



Study Committee C3

System Environmental Performance

Strategic Plan
2007 – 2016

(April 2007)



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1 INTRODUCTION

1.1 General situation

Electric Power Industry (EPI) worldwide is experiencing great development and undergoing profound changes.

Some main features are:

- the overall electricity consumption is increasing: electricity is vital for the development and the well being of the world
- despite the growth of Power Sector, in the world, one and half billion people are still without electricity
- the electricity generation is still largely based on fossil fuels, while fast growth rates is requested for the renewable sources
- despite the “maturity” of the Power Sector, the technology development is still playing a role anything but marginal
- liberalization and privatisation of electricity generation and integration of regional and national grids into large open markets are forcing deep re-organization of the Power Sector in all Countries
- the worldwide concern about global changes (especially the “greenhouse” effect) and resources depletion poses new challenges to the Power Sector and requires to implement effective strategies toward Sustainable Development
- environmental problems (e.g. air and water pollution in industrialised world and especially in rapid development economies) deserve great attention and rapid solutions.

CIGRE, since its 1999-2009 Masterplan, stated that the focus of its activities should shift from the traditional technology fields in the direction of system and overall supply aspects.

Environmental aspect and social dimension are acknowledged to be a primary concern for the industry, requiring the adoption of sustainable technology approaches.

1.2 Purpose of the Strategic Plan

The purpose of this Strategic Plan is to describe the medium and long-term ambitions and goals of CIGRE SC C3. It is a tool to evaluate the present situation and to plan and organise future activities, including the build-up and conservation of existing skills. It also provides guidance for assessing the need for, and development of, Working Group (WG) and Task Force (TF) activities.

The Strategic Plan spans a ten-year period and is updated every second year in order to allow for adaptation to developments and trends. It is intended to be a living document, supporting the preparation of a detailed Action Plan covering a three-year period and updated annually.

1.3 Mission and Scope of CIGRE

The mission of CIGRE is stated in its Masterplan for 1999-2009 and confirmed in the Masterplan 2006-2011 as follows:

CIGRE aims to:

- *Facilitate and develop the exchange of engineering knowledge and information, between engineering personnel and technical specialists;*
- *Add value to the knowledge and information exchanged by synthesising state-of-the-art and world practices;*

- *Make managers, decision-makers, regulators and Academia aware of the synthesis of CIGRE's work in the area of electric power.*

More specifically, issues related to planning and operation of electric power systems, as well as the design, construction, maintenance and disposal of equipment and plants are at the core of CIGRE's mission.

The Masterplan also states the CIGRE's Vision:

CIGRE shall be recognised as the worldwide leading organisation on Electric Power Systems, covering their technical, economic, environmental aspects and taking account of the impact of organisational and regulatory aspects.

1.4 Mission of SC C3

The mission and scope of SC C3 reflect the above CIGRE mission and vision applied to the range of activities assigned to the Committee.

To facilitate and promote the progress of engineering and environmental sciences, and the international exchange of information and knowledge, **in the field of system environmental performance**. To add value to this information and knowledge by means of synthesizing state-of-the-art practices and developing recommendations.

SC C3, therefore, deals with:

- identification and assessment of the various impacts on the natural environment arising from electric power systems;
- recommendations on appropriate monitoring, management and control measures.

Impacts addressed include:

- greenhouse gas emissions;
- air and water pollution;
- electromagnetic fields;
- noise, visual, land use and flora/fauna impacts.

Major consideration will be given to:

- optimization in the use of natural resources;
- system efficiency and its environmental implications;
- sustainable development;
- risk assessment and the economics of impact containment;
- effective communication with the public and regulatory authorities.

2 SCOPE AND ACTIVITIES OF SC C3

2.1 The main Target Groups

The main goal of SC C3 is to present positions and produce approaches on Power System environmental performance and impacts and on its implications for management, operation and investment decisions. In this sense the Electric Utilities themselves are the main Target Group, specially their executives and (environmental) managers. The global approach taken by this SC, if presented in a consistent and integrated manner, may be of immediate use to that group, either supporting decision making processes or providing arguments for discussion with authorities or for communication with other stakeholders.

Authorities and Regulators (and also investors, financial analysts, traders) should be made aware of the implications and trade-offs of environmental issues. They will be reached indirectly through the electric companies to whom CIGRE will provide relevant and timely reference material.

Authorities and Regulators could also be reached directly by the SC, both through its Members and through *ad hoc* contacts and liaison.

The public in general, mass media and NGOs are an important secondary Target Group due to the inevitable and growing interaction of Power Systems with citizens (air and water pollution, EMF, noise, visual and land impact, recycling of materials) and to the mass media and NGOs in setting and disseminating information on environmental issues.

Links with other international organisations with similar aims should be part of the SC activity, in line with one of the three main objectives of CIGRE Masterplan. Such organisations may be considered a different type of Target Group for C3. When justified, a member of the SC shall be appointed as permanent liaison member with an external organisation for exchange of information. Already identified relevant organisations are EURELECTRIC, IEEE, CIRED, WEC (World Energy Council), ISO (International Standards Organisation), WHO (World Health Organisation) and WBCSD (World Business Council for Sustainable Development).

At the moment the SC has direct contact (through its Members) with EURELECTRIC, WEC, WHO and WBCSD.

Links with other CIGRE SCs are essential to the activities of C3, inasmuch as each Study Committee remains responsible for environmental questions related to its scope of work. This is particularly the case of Study Committees B1 (Insulated Cables), B2 (Overhead Lines) and B3 (Substations). Furthermore, system environmental performance should not be dissociated from technical and economic performances, especially taking into account the needs and interests of the Target Group of decision makers. SC C3 will thus work in close contact with SC C1 (System Development and Economics) and SC C4 (System Technical Performance).

Interaction with other SCs will be established as a two-way process:

- Using, as inputs, the outcomes of other SCs related to the environmental performance of specific pieces of equipment or subsystems;
- Suggesting to other SCs the analysis of specific issues in a way that allows the subsequent incorporation of the results from a global perspective.

Whenever appropriate Joint WGs or TFs will be established to study subjects of common interest. At this moment (see § 3.4.1) two JWG are in place, namely WG C3-05, together with SC C6, and WG C3-06, together with SC C1.

Liaison with “mirror groups” established in the frame of some National Committees shall also be reinforced.

The relevance of the Target Groups is thus as follows:

Refer.	Target Groups	Importance
1	1.1 Utilities' Executives and Managers	Very High
2	2.1 Authorities, Regulators 2.2 Power System Operators 2.3 (Investors, Traders, Analysts)	High
3	3.1 Public in general 3.2 Mass media, NGOs	Relevant
4	4.1 Universities, Research Institutions 4.2 Contractors, Consultants 4.3 Equipment manufacturers 4.4 Engineers from Utilities	Average
5	5.1 International Organisations	High
6	6.1 Other CIGRE SCs	High

2.2 Priorities

In coordination with the Strategic Plans of CIGRE Technical Committee (TC) and of other CIGRE Study Committees, C3 activities shall have the following priorities:

- Provide appropriate answers to the evolving requirements of C3 Target Groups;
- Disseminate environmental related information in an integrated way;
- Develop, preserve and expand the technical expertise within CIGRE.

2.3 Strategic Technical Directions

SC C3 should focus on adding maximum value and integration as part of a systematic approach to environmental performance. There may be little need to develop new activities, but it will be important to integrate them more effectively, to fill identified gaps and to provide comprehensive reporting and issues solving processes.

To provide driving criteria for WGs, Strategic Technical Directions (TDs) are defined. TDs give the general scope and address long-term activity, while the WGs develop answers to specific questions within the TDs according to the agreed priorities. The scope of SC C3 will be categorised into the following main TDs:

- TD 1 Power Systems development and Environment
- TD 2 Power Systems operation and Environment
- TD 3 Global environmental changes and Power Sector
- TD 4 Risk assessment, management and communication

Each TD will be addressed by one or more WG or TF (see § 3.4.1).

The first TD addresses the environmental impact during planning and development phase of Power Systems, while the second focuses on the operation phase. The third TD should reflect the growing importance of global changes both on the development and the operation of Power Systems, while –for the moment- it doesn't include any specific WG; one of the Preferential Subject of 2008 Paris session, however, is dedicated to this topic. The fourth TD deals with the problem of “risk” and with communication issues.

3 THE ORGANIZATION OF SC C3

3.1 General

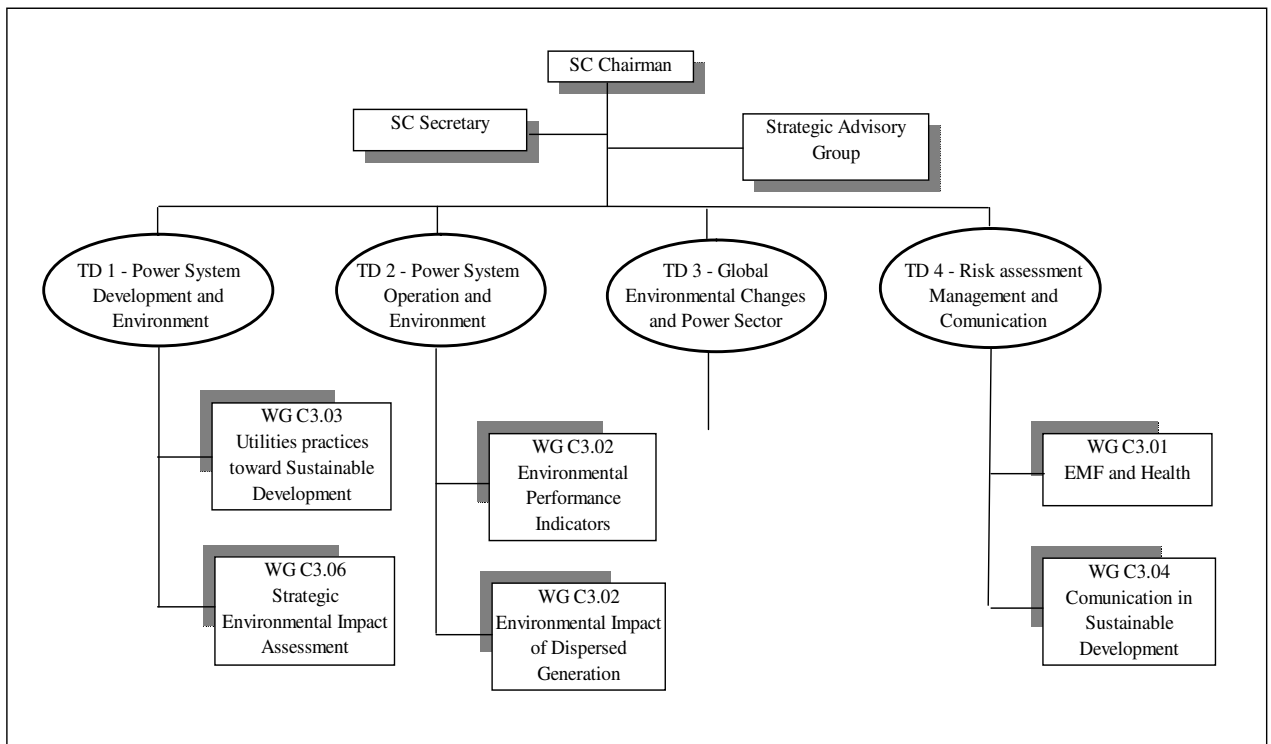
Strengths

- ✓ Environmental issues are of great importance and concern for the Power Sector worldwide
- ✓ C3 membership include experts from generation and transmission companies, together with Universities and Agencies

Weaknesses

- ✓ Environmental issues (from a system point of view) are relatively new for CIGRE
- ✓ The scope of C3 covers a quite broad spectrum of activities
- ✓ C3 membership is should be “reinforced”
- ✓ Manufacturers are not present in C3. Liberalisation and privatisation reduce the resources available at the Utilities for international activities
- ✓ Connection with other CIGRE SC and with international bodies should be improved

The overall structure of SC C3 is shown in the figure below.



3.2 Membership

SC C3 current membership consists of:

- Chairman
- Secretary
- 20 Regular Members
- 8 Observer Members

27 Countries are represented.

The 20 Regular Members are from Argentina, Australia, Brazil, Canada, China, France, Germany, Italy, Japan, Korea, Netherlands, Norway, Portugal, Russia, South Africa, Spain, Sweden, Switzerland, UK and USA.

The 8 Observer Members are from Algeria, Arab States of the Gulf, Belgium, Croatia, Egypt, India, Poland and Romania.

The scope of SC C3 covers a broad spectrum of activities which requires that its members do not form a homogeneous group of technical experts working in a well defined area, as is mostly the case in many CIGRE SCs. Environmental performance is not necessarily a specific technical “field of activity” in the CIGRE sense like most of the domains of the other CIGRE SCs. Current membership of SC C3 is a mixture of experts in more confined technical areas, members with a broadly-based experience and members with managerial responsibilities. The current membership composition is as follows:

The affiliation of SC C3 Members (including Chairman and Secretary) is depicted in the following Table:

Affiliation	Regular	Observer
Generating Companies	4	1
Transmission Companies	6	3
Distribution Companies		
Utilities Associations	1	
Energy Suppliers		
Governmental Entities	2	1
Regulators		
Research and Laboratories	7	
Universities	1	1
Manufacturers		
Consultants	1	2

It is desirable to obtain the typical maximum number of 24 Regular Members for CIGRE SCs.

Contrary to the normal situation in CIGRE SCs, there are no representatives of Manufacturers. The development of the SC activities will benefit from such additional membership, as well as from consulting firms. Specialists in other fields, namely environment, medicine or communication, may also be invited to give non-industrial points of view. This will require special efforts mostly from National Committees who will be specifically requested to provide it.

As a worldwide organisation, CIGRE should take due account of the concerns and requirements of developing and newly developed countries, as well as regional specificities. Regional diversification should be, as far as possible, reflected in the SC C3 membership. The current geographical background of SC C3 (including Chairman and Secretary) is:

- Europe 17

- America (North and South) 4
- Australasia 5
- Africa & Middle East 4

From sectorial and regional perspectives, the distribution of membership is somehow unbalanced. Through additional direct contacts with National Committees and the dissemination of the Strategic Plan, a more balanced representation will be sought, using the Regular members' vacancies still available.

3.3 Meetings

The Study Committee meets every year. In even years a one-day meeting is held in Paris, in conjunction with the CIGRE General Session. In odd years a one-and-a-half or a two-day meeting takes place in the country of one of the Study Committee members, upon invitation of that country's CIGRE National Committee.

SC C3 is responsible for organizing its corresponding session of the Paris Conference, by selecting the preferential subjects, reviewing the submitted papers, appointing a Special Reporter, editing the Special Report and chairing its session. After the session, the SC edits a summary containing the substantive points of the session.

It could be advisable to organize joint Session together with other SC's. The SC should also give contribution to the organization of the "special events" during General Sessions, e.g. Opening Panels etc.

SC C3 should organize colloquia on specific subjects in odd years. It should also organise workshops in conjunction with the National Committee of the host country arranging the SC meeting.

In the first four years of its life, no Colloquia or Symposia have been organized by SC C3, though this should be a priority, in order both to enhance "visibility" for the Study Committee and to increase the quality of the work and the cohesion among members.

During the 2007 meeting, as a first attempt, a one-day "technical conference" will be held, together with a half-day "special meeting", dedicated to the discussion of the WG's main results.

From 2009, efforts shall be made, in order to organize technical events in connection with "odd years" SC meetings.

3.4 Working Groups (WG) and Task Forces (TF)

The basic operating structures of the SC are WGs and TFs. They conduct the main activities and prepare draft reports and position papers. The role of the SC is to oversee and guide the work of the WGs so that their activities and reports fulfil the role assigned to the SC and satisfy the needs of the Target Groups.

WGs are entitled to conduct their works independently with the SC's ongoing directions. Their effective performance requires unambiguous guidelines for conveners and members, a clear definition of their Terms of Reference and a work plan with specific time limits. Typical duration of a WG is 3 to 4 years.

TFs may be set up within a WG when justified by the work involved. Such TFs operate under the responsibility of the WG convener.

Conveners of WGs and TFs are appointed by the Study Committee and report to it.

Terms of Reference for WGs and TFs are usually drafted by Advisory Groups. They are approved by the SC and submitted to the Technical Committee for final endorsement.

The efficient performance of WGs (and TFs) requires a suitable combination of participants' skills and backgrounds. The type of issues to be addressed by SC C3 and the changing nature of the institutional and operational framework of the electric power industry may require a dominance of multi-disciplinary generalists with technical, economic and environmental know-how.

For these working bodies:

- it is expected that each SC member participates actively to at least one of them,
- it is also expected that each member, in coordination with his/her National Committee contributes to the designation of experts for them, and to the dissemination and promotion inside the country's Power Sector of the work done.

3.4.1 Current Working Bodies

The current Working Bodies operating inside SC C3 are summarized in the following table:

Type	Number	Title	Name of Convener (Country)	Technical Direction (TD)	Year of creation	Scheduled year of disbanding
WG	WG C3.01	Electromagnetic Fields (EMF) and Health	Michel PLANTE (CAN)	TD 4		Permanent WG ⁽¹⁾
WG	WG C3.02	Environmental performance indicators ⁽²⁾	Etienne SERRES (FR)	TD 2	2004	2007
WG	WG C3.03	Utilities practices toward Sustainable Development	Antonio NEGRI (ITA)	TD 1	2004	2007
WG	WG C3.04	Communication in Sustainable Development	Hector PEARSON (UK)	TD 4	2005	2008 ⁽³⁾
JWG ⁽⁴⁾	JWG C3.05	Environmental impact of Dispersed Generation	Thomas SMOLKA (GER)	TD 2	2006	2009
JWG ⁽⁵⁾	WG C3.06	Strategic Environmental Impact Assessment	Ricardo FURTADO (BRA)	TD 1	2006	2009
JTF	JTF CI-GRE/CIREDC4.2.05 ⁽⁶⁾	Characterization of ELF	Jean HOEFFELMAN (B)	TD 4		2007

Notes

- (1) with the agreement of the TC the WG "*EMF and Health*" is accepted as "permanent" due to its specific characteristics and activities (keep track of scientific developments)
- (2) the target date is referred to the work dedicated to TSO-specific performance indicators; this WG will continue its activity aimed to Generation Companies-specific performance indicators
- (3) the WG has been in "stand by" till mid-2006, then it has been "re-started"; probably, the new disbanding expected date will be 2009
- (4) with SC C6
- (5) with SC C1
- (6) the SC C3 has one of its members (H. Soibelzon, ARG) participating to this JTF; the final report has been issued in early 2007.

A further WG (WG C3.07 “Limits for power frequency electric and magnetic fields –EMF- and interaction with territory, environment and sustainability”), whose approval by TC Chairman is still pending, could be launched in the next future. This proposed WG could address both TD 4 and TD 5.

Other topics to be covered by (possible) further WG’s are e.g.: Noise impact from OHL (Over Head Lines), Efficiency and its environmental implications, Environmental impact of RES (renewable Energy Sources....

A short description of the mandate and activity of the operating WG’s is given here below.

WG C3.01 – *EMF and Health*

For the last 30 years, the question of possible health effects of electric and magnetic fields has been raised. In 1987, CIGRE established a Working Group with the objective of following the research developments and producing original reviews on some specific aspects of this issue. Since then, many scientific reviews have been published by independent and authoritative organizations. The main objective of the WG is to comment on upcoming reports and related events, to keep track of the scientific developments relevant to the assessment of any potential human health risk of 50/60 Hz electric and magnetic fields and to periodically review the CIGRE position statement on EMF.

WG C3.02 - *Environmental Performance Indicators*

Many electric utilities and some national electricity associations have looked at this issue so that little additional work is needed. However, it is considered useful for a WG to explore criteria, terminology and indicators that are being used and to present a survey with an overall review.

WG C3.03 - *Utilities Current Practices in Sustainable Development*

This WG will look at current best practice models, principles and strategies used by electric utilities. It will identify how they address the realities of current dilemmas and will highlight how differing national and company circumstances drive strategic approaches. The WG may also discuss some substantive questions and challenges that will influence the nature of sustainable strategies in the future. It could prepare a checklist of those questions for further development.

WG C3.04 - *Communication Strategies in Sustainable Development*

Utilities must increasingly communicate about their performance and many already do so through reports, e.g. environmental reports. However, in the competitive market environment, utilities face harder challenges to the credibility of their positions and statements. There is scope for a WG to focus on and make a survey of processes and approaches taken by utilities to find out their information needs and the views of their external stakeholders and how they influence positions.

WG C3.05 – *Environmental Impact of Dispersed Generation*

Dispersed Generation (DG), based both on fossil sources and on renewables, is expected to experience a large penetration in Power Systems but the issue of its impact on the environment is still open

The aim of the WG is to define procedures and methods to evaluate the environmental impact of DG

WG C3.06 – *Strategic Environmental Impact Assessment*

Strategic Environmental Assessment (SEA), also called Environmental Evaluation of Plans and Programs, is becoming a normal practice in many Countries (EU, Brazil, South Africa...), as part of the planning process for large infrastructure and/or service projects. It is also applicable to the development of Power Systems.

SEA practice is very recent, with few application experiences and no harmonised methodologies.

The aim of the WG is to define procedures and methods to apply Strategic Environmental Assessment (SEA) to Power Systems Development.

3.5 Advisory Groups

To improve the effectiveness of the SC and to cope with the extended non-technical requirements detailed in the new CIGRE strategy, Advisory Groups (AGs) are set up to analyse items of a strategic nature such as customer relations, target groups, tutorials and strategic directions. Based on their analyses, AGs will prepare proposals for the management of these items for the SC. Their duration can be short-term or permanent and will depend on the type of issues they are required to address.

AGs may also be requested to draft or review Terms of Reference for WGs and TFs.

For the time being, one “Strategic Advisory Group” will help Chairman in monitoring the evolution of the SC Target Groups needs, establishing the topic to be covered by working bodies and defining and validating the ToR of these working bodies. Moreover, the Strategic Advisory Group will help in defining the subjects for Paris Session and organizing the SC events.

3.6 Outputs of the Study Committee

Short reports

Many people, and in particular executives and managers do not have time to read long reports. SC C3 will aim at producing short documents that can be read by high-level decision makers and thus demonstrating the value and usefulness of CIGRE for that Target Group.

Surveys or summaries of worldwide practices and experiences

CIGRE has a wide international coverage, which enables its WGs to produce comparative surveys or summaries of present practices in countries around the world. Such reviews can be very valuable in helping decision makers to find solutions or assess different options.

Recommendations

When the activities of a WG leads to productive or valuable results of general interest, SC C3 will produce recommendations for dissemination within the power industry and, if relevant, to energy policy decision makers or regulatory bodies.

Articles in ELECTRA

Working Groups will use ELECTRA for publication of relevant recommendations or results on completion of their work.

Reference booklets or manuals

Some WGs may produce booklets or manuals presenting state-of-the-art solutions or benchmarking of “best practices” for a given set of problems in the field of system environmental performance.

Presentations at non-CIGRE events

To reach non-traditional Target Groups and to give WG reports an increased value and relevance within the industry, it will be beneficial to present the WG results at non-CIGRE events. This will raise the profile of CIGRE and demonstrate its technical value.

3.7 The SC C3 website

The SC C3 website shall become the main tool for exchanging information, documents and news among SC members; it should be also used like a “forum”, for discussion about current themes of interest inside the SC.

The website shall also become the “window” through which the “external” world can look at the SC C3 and one of the most effective way through which the SC C3 can communicate with its Target Groups.

The website, managed by a dedicated person, contains:

- in its “public opened” part:
 - the description of SC C3 and of the ongoing work
 - the ToR of the working Bodies active inside the SC
 - the reference to the documents produced by CIGRE in the field of System Environmental Performance and –more in general- in the field of Environment (as far as power systems are concerned)
 - all reference and links to the documents produced by other Association and Bodies in the field of Environment
 - reference and links to events that are taking place throughout the world- in the field of Environment (especially those where power systems are concerned).
- in its “Member reserved” part:
 - the list of members
 - the official documents of the SC (i.e. the Strategic Plan, the last Action Plan, and the Activity Reports) and other eventual working document at SC level (e.g. programs for the next meetings, or events...)
 - an area for each working body, with the ToR, the indication of Convener and the members list, the working documents and any other information deemed useful by the relevant convener
 - references and links to the technical brochures published by CIGRE in the field of System Environmental Performance and –more in general- in the field of Environment (as far as power systems are concerned)
 - all papers presented at the last Paris Session and at the last Colloquia and Symposia organized by the SC.

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