CORPORATE SOCIAL RESPONSIBILITY REPORT OF THE KONČAR – ELECTRICAL ENGINEERING INSTITUTE







I GENERAL STANDARD DISCLOSURES



STRATEGY AND ANALYSIS

LETTER FROM THE MANAGEMENT

The previous year was very successful. Operating income was considerably higher than in 2014. Sales amounted 11.14 million euros, what is 24.8% more than in previous year and 10.6% more than planned. The reasons are, first of all, a considerable increase of export and deliveries of equipment and services for trains. Income from export is a result of global recognisability of some of our solutions and services. The most exported solution was the transformer and bushing monitoring system, the most exported service laboratory tests of HV equipment. Good results were also achieved with machine monitoring systems and services related to the development of rotating machines. There was also a considerable increase of other kinds of income, first of all from co-financed research projects and sales of intangible assets, so that the total operating income in 2015 was 12 million euros.

In 2015 the Institute was successfully reaccredited by the Ministry of Science, Education and Sports as a private scientific organization in the area of engineering. The accreditations of two existing laboratories were extended, and two new laboratories were accredited. That means that now the Institute has seven laboratories accredited under ISO/IEC 17025. Further, the Certification Service – SCERT was accredited under ISO/IEC 17065:2013 Conformity assessment – Requirements for bodies certifying products, processes and services.

Social responsibility towards the community, customers, employees and other stakeholders was not neglected, and sustainable operations were integrated in the long-term strategy and everyday operations. Anti-corruption policy was developed and adopted in the sustainable management model, enabling employees and external stakeholders clear understanding of our rules of ethical behaviour and zero tolerance for bribery and corruption.

Our employees enjoy economic stability and stimulating work environment. Scientific and professional improvement is encouraged as a precondition for innovative technical solutions competitive on global market. Contribution to the community was continued by the investment of 1.71 million euros in long-term assets (0.84 million euros in the equipment and 0.87 million euros in buildings). In accordance with the strategic plan, the Institute will make considerable additional investments in reconstruction, extension, and building of laboratories, because only in that way it can increase its competences and scientific, research and testing capabilities. All the Institute's facilities have energy certificates, which is a proof of our commitment to improvement of energy efficiency, i.e. to become even more environmentally conscious through control of our direct and indirect impacts.

For the first time the Institute has the opportunity to participate on a Horizon 2020 in project SafeLog, i.e. in the research, development and prototyping a safety vest for work in robotized warehouse systems.

Modern way of doing business with stable financial and sales results, education of employees, R&D of proprietary solutions for power industry and transport, research of transformers, rotating machines, switchgear and controlgear, power electronics and control systems for other KONČAR companies – all this guarantees long-term success of the Institute.

A comprehensive approach and integration of the principle of sustainability in doing business in the Institute are reflected in continuous improvement of CS reporting process. Adoption of the 4th generation of GRI guidelines in 2015 has additionally improved the quality of reporting and confirmed our permanent concern for stakeholders' needs.

Pushing the limits in creating advanced and innovative technologies, continual investments in employees, reduction of environmental impacts and creation of positive social environment are the core of our sustainable business operations in the forthcoming period.

Zagreb, June 2016

Managing Board Siniša Marijan, PhD President

Uniper

Rajko Gardijan Member

06 KONČAR - ELECTRICAL ENGINEERING INSTITUTE Inc.

EXTERNAL ASSURANCE

REVIEW OF THE INSTITUTE'S CSR REPORT 2015

The Commission of the Croatian Business Council for Sustainable Development (HR BCSD) welcomes the 9th CSR Report of KONČAR – Electrical Engineering Institute Inc., and confirms that the Report meets the requirements of Core option in accordance with u Sustainability Reporting Guidelines of Global Reporting Initiative (GRI).

For a number of years KONČAR – Electrical Engineering Institute Inc. has been systematically reporting about its corporate social responsibility and non-financial aspects in accordance with GRI guidelines. The level of reporting is continuously rising, and so is the number of aspects and indicators of non-financial corporate performance. Besides widening scope of issues, the quality of information made public is systematically improving.

Among other rather important information presented in the Report we would like to point to the investments and purchase of equipment that severalfold exceed the investments in previous years, and considerably improve the competitiveness of the Institute. At the same time considerable funds were invested in research and development as the Institute's core business, which is actually investment in the future of the Institute. More than average funds are invested in the training of employees, which is on one the hand natural because of high qualifications required to perform the business in the Institute, yet on the other hand it should be pointed out as a contribution of a privately-owned company to the development of knowledge economy which Croatia is striving to achieve.

Although environmental impact of the Institute is not high, in this case we can equate environmental protection with the sub-category Product Responsibility. It is evident from the efforts made to develop renewable energy technologies, and reduce power consumption and environmental impacts of the equipment that the Institute understands this connection.

Besides the responsibility for product environmental impacts it must be pointed also to the investments in energy efficiency of buildings, which has resulted in reduced energy consumption and greenhouse gas emissions.

The Commission would like to thank the Institute for taking into account very seriously the recommendations given in the previous year, so that a great progress has been made in representation of the processes that preceded defining material aspects, communication with stakeholders, participation of employees in decision-making, equal opportunities for men and women, and collaboration with academic community. Although the progress is visible, it remains to improve the visibility of the integration of sustainable development in business strategy, because the impacts of sustainable development are not clearly enough represented in the management process. This is especially evident from the long-term objectives of the Institute, which are not related to the strategy of sustainable development, but based solely on business objectives. Connecting business objectives with the strategy of sustainable development should be in the focus of Institute's endeavours.

We congratulate KONČAR – Electrical Engineering Institute Inc. for one more valuable contribution to the management of nonfinancial impacts in Croatia, as well as for the development of capacities for sustainable development application. Although under EU directive the Institute is not obliged to make CSR reports, we appreciate the persistence and thoroughness with which it joins this initiative on a voluntary basis. We believe that this shows that the Institute recognizes the benefits that this approach to business has on the business success on the long term.

Commission of the Croatian BCSD Board



ORGANISATIONAL PROFILE

KONČAR – Electrical Engineering Institute Inc. is a part of KONČAR Group and the centre of applied research, testing, and support of development projects of the Group. Besides supporting the Group in power industry and transport, the Institute offers its proprietary solutions and services on the global market. The Institute has the status of an autonomous company wholly-owned by KONČAR – Electrical Industry Inc., which leaves the Institute its entire profit for further development. The Institute has been operating on free market principles for 25 years, and it has been developing its competences for 55 years.

Diagnostic tests of the equipment installed in power plants and substations, supervision of their construction, and conformity tests are also important activities that ensure our employees a wide range of competences and direct contact with customers.

Being a scientific-research legal entity, the Institute is registered in the Register of the Scientific Organisations of the Ministry of Science, Education and Sports. At the same time, being a company specialized in applied research in electrical and mechanical engineering, it has two important roles within the KONČAR Group:

- support to further development of solutions manufactured and sold by KONČAR companies based on contracts and market principles, providing expertise and R&D testing in numerous laboratories of the Institute,
- applied research at its own expense for the development of new solutions compatible to the production programme of the KONČAR Group, for which the Institute bears risks not only regarding the development but also regarding their placing on the market.

KONČAR is celebrating 95 years of existence, and the Institute was founded in 1961 as support to the development of new products. Today the Institute is on the market, and develops its success exclusively on quality innovative solutions that ensure its stable economic growth.

The organisation of the Institute enables an efficient adaptation to the market rules and investment of its own funds in new technologies and applied research for development of new solutions. Such approach results in employees' and customers' confidence and competitive solutions whose characteristics and qualities meet all the customer criteria.

Departments in the Institute as centres of key competences for individual groups of products are profit centres, and the only measure of their business efficiency is



value added, which is also the basis for determination of workers' income in departments. The success of indi¬vidual or team work is rewarded by personal stimulation or one-off payment, depending on contribution to overall business of the Institute or creation of conditions for future successful business.

Transformer Department performs research on dielectric, electromagnetic and thermal phenomena. High-Voltage Laboratory provides services of developmental dielectric and thermal testing, and various routine, type and special tests. For end users of the equipment for power industry on-line transformer monitoring systems and off-line diagnostic tests are provided.

Rotating Machines Department provides research, development, diagnostics and monitoring for electric rotating machinery.

Switchgear and Controlgear Department works on low-, medium- and high-voltage switchgear and controlgear, metal-enclosed busbars and switchgear and controlgear for nonstandard conditions.

Materials and Technologies Department works on metal processing technologies, tests of mechanical properties of materials, vacuum and cryo technologies, physical and chemical tests of electrotechnical materials, diagnostic tests of transformer oil and paper, and applications of advanced materials and nanotechnology solutions.

Control, Renewables and Power Electronics Department works on embedded computer systems in power industry and transport, renewable power sources and power converters.

EMC, Safety and Calibration Department works on testing and calibration of measuring devices, testing electrical, electronic and gas household appliances, EMC testing, power quality and energy efficiency related measurements, and certification of machines, devices, work equipment and work environment.

Business activities of the Institute are carried out by departments, with support of common administrative units. Common services (units) provide support and consoli¬date the work of the departments, so that their rewards depend on common success of all the departments.

Within the Institute there is the independent, accredited Certification Service – SCERT, whose work is supervised by the representatives of government bodies and consumer associations. SCERT is a body accredited for conformity assess¬ment of electrotechnical products. In 2015 SCERT was accredited under EN ISO/IEC 17065:2013 Conformity assessment – Requirements for bodies certifying products, processes and services.

KEY BUSINESS ACTIVITIES

The Institute has 3 major business activities. As to income from sales, proprietary solutions were leading in 2015 with 46%.



MISSION OF THE INSTITUTE

Through application of knowledge and state-of-the-art technologies we develop solutions for efficient energy conversion and power transmission, on the principles of Corporate Social Responsibility.

VISION OF INSTITUTE'S BUSINESS ACTIVITIES

To become a globally recognizable partner in the fields of power engineering and rail vehicles, and in that way to contribute to the success of KONČAR Group.

LONG-TERM OBJECTIVES OF THE INSTITUTE

- To maintain and expand competences for applied research and testing as support to the development of products, technologies and services for transformers, rotating machines, HV switchgear and controlgear, power converters, renewable sources and components of rail vehicles (smart energy and clean transport)
- To maintain and expand the status EU Notified Body (NB) for testing and certification of electric power products and equipment
- To become and/or remain a recognizable provider of monitoring systems for primary power equipment with proprietary HW/SW
- To become a recognizable provider of embedded control systems for process control in electrical power sector and rail vehicles.

STRATEGY OF SUSTAINABLE DEVELOPMENT OF THE INSTITUTE

- Permanent increase of productivity with intense investments in the development of new products and services, life-long learning of employees, and construction of new laboratories or upgrading the existing ones
- · Business based on sustainable development, fostering and promoting partnership relations with all stakeholders
- Fostering collaboration with academic communities and public Institutes through joint scientific-research projects
- To be a scientific organization with status of an independent company within the KONČAR Group, whose owner leaves its entire profit for its further development
- To be on market principles a key support to the development of products other KONČAR companies

STRUCTURE OF EMPLOYEES AT THE END OF 2015

- 168 employees
- 82 with faculty degrees and post-secondary school
- 10 with PhD and 5 with MSc degrees
- 42 female executives (Managing Board and heads of departments)
- 48% employees with 10 or less years of service
- Average age: 40 years
- Average years of service: 16 years



Each employee can exercise their freedom of association and the right to collective bargaining. Rights defined in the Collective Agreement apply to all the employees, and 93% of them have permanent employment contracts.

THROUGH QUALITY AND INNOVATIVE SOLUTIONS TO RECOGNISABILITY ON THE MARKET

Corporate social responsibility successfully connects business values, purpose and strategy with stakeholders' social and economic needs and at the same time integrates responsible and ethical business policy in the whole company

Key fields of Institute's activities are electric power engineering and transport, and advanced technologies based on smart sensors, ICT, advanced materials and renewable sources are being introduced. It is expected that our own development of specific sensors together with necessary electronic circuits will considerably improve the innovative solutions, quality and competitiveness of all monitoring systems as products with the biggest market potential.

In 2015 direct import was 2.30 million euros or 99.9% more than in previous year. Considerable increase of income from abroad is a result of global recognisability of some of our solutions and services, intensive marketing and promotion, and earlier realisation of some projects planned for 2016.

Long-lasting difficulties on the Croatian market have forced the Institute to base its further operations, apart from R&D for KONČAR Group and the activities on the domestic market, on export of its products and services. Therefore the Institute will continue to pay special attention to export of its products and services (monitoring systems, laboratory tests, autonomous power supply from renewable sources and embedded control systems for specific purposes).

To improve recognisability of its products and increase sales abroad, the Institute continually changes and expands its market presence strategy. Besides joint appearance on various fairs together with other companies of the KONČAR Group and participation at conferences and exhibitions, the Institute will intensify the organisation of visits and presentations to potential customers, business promotion by web-based communication, B2B marketing, expansion of network of distributors and agents on the key and some new promising markets.

Major companies for the power systems area, telecommunications and transport are the Institute's long-time partners on the Croatian market. The most important customers on the world market are the global companies from the Republic of Korea, Qatar, India, Oman, Germany, Brazil and Serbia.

The most important products and services that the Institute exports are transformer and bushing monitoring systems and laboratory testing of HV equipment. Machine monitoring systems and development of rotating machines have also good initial results. In the last two years the Institute has worked intensively to increase also export of R&D-related services.



INSTITUTE'S SUPPLY CHAIN

Code of Business Ethics is the basis on which the Institute develops its relations with suppliers, business partners and all the stakeholders. Suppliers are chosen on the basis of their competencies and professional qualities in an objective and transparent way.

Because of very stringent requirements on products and services, in most cases contractual arrangements based on quality, competitive prices, respect and integrity are made with suppliers. Through dialogue, mutual transparency and equality, values are generated both for the Institute and all the partners in the supply chain.

Business activities of the Institute are based on a wide scope of suppliers and business partners mostly from electrical industry, but also from numerous other fields. Most important partners in R&D field are companies from KONČAR Group. Most important markets for diagnostics, testing and certification are the Croatian and Swedish ones. Products and systems are mostly exported to Qatar, the Republic of Korea, Qatar, India, Oman, Germany, Brazil and Serbia.

MEMBERSHIP IN DOMESTIC AND INTERNATIONAL ORGANISATIONS AND ASSOCIATIONS

- Croatian Academy of Engineering (HATZ)
- Croatian Laboratories (CROLAB)
- Electrotechnical Society Zagreb (EDZ)
- European Committee for Electrotechnical Standardization
 (CENELEC)
- Croatian Chamber of Economy (HGK)
- Croatian Automotive Industry Competitiveness Cluster
- Croatian ICT Industry Competitiveness Cluster
- Croatian Electrical and Mechanical Machinery Industry and Technology Competitiveness Cluster
- Croatian Maritime Industry Competitiveness Cluster
- Croatian Defence Industry Competitiveness Cluster
- Croatian Chamber of Electrical Engineers (HKIE)
- Croatian Chamber of Mechanical Engineers (HKIS)

- Croatian Exporters Association (HIZ)
- Croatian National Committee of the International Council on Large Electric Systems (HRO CIGRÉ)
- Croatian Business Council for Sustainable
 Development (HR PSOR)
- Croatian Standards Institute (HZN)
- International Conference on Electricity Distribution (CIRED)
- International Council on Large Electric Systems (CIGRÉ)

The Institute is a member of Croatian Business Council for Sustainable Development since 2010.



IDENTIFIED MATERIAL ASPECTS AND BOUNDARIES

GRI G4 guidelines are based on principles of sustainability, which ensure transparency and continual improvement of reporting process. Companies should analyse their economic, social and environmental impacts, and establish priorities relevant for sustainability. Reports of the Institute are based on information obtained from many sources, including feedback from key stakeholders, general information about markets, and contacts with the management, employees and appropriate services.

Various approaches are used for efficient understanding of the needs and priorities of our external and internal stakeholders (polls, interviews, official and unofficial meetings etc.). To ensure a reasonable and balanced presentation of topics that reflect both negative and positive impacts, each topic is considered separately in accordance with its importance in the reporting period. The final defined material aspects are verified by the Managing Board to ensure their compliance with business values and strategy of the Institute.

After completion of analyses, the following topics were found especially important for the Institute and its stakeholders, and identified as material with appropriate qualitative and quantitative indicators.

MATERIAL ASPECTS

Economic category	Environmental category	Social category: Labour practices	Social category: Society	Social category: Product responsibility
Economic performance	Energy	Employment Benefits for	Anti-corruption	Product and service labelling
Indirect economic	Water	employees	Local communities:	
impacts			Collaboration with	Customer health and safety
Significant indirect economic impacts:	Emissions	Training and education	academic community	
Applied research	Effluents and Waste	Diversity and equal opportunities		

STAKEHOLDER ENGAGEMENT

Inclusion of stakeholders and taking into account their needs are indispensable preconditions for strategy setting, identification of material aspects, and elaboration and content of each CSR report. Determination of the content and key indicators of Institute's performance enables continual monitoring of results related to economic, environmental and social impacts.

In the last three years we requested the opinion of the Commission of the Croatian Business Council for Sustainable Development as impartial third party about the report for the current year. Taking into account suggestions given by the Commission we improve the processes of Institute's performance management and monitoring, concentrating on issues of importance both for our business and for wider community.

DIALOGUE WITH STAKEHOLDERS

Collaboration with stakeholders enables joint solving of problems to improve the Institute's capability to fulfil its obligations to stakeholders. The process of identification of material aspects is a part of routine activities, and is implemented through various mechanisms shown in the map of Institute's stakeholders.

Stakeholders	Mechanisms of inclusion	Frequency
CUSTOMERS	Survey of customer satisfaction Meetings, workshops, consultations Professional training Solving and analysis of complaints, request and suggestions Fairs, conferences, gathering Official website E-mail Visits to customers CSR report	Annually When necessary When necessary Annually Continuous Continuous Annually Annually
EMPLOYEES	Survey of employee satisfaction	Annually Continuous Continuous Continuous Annually
SHAREHOLDERS AND INVESTORS	General meeting Letters, e-mail CSR report	Annually When necessary Annually
SUPPLIERS AND PARTNERS	Participation at conferences Mutual audits Official website CSR report	When necessary Annually Continuous Annually
BUSINESS AND PROFESSIONAL ASSOCIATIONS	Membership Working groups, working bodies Participation at conferences CSR report	Continuous Continuous When necessary Annually
ACADEMIC COMMUNITY	Scientific and professional papers Seminars and workshops Participation at conferences and gatherings Joint activities CSR report	Continuous When necessary Continuous Continuous Annually
PUBLIC ADMINISTRATION BODIES	Working groups Letters, e-mail Official website CSR report	Continuous Continuous Continuous Annually
LOCAL COMMUNITY	Visits and joint activities Donations and sponsorships Official website CSR report	When necessary Continuous Continuous Annually

PROFILE OF THE REPORT

The content of this CSR report follows GRI G4 guidelines, and this year it is in accordance with GRI G4 – Core option.

This is the 9th CSR report of the Institute made in accordance with internationally recognized methodology of Global Reporting Initiative (GRI). It is published annually, and each report contains the results from the previous calendar year, and provides a balanced and reasonable presentation of the effects of Institute's sustainability.

Last report was published in June 2015, and it is planned to publish the next one in May 2016. Besides topics relevant for sustainable development, this report also presents business activities based on new technical solutions and services which the Institute offers on the market or is currently developing External assurance of the report was not made

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GOVERNANCE STRUCTURE AND COMPOSITION

KONČAR – Electrical Engineering Institute is a joint stock company fully owned by KONČAR – Electrical Industry Inc. Companies within KONČAR Group are independent legal entities. The parent company monitors, strategically directs and supports the Institute through supervisory boards and meetings of shareholders in accordance with the Croatian Companies Act and Articles of Incorporation of both KONČAR – Electrical Industry and KONČAR – Electrical Engineering Institute.

Supervisory Board of the company appoints and dismisses the Managing Board, and decides about the number of its members and duration of their term of office. Supervisory Board has five members, three of them are elected at the annual general meeting, one member is appointed by employees, and one by the majority shareholder. The length of term of members of the Supervisory Board is four years.

In accordance with the Companies Act and Articles of Incorporation, the Managing Board manages the business of company on their own responsibility. In doing so, the Board is obliged and authorized to make decisions necessary for successful management of the company. There are certain kinds of decisions prescribed by Articles of Incorporation that require approval by the Supervisory Board. The basic organisational structure of the Institute is set down by the Managing Board and approved by the Supervisory Board.

ETHICS AND INTEGRITY

Our value system

Market success of the Institute is based on knowledge and skills of its employees, and also on the fostered value system:

- · To provide superior expertise, professional competence, and correct and impartial assessments
- To foster fairness, responsibility, and mutual respect and trust
- To observe time schedules and agreed time limits.

Our competitive advantage is based on quick and versatile learning and knowledge exchange with our partners. During cooperation we provide feedback, and each party takes full responsibility with all rights and obligations. Successful application of knowledge, ability to communicate and loyalty are the main criteria for promotion, and attained results are the measure of personal income.

The Institute is a signatory of the CODE OF BUSINESS ETHICS of the Croatian Chamber of Economy. The Code defines ethical behaviour expectations from employees. All employees must follow the code in their work and everyday activities, and the code covers rules and procedures, guidelines for decision making and examples of potential ethical dilemmas related to business activities.



In our business practice we follow the highest ethical standards, and build our reputation on expertise, trust and reliability. All our employees are obliged to treat all the stakeholders with due care and attention.

Aspect: Anti-corruption

G4-SO5

The Institute as a company that accepts democratic values, innovativeness, and fair business relations has recognized the need and responsibility to follow contemporary trends in fight against corruption by implementing the Code of Ethics and defining rules for reduction of risk from bribery and corruption in the Institute to the minimum.

Anti-corruption policy of the Institute is implemented by doing the entire business in accordance with laws, international regulations and rules of profession in an honest, fair and ethical way, with zero tolerance to bribery and corruption. No case of corruption has ever been noticed in the Institute.

Aspect: Anti-competitive behaviour

G4-SO7

The Institute is also committed to creating a fair and transparent competition in all the fields and business activities. So far no cases of anti-competitive behaviour have been found in the Institute.

Corporate social responsibility is one of the essential determinants which guarantee sustainable development of the Institute because:

- It motivates employees to creativity because it fosters fairness to all stakeholders,
- · It improves loyalty of the employees and business partners because they can see advantages for both sides,
- It enhances the reputation of the Institute in the society, because only the best can become its employees both as regards their knowledge as well as readiness for mutual cooperation and team work,
- It directs the development of academic community towards general applicability of the results of their education and research,
- It improves the employment, and ensures material support for social activities that improve the living conditions in general.

INTEGRATED MANAGEMENT SYSTEM

The market competence of the Institute and its recognisability in social community are based on the Integrated Management System which covers quality management system (ISO 9001), environmental management system (ISO 14001), occupational health and safety management system (OHSAS 18001), system for management of testing and calibration laboratories (ISO/IEC 17025), and system for management of certification bodies (ISO/IEC 17065).

In this way we ensure application of principles of corporate social responsibility together with balanced relation to customers, employees, owners, suppliers and social community. Through application of Integrated Management System the Institute defines roles and responsibilities, organization and processes that are important for achievement of high level of quality of our products and services. Through such processes the Institute communicates with customers and other stakeholders, realizes products, achieves goals, learns, and makes continual improvements.

l Qualit relatec meet th stakehc contine	ISO 9001 ty management d to processes to the expectations of olders and ensure ual improvement	ISO 14001 Environmental management directed to environmentally acceptable activities and products to improve positive environmental impacts	ISO 18001 Occupational health & safety management provides safe and healthy working environment for creation of reliable and efficient technical solutions
ISC Cert Rec establisi impartia i	D/IEC 17065 tification body quirements for hment of trust and ality of certification institutions	ISO/IEC 17025 Competence of laboratories General requirements for technical competence of testing and calibration laboratories	Nuclear safety requirements for suppliers of Safety Related (SR) products and services

CATEGORY: SOCIAL SUB-CATEGORY: PRODUCT RESPONSIBILITY **Aspect: Customer health and safety** G4-DMA Disclosures on management approach

PRODUCT CERTIFICATION BODY ACCREDITED UNDER ISO/IEC 17065

KONČAR – Institute is a Notified Body NB 2494 of the European Commission for the following directives, i.e. areas:

- EMC (2014/30/EU)
- machinery (2006/42/EC)
- noise emission in the environment by equipment for use outdoors (2000/14/EC)
- gas appliances (2009/142/EC (ex-90/396/EEC))
- radio equipment (2014/53/EU)
- welding procedures of pressure equipment (97/23/EC)



KONČAR – Electrical Engineering Institute, as a Notified Body (NB), assists manufacturers in conformity assessment and certification of their products in accordance with European standards and directives, before CE marking and placing on EU market.

Apart from conformity assessment as NB, KONČAR – Electrical Engineering Institute as accredited product and procedure certification body makes also conformity assessments of low- and high-voltage equipment, connection equipment, corrosion and IP protection. It is also equipped for the following conformity assessments of products: climatic conditions, noise and vibrations, ecological design, energy labelling, measuring instruments, interoperability of rail systems and equipment for traffic regulation.

CE MARKING

The conformity of products intended for EU market must be assessed in accordance with stringent requirements of European directives and standards. Before affixing CE marking it is necessary to be familiar with the requirements and apply some standard procedures:

HOW TO GET CE MARK?



Accredited certification schemes of KONČAR – Institute enable conformity assessments and certification of products in¬tended for markets other than EU that are made in accordance with ISO and IEC standards or manufacturer specifications.

Well-equipped laboratories and a wide range of accreditations, authorisations and notifications of the Institute enable numerous and diverse services:



- Type testing of products in our test laboratories
- Expert supervision of tests in external laboratories
- Assessment of completeness of technical documentation
- Conformity assessment of technical documentation
- Assessment of product design
- Type examination of products for certification purposes
- Certification
- Auditing compliance with the type of product

LABORATORIES OF THE INSTITUTE ACCREDITED UNDER ISO/IEC 17025

Accreditation under ISO/IEC 17025 is a proof of independence and competence of laboratories to test products with modern test and measuring equipment in accordance with requirements of standards and technical specifications.

In 2015 scopes of accreditation of High Voltage and High Power Laboratories were expanded, and in the beginning of 2016 two more laboratories were accredited under ISO/IEC 17025: Laboratory for Noise and Vibrations and Laboratory for Mechanical and Technological Tests, so that at the moment the Institute has 7 accredited laboratories.

LABORATORIES OF THE INSTITUTE

- High-voltage Laboratory
- High Power Laboratory
- EMS and Safety Laboratory
- Calibration Laboratory
- Laboratory for Physical and Chemical Testing
- Laboratory for Mechanical and Technological Testing
- Laboratory for Noise and Vibration
- Laboratory for Rotating Machines
- Electronics and EMD Laboratory
- Environmental Laboratory



Laboratory testing

- High voltage testing
- Testing of rotating machines
- Noise and vibration measurements
- Short-circuit withstand testing
- Physical and chemical tests

- Mechanical and technological tests
- Testing of embedded electronic systems, electronics
 and electric drives
- EMC and safety tests
- Calibration of electrical equipment



High voltage testing of electric power equipment

- Power-frequency voltage tests
- Impulse voltage tests
- Tests in artificial pollution conditions
- Partial discharge measurements
- Calibration of high voltage measurement systems

Electric power equipment testing in High Power Laboratory

- Short-circuit withstand tests of switching devices, switchgear and controlgear, instrument & power transformers
- Breaking & making capacity tests
- Temperature-rise & voltage drop tests





Electromagnetic compatibility and safety

- EMC and safety tests of equipment
- Radio Frequency Spectrum Measurement and Analysis
- Measurements of non-ionizing radiation
- Energy efficiency tests

Calibration laboratory

- Calibration of DC and AC measuring instruments
- Measurements of multipurpose instruments
- Calibration of electronic measuring equipmen





Physical and chemical testing

- Insulating oil testing
- Testing of properties of insulating oil
- Testing of other materials

Mechanical and technological testing

- Testing of mechanical and technological properties of metallic and non-metallic materials
- Metallographic and fractographic analyses
- Corrosion protection tests of metallic materials





Noise and vibration measurements

- Testing, measurements, analyses and research of vibroacoustic characteristics of machines, electric apparatus, installations, plants, devices and implements in anechoic chambers and on site
- Determination of acoustic power of sound source by measurements of acoustic source pressure and strength
- Usage of acoustic camera for noise emission investigation
- Checks of mechanical strength of components and devices to vibrations (sinus, random, shock)

LABORATORY AND ON-SITE TESTS OF POWER EQUIPMENT AND SYSTEMS

- Transformer diagnostics
- Rotating machines diagnostics
- Acoustic diagnostics
- HV circuit breaker diagnostics
- SF₆ gas-insulated switchgear (GIS) diagnostics
- EMC and safety tests

- Energy efficiency tests
- Power quality tests
- Earthing system measurements
- LF and HF electromagnetic field measurements
- Wind turbine diagnostics
- Safety at work

Transformer and high-voltage equipment diagnostics

Expert knowledge of HV equipment diagnostics reduces the risk of faults to the lowest level and enhances the availability of electric power equipment. The Institute has 4 mobile test stations for diagnostic tests of HV electric power equipment. Our test engineers use calibrated measuring instruments for assessment of the condition of power and instrument transformers, wind turbines, rotating machines, HV circuit breakers and GIS.





Acoustic diagnostics

With special measuring instruments (acoustic camera) we provide R&D and diagnostic noise measurements, and solve acoustic problems of noise source detection and sound propagation.

Noise is a proven hazard to both health and environment. Its reduction requires continuous research, source analyses and knowledge of its characteristics variables.

Rotating machines diagnostics

Diagnostic tests are comparative measurements of machine parameters to assess whether they are correct. By timely and periodical machine condition assessment it is possible to make extraordinary savings and improve reliability of the machine and the plant.

The following is performed:

- Visual inspection
- Tests and diagnostics
- Condition prediction



SF₆ gas-insulated switchgear (GIS)

GIS diagnostics includes the following tests:

- operating times
- current and voltage of closing and trip coils
- contact speed
- voltage drop of the main circuit
- quality of SF₆ gas in every gas-tight compartment
- blockades check.

Measurement of radiated emissions of electrical devices

Chamber with absorbers is intended for measurements of radiated emissions of electrical devices in a wide frequency spectrum: 150 kHz to 26 GHz. Quality measurements without emissions radiated from the surroundings (FM radio, communications, TV, GSM etc.) are especially important for the equipment put on the market.

EMC and Safety Laboratory is accredited for almost all the principal methods in EMC area, and performs tests in accordance with essential requirements of EU EMC directive.



Energy efficiency and power quality

Energy efficiency is a set of measures to change the existing method of using energy in industry and buildings in order to reduce the overall energy costs, without affecting the normal course of technological processes and the user's comfort.

- Verification tests of energy efficiency of products
- Solving power quality problems due to energy efficiency measures
- Energy certificates
- Energy audits
- Measurements of savings in energy consumption



LF and HF electromagnetic field measurements

- Measurements of non-ionizing radiation from the magnetic resonance devices
- Measurements of 50 Hz frequency in households and business objects near power lines or power substations
- High frequency electromagnetic field measurements of GSM base stations Assessments, calculations and measurements of electromagnetic fields for obtaining construction permissions.

OTHER SERVICES

Analyses and studies

- Electrical equipment failure analyses
- Assessments of equipment condition
- Power station feasibility studies
- Tenders
- Conceptual designs
- Reviews of studies and projects
- · Assessment of hazards in manipulation and maintenance of electrical and gas equipment

INDOC Department

INDOC Library supports research activities of the Institute and provides literature and journals in the fields of electrical engineering, electronics, energy, transport and natural sciences, applying modern information technology, wellorganized supply and interlibrary loan.

- More than 20,000 printed professional books
- More than 800 scientific and professional journals
- · Databases of e-books, e-proceedings, e-papers
- Database of 1900 currently valid standards
- Database of PhD, MSc and BSc theses.

Supervision and quality control

- Supervision of substations
- Supervision of renewable energy sources plant con¬struction
- Supervision of tunnels
- Supervision of highways
- · Quality control of electric power equipment and plants

Quality Management System (QMS)

Objective and impartial external auditing of our ISO 9001 Quality Management System guarantees quality products and services, and also ensures our recognisability and reliability in market completion. At the same time it also improves the quality of everyday work and motivation of employees.

Complying with ISO 9001:2008 Certified by Quality Austria Training, Certification and Evaluation Ltd. Registration No.: 1095/0 Date of initial issue: 28 July 1997 Valid until: 02.04.2018











II SPECIFIC STANDARD DISCLOSURES CATEGORY: ECONOMIC

Aspect: Economic performance

G4-EC1 Direct economic value generated and distributed

	EUR million
Component	2015
Direct economic value generated	11.72
Sales	11.14
Financial income	0.08
Asset income (rental and sales)	0.50
Direct economic value distributed	10.65
Suppliers of materials and services	4.40
Education & training	0.11
Services of academic community	0.01
Other costs	0.49
Salaries & allowances	3.22
Taxes, contributions, insurances	2.41
Donations	0.01
Retained earnings	1.08

Corporate Social Responsibility (CSR) of the Institute is based on a set of measures of business policy aimed at creation of an environment favourable for creativity and innovativeness as well as correct and stimulating relations between all the stakeholders involved in business processes

The Institute is doing business entirely with its own funds and it is not exposed to interest rate risk, credit risk and liquidity risk. Its short-term assets are 7.8 times bigger than its current liabilities. Financial assets make 63% of short-term assets, which guarantees business stability in the following period considering outstanding liabilities at the end of the year.

In 2015 total income from sales was 11.14 million euros, wherein direct export was 20.6% or 99.9% more than in the previous year. The increase of direct export is important for the Institute because this good result was achieved by sales of services related to testing and to direct sales of monitoring systems, what proves that these products are competitive also on the global market.

The Institute has increased its productivity by 16%, value added per employee from 35,204 euros in 2014 to 40,794 euros in 2015, what is a result of increase of sales of income-generating products and services.



TRENDS IN INCOME, VALUE ADDED* AND NUMBER OF EMPLOYEES

In 2015 the Institute had an average of 165 employees. 9 new employees joined the Institute, and 5 left. Three employees retired, one joined another company of KONČAR Group, and one cancelled his employment contract.

21 employees attend postgraduate doctoral studies at three faculties of the University of Zagreb, and 7 attend postgraduate specialist studies. The Institute has 26 researchers registered in the Register of Researchers, 7 of them with the status of research associate. In 2015 31 papers were published in various kinds of publications, and 12 employees attended courses in various foreign languages: English, German, Arabic, Russian and French.

Combining internal and external resources the Institute does is best to maximize value added in order to improve its efficiency and competitive advantage.

G4-EC4 Financial assistance received from government

In 2015 the Institute was granted financial assistance from the Government in the amount of 10,776 euros in the form of income tax reduction (aid for education and training). A research-development project was co-funded with 131,413 euros by the European Fund for Regional Development and the Ministry of Science, Education and Sports through EUREKA (a publicly-funded, intergovernmental network fostering innovation-driven entrepreneurship in Europe). A part of the investments in energy efficiency in the amount of 52,565 euros was co-funded by the Environmental Protection and Energy Efficiency Fund (FZOEU).

Aspect: Market presence

G4-EC5 Average monthly income

In 2015 the average monthly gross wages in the Institute were 2.5 times higher than the average gross wage in Croatia, or 37% higher than the average in the scientific-research sector according to the data of Croatian Bureau of Statistics.

Aspect: Indirect Economic Impacts

G4-EC7 Development and impact of infrastructure investments and services supported

In 2015 the investments in non-current assets was 1.71 million – 0.11 million euros in equipment and 0.87 million euros in buildings. 0.32 million euros was invested in research and development, whereof 131,413 euros were co-funded by the European Fund for Regional Development and the Ministry of Science, Education and Sports through EUREKA (a publicly-funded, intergovernmental network fostering innovation-driven entrepreneurship in Europe). Investments in education and related costs (scholarships, fees, reference literature and trips for educational purposes) amounted 0.11 million euros or 0.9% of income from sales.

					EUR million
	2011	2012	2013	2014	2015
Investments in equipment & refurbishments	0.59	0.85	1.21	0.21	1.71
Investment maintenance	0.26	0.05	0.04	0.14	0.05
Investments in R&D	0.56	1.24	0.99	0.56	0.32
Education	0.28	0.21	0.16	0.10	0.11

In 2015 investments were 30% higher than planned due to realization of a part of a project with working title CEKONET, together with approved incentives. A part of the CEKONET project – the project of construction of a new Laboratory for High-Voltage, Power Systems and Drives is just being developed.

A large part of investments in 2015 was used for reconstruction of PEX-facility and purchase of a chamber with absorbers for testing large devices with electronic and power components under EMC directives and standards. A part of the price of the chamber (40% or 0.11 million euros) was financed by funds from the public under the Operative Programme by the Ministry of Economy of regional subsidies for investments in equipment in 2014. Within this investment the Environmental Protection and Energy Efficiency Fund (FZOEU) has invested in energy efficiency of the PEX-facility 0.05 million euros.

In the next 5 years it is planned to make further investments in the equipment for the reconstructed of the existing infrastructure and the newly built one. That will improve our competences and expand the scope of applied research and development in power industry and transport.

The Institute builds its long-term sustainable development in the areas of electrical power engineering and clean transport on: R&D services, competent laboratories, competitive advanced IT solutions and smart sensors.

Major results of the development of products and services in the last two years

- A new generation of transformer monitoring system with proprietary HW/SW
- Bushing monitoring system for power transformers
- Advanced systems for monitoring and diagnostics of specific conditions of rotating machines
- Shaft current and voltage protection relay
- Shaft torsion and power measurement system
- Machine air gap sensor with proprietary HW/SW
- Development of a new HW/SW platform for safety critical applications
- New generation of central computer for diesel-electric trains

CATEGORY: ENVIRONMENTAL

The Institute is not a manufacturing company, and therefore it does not contribute much to pollution, and neither it can help much in reducing emissions and carbon footprint. But our solutions help others to do so: e.g. to reduce faults, losses, breakdowns, and thus improve life, reliability and safety of operation of equipment

Products have impacts on the environment during their manufacture, use and after expiration of their life. Increased awareness of the need to protect the environment, together with requirements of applicable standards and technical regulations, motivate producers to create devices with lowest possible environmental impact. New requirements are related to e.g. reduction of exhaust gases, effluents, losses, electromagnetic emissions, use of recyclable and degradable materials etc.

The Institute implements continual and systematic activities for environmental protection in accordance with Croatian laws and regulations, and systematically monitors potentially strong environmental impacts. Environmentally friendly materials and procedures are used in the design and manufacture of our products. Constant attention is paid to rational utilisation of energy and other natural resources. Potential incidents are recognized and prevented. Awareness of employees is fostered, and they are trained for efficient environmental protection. At the same time there is also active collaboration with local community and stakeholders on environmental protection.

Aspect: Energy

G4-EN3 Energy consumption within the organization

Strong business activities had direct impact on energy consumption. Besides increase of fuels for vehicles, consumption of electricity was increased as well. The cause was the exceptionally long and hot summer, with long season of air-conditioning as a result.





INDIRECT ENERGY CONSUMPTION

Consumption of electricity

	2011			2012			2013			2014			2015	
MWh	GJ	t CO ₂ *	MWh	GJ	t CO ₂ *	MWh	GJ	t CO ₂ *	MWh	GJ	t CO ₂ *	MWh	GJ	t CO ₂ *
885	3185	245	694	2501	192	537	1936	149	515	1854	143	693	2494	192

* Specific CO₂ emission per produced kWh of electricity is 276.75 [g/kWh]. From the Manual for Energy Consultants, UNDP.

Heat consumption

	2011			2012			2013			2014			2015	
MWh	GJ	t CO ₂ *	MWh	GJ	t CO ₂ *	MWh	GJ	t CO ₂ *	MWh	GJ	t CO ₂ *	MWh	GJ	t CO ₂ *
1552	5587	418	1412	5082	380	1404	5054	378	1231	4433	332	1281	4612	345

* Specific CO₂ emission per produced kWh of heat is 269.39 [g/kWh]. From the Manual for Energy Consultants, UNDP.

Aspect: Water

G4-EN8 Total water withdrawal by source

In 2015 water consumption was 14 m³ per employee



Aspect: Emissions

G4-EN16 Energy indirect greenhouse gas (ghg) emissions

TOTAL DIRECT AND INDIRECT GREENHOUSE GAS EMISSIONS PER WEIGHT

	Fuel CO ₂ (t)*	Electricity CO ₂ (t)*	Heat CO ₂ (t)*	Emissions total CO ₂ (t)*
2011	96.6	244.8	418.1	34.5
2012	103.8	192.2	380.3	42.0
2013	96.1	148.8	378.2	36.1
2014	79.9	142.5	331.7	23.8
2015	92.7	191.7	345.1	28.4

*From the Manual for Energy Consultants, UNDP.

This report covers for the first time both direct and indirect emissions. Apart from fuel consumption of company-owned vehicles, fuel consumption of privately-owned vehicles used for business purposes and fuel consumption of planes are also included. New calculation was applied to all 5 years in order to compare the data.

Annual fuel consumption of vehicles and planes is directly dependent on business activities and increased number of travels and diagnostic tests on site (transport of measuring equipment and test engineers). However, to rationalize fuel consumption in the long term, all the new vehicles that were bought have diesel engines with less consumption than others.

RENEWABLE ENERGY SOURCES

Following the strategy of industrial development, the Institute has recognized in time the growth of energy generation from renewable sources. It gained expert knowledge over many years of research in this area, and integrated it in its proprietary solutions for utilisation of wind and solar energy, autonomous power supply systems based on renewable sources, systems for renewable source monitoring (wind turbines, photovoltaic plants and batteries), and partly hydrogen technology and energy storage.

Lower energy consumption and environmental impact of the equipment are the key parameters of its excellence, and the subject of extensive research and development in the world. Rational energy utilisation as the driving force of all the processes around us, and the least possible environmental impact are the key factors of sustainable development of social community.

ENERGY EFFICIENCY

In 2015 the Institute has invested 0.53 million euros in energy efficiency of EMC and Safety Laboratory. Direct benefits from this investment are rational energy utilisation, reduction of CO_2 emissions, lower costs and further improvement of energy efficiency in adaptations and/or refurbishments. A part of this investment was financed by funds from the public tender of the Ministry of Economy under Operative Programme of regional subsidies for investments in equipment in 2014.

The Institute has energy audit reports and energy certificates for all of its 9 buildings and laboratories. They are important tools for improvement of overall energy efficiency of buildings, because they provide information about their energy characteristics, and how much heat per annum it is needed for heating of each of them.



Aspekt: Effluents and Waste

G4-EN23 Total weight of waste by type and disposal method

Since introduction of Environmental Management System (EMS) in 2002, waste has been disposed in the Institute in accordance with Croatian laws and regulations. Our work processes generate waste that requires special disposal methods including recognition of hazardous waste, collecting, temporary storage, disposal by the authorized waste disposal contractors, keeping prescribed records and delivery of data about waste. So far the Institute has had no complaints on EMS functioning wither by local community, inspectors or other services.

WASTE TYPE	2011	2012	2013	2014	2015
Municipal waste (mixed) (m ³)	158	163	168	160	133
Hazardous waste (t)	6.37	2.35	3.29	3.54	3.73
Non-hazardous waste (t)	3.04	10.24	6.01	5.34	12.98

With the aim to improve the waste disposal and collection system, in 2015 the waste disposal contractor was changed, an area for collection of non-hazardous waste was established, and the waste collection method was upgraded. Furthermore, all the premises were equipped with new boxes for separate disposal of waste paper, municipal waste and waste packaging. The employees were informed about better waste separation and its importance.

Separation of usable waste (mixed packaging) from unusable (municipal) waste has contributed to the reduction of unusable waste quantities and at the same time raised the employees' awareness of the environmental protection importance. Consequently, the amount of collected paper and cardboard was increased in relation to 2014. Nevertheless, non-hazardous waste amount was partly increased due to growth of business activities.

MIXED MUNICIPAL WASTE



USABLE NON-HAZARDOUS WASTE



Aspect: Overall

G4-EN31 Total environmental protection expenditures and investments by type

ENVIRONMENTAL PROTECTION EXPENDITURES

The monitoring of environmental protection expenditures has created preconditions for improvements and rationalisation in this area.

In 2015 environmental protection expenditures were1.6% value added





ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

In accordance with our commitment to quality services and continual improvement, we have established EN ISO 14001 Environmental Management System audited by a third party. It is our tool for continual quality man[¬]agement and improvement and reduction of environmental impacts with the view to achieving our objectives

Complying with ISO14001:2004	CERTIF	ICATE
Certified by Quality Austria Training, Certification and Evaluation Ltd. Registration No.: 261/0 Date of initial issue: 19 December 2002 Valid until: 02.04.2018		

CATEGORY: SOCIAL SUB-CATEGORY: LABOUR PRACTICES AND DECENT WORK

Specific knowledge is an important asset of the Institute, because it is a strong competitive advantage

The Institute pays great attention to education and motivation of employees and occupational health and safety. For research, development and testing they have at their disposal knowledge contained both in Institute itself and in domestic and international databases. Special attention is given to purchase of new equipment and software for development and testing. For efficient communication, process control and monitoring there is an intranet-supported information system that is constantly upgraded.

Team work and knowledge gained by work on R&D tasks together with other KONČAR companies or in partnerships on domestic and international projects are the greatest strength of the Institute. All employees have the possibility of personal and professional development through educational and professional programmes. Motivation of employees for scientific and professional improvement and advancement and focus on the fields of Institute's interest are an enormous drive for technical creativity and competition on global level.

Aspect: Employment

G4-LA1 Total number and rates of new employee hires and employee turnover

NUMBERS OF EMPLOYEES 2011 TO 2015

	2011	2012	2013	2014	2015
New employee hires	10	7	7	9	9
Employees who left the Institute	-6	-11	-14	-7	-5
Total number of employees as at 31 December	173	169	162	164	168

Criteria for new employments ensure that the most suitable persons have been chosen for each job on the basis of their qualities and experience, whereas equal chances are given to men and women.

G4-LA2 Benefits provided to employees

Additional benefits create a positive atmosphere that favours the climate of unity and cohesion in the Institute, in spite of differences in monthly wages that are related to the success of performance of each department:

- · Educational and professional programmes for improvement of knowledge and skills
- Paid business trips and participation in international conferences
- Christmas and Easter bonuses, holiday cash grants
- Jubilee financial rewards for 10, 15... years of service in the Institute
- Money reward for completion of graduate and postgraduate studies
- Financial aid in the case of sick leave exceeding 90 days
- · Allowance in the case of death of immediate family member
- Allowance for each new-born baby
- Regular medical check-ups
- Leisure time recreation
- Mobile phone.

There are special bonuses for each successfully completed job. Corporate loyalty is fostered and each employee who wishes to improve their knowledge in the areas that are of interest for the Institute will have paid expenses of such training or education.

EMPLOYEE INCLUSIVENESS AND SATISFACTION

Satisfaction and engagement of employees is monitored and measured to improve the ways of their involvement in decision-making processes. The 5th survey of employee satisfaction was made in December 2015, and the questionnaire was filled in by 65% of employees.

Like in previous years, they were requested to rate the degree of their agreement with statements divided in 5 areas, so that the results could be compared. All the employees are included in surveys, they are carried out once a year, and the survey results are made public on the intranet.

The analysis of results of the 5th survey shows that 83% of employees are satisfied with their jobs. Furthermore, 74% of them state they are respected and supported by their colleagues, two thirds think that their immediate superiors include them and motivate to jointly solve problems, and more than a half is satisfied with their status in the Institute.

The objective of the survey is to understand standpoints and opinions of employees in order to recognize opportunities and drawbacks that have effects on their progress.

Aspect: Occupational health and safety

G4-LA5 Level of monitoring and advising in occupational health and safety programmes

Occupational health and safety are very important elements of work conditions, and as such are monitored by a third party through the certified Occupational Health and Safety Management System complying with OHSAS 18001.

The Institute continually and systematically identifies hazards, and assess and monitors risks that can influence the health and safety of employees and third parties as prescribed by Croatian legislation. It also continually and comprehensively plans, implements and assesses the competence of all the employees in the area of safety at work. Employees are also sent to regular periodical medical check-ups. Physical and chemical factors and installations in premises, machines and devices with increased safety risk are also checked. Individual awareness and understanding of employees' obligations is enhanced, and their active participation in establishment, review and improvement of safety at work are fostered.



OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM (OHSMS)



Aspect: Training and education

G4-LA9 Average hours of training per year per employee by gender, and by employee category

Personal development and improvement of each employee is very important for the Institute, because expertise and innovativeness are competitive advantages, and contribute to the success of the development of new products and services. The Institute's business activities and development are based on application of knowledge, i.e. good knowledge of problems and their solutions based on new technologies. New knowledge is acquired by additional training of employees and active participation at international conferences and exhibitions. Competitive advantage of the Institute is enhanced by new technical solutions and innovations.

Employees have the possibility of permanent professional education and attending courses in foreign languages, IT, quality, environmental, and occupational health and safety management systems. New knowledge is acquired through post-graduate doctoral and specialist studies, and also through work on R&D projects in teams with employees of other KONČAR Group companies, on seminars and active participation at international conferences and exhibitions. Creativity and managerial skills of employees as also stimulated.

Programme for newly employees and trainees makes them familiar with by-laws of the Institute, management systems, safety at work and basic principles of corporate social responsibility and sustainability.

In the last five years the Institute has invested in training and education of its employees 0.85 million euros or an average of 1,051 euros per employee. In 2015 67% of employees attended various forms of trainings in approximate duration of 67 hours per employee.

Category	Average hours of training in 2015
The Managing Board (Top management)	132
Heads of departments (Middle management)	66
Heads of laboratories and sections (Lower management)	38
Employees	70

Average hours of training and education in 2015		
Males	70	
Females	59	

G4-LA10 Programs for skills management

EDUCATION FOR MANAGERS

To develop independence in work and leadership skills of candidates under 35, there is a special programme of training in management (FBA – Fundamentals of Business Administration) that will render them capable of applying modern management methods.

The programme has been attended so far by 10 candidates from the Institute. The success of the programme was proven by participation of one employee of the Institute in the team that was the winner of the 4th Global Case Study Competition organized by IEDC – Bled School of Management, Slovenia.

Aspect: Diversity and Equal Opportunity

G4-LA12 Breakdown of employees per employee category

Due to specific business activities of the Institute most employees are male. Percentage of female employees is almost the same for a large number of years, and it is about 24%. However, the management structure has been largely changed. Ten years ago there were 23% female managers, while in 2015 it reached the high 45%.

COMPARATION OF PRECENTAGES OF FEMALE EMPLOYEES IN THE MANAGING BOARD AND MIDDLE MANAGEMENT IN 2005 AND 2015



The following table shows percentages of female employees in the total number of employees:

Female employees in:	2005	2010	2015
The Managing Board and middle management (heads of departments)	23%	15%	45%
Lower management (heads of laboratories and sections)	10%	12%	22%
Employees	25%	24%	24%

In the last ten years also the age structure has essentially changed. In 2005 the average age of the employees was 45, and in 2015 it was 40. This is a result of systematic "youth movement" in the Institute that was started some ten years ago. However, care is taken to transmit and preserve knowledge of older generations for the new ones. Also, since 2010 the structure of the top management has almost completely changed, so that now the average age is 44 (in 2010 it was 58).

Average age:	2005	2010	2015
The Managing Board and middle management (heads of departments)	52	58	44
Lower management (heads of laboratories and sections)	49	44	46
Employees	45	40	40

This change of generations will certainly be reflected on business and organisational climate in the Institute in the next period, and improve flexibility to fulfil the needs and expectations of key stakeholders.

SUB-CATEGORY: SOCIETY

Aspect: Local communities

G4-SO1 Operations with implemented local community engagement

New employees of the Institute are mainly young highly educated people, who are stimulated to additionally improve their knowledge and education in the field of technical sciences. Knowledge, skills and capabilities of employees are focused on solving complex technical problems in order to constantly and innovatively improve the existing products and services. Business activities of the Institute are supported by its connections with the academic community and joint work on scientific-research projects co-funded by the Croatian and EU funds.

COLLABORATION WITH ACADEMIC COMMUNITY

Collaboration of the Institute with academic society has been fostered for a number of years, and is constantly improving. Connecting economy with academic society is also strongly supported by the European Commission with a view to transferring new technologies and knowledge from faculties to industry, and thus improve the existing high-technology products and services and develop new ones.

By connecting with academic community the Institute tries first of all to acquire new knowledge through additional training of employees and scientific research in order to solve complex technical problems related to development of new products, and also to inform wider society about the achieved results.

The possibility of co-funding R&D projects by European and national funds has established a new foundation for connecting the Institute with the academic community. By joint work on R&D projects the Institute and academic community share the risks regarding the results of such projects, oblige themselves to observe the terms of completion and application of project results, and are equally responsible for the development of the economy and society.

Such collaboration results in new knowledge and skills that lead to original solutions of complex technical problems applying scientific approach. The costs are covered by the European and national funds, which reduces the expenditures for investigations.

Academic society benefits from such partnership not only regard material aspects, but also has the opportunity for research relevant for the economy that eventually results also in valuable papers for CC journals and conferences, which are important for advancement of scientists and mutual transfer of knowledge and skills.

Knowledge, skills and their application are the key factors in the development of the Institute, and multifaceted collaboration with scientific community provides inflow of new knowledge and skills through post-graduate doctoral and specialist studies and joint R&D projects.

	2011	2012	2013	2014	2015
R&D projects approved by Ministry of Science, Education and Sports (MSES)	4	7	7	6	0
Projects co-financed by academic community	0	0	0	2	2
Junior researchers financed by MSES	6	5	2	2	2
Published papers	41	40	46	27	31
Attendants of postgraduate doctoral studies	31	26	24	22	21
Defended PhD theses	1	2	2	2	0
Members of the Institute teaching at faculties	13	10	10	9	10

DONATIONS AND SPONSORSHIPS IN 2015

The Institute builds up partnership with the academic community, develops and supports both professionally and financially organisation and participation at scientific meetings, conferences and symposia that enable exchange of experiences and development of science, and also awards best students at three faculties of engineering.

The Institute participates in awarding best students of three faculties: the Faculty of Electrical Engineering and Computing in Zagreb (Josip Lončar Award; the Institute provides the award money), the Faculty of Mechanical Engineering and Naval Architecture in Zagreb (Davorin Bazjanac Award; the Institute provides the award money), and the Faculty of Chemical Engineering and Technology in Zagreb (Vjera Marjanović-Krajovan Award).

STUDENT COMPETITION ELEKTROBOJ

The Institute has been supporting for three years the student competition ELEKTROBOJ as a partner from the economy. ELEKTROBOJ is a competition of students in the development of HW/SW platform solutions, and its objective is to stimulate students to independent work on extracurricular activities, thus improving their creativity and technical competences.

The Institute is included in the jury of experts, and during the competition students visit laboratories, have lectures on product certification, and take part in testings under EU directives and standards.

FOSTERING INDUSTRY SCIENCE COOPERATION

EU PROGRAMMES – HORIZON 2020

The Institute has got the opportunity to join Horizon 2020 as a partner in a project "Safe human-robot interaction in logistic applications for highly flexible warehouses" (abbr. SafeLog). Project coordinator is Karlsruhe Institute of Technology, and partners in the project are Fraunhofer IML, Czech Technical University of Prague, Swisslog, Faculty of Electrical Engineering in Zagreb and the Institute. The aim of the project is to enable safe human-robot interaction in flexible logistic centres, and the task of the Institute is the complete prototyping of a safety vest for warehouse personnel and its certification.

PROJECTS CO-FUNDED BY THE EUROPEAN REGIONAL DEVELOPMENT FUND (ERDF)

The project **Advanced technologies in power systems and rail vehicles** was successfully completed within the call for proposals "Capacity building for research, development and innovation". The project leader Faculty of Electrical Engineering in Zagreb and the Institute as the partner from industry were granted funds from EFRR. Apart from capacity building for research, development and innovation, the main aim of the call was transfer of technology and knowledge from faculties to industry transferring new technologies and knowledge from faculties to industry, and thus improve the existing high-technology products and services and develop new ones.

Within the same call the Institute participated together with Faculty of Machine Engineering and Naval Architecture in Split in the project **Research and development of hydrogen energy system powered from renewable energy**. Apart from capacity building for research, development and innovation in renewable sources, the main aim was new knowledge on hydrogen technologies. This includes hydrogen generation through electrolysis, hydrogen storage, and electricity generation from hydrogen utilizing fuel cells as well as the integration of electrolysis to an autonomous power system.

The Institute plans to apply for the project **CEKONET – Centre of Competence for Smart Energy and Clean Transport** together with Croatian Electrical Utility (HEP), Croatian Transmission System Operator (HOPS) and three faculties of the Zagreb University. The main aim of the project is to improve competencies and strengthen the infrastructure of primary and secondary power equipment. This will enhance competitiveness of products from this area, which has been for a long time recognized on the global level.

The Institute is CEKONET project leader, and it will apply to the Ministry of the Economy for ERDF co-funding. Croatian Electrical and Mechanical Machinery Industry and Technology Competitiveness Cluster has given the project PNI (= Project of National Interest) status.

PROJECT CO-FUNDED BY EUREKA – EUROPEAN R&D NETWORK

About the middle of 2015 the international project E!8723 VISINEV VISually augmented analysis of complex IN-formation structures EVolving in sociotechnical systems was successfully completed. The project was funded by EUREKA, European network for financing international, market-oriented research and innovations, whose objective is to stimulate companies to invest in R&D, initiate collaboration between enterprises and R&D organisations and to create the foundation for their entering the world market.

AWARDS AND SOCIAL RECOGNITIONS IN 2015





ARCA Silver Medal was awarded to KONČAR – Electrical Engineering Institute team headed by Ante Elez, PhD for the development of SCVP – Shaft Current and Voltage Protection Relay used for shaft voltage and voltage measurement and analysis at the 13th International Exhibition of innovations, new ideas, products and technologies ARCA 2015.



Tihomir Čihak, member of the Institute, was a part of KONČAR team that was the winner of **Global Case Study Competition** – the 4th global international competition in solving business cases organized by IEDC – Bled School of Management, Slovenia.

CATEGORY: ECONOMIC

Aspect: Indirect Economic Impacts

G4-EC8 Significant indirect economic impacts, including the extent of impacts

APPLIED RESEARCH

The Institute follows trends and invests in research in order to be the leader in application of hightech technologies to the production programme of companies of the KONČAR Group and to improve its proprietary solutions for the global market.

Applied and development research is directed towards acquisition of new knowledge that helps to solve current requirements on power equipment:

Reduction of energy consumption (losses)

Increased dynamics (frequent starts, variable speeds...) Equipment condition monitoring (sensors and monitoring) Controllability of equipment (measurement of process variables)



- Ultra-high-voltage transformer insulation research
- Research of HVDC insulation systems
- Research of new environmentally friendly insulation materials
- Investigation of power and instrument transformer failures





Research and applied solutions in the field of mechanisms of switching apparatus as well as kinematic and dynamic analysis of components



CATEGORY: SOCIAL SUB-CATEGORY: Product Responsibility **Aspect: Product and Service Labelling** G4-PR3 Type of product and service information

MONITORING SYSTEMS

The Institute's proprietary technical and technological solutions and efficient work provide enough added value for investments in experimental research and for creation of opportunities for competition of our R&D engineers at a global level

INTEGRATED MONITORING SYSTEM



MONITORING OF ELECTRIC POWER PLANTS (IMS-INTEGRATED MONITORING SYSTEM)

- Centralized monitoring and protection of capital equipment in a power plant (generator, turbine, transformer, circuit breakers, ...)
- Higher availability of equipment
- Higer safety of a power plant
- Better asset management
- Reduced cost of maintenance predictive instead of periodic equipment maintenance

State-of the-art technical solutions of the Institute are results of decades of experience and knowledge gained in the field of electric power equipment. Monitoring systems enable enhanced capital asset management and risk control.

TRANSFORMER MONITORING SYSTEM

Decades of experience in transformer research, development and on-site diagnostics as well as a fieldproven hardware platform are integrated in transformer monitoring and diagnostic system.

- Advanced fleet-wide on-line monitoring and diagnostics system for all types of power transformers and shunt reactors
- Provides monitoring of all vital transformer parts (bushings, oil and paper • insulation, core, OLTC and cooling system)
- Automatic data analysis, trending, alarming and reporting function
- Diagnostic and prognostic tools (IEC/IEEE ratio models, Duval's triangles, etc.)





TMS Server + HMI

Web based visualization



BENEFITS

- Detects incipient faults and assists in preventing failures and unplanned outages
- Enables condition-based maintenance
- Improves staff safety and environmental protection
- Provides valuable data for a root cause analysis and an investigation in case of a failure event
- Helps in optimizing transformer performance and enables better asset management (overloading, lifetime expectancy estimations)
- Makes the transformer ready for the "Smart Grid"

Celebrating 10 years of worldwide proven field performance With more than 350 systems installed worldwide





Ras Girtas IWPP. Qatar

Substation Velebit. Croatia





Nuclear Power Plant Krško, Slovenia

Hydro Power Plant Zelenchukskava. **Russian Federation**

ADVANCED SOLUTIONS FOR MONITORING OF ROTATING MACHINES

Stable electric power system is the backbone of any economy. Especially the production part of electric power system must be available and secure to ensure uninterrupted supply of electrical energy. Rotating electrical machines as part of a complex power system are vital elements and thus must fulfil modern and complex requirements.

To ensure reliable operation of the machines we have developed various condition monitoring systems, whose main function is early detection of possible defects and prevention of major material and financial losses. The use of such systems allows better management of capital assets.

Features of expert systems for machine condition monitoring and fault detection

- On-line systems
- Applicable to all kinds of machines
- Modular and upgradable systems for new as well as for the existing machines
- Long-term data storage and important events tracking (trends, waveform, alarms ...)
- Local and remote data access

RMS ROTOR MEASUREMENT SYSTEM

 Wireless system for rotor measurements (excita tion current and voltags, temperatures, ...) pow ered from excitation or by energy harvester[®] (from magnetic field).





RMI ROUNDNESS MEASUREMENT INSTRUMENT

Easy and simple solution for analysing stator and rotor roundness. Used during machine overhauls.

RGDS

ROTOR GROUND DETECTION SYSTEM

• Wireless system for excitation winiding ground detection and protection.



EMBEDDED CONTROL SYSTEMS FOR RAILWAY APPLICATIONS

TRAIN CONTROL AND MONITORING SYSTEMS – TCMS

After successful development of embedded control systems for locomotives and trams, the Institute has developed and delivered train control and monitoring systems for new Croatian electric and diesel trains. Almost all components of these systems are based on modular and sustainable platform which is a product of years of in-house development. The platform comprises numerous hardware and software components which enable configuration of different control systems for various purposes and of various levels of complexity. TCMS set is composed of:

- train main computer,
- man-machine interface,
- gateway,



SAFETY CRITICAL CONTROL SYSTEMS (SILX)

KLC3

KLC3 is an embedded control system for, and thus a vital part of, level crossings. It has been developed according to very strict SIL 4 (Safety Integrity Level) requirements of European norms. KLC3 is based on proprietary modular Safety Platform.

Safety HMI – SafeHMI

SafeHMI provides added value to railway infrastructure systems via safe human-machine interface. It has also been developed according to SIL 4 requirements and it enables remote monitoring and control of multiple level crossings.

Safety Control Units – SafelO

SafelO is a safety embedded computer system based on VISK modular platform which has been used for years in power generation and transportation. Primary application of SafelO units is for expanding capabilities of the SafeHMI system, but due to its modularity it can be used in other safety critical projects. It is suitable for implementation of SIL 4 functions.

AUTONOMOUS POWER SUPPLY SYSTEM FROM RENEWABLE ENERGY SOURCES

The most outstanding feature of this hybrid base station system is up to 100% energy availability, which is otherwise difficult to achieve using only renewable energy sources such as solar and wind power. The hybrid system is made up of three basic components, each of them is developed as a separate solution that can be modularly set up according to the consumption needs and climate conditions of each location.





Basic Concept

The autonomous power supply system is a self-contained system integrating various devices for generation of electricity from renewable sources (wind turbines, photovoltaic cells), energy storage in batteries, hydrogen tank and fuel cells for the production of electricity from hydrogen, as well as protection, measurement and control systems. The system has built-in communication with remote users, and provides monitoring of various parameters, warnings and alarms. Instead of hydrogen and fuell cells, the system can integrate diesel genset.



KONČAR HYBRID BOX®

- The autonomous power supply system based on renewable energy sources with hydrogen or diesel genset as auxiliary
 energy source
- Energy-efficient solution with space for installation of base station equipment
- Modular and scalable solution in accordance with customer requirements
- Up to 100% energy availability
- Remote control and data access
- Applications: telecom base stations, gas pipeline stations, oil pipeline stations, radal stations, rural areas

REFERENCES



Base station Županja





Base station Koprivnica

Base station Vidulini

Base station island Žut

GLOBAL REPORTING INITIATIVE G4 CONTENT INDEX – CORE OPTION

Global Reporting Initiative (GRI) Guidelines are a globally accepted tool for sustainability, i.e. corporate social responsibility reporting. They are periodically revised to enable companies to communicate most appropriately the impacts of their economic, environmental, social and governance performance.

Guidelines of the 4th generation (G4) emphasize additionally the orientation of companies to the issues that are most important for attainment of their goals and control of social impact.

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