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CESI is a leading player in engineering, testing and power systems consulting for the electricity sector worldwide.
Since the beginning CESI supports the development of the national electrical system

1950

1956: The Foundation

70s-80s: cable testing and “1000 kV Project”

1975

2000: Liberalization of the Italian Electrical System and pioneer digital metering tests

2002-2005: Internationalization and Acquisition: ISMES, IPH and FGH

2012: New Subsidiaries CESI Middle East and CESI do Brasil

19/08/2016
A long legacy in offering independent advise and unbiased solutions to clients in the energy world

We like to be Partners to our Clients, to the point that some of the major European utilities and electromechanical company are also Shareholders:
Over 800 experienced professionals to offer our clients high-end, tailored solutions

CESI

Testing & Certification
- Testing Laboratories
- Certification
- Solar Cells

Consulting, Solutions & Services
- System Planning
- Network Operations
- Engineering Consulting
- Power Generation
- Smart Grids

Engineering, Environment
- Structural & Civil Engineering
- Environmental Monitoring Studies
- Environmental & Sustainability Consulting

Shaping a Better Energy Future
CESI at a Glance

Summary

1. Company Overview
2. Testing & Certification Services
3. Consulting Solution Services
4. Engineering & Environment Services
CESI acts as an international, independent conformity assessment body accredited for testing, certification and inspection

CESI is a founding member of STL and all CESI Group laboratories get access to the circuit and are accredited ISO/IEC 17025 standard.

### Tested Components Categories

#### Electromechanical Components
- Circuit breakers
- Switchgears
- Transformers
- Cables
- GIS

#### Electronic Components
- Avionics (military or aerospace)
- Measure devices
- Inverters
- Automotive embedded electronics
  - ... ...

### Testing Services Categories

#### Type Test

#### Routine Test

#### Research and Development

### Testing Areas

#### Electrical
- High power laboratories up to 2.000 MVA for HV
- Synthetic laboratory up to 22.000 MVA equivalent for HV
- High voltage labs up to 4.000 kV for impulse tests, 2.000 kVcc, 1.800 kV 50 Hz

#### Mechanical
- Shaking table of 4x4m provided with three-axes movement, six degrees of freedom and acceleration up to 50m/s²

#### Climatic/Environmental
- 2 climatic chambers up to 690m³ for temperature range -30° / +60°C
- EMC Testing (radiated, induced, …)
- 2 anechoic chambers for frequency range 30Hz to 18GHz maximum size 23x10x12m

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CESI is a founding member of STL and all CESI Group laboratories get access to the circuit and are accredited ISO/IEC 17025 standard.
Milan Testing Platform

Smart Components Lab

Smart Meters Simulated Testing Field

Drives & Motors Test Area

Two dedicated bays featuring a fixed installation of variable speed drivers and two motors up to 30 MW developed in partnership with ABB.
High Power Synthetic Lab

More than 10,000 of switching devices and systems tested from the Medium Voltage to the Extra High Voltage for power transmission and distribution grids

HV AC Cables

3 lines for Prequalification of cables simulating 40 years ageing operating conditions up to 800kV

Emulating the full chain of communication through a realistic small town of 600 houses with electrical appliances
Berlin Testing Platform

Low Voltage

Covering the whole testing spectrum for Low Voltage industrial, civil and special applications

HV AC Test Area

2 Prequalification lines of HV cable systems for terrestrial and submarine applications.
Berlin Testing Platform

HV Dielectric Tests

Verification of the insulation level of electrical equipment from the Medium Voltage to the Extra High Voltage for power transmission and distribution grids in normal and critical installations.

On-site tests

Complete AC high-voltage acceptance tests combined on EHV cables for terrestrial and submarine applications.
Mannheim Testing Platform

HV AC Test Area

5 Prequalification lines of HV cable systems for terrestrial and submarine applications.

HV Dielectric & Pollution Tests

verification of the insulation level of electrical equipment from the Medium Voltage to the Extra High Voltage for power transmission and distribution grids in normal and critical installations (seaside, desert, highly polluted areas).
Mannheim Testing Platform

HVDC Cables Testing Facility

The first independent testing facility in Europe for pre-qualification, type tests and R&D tests of HV Cables and accessories to high up to 600 kV DC
CESI is involved in Quality Assurance services globally

Witnessing tests of Transformers and Reactors

In-production Inspection and Verification of manufacturers process

Quality Assurance on key Equipment of 660-800-1000 kV UHVDC

Audit & Assessment of suppliers

Electrical components manufacturers qualification

Qualification and Monitoring of Power Transformers manufacturers

Design Review and basic Design in the HVDC project

Design Review of Engineering & Construction of Power Transformers
CESI has accreditation and solid experience for enabling product and system compliance to International Standard

Management System Certification

✔ Quality (ISO 9001)
✔ Environment (ISO 14001)
✔ Health & Safety (BS OHSAS 18001)
✔ Data Security (ISO 27001)
✔ Energy (ISO 50001)

Conformity assessment of electric equipment and systems

Electric & Green Components Certification (EN 45011)
CESI has 30-year experience in the research, development and production of high efficiency solar cells based on III-V compounds.

- **Space applications:** Convert the solar radiation into electricity with efficiency above 30%;
- **Terrestrial Applications:** H-CPV systems with cells performances in the range of 38% efficiency at 1000 suns.
# CESI at a Glance

## Summary

1. Company Overview
2. Testing & Certification Services
3. Consulting Solution Services
4. Engineering & Environment Services
# Main Consulting Activities in Transmission and Distribution

## Transmission
- **Planning**
  - Planning studies & Interconnections
  - Integration of Renewable Energy Sources into the Grid
- **Engineering**
  - Support for the development of HVAC and HVDC infrastructures
- **Operation**
  - Consultancy services for Power System Operations
  - Consultancy for Asset Management

## Distribution
- **Planning**
  - Strategic studies for Smart Grids and Smart Metering projects
  - Master plan of Distribution networks
- **Engineering**
  - Owner’s Engineering for Smart Metering and Smart Grids deployment
  - Specification of Distribution Network Automation
- **Operation**
  - Assessment and Improvement of Distribution Networks performance
Transmission - Planning
CESI Experience in Power System studies

Ireland, NIE
Transmission development plan to integrate RES generation

BID, Arco Norte Project
Feasibility study for 4 countries interconnection

Colombia, ISA-ETESA
Feasibility study of Colombia-Panama link

Ecuador, CELEC
Master Plan of transmission network

Chile
Transmission Master Plan

Algeria, SONELGAZ
Update of Defense and Restoration Plans

Germany, Desertec I.I.
2050 Highways EU-North Africa

Belgium, EC
Baltic Countries Interconnections

Romania Moldova, EBRD
Feasibility studies of 400 kV Romania- Moldova connection

Serbia, EMS
Technical assistance for Serbian TSO

Arab Countries, AFESD
Feasibility Study of the Electrical Interconnection and Energy Trade

Jordan, MEMR
Wind integration study

Libya, GECOL / REAOL
Update of defense plan & Wind integration studies

CESI is the most referenced company worldwide for Transmission Master Plans and Regional Interconnections studies
CESI performed **more than 35 HVDC Consultancy Projects** at International level, including more than **10,000 km of overhead lines, 6000 km of submarine cable** and **50 GW of installed capacity**.
**Transmission - Operation**
**CESI Services to TSOs for Power System Operation**

<table>
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<tr>
<th>Consultancy services for Power System Operations</th>
<th>Consultancy for Asset Management of Transmission Equipment</th>
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<td>Since the unbundling of the Transmission System Operator in Italy from the vertically integrated utility, <strong>CESI has been acting as strategic partner of Terna in Power system Operation</strong> issues and development of tailor tools and methodologies for the Control Room.</td>
<td>CESI has supported Terna and many foreign TSO in the development of advanced <strong>Asset management Systems</strong> for optimizing the maintenance of HV transmission network components, namely lines and substations.</td>
</tr>
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Distribution - Engineering
CESI Support in DSOs Smart Metering projects

Focus on Italy

Involvement in projects deploying more than 30 Million meters for Italian DSOs (mainly ENEL Distribuzione and ACEA, HERA, A2A, ACEGAS, AIM..)

Other Projects Worldwide

Spain, Endesa
16 Million meters
2008-2013

Serbia, EPS
0.4 Million meters
2009-2014

Malta, Enemalta
0.4 Million meters
2009-2010

Montenegro, EPCG
0.2 Million meters
2010-2014

Saudi Arabia, ECRA
2012-2013

Uzbekistan, Uzbekenergo
1 Million meters
2013-2016

CESI involvement for more than 50 Million Digital Meters worldwide
Top 50 CESI customers over the last 5 years
## CESI at a Glance

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Shaping a Better Energy Future
“New Power plants” Environmental Impact Assessment

More than 70 EIA for power plants & HVDC

1. Siting
2. Environmental Impact Assessment
3. Permitting

Environmental Impact Assessment for Gibel Gibe – Hydroelectric power plant in Ethiopia.

Thermo-electrical power plant.

Wind farms.
Monitoring Environmental impact of industrial plants

More than 100 projects realized in the last 5 years.

Coal Terminal emissions

Dust emissions from Coal Domes

Water quality
Civil engineering solutions for Hydro, wind farms and substations

Dam Monitoring & Safety

Civil Engineering for Substations

Itaipu - The biggest hydroelectric plant of the world

Seismic and structural Verification (Mochovce, nuclear power plant)
Dam Safety and Management references around the globe

- CESI at a Glance
- Itaipu Dam
- UTE Dams Re-Assessment Project
- Khao Laem Dam
- EGAT 11 Dam Re-Assessment Project
- Vietnam Dam Rehabilitation
- Bosnia Dam monitoring system
- Cerni Ossam Project
- 300 Italian Dams
- Doiras Power Plant
- SCAI Cercs
- Flumendosa power Plant DENOX
- Environmental & hydrometeorological monitoring center
- Itaipu Dam
- UTE Dams Re-Assessment Project

CESI at a Glance
Shaping a Better Energy Future
EEI – Business Model Empowerment

Service Portfolio Reconceptualization

- **Civil Engineering**: Business Continuity/Seismic Assessment of productive building
- **Geomatics**: Support to Hydropower, Infrastructure, Transportation Sectors to Manage Hydrogeological Issue
- **Sustainability**: Life Cycle Assessment
- **Modelling & Permitting**: Health Risk
- **Legal & Technical Advisory**: Water Management
- **Water Management**: Water quality, supply & water footprint

More Markets

- **ALSTOM**, **FINMECCANICA**, **RFI**, **TRENORD**
- **Ferrero**, **Prysmian**, **Enel**, **Fiat**, **Volkswagen**, **Nestle**, **Bosch**, **CRH**, **MCD**, **PRIMAFREI**

More Abroad


Networking – Knowledge – Best Practice & Interest Sharing

CESI at a Glance

Shaping a Better Energy Future
Nuclear – Main References

- Client: State Specialised Enterprise Chernobyl NPP
- CESI worked with two partner (Ansaldo Nucleare and Thales Alenia Space)
- CESI is committed to design, supply, install and start-up a integrated monitoring system
- Main goal of the system is to provide information to guarantee safety conditions
- The main monitoring system units are:
  - Nuclear safety monitoring unit
  - Structural monitoring unit
  - Seismic monitoring unit

Consulting to select new Italian NPP site (2010 – 2011)
- Client: Enel Ingegneria & Ricerca SpA
- CESI is committed to execute siting, environmental studies and risk analysis
- Main purposes:
  - Site suitability assessment by environmental and socio economics data analysis and modeling
  - Support in drawing up the Site Reference Report and the Preliminary Safety Analysis Report
  - Risk analysis
Nuclear – Main References

Consulting for Nuclear Power Plant (2008 – ongoing)

- Client: Enel Ingegneria & Ricerca SpA
- CESI is committed to verify the consistency between the Enel specifications, the suppliers plan and the qualification results
- Main purposes:
  - Assessment of concrete and metal structures by on-site survey and lab analysis
  - Assessment of consistency between the Enel specifications, the suppliers plan and the qualification results regarding the equipment to be installed on NPP

Consulting for Avogadro site in Saluggia (1982 – ongoing)

- Client: Sogin SpA
- CESI is carrying out the corrosion monitoring of radioactive materials containers
- Main purposes:
  - To guarantee the continuative database improvement concerning the material corrosion
  - Integrity of containers evaluation
Nuclear – Main References


- Client: Sogin SpA
- CESI carried out structural and indoor pollution monitoring
- Main purposes:
  - To assess the structural conditions during the decommissioning of RHR - Residual Heat Removal towers
  - To evaluate the quality of work environments, by analyzing the main organic pollutant air and waste water
EEI – Business Model Empowerment

Nurturing Core

Networking – Knowledge – Best Practice & Interest Sharing

Service Portfolio Reconceptualization

- Civil Engineering: Business Continuity/Seismic Assessment of productive building
- Geomatics: Support to Hydropower, Infrastructure, Transportation Sectors to Manage Hydrogeological Issue
- Sustainability: Life Cycle Assessment
- Modelling & Permitting: Health Risk
- Legal & Technical Advisory
- Water Management: Water quality, supply & water footprint

More Markets

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CESI 1956-2016

Testing • Consulting • Engineering • Environment

Milan • Berlin • Mannheim • Dubai • Abu Dhabi • Rio de Janeiro • Washington DC