compressors, fans and pumps
- jobs in energy or maintenance departments

But most investments create employment, and money can only be invested once. In the face of several choices, one should always ask if the same amount of money invested in another domain would not create more jobs. In other words, when judging an investment, one should look at the overall net creation of employment and its influence on the whole economy.

Investing to rationalise the energy use of motor systems pays itself back in a relatively short period, after which the energy savings cost results in pure profit. Therefore investing in highly efficient motor systems doesn't divert money from other essential areas. On the contrary, it even creates more money for new investments and consequently new jobs.

Reduce Dependency of Fossil Fuels

Saving 202 billion kWh a year (EU-25) would also improve Europe's security of supply and reduce dependency on fossil fuel imports. It represents an annual amount of 42.5 Mton oil equivalent. ⁽¹⁴⁾ So saving energy on motors would buy more time to develop alternatives for fossil fuels. With only this argument in mind, it would even be defensible to look beyond only the economic potential of motor systems, and to encourage the technology that can make them as energy efficient as possible. Or, in other words, in the long-run a large portion of the technical savings potential could benefit the economy as well.

As a Conclusion

Realising the savings potential of 202 billion kWh for the EU benefits European industry, society as a whole, and contributes to EU energy policy objectives. However, without action by the public sector, this potential will not be realised, despite strong economic drivers. The market will not deliver energy efficiency, because of technical and managerial barriers.

Solutions exist. They are well known, and have been demonstrated in the market place. The optimal mix of solutions includes regulation, financial incentives and information campaigns.

The table below demonstrates that the public and industry sector can justify the investment of €71 billion, under economic payback conditions, to realise this saving potential.

A role for Government and the public sector

We suggest that Government and the public sector define a four-year programme investing €400 million in the market. The programme needs to include:

- **A system for licensing and periodic inspection** of energy systems in industrial installations.

- **Financial support** for training and certification of energy auditors.
- **Fiscal incentives** for investment in energy saving projects.
- **Definition of a framework** for claiming emission credits for investment in electricity saving.
- **An information campaign** such as the Motor Challenge Programme.

While €400 million may seem a large amount, this needs to be appropriately subdivided among countries and programme actions. Part of it can be implemented through fiscal measures designed to be neutral on the public budget. Some cash portion however, needs to be provided to support the information, education, training, audits and verification that will actually accomplish the task of saving energy.

A role for industry

Industry's role is to embrace the Motor Challenge Programme and invest in staff training and high efficiency systems. This must be within the framework and with the support of Government and the public sector.

The investment requirement of 51 billion euro is actually very close to the €50 billion investment in power plants that efficient motor systems would make unnecessary.

It is therefore suggested that instead of building unneeded power plants, a better alternative is to invest in efficient manufacturing systems. In this way, environmental performance is increased and Europe's energy dependency reduced.

Amounts in billion euro for EU-25	Beneficiary	Benefit /year	Cost (billion)
<i>Energy saving cost</i>	Industry & society	10	
<i>-> of which reduced requirement for power plants</i>	Society	5	
<i>Non-energy saving benefits</i>	Industry	5-10	
<i>Reduced environmental costs</i>	Society + Industry	6	
<i>-> of which due to trading of emission reduction units</i>	Industry	2	
<i>Justified investment by industry (under 3 year payback)</i>	N/a		51
<i>Justified investment by Government and the public sector (under 5 year payback)</i>	N/a		20

Notes

1. EU-25 = the new, extended Union of 25 countries (including Poland, Czech Republic, Slovakia, Hungary, Slovenia, Estonia, Latvia, Lithuania, Malta and Cyprus)

EU-15 = the current European Union (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal, Spain, Sweden, UK)

2. The industrial energy consumption does not include transport, tertiary sector, district heating and residential consumption. The tertiary sector numbers include many motor systems due to the use of fans and pumps in HVAC systems. The total electricity consumption in the tertiary sector in the EU-25 was 652 TWh in 2000 [6].
3. The economic savings potential = the potential of measures with a reasonable payback ratio. The technical energy savings potential, without concern for economic efficiency, is even higher. The economic saving potential depends also on the price of the kWh, so it can vary through time.
4. It is interesting to look at the perspectives for the year 2020. Indeed, energy policies are made based on long-range projections. Building new power stations, as well as introducing successful energy savings programmes takes several years. The report 'European Energy and Transport – Trends to 2030' [6] estimates the industrial energy consumption in the EU-25 by 2020 to be 1,432 TWh. If the percentage of industrial motor systems' consumption, compared to the total consumption, remains the same, those systems are expected to use 859 TWh by 2020 if no action is taken. If by then the EU attains all the economically efficient energy savings on those motor systems, the result would be an annual savings of 270 TWh (31% of 859 TWh). In other words: the total electricity consumption of Spain in 2000 [6].

5.

System	Savings potential on the application side(TWh)	Present electricity use in the industry (TWh)
Compressors	26	80
Fans	34	100
Pumps	52	189
Other systems	unknown	206
Total	+ 112	575

Source: SAVE studies, 2000 [1-5]

6. EU-25 figures estimated based on a 12% increase in industrial electricity use with 10 new member states [6].
7. The national savings potentials for High Efficiency Motors and Variable Speed Drives for Germany, France, Italy and the UK are estimated by subdividing the EU-15 figures with the same factors as for the application part of the motor systems.

8. CO₂ equivalent = a metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential (GWP). Carbon dioxide equivalents are commonly expressed as 'million metric tonnes of carbon dioxide equivalents (MMTCDE)'. The carbon dioxide equivalent for a gas is derived by multiplying the tonnes of the gas by the associated GWP. $MMTCDE = (\text{million metric tonnes of a gas}) * (\text{GWP of the gas})$. For example, the GWP for methane is 21 and for nitrous oxide 310. This means that emissions of 1million metric tonnes of methane and nitrous oxide respectively is equivalent to emissions of 21 and 310 million metric tonnes of carbon dioxide. [14]
9. The average CO₂eq emission factor for EU-15 is 0.435 kg/kWh. For the ten accession countries it is 1 kg/kWh. For Germany it is 0.638 kg/kWh, UK 0.510 kg/kWh, Italy 0.495 kg/kWh and France 0.083 kg/kWh.
10. Report [15] states absorption figures for an average European forest between 0.49 tCarbon/ha-yr and 1.4 tCarbon/ha-yr, with a preference for 0.6 tCarbon/ha-yr (p 30). One ton of Carbon equates to 3.67 ton of CO₂ and 100 hectare is 1 square kilometre. A small calculation results in the production of CO₂ per square kilometre per year: $3.67 * 0.6 * 100 = 222 \text{ ton CO}_2/\text{km}^2$. So 79 million ton of CO₂ a year equates to the absorption of 355, 500 km² average European forest (surface of Finland = 338, 000 km²).

Regarding solar PV, we assume 'typical' figures for Europe: solar irradiation 1,000 W / square meter; availability of solar energy = 1,000 hours / year. Conversion efficiency to electricity = 10%. Hence, electricity generated = 100 kWh / year and per square meter. Assuming 5 square meter per roof requires 362 million solar roofs to generate 181 TWh.

11. External costs of electricity generation for various fuel cycles [16] (all figures in eurocent/kWh)

Eurocent / kWh	Italy	Germany	France	UK
Oil	5.6	5.1-7.8	8.4-10.9	-
Gas	2.7	1.2-2.3	1.9-3.1	1.1-2.2
Hydro	0.3	-	-	-
Coal	-	3.0-5.5	6.9-9.9	4.2-6.7
Biomass	-	2.8-2.9	<0.1	<0.1
Wind	-	<0.1	-	0.1
Nuclear	-	0.4-0.5	-	-
PV	-	<0.1	-	-

12. Electricity prices to industry [17] (all figures in eurocent/kWh). In this paper, an EU average price of 5 c / kWh is used.

Country	2000	2001	2002
France	3.9	3.9	3.9
of which tax	0	0	0
Germany	5.3	4.4	4.9
of which tax	0	0	
Italy	9.7		
of which tax	1.5		
UK	3.7	3.5	3.4
of which tax	0	0.2	0.25

13. The 'power generating capacity' is the maximum capacity of power stations, calculated in Watt. To know their annual production in Wh, this figure should be multiplied by the amount of hours this capacity is running a year. According to [18], the average European power station is running 6,700 hours a year. So producing 1 TWh of electricity a year requires a 150 MW capacity. In other words, 202 billion kWh of energy savings makes 30,000 MW (30 GW) capacity unnecessary.
14. 202 billion kWh energy savings converts to 17 Mtoe. Assuming an average conversion efficiency of European power plants of 40%, this converts to a primary energy equivalent of 42.5 Mtoe, or 3% of Europe's primary energy consumption [19]. Since Europe imports more than half of its primary energy, this reduces imports by 6%.

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4 – Case Studies

Example 1: the BBC's archives

All of the programmes broadcast by the BBC are recorded and archived at the Brentford site in London. To avoid the deterioration of tapes over time, these archives are kept at a constant cool temperature using a water cooling and air conditioning system that operates around the clock.

- *Action taken:* a study carried out to evaluate the financial and energy savings potential of replacing one of the defective motors with a highly efficient, optimum size motor, as well as that of the pump.
- *Results:* the largest energy saving was achieved by replacing a 4.0 kW motor working at 27% efficiency with a 2.2 kW high efficiency motor. The motor's energy efficiency rose from 55% to 84%, achieving an energy saving of 35%.
Replacing the water cooler pump also led to an energy saving of roughly 15%.
- *Profitability:* the investment made for the new motor was roughly € 463 (£315), but it generated a gain of € 490 per year.
- *Payback period:* less than one year.

(Source: Copper Development Association UK)

Example 2: Timers

A workshop used a number of process air suction fans to reduce the amount of airborne particulate matter and chemicals, for the purpose of worker safety. These were equipped with manual on/off switches. However, worker discipline was poor in turning off the units after use, or at the end of the workday.

- *Action taken:* The 20 units were equipped with timers that automatically shut them off after a pre-set delay at the end of the workday.
- *Results:* Electricity consumption was reduced by 280 MWh/yr, which generated savings of €12,800 per year. In addition, district-heating consumption was reduced by 350 MWh/yr, which gave an additional savings of approx. € 10,500 per year.
- *Profitability:* the pay-off time was approximately 4 years

(Reference: Motor Challenge)

Example 3: Unnecessary Electric Motors

LKAB, a mining company, uses powerful electric motors to drive conveyor belts in its Kiruna dressing plant. Careful measurements of energy requirements during operations were conducted in collaboration with an energy utility. The results showed that the energy consumption was 370 kW, while the installed capacity was 900 kW (two motors at 450 kW each).

- *Action taken:* One of the two motors, along with its transmission, could be removed. This same measure could be carried out on a total of 8 conveyor belts with equally large installed capacity.
- *Results :* Reduced energy costs by € 105,000 per year, reduced maintenance costs following the removal of 8 motors and 8 transmissions, lower reactive power consumption, etc.
- *Profitability:* The pay-off time was approximately 3 years (including the costs for measuring power consumption).

(Source: Motor Challenge)

Example 4: Energy Savings by Reducing the Size of a Pump Impeller

A manufacturer uses a centrifugal pump to move condensate from a process and returned it to a boiler. Operational analysis showed that the pressure generated by the pump was considerably higher than was necessary. The high degree of throttling that was needed had led to instability in the system resulting in mal-operation and high maintenance costs.

- *Action taken:* After discussion with the pump manufacturer, the company decided to trim the diameter of the pump impeller from 320 mm to 280 mm, which allowed the pump to operate without throttling. Reducing the power required by the pump also allowed a smaller motor to be fitted, which produced further energy savings.
- *Results:* The measures taken eliminated the instability (cavitations) and resulted in significant energy savings. The power consumption of the pump after impeller trimming fell by nearly 30%. Analysis showed that the energy saved by trimming the impeller was 197,000 kWh/year worth €12,714 and in addition avoided maintenance costs that had previously cost € 4,285 /year when the pump was cavitating. Reduced power required by a smaller impeller allowed the 110 kWh motor to be replaced by a 75 kWh motor. This smaller motor, operating closer to its peak efficiency, produced additional savings of € 1,071. The work involved in uncoupling, stripping and rebuilding the pump was modest and machining the outside diameter of the small impeller was a simple job. The cost to trim the impeller was € 371. Replacing the 110 kW motor with a new motor of 75 kW required an additional investment of € 3,600. Reducing cavitation of the throttling valve also reduced excessive vibration and unacceptable noise.
- *Profitability:* The overall combined payback on both the impeller trim and motor size reduction is therefore just 11.4 weeks calculated from annual savings of € 18,070 on a total investment of € 3,971.

(Reference: Motor Challenge)

5 – Copper’s Contribution to Energy Efficiency

Potential energy savings to achieve the Kyoto objectives

In 1997, the Kyoto protocol established for industrialised countries, different objectives for reducing global greenhouse gas emissions by 2010. An overall objective of a 5% reduction worldwide, including -8% for the European Union, -7% for the USA, -6% for Japan and Canada, and 0% for Russia and Ukraine. These objectives relate to all six types of greenhouse gas, the three most important of which are carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O), and will be calculated on average over the period 2008 - 2012, and compared to 1990.

One of the most effective ways to achieve the goals established in Kyoto is to improve energy efficiency. This allows operating expenses to be reduced for the user, while decreasing the greenhouse gas emissions caused by the use of fossil fuels. For example, energy efficiency could contribute 275,000,000 tonnes of CO₂ per year to the reduction of greenhouse gas emissions, for a cost of less than 20 euro per tonne. As a result, improving energy efficiency yield alone could **achieve 120% of the Kyoto goals**.

Potential savings from improving energy efficiency

Activity sectors	Potential savings by 2020	In all, 30% of the energy consumed in final use can be saved.
Industry	7-50%	
Residential	10-45%	
Tertiary	15-50%	
Transport	Up to 30%	

Source: World Energy Assessment, UNDP

How can we make a significant improvement to energy efficiency?

There are many ways to improve the energy efficiency of motor-driven systems, which represent 30% of all electricity used in the European Union. The first step is to achieve more rational use of energy. Another highly promising solution consists of using more efficient equipment: transformers, electric motors, modern cables, etc. Making such investments, or simply improving processes and maintenance, would save 30-50% of the electricity consumed by pumps, compressors or fans.

Copper’s contribution to the energy efficiency of motor-driven systems

Copper is the best electricity conductor among all non-precious metals. Optimal use of copper would reduce energy losses and therefore improve energy efficiency. We know that increasing copper contents in transformers, cables and motors can reduce energy losses by as much as 70% (including the optimal use of other metals such as magnetic steel).

A study carried out for the European Commission and published in December 1999 evaluates the potential savings obtained via the use of low voltage transformers in the public network: 22 GWh per year for Europe,



which is equivalent to not producing 9 million tonnes of CO₂ per year. The potential energy savings achieved by using high efficiency motors is 27 GWh per year.

Through the use of more efficient electric equipment, copper can help to reduce Europe's CO₂ emissions by roughly 20,000,000 tonnes a year, (i.e. 7.5% of Europe's Kyoto objective).

5 – COP 9: new phase of international negotiations on climate change

From 1 to 12 December 2003, the city of Milan will host the ninth session of the Conference of the Parties of the United Nations Convention on Climate Change, to be chaired by Miklós Persány, the Hungarian Minister for the Environment and Water. Participants will include the representatives of the various United Nations agencies, multilateral financial institutions, international environmental associations, and the world's largest energy firms, from 180 different countries. More than 4,000 participants are expected in Milan. One of the highlights of this conference will take place on 10-12 December, when the ministers of nearly 70 countries will participate in a series of roundtables.

COP 9: the result of a process

In 1979, the city of Geneva hosted the world's first conference on climate. This conference, which, more than anything else, was focused on science, ended with a solemn call for "all of the world's governments to deal with and prevent man-made climate change that could harm the well-being of humanity". In 1988, the Intergovernmental Group of Experts on Climate Change was set up. It submitted its first report in 1990: the report confirmed the scientific proof of climate change. Finally, in 1992, 182 countries adopted the "United Nations Framework Agreement on Climate Change" at the Rio de Janeiro Conference on the Environment and Development (otherwise known as the "Earth Summit"). The agreements signed in Rio were a starting point for many actions in most of the signatory countries. Since then, the signatory countries (also called "Parties") have been meeting regularly to take decisions on the real-life implementation of this Agreement's goals at "Conferences of the Parties" or COPs.

It was at COP3 that the famous Kyoto protocol was adopted. The protocol was an additional protocol to the Rio agreement on climate change. It was signed on 11 December 1997 and addressed the Rio goals more specifically. The goal of the agreement ratified in Kyoto was notably a global reduction of 5% of greenhouse gas emissions from the 1990 level: 8% for the European Union (i.e. 266,000,000 tonnes of CO₂ between 2008 and 2012). The European Commission launched the European Climate Change Programme in March 2000 to comply with Europe's Kyoto commitments.

The challenges of the Milan conference

The 9th Conference of the Parties is expected to take significant strategic decisions, notably on relations between developing countries and industrialised countries. It will also be an opportunity to take stock of progress made against the various countries' commitments, to assess climate changes and make forecasts for the future, to attempt to convince Russia to ratify the protocol, to convince the United States to reconsider its decision, etc.

In Milan, local and regional authorities will be particularly in the spotlight. The conference will notably analyse the role of local and regional governments in implementing international policies to combat climate change. The goal of the first workshop, the "**Role and strategies of regional government against climate change**", will be to come up with initiatives for achieving greater recognition of regional governments' contribution to the policy to combat climate change, as well as the potential for local and regional actions in this area.

The second workshop, **“Regional actions and sustainable development strategies against climate change”**, has been organised as an opportunity to present the best policies and practices against climate change at the local and regional level in 9 areas: renewable energy sources, co-efficiency, transport, agriculture, land use, sustainable public expenditure, research and innovation, and education and communication. Local and regional governments attending the workshop will be able to present their strategies for sustainable development, and share their know-how and experiences in combating climate change.

6 –Motor Challenge Programme

The Motor Challenge Programme is a European voluntary programme promoted by the European Commission to aid companies in improving the energy efficiency of their electric Motor Driven Systems. The Challenge focuses on Electric Drives, Compressed Air, Fan and Pump systems, for which it has been demonstrated that there exists a large technical and economic potential for energy savings.

Any organisations wishing to contribute to the Motor Challenge Programme objectives can participate.

Companies that use Motor Driven Systems can request "Partner" status.

Organisations, (in particular companies that supply Motor Driven Systems and components) wishing to aid the Commission and Member States in carrying out the Motor Challenge Programme may become "Endorsers".

The Motor Challenge Programme is an initiative of the European Commission Directorate General Energy and Transport and it is managed by the European Commission Joint Research Centre.

URL: <http://energyefficiency.jrc.ec.eu.int/Motorchallenge/index.htm>

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6 – European Copper Institute

The European Copper Institute is a joint venture between the world's mining companies (represented by the International Copper Association, Ltd) and the leading European fabricators. Its mission is to promote copper's benefits to modern society across Europe, through its Brussels office and a network of 11 Copper Development Associations.

ECI is active in 4 key areas in Europe:

- Electric & Electronics
- Building Construction & Automotive
- Environment
- Health

The ECI Electric & Electronics Programme

- 1) Energy efficiency, with the target of saving 50 TWh/yr, equivalent to 20 million tonnes of CO₂ each year.
- 2) Power quality: an ECI & Leonardo adult education programme involving leading academia, industry and vocational institutes, aimed at reducing electrical disturbances, with the target of saving 10 billion euro/year for European business.
- 3) Safety & functionality: a steady programme of housing renovation to improve domestic electrical safety standards in Europe.

The ECI Building Construction & Automotive Programme

Renewable energies: a programme to communicate copper's superior electrical conductivity as a key player in harnessing solar and wind energy.

Automotive sector: a programme to communicate copper's role in improving the safety and convenience of modern cars and in making possible the future electric car.

Piping systems: a promotion and research programme to communicate copper's durability and natural antibacterial properties in providing safety and hygiene in drinking water, heating and gas distribution systems.

The ECI Environmental Programme

ECI's environmental programme is primarily directed at understanding any potential impacts in soil and water. Results are used to contribute to regulatory debates both at the EU and at national level. All research is carried out with the support of prominent scientists.

The ECI Health Programme

ECI's health programme is primarily directed at understanding any potential effects on humans. Results are used to improve human health by contributing to regulatory initiatives both at EU and at world level.

For more information:

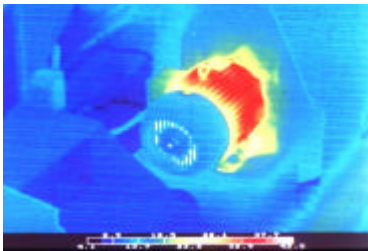
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Annex: illustrations



"Copper winding wire"
(Photo Nexans)



Infrared picture of running LV induction motor
(Photo Future Energy Solutions)



Energy-saving LV motor
© Siemens



Copper foil winding for distribution transformer
Photo Future Energy Solutions