ONS Annual Report
2012

Summary

Institutional Information

1.1 – ONS Associate Members

AES SUL Distribuidora Gaúcha de Energia S/A
AES Uruguaiana Empreendimentos S/A
Afluente Transmissão de Energia S/A
Agro Energia Santa Luzia Ltda.
Alumar Consórcio de Alumínio S/A
Alumínio Brasileiro S/A
Amazonas Distribuidora de Energia S/A
Amazônia-Eletronorte Transmissora de Energia S/A
Ampla Energia e Serviços S/A
Anglo American Barro Alto
Anglo American Brasil Ltda.
Anglogold Ashanti Brasil Mineração Ltda.
Anglogold Ashanti Córrego do Sítio Mineração S/A
Araraquara Transmissora de Energia S/A
Arcelormittal Brasil S/A
Arcelormittal Inox Brasil S/A
Arembepe Energia S/A
Artemis Transmissora de Energia S/A
ATE II Transmissora de Energia S/A
ATE III Transmissora de Energia S/A
ATE Transmissora de Energia S/A
ATE VII Foz do Iguaçu Transmissora de Energia S/A
ATE VIII TRANSMISSORA DE ENERGIA SA
ATLANTICO CONCESSIONARIA DE TRANSMISSAO DE ENERGIA DO BRASIL
Baguari I Geração de Energia Elétrica S/A
Barra Bioenergia S/A – Filial Ipaussu
Barra do Braúna Energética S/A
Berneck S/A Painéis e Serrados
Bolognesi Participações S.A.
Bons Ventos Geradora de Energia S/A
Borborema Energética S/A
Borracha Vipal S/A
Braskem UNIB–RS
Brasken S/A
Brasnorte Transmissora de Energia S/A
Breitener Tambaqui S.A.
Brentech Energia S.A.
Brentech Energia S/A

Brilhante Transmissora de Energia Ltda.
Cachoeira Paulista Transmissora de Energia S/A
Caiuá – Serviços de Eletricidade S/A
CALDAS NOVAS TRANSMISSÃO AS
Campos Novos Energia S/A
Campos Novos Transmissora de Energia S/A - ATE VI
Candeias Energia S/A
Canoas Duke
Caramuru Alimentos Ltda.
Carbocloro S/A Industrias Químicas
Castertech Fundição e Tecnologia Ltda.
Catxere Transmissora de Energia S/A
Cauipe Geradora de Energia S/A
CEB Distribuição S/A
CEB Geração S/A
CELG Distribuidora S/A
CELG Geração e Transmissão S/A
Centrais Elétricas Cachoeira Dourada S/A
Centrais Elétricas de Pernambuco S/A - EPESA
Centrais Elétricas de Rondônia S/A
Centrais Elétricas de Santa Catarina S/A
Centrais Elétricas do Norte do Brasil S/A
Centrais Elétricas do Pará S/A
Centrais Elétricas do Rio Jordan S/A
Centrais Elétricas Matogrossense S/A
Central Eólica Praia do Morgado S/A
Central Eólica Volta do Rio S/A
Central Geradora Colônia S.A.
Central Geradora Eólica Icaraí II S.A.
Central Geradora Eólica Icaraí I S.A.
Central Geradora Eólica Taíba Águia S.A.
Central Geradora Eólica Taíba Andorinha S.A.
Central Geradora Termelétrica Fortaleza S/A
Cia Energética de Petrolina
Cia. de Transmissão Centroeste de Minas
Cocal Termelétrica S/A
Companhia Brasileira de Alumínio
Companhia de Eletricidade do Acre
Companhia de Eletricidade do Estado da Bahia
Companhia de Energia Elétrica do Estado de Tocantins
Companhia de Geração de Energia Elétrica Tietê
Companhia de Geração Térmica de Energia Elétrica
Companhia de Interconexão Energética
Companhia de Transmissão Centroeste de Minas

Companhia de Transmissão de Energia Elétrica Paulista
Companhia Energética Chapecó
Companhia Energética de Alagoas
Companhia Energética de Minas Gerais
Companhia Energética de Pernambuco
Companhia Energética de Petrolina
Companhia Energética de São Paulo
Companhia Energética do Ceará
Companhia Energética do Maranhão
Companhia Energética do Piauí
Companhia Energética do Rio Grande do Norte
COMPANHIA ENERGÉTICA MANAUARA
Companhia Energética Potiguar S/A
Companhia Energética Rio das Antas
Companhia Energética Santa Clara
Companhia Energética São Salvador
Companhia Estadual de Distribuição de Energia Elétrica
Companhia Estadual de Geração e Transmissão de Energia Elétrica
Companhia Hidroelétrica do São Francisco
Companhia Jaguari de Energia
Companhia Luz e Força Santa Cruz
Companhia Paraibuna de Metais - Sobragi
Companhia Paulista de Força e Luz
Companhia Piratininga de Força e Luz Ltda.
Companhia Siderúrgica de Tubarão
Companhia Siderúrgica Nacional
Companhia Sul Paulista de Energia S.A.
Companhia Transirapé de Transmissão
Companhia Transleste de Transmissão
Companhia Transudeste de Transmissão
Consórcio AHE Funil
Consórcio Candonga
Consórcio Capim Branco Energia
Consórcio CEMIG-CEB
Consórcio Empresarial Salto Pilão
Consórcio EnerPeixe
Consórcio Estreito Energia
Consórcio Igarapava
Consorcio Jauru
Consórcio Paraibuna
Consórcio Porto Estrela Ltda.
Consórcio Serra do Facão
Consórcio UHE Guilman Amorim
COPEL Distribuição S/A

COPEL Geração S/A
COPEL Transmissão S/A
Coqueiros Transmissora de Energia Ltda.
Corumbá Concessões S/A
Coteminas S/A
CPFL - Geração de Energia S/A
Desa Eólicas S/A
Dona Francisca Energética S/A
DSM Elastômeros Brasil Ltda.
Duke Energy International – Geração Paranapanema
Eka Bahia S/A
Elebrás Projetos S/A
Elektro – Eletricidade e Serviços S/A
Eletrobrás Termonuclear S/A
Eletrogóes S/A
Eletropaulo Metropolitana – Eletricidade de São Paulo S/A
Eletrosul Centrais Elétricas S/A
Empresa Amazonense de Transmissão de Energia
Empresa Bandeirante de Energia S/A
Empresa Brasileira de Transmissão de Energia S/A
Empresa Catarinense de Transmissão de Energia S/A
Empresa de Eletricidade Vale Paranapanema S/A
Empresa de Transmissão de Energia de Mato Grosso S/A
Empresa de Transmissão de Energia do Oeste Ltda.
Empresa de Transmissão de Energia do Rio Grande do Sul S/A
EMPRESA DE TRANSMISSAO DE VARZEA GRANDE AS
Empresa de Transmissão do Alto Uruguai S/A
Empresa de Transmissão do Espírito Santo S/A
Empresa Elétrica Bragantina S/A
Empresa Energética de Mato Grosso do Sul S/A
Empresa Metropolitana de Águas e Energia S/A
Empresa Norte de Transmissão de Energia S/A
Empresa Paraense de Transmissão de Energia S/A
Empresa Regional de Transmissão de Energia S/A
Empresa Santos Dumont de Energia
ENCRUZO NOVO TRANSMISSORA DE ENRGIA LTDA
Enerbrasil – Emergias Renováveis do Brasil Ltda.
Energest S/A
Energética Águas da Pedra
Energética Barra Grande S/A
Energética Camaçari Muricy I S/A
Energética Suape II S/A
Energia Sustentável do Brasil S/A
Energisa Borborema Distribuidora de Energia S/A

Energisa Minas Gerais Distribuidora de Energia S/A
Energisa Paraíba
Energisa Sergipe
Enguia Gen CE Ltda.
Enguia Gen PI Ltda.
Eólica Cerro Chato I S/A
Eólica Cerro Chato II S/A
Eólica Cerro Chato III S/A
Eólica Faísa I Geração de Energia S.A
Eólica Faísa II Geração de Energia S.A
Eólica Faísa III Geração de Energia S.A
Eólica Faísa IV Geração de Energia S.A
Eólica Faísa V Geração de Energia S.A
Espírito Santo Centrais Elétricas S/A
Espora Energética Ltda.
Estação Transmissora de Energia As
Evrecy Participações Ltda.
Expansion Transmissão de Energia S/A
Expansion Transmissão Itumbiara Marimbondo S/A
Fibraplac Chapas de MDF Ltda.
Foz do Chapecó Energia S/A
Foz do Rio Claro Energia S/A
Furnas Centrais Elétricas S/A
Geração CIII S/A
Geradora de Energia do Amazonas S/A
Geradora de Energia do Norte S/A
Gerdau Aços Longos S/A – Barra dos Coqueiros
Gerdau Aços Longos S/A – Caçu
Gerdau Aços Longos S/A – SP
Goiânia Transmissora de Energia S/A
Goiás Transmissão S/A
Ijuí Energia S/A
Innova S/A
Integração Transmissora de Energia S/A
Interligação Elétrica de Minas Gerais
INTERLIGAÇÃO ELETRICA DO MADEIRA S.A
Interligação Elétrica Norte e Nordeste S/A
Interligação Elétrica Pinheiros S/A
Interligação Elétrica Serra do Japi S/A
Interligação Elétrica Sul S/A
Investco S/A – Lajeado
Iracema Transmissora de Energia S/A
Itá Energética S/A
Itaipu Binacional

Itapebi Geração de Energia S/A
Itiquira Energética S/A
Itumbiara Transmissora de Energia Ltda.
Jauru Transmissora de Energia Ltda.
Kinross Brasil Mineração S/A
Lambari Geradora de Energia S.A.
Lanxess Elastômeros do Brasil S/A
Light – Serviços de Eletricidade S/A
Light Energia S/A
Linde Gases
Linha de Transmissão Corumbá
Linha Verde Transmissora de Energia S/A
Linhares Geração S/A
Linhas de Macapá Transmissora de Energia Ltda.
Linhas de Transmissão de Montes Claros Ltda.
Linhas de Transmissão do Itatim Ltda.
Linhas de Xingu Transmissora de Energia Ltda.
Londrina Transmissora de Energia S/A – ATE V
LT Triângulo S/A
Lumitrans Companhia Transmissora de Energia Elétrica
Macaúbas Energética S/A
Manaus Transmissora de Energia S/A
Maracanaú Geradora de Energia S/A
MGE Transmissão S/A
Mineração Maraca Indústria e Comercio S/A
Mineração Paragominas S/A
Mirabela Mineração do Brasil Ltda.
Monel Monjolinho Energética Ltda.
MPX Energia S/A
MS Participações Societárias S/A
New Energy Options Geração de Energia S/A
Nordeste Transmissora de Energia S/A
Norte Brasil Transmissora de Energia S.A.
Nova Era Silicon S/A
NovaTrans / Enelpower do Brasil Ltda.
Oxiteno Nordeste S/A Indústria e Comércio
Pedra Branca S/A
Pedras Transmissora de Energia Ltda.
Petróleo Brasileiro S/A
Petróleo Brasileiro S/A – Fábrica de Fertilizantes Nitrogenados – FAFEN-SE
PIE-RP Termelétrica S/A
Poços de Caldas Transmissora de Energia Ltda.
Porto Primavera Transmissora de Energia Ltda.
Porto Velho Transmissora de Energia S/A

Refinaria Presidente Getúlio Vargas – Araucária – PR
Retiro Baixo Energética S/A
Ribeirão Preto Transmissora de Energia Ltda.
RIMA INDUSTRIA S.A.
Rio Amazonas Energia S.A.
Rio Branco Transmissora de Energia S/A
Rio Claro Agroindustrial S/A
Rio Grande Energia S/A
Rio Verde Energia S/A
Rosal Energia S/A
Sadia S/A
Salobo Metais S/A
Samarco Mineração S/A
Santo Antônio Energia S/A
São Mateus Transmissora de Energia S/A – ATE IV
São Pedro do Lago S/A
SE Naramdiba S/A
Serra da Mesa Transmissora de Energia Ltda.
Serra Paracatu Transmissora de Energia Ltda.
Sete Gameleiras S/A
SETE LAGOAS TRANSMISSORA DE ENERGIA LTDA
Siderúrgica Barra Mansa
Sistema de Transmissão Catarinense S/A
Sistema de Transmissão Nordeste
SOLVAY INDUPA DO BRASIL
Sul Transmissora de Energia Ltda.
Tangará Energia S/A – Guaporé
TERMELÉTRICA PERNAMBUCO III S.A.
Termelétrica Viana S/A
Termo Norte Energia Ltda.
Termo Pernambuco Ltda.
Termocabo Ltda.
ThyssenKrupp CSA Siderúrgica do Atlântico
Toyota do Brasil LTDA
Tractebel Energia S/A
Transenergia Goiás S.A
Transenergia Renovável S/A
Transenergia São Paulo S/A
TRANSMISSORA DE ENERGIA SUL BRASIL
Transmissora Delmiro Gouveia S/A
Transmissora Matogrossense de Energia S/A
Transmissora Porto Alegrense de Energia Ltda.
Transmissora Sudeste Nordeste S/A
Transmissora Sudeste Nordeste S/A – PATESA

U. E. G. Araucária Ltda.
Uirapuru Transmissora de Energia
Usina Termelétrica de Anápolis Ltda.
Usina Termelétrica Norte Fluminense S/A
Usina Xavantes S/A
Usinas Siderúrgicas de Minas Gerais S/A
UTE MC2 Camaçari 1 S/A
UTE MC2 Catu S/A
UTE MC2 Dias Davila 1 S/A
UTE MC2 Dias Davila 2 S/A
UTE MC2 Feira de Santana S/A
UTE MC2 Senhor do Bonfim S/A
Vale Potássio Nordeste S/A
Vale S/A
Vallourec & Sumitomo Tubos do Brasil Ltda.
Ventos do Sul Energia S/A
Veracel Celulose
Vila do Conde Transmissora de Energia Ltda.
Votorantim Cimentos Ltda.
Votorantim Metais Níquel S/A
White Martins

1.2 – Administration Board

Elected for the biennium April/2012 to April/2014

Category: Production

⇒ Valter Luiz Cardeal de Souza (ELETROBRÁS) as titular member and Luiz Henrique de Freitas Schnor (CGTEE) as alternate member;

⇒ Cesar Ribeiro Zani (FURNAS) as titular member and Ricardo Daruiz Borsari (EMAE) as alternate member;

⇒ Fernando Henrique Schuffner Neto (CEMIG) as titular member and Alexandre Magno Firmo Alves (CDSA) as alternate member;

⇒ Maurício Stolle Bähr (TRACTEBEL) as titular member and Armando de Azevedo Henriques (DUKE) as alternate member;

⇒ Xisto Vieira Filho (MPX) as titular member and José Alcides Santoro Martins (PETROBRÁS) as alternate member;

Category: Transport:

⇒ Mozart Bandeira Arnaud (CHESF) as titular member and Luciano Paulino Junqueira (NTE) as alternate member;

⇒ Ronaldo dos Santos Custódio (ELETROSUL) as titular member and Ramon Sade Haddad (STATE GRID) as alternate member;

⇒ Celso Sebastião Cerchiari (CTEEP) as titular member and Asley Stecca Steindorff (CELG) as alternate member;

⇒ Lauro Sergio Vasconcelos David (TBE) as titular member and Jose Aloise Ragone Filho (TAESA) as alternate member.

Category: Consumption

⇒ Lindolfo Zimmer (COPEL) as titular member and Cleverson Siewert (CELESC) as alternate member;

⇒ Wilson Pinto Ferreira Junior (CPFL) as titular member and Donato da Silva Filho (EDP ESCELSA) as alternate member;

⇒ Britaldo Pedrosa Soares (ELETROPAULO) as titular member and Paulo Roberto Ribeiro Pinto (LIGHT) as alternate member;

⇒ Solange Maria Pinto Ribeiro (NEOENERGIA) as titular member and Lucas Leandro Müller (REDE) as alternate member;

⇒ Ricardo Batista Mendes (VALE) as titular member and Erico Teodoro Sommer (GERDAU) as alternate member;

Ministry of Mines and Energy

⇒ Francisco Romário Wojcicki as titular member and Ricardo Spanier Homrich as alternate member.

Fiscal Board

⇒ Mauro Guilherme Jardim Arce (CESP) as titular member and Pedro José Diniz de Figueiredo (ELETRONUCLEAR) as alternate member, representing the Category Production;

⇒ Wady Charone Junior (ELETRONORTE) as titular member and Domingos Sávio Castro Horta (TAESA) as alternate member, representing the Category Transport;

⇒ Sérgio Souza Dias (CEEE) as titular member and Marcus Sérgio Fontana (CEB) as alternate member, representing the Category Consumption.

1.4 – ONS Board of Directors

Hermes Chipp – CEO

Álvaro Fleury Veloso da Silveira – Director of Administration of Transmission Services

Francisco José Arteiro de Oliveira – Director of Operation Planning and Scheduling

István Gárdos – Director of Corporate Affairs

Ronaldo Schuck – Director of Operations

1.5 – Administration Board's Message

Two relevant points

The year 2012 sets out another cycle of intense work of Operador Nacional do Sistema Elétrico - ONS, both in the fulfillment of its institutional mission - to ensure the security and economicity of electricity supply to consumers of the Brazilian Interconnected Power System - as in the continuous search for improvement of the organizational management.

The work of the Administration Board joins this integrated effort of the technical teams of the Operator, Associate Agents and other organizations that conduct the electric sector, contributing to this impressive set of positive results, both in the technical field and in the corporate management.

I highlight the efforts of the Commission of Counselors which examined the challenges and proposals for improvement of the processes for expansion of generation and power transmission. The objective was to identify the impact on the operation of the BIPS of a process of planning and expansion in which has prevailed hydroelectric generation without reservoirs and the intermittent generation, as well as to propose enhancements.

Among the challenges mentioned, it is possible to highlight: the need of holding regional auctions and by source type, the need to restrain the loss of regularization of the reservoir system capability, the need to increase basic thermal generation also considering new technology to reduce CO2 emissions, the need to accommodate large amounts of intermittent generation to meet the load, the need to improve operating security mechanisms, and the specific needs of regulation, implementation and operation of transmission grids.

The second point I would like to comment on was the process of review and improvement of the Operator Management Plan for Jobs and Remuneration. Formulated from a comprehensive internal work, the proposal made possible by the Commission of Counselors sought to ensure the sustainability of the organization, making it able to attract and retain highly qualified human resources necessary to the holding of its institutional mission. At the same time, we sought a modern formulation in order to promote the rationalization of staff costs. The approval of the proposal sent by the Board in its entirety shows that we are in the right direction.

I also highlight the positive outcomes of the project of deployment of the Operator new facilities in Florianopolis, Recife and Rio de Janeiro, which will elevate the organization to a new level in terms of physical environment in a short time.

I am sure the evolution of these issues will lead to a fully trained Operator to coordinate the operation of a system becoming larger and more complex, expanded from the perspective of the commitment to future generations, and that can meet an increasing energy demand per capita. Adding the dedication and expertise of its technical staff to the management ability of the Board of Directors and the reliable guidance of its Administration and Fiscal Boards, all of the challenges that the future will bring will be overcome.

Maurício Stolle Bähr

President of the Administration Board

1.6 – CEO's Message

Put to the test

When analyzing retrospectively the results achieved in 2012, I notice that this was a year in which the Operator was put to the test in various challenges we have faced. And if at the end of the period we could view the achievements with pride, considering the characteristics of the organization, this is due to a coordinated and proactive management in several aspects.

We have had the necessary and valuable collaboration of all institutions responsible for the management of the electric sector: the Ministry of Mines and Energy, the Brazilian Electricity Regulatory Agency and other regulatory agencies, the Energy Research Company, the Electric Power Trading Chamber, the State Secretariats of Energy, each of the 321 associate agents and the associations that represent them.

In addition, we rely on ongoing dedication and personal commitment of each member of ONS' technical staff. Working responsibly and integrated, we have been able to overcome challenges and keep the organization in the long journey of success that has marked its history.

In 2012 projects that prepare the system so that our mission can be performed more effectively in the future have been continued. I highlight among them the analysis of the supply conditions of the host cities of FIFA Confederations Cup, of FIFA World Cup in 2014 and the preparation for 2016 Olympic Games; the assessment of compliance of the basic projects of Madeira transmission system to the requirements of the the bidding documents, essential for its integration into the BIPS; deployment activities of ONS Power Management Network (REGER); the adoption of a regular cycle of review of all Grid Procedures involving the Agents; and the work of the technical groups that analyze the conditions of power supply to the main load centers, responsible for studying the actions and measures for the implementation of the works already established and operational measures necessary to ensure the supply to various states of the federation, which involved the State Secretaries of Energy and Environment. In particular, it was given a differentiated treatment for facilities considered strategic in order to minimize the effects of multiple contingencies on the transmission system. All are long-term projects that extend beyond the boundaries of the calendar year.

Regarding the finalistic activities, we have faced specific challenges, both in the administration of the resources available to meet the power load in a year marked by unfavorable hydrological conditions, and in coping with large disturbances occurring between September and December, which had great social impact. Despite these difficulties, we have continued efficiently coordinating the operation of the BIPS and guaranteeing the energy supply with security at the lowest cost.

I would like to highlight the involvement of ONS technical team in preparation for the entry into operation of the interconnection Tucuruí-Macapá-Manaus, which will enable a significant reduction in the cost of thermal generation in the North region, as well as provide thousands of consumers of the areas to be interconnected the same supply guarantee standards available for other consumers in the country. I emphasize further the effective participation of ONS staff at the work coordinated by the Administration Board, which examined the challenges and proposals for improvement of the processes for expansion of generation and power transmission, as presented to MME.

From a corporate perspective, the projects for moving to new facilities in Florianópolis, Recife and Rio de Janeiro have been continued. Regarding the personnel management, investments in improving the technical capacity and human development have been kept, paving the way for their participation in defining initiatives that affect their professional and personal lives, aiming at the organization sustainability. Among these projects, I would highlight in 2012 the redefinition of organizational values, the structural review of the Management Plan for Jobs and Remuneration, the implementation of the Career Paths Program and the beginning of the establishment of Manager Model.

To the institutions that participate in the management of the Brazilian electric sector, to the people who are part of them and to our workforce, our thanks on behalf of ONS Board of Directors.

Hermes Chipp, CEO

1.7 – Highlights of 2012

Pre-operational studies of Madeira River Complex

After the integration of the first generation units of Santo Antonio power plant to the BIPS, in March 2012, with only one of the three 230 kV planned circuits of the transmission system in operation, it was necessary to define various operational measures to allow harnessing the energy produced by this plant securely, reducing the local thermal generation and increasing operational flexibility.

Interconnection Tucuruí – Manaus – Macapá

This is an important strategic business action to interconnect other two states to the BIPS – Amazonas and Amapá – through a new 500/230 kV transmission trunk involving new generation, transmission and distribution agents which shall be part of this system. The integrated performance involving ONS staff and the Agents has allowed an adequate preparation of the integration of new transmission facilities and these systems isolated to the BIPS as well as enabled ONS to have a positive and proactive position together with MME, Aneel and Agents.

Performance of the Technical Teams on Optimization of Electro Power Availabilities of the BIPS during the Wet Season 2012-2013

The delay on the characterization of the wet season 2012-2013 in the Southeast / Midwest, Northeast and North, in sequence to a pronounced dry season in the Northeast and South, with low inflows and depletion of reserves accumulated in the reservoirs of the BIPS, led CMSE to authorize the dispatch of the full thermoelectric park from mid-October, including nuclear power plants, coal, gas and liquid fuels. This situation required the operational planning and daily and weekly scheduling technical teams a careful management of existing reserves and careful management of the transmission grid in order to facilitate transfers of additional power through the main trunks of interconnection between areas and regions.

Performance of the Technical Teams in Response to September to December 2012 Occurrences

From September to December 2012 six significant occurrences have been registered in the BIPS involving the supply to Distrito Federal in two occasions, the supply to the North and Northeast in other two, with the occurrence of total blackout in the Northeast in one of them, and

performance of ERAC in large part of the BIPS, which originated from 765/500kV Foz do Iguaçu substation. In this context, the rapid response of ONS teams, Agents and CMSE performance was crucial in many aspects, as the coordination of restoration actions and preparation and publication of RAP – Disturbance Analysis Reports, including the identification and implementation of additional measures to ensure the secure operation, as well as in the relationship with the press in each of these situations.

Plan for Enhancing the Security of BIPS (PSSIN)

PSSIN has been structured with the purpose of increasing BIPS security results, through the integration of the activities of several units, through the development and implementation of actions to reduce the incidence of occurrences, especially those that cause load interruption as well as aiming to restore the affected areas in the shortest time possible securely. This plan was developed with specific methodology for the process definition, prioritization of actions and the monitoring of their implementation, with application of concepts and tools of strategic management and its dissemination in the organization. Among PSSIN projects, deserve mention:

• Conduction a workshop on large occurrences;
• Mapping of Operation Network teleassisted facilities and proposal for revision of the Grid Procedures containing new requirements and rules for teleassistance;
• Definition of criteria and monitoring of communication channels of the Agents;
• Preparation of the Plan for Training Real Time Teams.

Management of Grid Procedures

The process of revising Grid Procedures, work that included the valuable participation of agents and associations, had significant developments in 2012. New versions of 143 submodules, which have been forwarded to the regulator, have been prepared. Such new versions will be subject to a Public Hearing to be held by ANEEL in 2013, for entry into effect.

Review of Organizational Values

Increasingly, obtaining better results is not sufficient for the sustainability of an organization. The way to get them is considered as important as the results themselves. Organizational values are beliefs or principles that

establish how people should behave and make decisions in the organization, hence its importance. Conducted in an ope n and participative way, the review of organizational values project has a high impact on the life of the company, both internally and towards its external publics.

Implementation of Career Trajectories Program

With the accomplishment of its three main objectives - classification of employees on career tracks, dissemination of the competencies required for each position and performance evaluation of employees based on these skills - all the goals of the implementation Career Trajectories Program have been met in 2012. From this fact, the planning of the career and personal development in a manner aligned to the needs of the organization will be easier for each employee.

Approval of Jobs and Remuneration Management Program

A structural review of the Program Jobs and Remuneration Management can be considered as a fundamental step to ensure the competitiveness of the Operator in finding and retaining highly qualified human resources, and at the same time promote the rationalization of staff costs. The work was based on the proposal of a working group composed of employees from all locations and directors and has been improved upon by a committee of the Administrative Board, having been fully approved by ANEEL.

2 – TECHNICAL RESULTS IN 2012

2.1 – Evaluation of Supply Conditions to the States

ONS has conducted and created working groups to develop specific evaluation studies of the supply conditions and propose solutions to the problems identified in the implementation of the works necessary to ensure the power supply to the states of the federation within the timelines established in the concession contracts. These groups include the participation of MME, ANEEL, EPE, State Departments of Energy and Environment, Institute of Historical and Artistic Heritage (IPHAN) and transmission and distribution companies involved.

The expansion of the discussions with the participation of all public and private institutions involved has allowed better solution to the problems that hinder or even prevent compliance with the schedules of the projects. The ten Working Groups that include the states of Rio Grande do Sul, São Paulo, Rio de Janeiro, Espirito Santo, Goiás / Brasília, Bahia / Sergipe, Alagoas / Pernambuco / Paraíba / Rio Grande do Norte, Ceará / Piauí and Pará / Maranhão / Tocantins were continued in 2012. Actions and steps have been defined to accelerate the environmental licensing, especially at the state level, and the implementation of deployment schedule of the works already defined, in order to identify the studies required to define the operative measures necessary to mitigate the effects of delays in schedules of works, until the structural works are completed. The effectiveness of these actions represented a significant progress for solving the supply to these states.

2.2 – Pre-operational Studies of Madeira River Complex

The energy produced by Santo Antônio and Jirau hydroelectric plants (with a total power of about 6500 MW) will be transported by a transmission system consisting of two dipoles of the DC in ± 600 kV, covering a distance of 2,375 km to São Paulo, and two 2 x 400 MW back-to-back converters, installed in Porto Velho for local supply.
The project incorporated new technologies, both in the generation, by the use of bulb turbines, as in back-to-back converter stations, which employ CCC (Capacitor Commutated Converter) technology.

The integration of the first generation units of Santo Antônio plant to the BIPS occurred in March 2012, through a 525/230 kV - 465 MVA transformer and an incomplete transmission system, ie, with only one of the three 230 kV planned circuits for the system Acre-Rondônia. Thus, it was necessary to adopt a number of operating measures that allowed to securely explore the energy generated at Santo Antônio plant, reducing dependence on local thermal generation and increasing operational flexibility.

The start of operations of the back-to-back converter station occurred during the second half of 2012, providing greater reliability for both the system Acre - Rondônia as for Santo Antônio plant.

Studies regarding back-to-back converter demanded effort from the Operator and agents involved, since the equipment has been designed considering the three 230 kV planned circuits to Acre-Rondônia. The technological solution found was to keep in operation the transformer used for the connection of the first units of Santo Antônio plant. The operation of a direct current system in parallel with an AC system represented a technological milestone for the Operator, since this operation is unprecedented in the world.

The year 2012 records the early implementation of the Continuous Current Transmission Systems Simulator in ONS facilities. This tool simulates the behavior of the power system in real scale of time and consists of twenty-three cubicles matching: one central device - the RTDS - and replicas of control modules and protection associated with the dipole converters I, dipole II and back-to-back connection, installed in substations Araraquara and Porto Velho of the Madeira River transmission system. The availability of this tool allows the Operator to evaluate the performance of such controllers to various events that may occur in the AC and DC grids simulated in RTDS, anticipating the consequences of these disturbances to the real system.

The following stage of the project is draining the energy generated at the plants of Santo Antônio and Jirau to the Southeast through a transmission system composed of one DC dipole in ± 600 kV. This operation is scheduled for the first half of 2013, and its main challenge is operating with a small number of generating units in Madeira complex and the design of complementary control and systemic protection actions.

2.3 – Interconnection Tucuruí - Macapá - Manaus

The interconnection of the isolated systems of Manaus and Macapá to the BIPS should occur in the second half of 2013, with the entry into operation of a 500 kV transmission system of approximately 1,400 km - starting from the substation Tucuruí, through substations Xingu, Jurupari and Oriximiná, in the state of Pará, to reach the substations of Silves and Lechuga, now in the state of Amazonas. The interconnection of Manaus system to the BIPS will be at Lechuga substation, and the interconnection of Macapá system to the BIPS will be from Jurupari substation.

A large number of works in the receptor systems of Manaus and Macapá is also planned, to allow the integration of the distribution system to the transmission system.

Several studies have been conducted to allow the integration of the systems Macapá and Manaus to the BIPS, highlighting studies on energization, load

rejection and restoration, contingency analysis and voltage control, systemic protections and adjustments and controllers optimization.

Due to the uncertainties inherent in the performance of a system of 1400 km of double circuit transmission lines, much on the Amazon rainforest and with extensive river crossings, it was necessary to define a Regional Scheme for Load Relief (ERAC), concomitant with a thermal generation dispatch, as a way to mitigate the consequences of any losses of that interconnection. Thus, it will b e possible to provide enhanced security and reliability to Manaus, since the city is one of the headquarters chosen for the World Cup in 2014.

A further challenge for the entry into operation of this interconnection was the delay in major facilities planned for the receptor systems of Manaus and Macapá. The delay will involve several operating configurations throughout the year of 2013, which require additional studies seeking to define operational measures to mitigate the risk of load cut both to Manaus as to Macapá, in a possible loss of interconnection, and the amounts of thermal generation which shall remain in operation during this temporary operation, aiming at mitigating the impacts of contingencies in the system.

2.4 – World Cup 2014

In continuity to activities for compliance of the electrical system for the World Cup 2014, has been approved by the Power Sector Monitoring Committee - CMSE, in February 2012, the Synthesis Report of the activities of the task forces, containing the set of works considered strategic to guarantee the service conditions desired for each host city. Since then, the Electric Sector Monitoring Department – DMSE of MME has accompanied in a special way all the works referred to in this document.

Throughout 2012, DMSE has held sectored meetings in the host cities involving, besides ONS, EPE, transmission companies, distribution companies and sectors of municipal and state administration. On these occasions, it was sought the commitment of the various public bodies and entities to overcome the difficulties encountered on the implementation process of the works considered strategic for the World Cup 2014 event.

After the approval of the Synthesis Report, the WG-World Cup 2014 has held general meetings involving representatives of all capitals, every six months to ensure the overall alignment of actions and monitoring and evaluation of timelines established for each work.

In the last quarter of 2012, WG-World Cup 2014 initiated its operations with a focus in the Confederations Cup to be held in June 2013 in the capitals Rio de Janeiro, Brasilia, Belo Horizonte, Recife, Fortaleza and Salvador. The importance of the Confederations Cup can be measured since it is a large rehearsal for the World Cup 2014.

2.5 – 2016 Olympic Games

The Olympics is considered by many as the greatest show on earth, and, in 2016, will be held in Rio de Janeiro, Brazil. The event involves various sectors of the economy - and representatives of public and private administration - and, due to its international dimension, will demand a perfect infrastructure planning and coordination of logistics, in order to ensure its successful completion.

Based on the decision of the Power Sector Monitoring Committee (CMSE), MME coordinates the working group WG-2016 Olympic Games, created in June 2012 by Decree 379/2012, in which was set up task force TF Olympics 2016, whose purpose is the electrical system, coordinated by ONS. This task force aims to develop an Action Plan with the measures necessary to ensure the supply of electricity to the city of Rio de Janeiro during 2016 Olympics event, according to the requirements of the International Olympic Committee to the host city. These requirements consider a set of investments that will revert to society after the event, referred to as *legacy*, and one that is temporary, only necessary to perform the show, called *overlay*.

Besides the evaluation of the service to the region of hotels, airports, tourist spots and facilities for the infrastructure of the event, special attention should be given to the four "*Olympic clusters*" of the city of Rio de Janeiro. *Cluster* is the set of competition venues (arenas) where the games will be held, i.e.:

- *Cluster* Barra: Olympic Park + Rio Centro + Athletes Village + Golf Course + Media Village (Legacy = Olympic Neighboorhood Carioca).
- *Cluster* Copacabana: Lagoa Rodrigo de Freitas + Copacabana Stadium + Fort Copacabana + Marina da Glória + Flamengo Park.
- *Cluster* Deodoro: National Equestrian Center + National Shooting Center + Deodoro Arena + Deodoro Modern Pentathlon Park + Olympic Mountain Bike Park + Olympic Whitewater Stadium + Olympic BMX Center + Olympic Hockey Center.
- *Cluster* Maracanã: João Havelange Stadium + Maracanã Stadium + Maracanãzinho + Sambódromo.

It is noteworthy that, by having a longer timeline than the rest, the modality football begins before the official opening of the Olympics and will have their games played in the city of Rio de Janeiro, as well as in Salvador, Belo Horizonte, São Paulo and Brasilia .

ONS also participates in weekly meetings at the Olympic Public Authority - APO, participating in the Energy Working Group, where all operational issues to serve to the above clusters are analyzed. APO is an entity formed by the Federal, State and City Governments through the City Hall of Rio de Janeiro.

2.6 – Improvement of Electric Security

The electrical systems are subjected constantly to failures caused by various causes. Disturbances in these systems may originate from acts of nature (lightning, high winds, rain, frost, etc.) or human actions (fire, vandalism, project errors, operation errors, miscommunications) and intrinsic failures to the own equipment that compose them. Regarding the type of disorder, single or multiple contingencies may occur.

The systems are planned by reliability criterion n-1, ie, they must be able to withstand any single contingency without interrupting the supply. However, in real-time operation, the systems are subject to contingencies involving the loss of two or more components. When the additional investment in reliability is lower than the social and / or economic impact caused by any multiple failures in the supply, the adoption of a more restrictive reliability criterion can be justified. ONS has been working continuously in order to add additional security for the performance of the BIPS, through various initiatives.

2.6.1 – Strategic Facilities

An important work was the identification of a set of facilities called strategic facilities. These are the power plants, substations and transmission trunks which, if turned off by electrical problems or destroyed / damaged for other reasons, the interruption of their services may lead to the occurrence of loss of large blocks of generation and even blackouts, whose social, economic and political impact affects the security of the state and society.

Knowing the strategic facilities allows adopting measures to:

- Preparing the BIPS to cope with total / partial loss of the facility, caused by multiple contingencies, and analyzing and suggesting possible improvements that will strengthen the intrinsic security of the installations.
- Enabling the secure areas to know the set of Strategic Facilities, in order to allow the adoption of preventive and / or corrective actions in case of possible threats, to ensure continuity of services, even in crisis situations.

Based on the knowledge of strategic facilities, ONS, with the participation of the agents involved and Cepel, undertook the following actions regarding them in 2012:

- Identification of the set of substations assisted.
- Improving information on environmental weather conditions (rain and direction of winds, lightning, air temperature, atmospheric pressure) and burnings, available in control centers, in order to prepare the BIPS for multiple contingencies.

- Interacting with the planning area of expansion for the definition of reinforcements to minimize the consequences of certain multiple losses.
- Implementation of new Special Protection Systems (SEPs).
- Improving the project of new SEPs to minimize accidental or incorrect performances.
- Adoption of more conservative criteria when maintenance services are performed at these facilities.
- Analysis of conditions of substations in order to identify possible changes that may contribute to their intrinsic improvement, minimizing the consequences of major disturbances.
- Adoption of special criteria for the testing of black-start devices of the generating units.

2.6.2 – Performance Assessment of Special Protection Systems

Criteria and procedures have been defined in 2012 for performing functional tests on Special Protection Systems (SEPs) installed in the BIPS, in order to ensure their proper performance.

Based on these definitions, tests in twenty SEPs installed in various areas of the system have been performed. For each test, a report containing a brief description of the SEP was generated, describing its purpose, the tests performed, the abnormalities possibly found, as well as actions taken.

Furthermore, an annual report containing the tests has been drawn, consolidating in one document all tests. This practice will be extended to the rest of the SEPs of the BIPS from the next few years through a previous program of the performance tests.

2.6.3 – Implementation of the Phasor Measurement Units System

One of the new technologies identified for increasing the security of the BIPS was the implementation of a Synchronized Phasor Measurement System (SMSF) to perform the analysis of large events.

The synchronized phasor measurement was developed some years ago and made possible by the deployment of the reference of time of the Global Positioning System - GPS. This measurement technology allows the analysis of long-term phenomena and opens a whole range of opportunities for new and better tools for operation of electrical systems.

The long-term phenomena, such as electromechanical oscillations and frequency variations appear in electrical systems when large disturbances that affect the

system so widespread occur. The analysis of these phenomena basically involves measurement of frequency and module and phase angle of the electrical magnitude for periods of time ranging from seconds to a few minutes after the occurrence of the disturbance.

In this scenario, ONS has initiated necessary actions for the implementation of a SMSF for the BIPS. These actions correspond basically to the installation of Phasor Measurement Units (PMUs) on the equipment in BIPS and the installation of hardware and software infrastructure for acquisition and analysis of synchrophasors on the premises of ONS.

Analysis for the implementation of SMSF in BIPS began in 2005. Between 2007 and 2008, ONS counted on funds from the World Bank - ESTAL project - to study the use of Synchrophasors for real-time applications. From 2012, ONS has initiated the request for a new loan from the World Bank - META Project - to purchase all the hardware and software infrastructure for deploying SMSF in ONS.

The project financing through the World Bank is interesting to ONS, since it uses a "refundable" line of credit, in which the World Bank finances 80% and the Brazilian government comes with 20% of the funding. For practical purposes, there is no impact on the tariff, which in the final analysis benefits the Brazilian consumer.

Currently, ONS already makes use of tools based on Synchrophasors for some assessments in post-operation, through a pilot project with the Federal University of Santa Catarina - UFSC. The current forecast is that the system of PMUs of the BIPS, under the management of ONS, is in operation by the end of 2015.

2.7 – Operation Planning and Scheduling

The planning of the operation is updated on an annual cycle, with the participation of associated agents. It consists of the planning of the energy operation, which assesses the conditions of energy supply for the BIPS considering a five-year horizon - January of the current year to December of the fifth year ahead - and the planning of electric operation, which evaluates the operating conditions of the power grid to the horizon of 16 months, from January of this year to April of the second year ahead. Daily and weekly schedules are presented ahead, produced with severe involvement of the groups in which electrical and energy aspects intertwine increasingly, to the extent that the analysis horizon is shortened.

2.7.1 – Energy Management Operation

Medium Term Horizon

The energy operation planning process, in the context of Annual Cycle Of Operation Planning, results in two basic products: Energy Operation Plan (PEN), whose horizon comprises the period from May of the current year (end of rainy season) to

December of the fifth year ahead; it was issued by ONS in September/2012 in the report entitled Energy Operation Plan 2012/2016 - PEN 2012 - Volume I - Executive Report. In turn, the second product is the calculation - every month of the current year - of the Future Cost Functions, using the medium term optimization model Newave. This product allows the coupling of medium-term operating strategies to short-term model Decomp, establishing power policies of the operation of each week of the current month, in Monthly Operation Program - PMO.

Exceptionally in PEN 2012, the conditions of service to the BIPS have been evaluated at the horizon August/2012 to December/2016. The analyzes have been based on the expected load on the 2nd four-month revision and the planned expansion of the generation supply, regarding the work schedules set by MME / CMSE / DMSE for August/2012 PMO, in order to capture in their analysis the significant changes occurred in the supply schedule.

The analysis of the conditions of service to the load based on the probabilistic assessment of the risk of energy deficit indicates the adequacy to supply criterion established by the National Council for Energy Policies (CNPE), to the extent that the deficit risks are less than 5% for all subsystems on the horizon 2013-2016, with values close to zero in the Northeast subsystem, in almost all the study horizon.

This result is mainly due to the growth in new energy supply aggregated over generation and transmission lines auctions. From August 2012 to December 2016, is expected the entry into operation of 314 new plants, 15 of which hydroelectric, 48 thermoelectric, 241 wind farms and 10 small hydroelectric plants - SHPs, plus 56 other small plants authorized by ANEEL .

Regarding the participation of different energy sources, the Brazilian energy matrix will go through an important transformation in the next five years. The thermoelectric power will increase from 18,235 MW (16.3%) to 27,692 MW (19.0%). Wind energy will have a growth of 509%, from 1,342 MW (1.2%) to 8,176 MW (5.6%). The energy produced from biomass will increase 43%, from 4,250 MW (3.8%) to 6,062 MW (4.2%).

The evolution of this matrix, with the maintenance of the current expansion trend of hydroelectricity with low or no multiannual regularization makes flexible or low inflexibility thermoelectric, with moderate operating costs and lower uncertainty in the supply of fuel - natural gas, liquefied natural gas and coal - start to play a critical role in the selection of projects to be deployed in the coming new energy auctions. Likewise, small power and complementary alternative sources in the dry season, such as wind and biomass, although with intermittent offer profiles, also come to play complementary role in the operational security of the BIPS.

Also deserves mention the analysis of service of the maximum demand, where the static balance sheet indicates that the net capacity available under the horizon of PEN 2012 is always higher than the projected demand. However, the trend is that it is necessary the thermal generation dispatch above the inflexibilities declared by

thermal generation agents, depending on the severity of the losses by depletion of reservoirs and / or internal restrictions on the transmission grid. Added to these events the increasing participation in the supply of hydraulic expansion grounded in plants with low and / or no regularization, which reduces the hydraulic availability at the time of maximum demand.

Sensitivity analyzes suggest that greater availability of hydroelectric generation may result from the application of operative security policies - POCP, which elevate levels of the reservoirs, reducing losses by depletion. Besides this feature, hydroelectric generation can also be enhanced by the deployment of new generating units in wells provisioned in some existing hydroelectric plants (about 5 GW, according to ABRAGE inventory).

The main recommendations of PEN 2012 are listed below:

- Energy evaluation results indicate the need to develop economic feasibility studies to expand the capacity of the North-South and South-Southeast/Midwest interconnection and export capacity in the Northeast;
- The planning studies of supply expansion should now take into account the needs to meet the maximum demand of BIPS, so that the scaling of capacity for this service is as economical as possible;
- In this sense, MME and ANEEL should evaluate the creation of regulatory mechanisms that encourage the installation of hydraulic power in the BIPS, whether by the engine of the existing wells in operating plants, either by repowering existing plants, or by the possibility of contracting power and / or capacity charges;
- The feasibility of conducting energy special auctions by source and region, in particular for the subsystems South and Southeast / Midwest, aiming at the aggregation of thermal generation, especially in the southern region of the country, must be assessed by MME.

Short-term Horizon

The summer of 2012 was characterized by a weak performance of the weather phenomenon La Niña, which caused considerable delay in the start of the wet season in the major basins of Southeast / Midwest, Northeast and North subsystems. Inflows during this period showed high values in January in the subsystems Southeast / Midwest, South, Northeast and North, which was extended until February in the Northeast and until March in the North, being succeeded by a significant recession in the subsequent months. Thus, the inflows were below the historical average (MLT) in the period from January to April in the subsystems Southeast / Midwest, South and Northeast, reaching respectively 91%, 72% and 81% of MLT. Within the subsystem North inflows reached 104% of MLT this period. This unfavorable hydrological scenario contributed that subsystems Southeast / Midwest, South and Northeast were unable to recover their maximum capacity storage at the end of April, which were respectively 76.0%, 37.0% and 78.9 % of its Maximum Stored Energy (EARmax). The North was the only subsystem that reached high storage level at the end of April, reaching 99% EARmax.

During the dry season, the permanence of the recession of inflows in the Northeast and North subsystems was observed, which resulted in average inflows in the period from May to October of 56% and 64% of MLT in these subsystems, respectively. In both cases, this was the third worst dry period the entire history available (1931-2012). Within the subsystem Southeast / Midwest, the occurrence of rainfall above the historical average for the months April to June provided favorable inflows during the dry period, reaching 106.5% of MLT in this period.

Subsystem South, despite the occurrence of some favorable inflow peaks in the period from May to October, the situation was predominantly of low inflows.

In this unfavorable hydropower scenario throughout the year, the application of Short Term Operating Procedures in 2012 identified the need for additional thermal dispatch in the BIPS from the month of April, initially with the use of thermal nuclear generation, coal and gas (group GT1A.) From the middle of October, CMSE authorized the full dispatch of thermal power (nuclear, coal, gas and liquid fuel), aiming at the achievement of the target levels established of 42% EARmax and 33% EARmax at the end of November, respectively, for the Southeast / Midwest and Northeast.

With the additional thermal dispatch and the optimization of available hydropower of the BIPS, storage at the end of November in the Southeast / Midwest and Northeast stood at 31.9% EARmax and 34.1% EARmax, respectively, not being possible the achievement of target level in the Southeast / Midwest.

Additionally, climate forecasts of national and international meteorological centers, from the month of October, showed that the beginning of the wet season 2012/2013 would be characterized by irregularly distributed rainfall in the basins of Southeast / Midwest subsystem, face to the prospect of a small number of South Atlantic Convergence Zone - ZCAS settings, and precipitation below average in the basins of Northeast subsystem.

According to climate forecasts, there was a delay in the beginning of the wet season 2012/2013, which has meant that inflows were below historical averages in the months of November and December in all subsystems of the BIPS.

In this context, CMSE decided to maintain the order of full thermal park dispatch (nuclear, coal, gas and liquid fuel) in December, with the aim of preserving the stocks stored in the reservoirs of hydropower plants of the BIPS.

Despite this measure, the storage conditions in the regions of BIPS have been aggravated, leading to levels of 28.9% EARmax in Southeast / Midwest, 36.5% EARmax in the South, 31.9% EARmax in the Northeast and 41.2% EARmax in the North, at the end of December.

Energy integration with the electrical systems of Uruguay and Argentina continued to be held, with the export of 462 GWh of energy to these countries, always using thermal generation resources not used to serve the energy requirements of the BIPS.

2.7.2 – Electric Operation

Medium Term Horizon

The planning process for electric operation gives rise to two basic products: Medium Term Electrical Operation Plan (PEL) and the Guidelines for Electrical Operation with Four-Monthly Horizon (QEL).

PEL presents the evaluations of electrical performance of BIPS for the period between the months of January 2013 and April 2014, while the QEL details for each four months of the current year, the operative measures necessary to the operation to meet the standards and criteria established in the Grid Procedures, to reconcile electrical restrictions and compliance with load with energy policies. All aimed at the lowest cost in operation and maximum operational security of the BIPS.

PEL 2013/2014 studies have been mainly developed to evaluate the performance of regional interconnections, the need for thermal generation due to transmission constraints and compliance with electrical areas of the BIPS. From these evaluations, stand out the main results of studies of the adaptation proposals of the schedule of planned works to the needs of the BIPS, operative solutions - such as the deployment of Special Protection Systems (EPS) -, the change of the grid topology, plus operational strategies to be used in the operation of the BIPS in this horizon.

In PEL 2013/2014, studies have aimed at identifying the necessary actions to ensure greater reliability for cities that will participate in the Confederations Cup: Brasilia, Belo Horizonte, Rio de Janeiro, Salvador, Recife and Fortaleza. The diagnosis considered the current system and works likely to be completed by May 2013.

Several actions have been proposed, with emphasis on t he need for thermal generation and implementation / review of Special Protection Systems, aiming to ensure additional security to the BIPS during the event of the Confederations Cup.

The four-month study (QEL) has the aim to support the development of the operating instructions used by ONS to fulfill its mandate of coordinating the operation of the BIPS. Furthermore, they also help assessing the performance of Special Protection Systems (SEP) in operation, indicating the need for revision or deactivation of existing and installation of new ones. They define the need for thermal generation by electrical constraints as well as the limits of transmission in regional interconnections and geoelectric areas.

Within four-monthly studies, there is the search for alternatives to meet Distrito Federal, considering the existing transmission system and its evolution until April 2013, when it is anticipated that the works that will allow the closing of the ring in 138 kV between substations Samambaia and Brasilia Sul. In this context, conjunctural alternatives have been presented to provide greater security and reliability to the system supply to the nation's capital.

Regarding the aspects related to operational electrical security, ONS has coordinated several actions together with the agents of transmission, generation and distribution, in order to diagnose the main weaknesses of the BIPS and indicate the measures to be taken in order to revitalize the existing facilities, adapting them to the security standards set in the Grid Procedures.

The Plan for Facilities Modernization (PMI) indicates the works of revitalization and improvements needed to maintain adequate service provision by the transmission utilities, and also lists the interventions improvements and reinforcements that must be implemented by generators and distributors.

PMI developed in 2012 includes the period between 2012 and 2015 and recommended the implementation of 264 renovations, with a few small facilities, with 247 for transmission companies, 16 for distribution companies and one for a generation company.

Short-Term Horizon

Throughout 2012, ONS developed studies and implemented contingency measures that allowed operating the grid in accordance with the criteria of continuity, reliability and quality of supply set out in the Grid Procedures, as outlined below.

Among the studies carried out, it is worth mentioning:

- The analysis of about 40,000 interventions in the Brazilian Interconnected Power System - BIPS, in which it was guaranteed systemic security during the period of the mentioned interventions.
- The deployment and monitoring of the performance of autoreclosing schemes of BIPS transmission lines, to ensure continuity of service with increased reliability.
- Optimization of generators control systems, to ensure adequate damping of oscillations and prevent loss of synchronization in the occurrence of disturbances.
- The definition of the Special Protection Systems, in order to ensure operational security of the BIPS, even in the occurrence of multiple contingencies.
- The definition of new fluent restoration corridors of the BIPS, as well as updating the existing ones, in order to accelerate the normalization of supply after disturbances.

Among the results, we highlight the beginning of the services needed in 138 kV substation Samambaia, belonging to Furnas, to power the new 138 kV transmission line Riacho Fundo - Samambaia, belonging to CEB, which contributed to the improvement of loads supply in Distrito Federal.

At the end of 2012, new export limits from Southeast and Midwest to the North and Northeast have been set, aiming at preventing that the North / Northeast system frequency ranges less than 57.1 Hz, in the event of loss of interconnections North / South and Southeast / Northeast.

Another highlight was the entry into operation of substation Araraquara 2 in 2012, part of the receiver system of the power to be transmitted by the dipoles 1 and 2 Porto Velho - Araraquara 2, allowing the flow of the plants of Madeira Complex to Southeast .

It should be noted that the entry into operation of substation Araraquara 2, consisting of three 500/440 kV - 3x1250 MVA transformers, two circuits of 500 kV TL Araraquara 2 - Araraquara and two circuits of 440 kV TL Araraquara 2 - Araraquara, allowed the coupling of 500 kV and 440 kV grids in São Paulo, providing the BIPS important additional resource for balancing reactive power in 500 kV, 440 kV and 345 kV trunks. This provided relief in the generation of reactive power by synchronous compensators located in substations Ibiúna, Tijuco Preto, Embu Guaçu and Santo Ângelo.

It is noteworthy that these new developments have contributed to the mitigation of problems related to the control voltage in 440 kV São Paulo substations, especially in situations of high exchanges to the Southeast.

2.8 – Real Time Operation

In 2012, in addition to the medium-term projects already in progress, new shares have been prioritized with the ultimate goal of expanding BIPS Operation Security involving the resources in Supervision and Control, resources in Operation Support, operational processes and teams involved in all areas of ONS Operation Centers.

In accordance with ONS Plan for Supervision and Control, development activities and implementation of the project REGER - Power Management Network - have continued:

- "Field testing" in Southeast Regional Operation Center (COSR UP), in Rio de Janeiro, have been completed. In Brasilia, REGER initiated the functional testing at the National Center for System Operation (CNOS) and the Regional Operation Center North and Midwest (COSR-NCI). In South Regional Operation Center (COSR-S), Florianópolis, and Northeast Regional Operation Center (COSR-NE), in Recife, tests of hardware, security and network have been performed successfully.

- Deployment and ratification of ROP-REGER has been completed, so-called the new operational telecommunications network essential for operational processes and data exchange between BIPS and ONS Operation Centers and that has been designed to meet the requirements of the Energy Management Network.

- Modernization of voice communication has been completed in Control Centers, with the use of IP technology.

- To ensure the effectiveness of the Plan for Contingencies of ONS Operation Centers, essential feature to ensure continuous supervision and control of the BIPS operation in emergency conditions in any of the locations, REGER architecture provides using two communication channels of data and voice in Regional Centers calls with adequate availability and performance. The activities of deployment of the

monitoring system of the availability of these channels have been initiated with great involvement of agents.

The National System Project for Observability and Controllability - SINOCON reached in 2012 the deployment of new data acquisition units in 101 of the 116 facilities planned in this stage. Lots 1, 2 and 3 are completed. In Lot 4, five facilities have been completed by 2012 and fifteen other facilities are underway.

For the development of ONS Operation Teams in 2012:

- The development works of the Structured Training Program for Empowerment of Real Time Teams have started. The program aims to improve the technical performance of these teams to a level compatible with the evolution of system complexity. The first stage of this project will be completed in 2013 with the support of expert advice and experience in such work.

- Several simulated exercises on restoration of the BIPS have been conducted with the participation of ONS Operation Centers and guest agents, representatives in the areas of transmission, generation and distribution. This year, the exercises have evolved with improvements made to the access of agents to ONS simulators, as well as *in-company* training for the participating agents. Performed systematically since 2006 in order to simulate a possible scenario of occurrence in the operation of the BIPS, such exercises allow evaluating the performance of teams, processes, procedures and adequacy of resources. They serve as a tool for development of professionals involved who use environments similar to Operation Centers control rooms, with all its infrastructure capabilities, simulating the conditions of possible occurrences in the BIPS.

47,615 interventions for maintenance and / or testing on equipment and electrical installations of the BIPS have been coordinated and carried out, and all the adjustments and rescheduling needed to meet current operational procedures and in compliance with the security criteria established have been made.

Regarding the Grid Procedures, should be highlighted:

- Review of Submodule 10:14, contemplating a revision of Technical Requirements for Facilities Operation and aiming at the expansion of operational security of the BIPS.

- Revision 2012 of Complementary and Supervision Networks, as well as routine RO-RD.BR.01 - "Setting the Network to which belong the equipment of a facility of the BIPS", presented at regional meetings, to Transmission, Generation and Distribution Agents.

- 1628 revisions from a total of 1074 current regulation documents have been performed, updating them or inserting improvements.

- Issuance of technical reports, subsidizing issuing opinions on access for new works or facilities, setting a new record in 2012.

In order to improve the processes of analysis and verification of operation, the following activities may be mentioned, among others routinely performed:

- Consolidation of the process of calculating MUST, including the calculation for generators and for periods away peak load.
- Implementation of WEB version for SAGIC, providing greater ease and security for verification of generation, exchange and load data.
- Revision of the criteria and procedures for evaluation of verbal communication in the operation.
- Establishment of working groups for improvement of processes and alignment of understandings regarding the verification of transmission, generation and use of the transmission system data, used for financial accounting purposes, with important results for the Agents.
- Development of applications by using the PI app - OSIsoft Company - for exploration of the data of BIPS Operation, for developing applications using PI - OSIsoft.

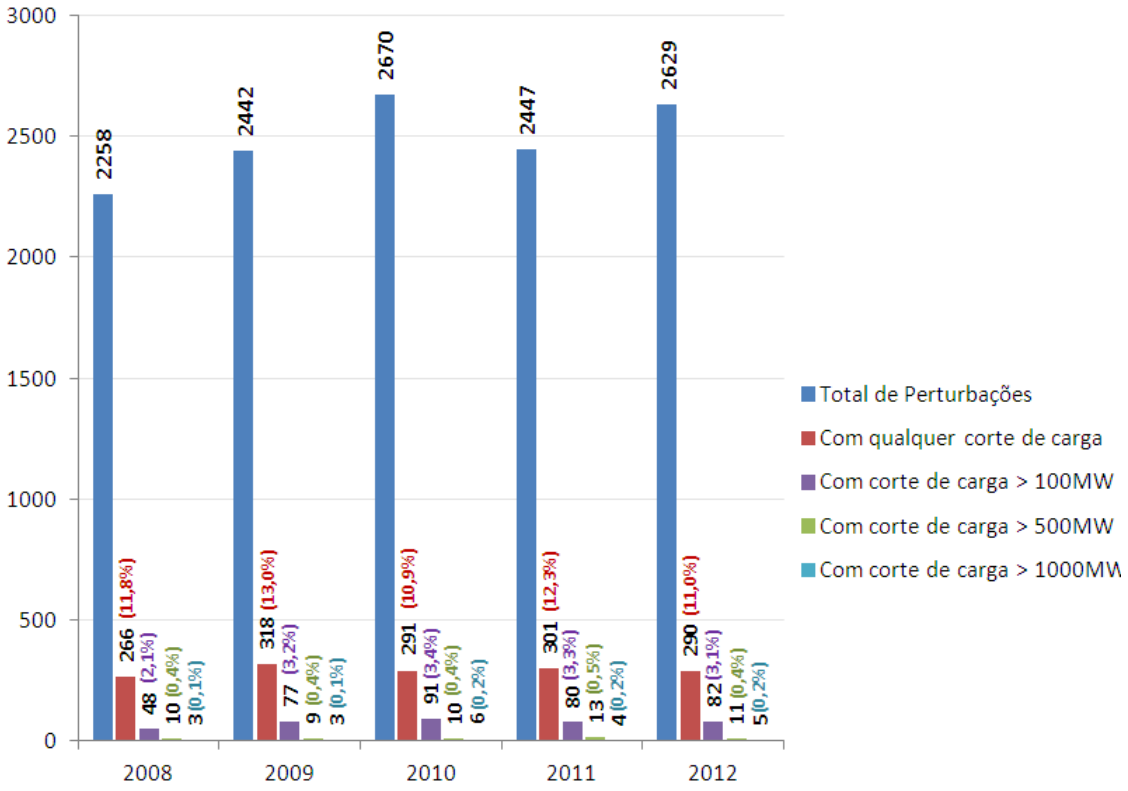
With the result of 98.5% satisfaction for a sample of 100 agents (generation, transmission, distribution and free consumers) - a survey on customer satisfaction relative to the processes and products of Operation Centers has been conducted with the aim of measuring points to be improved from items or issues specifically identified.

The intense involvement of the Regional Operation Centers in Florianópolis, Recife and Rio de Janeiro also deserves to be highlighted regarding the preparation of the Plan for Building Moving, whose execution will occur at these locations in 2013, in order to be observed strictly the criteria for maximum operational security of BIPS, when it is effected the transfer of these operation centers and resources to the new facilities.

2.9 – BIPS Performance Indicators in 2012

From the total of 2,629 registered disturbances in 2012, it is noteworthy that in only five (0.2%) the load cuts have been more than 1,000 MW. In the graph below, it is observed that there had been 11 events (0.4%) with load cut exceeding 500 MW, and a total of 82 (3.1%) with load cut exceeding 100 MW.

Evolution in number of disturbances and their impact on BIPS



- Os valores acima referem-se a perturbações que envolveram a Rede Básica;
- Os percentuais foram calculados com base no número total de perturbações.

The table below shows the growth of the length of transmission lines and transformation capacity of the Basic Grid in this period. The comparison of performance indicators with size of the grid shows that there is stability in these indicators over the last few years, even having a significant increase in the number of circuits and equipment of the transmission grid.

Basic Grid (230 kV e acima)	2008	2009	2010	2011	2012
Extension of TLs (km)	90,316.4	95,464.9	98,648.3	103,361.7	105,929.1
Transformation Capacity (MVA)	225,100.8	233,875.8	242,075.5	252,766.8	274,237.8

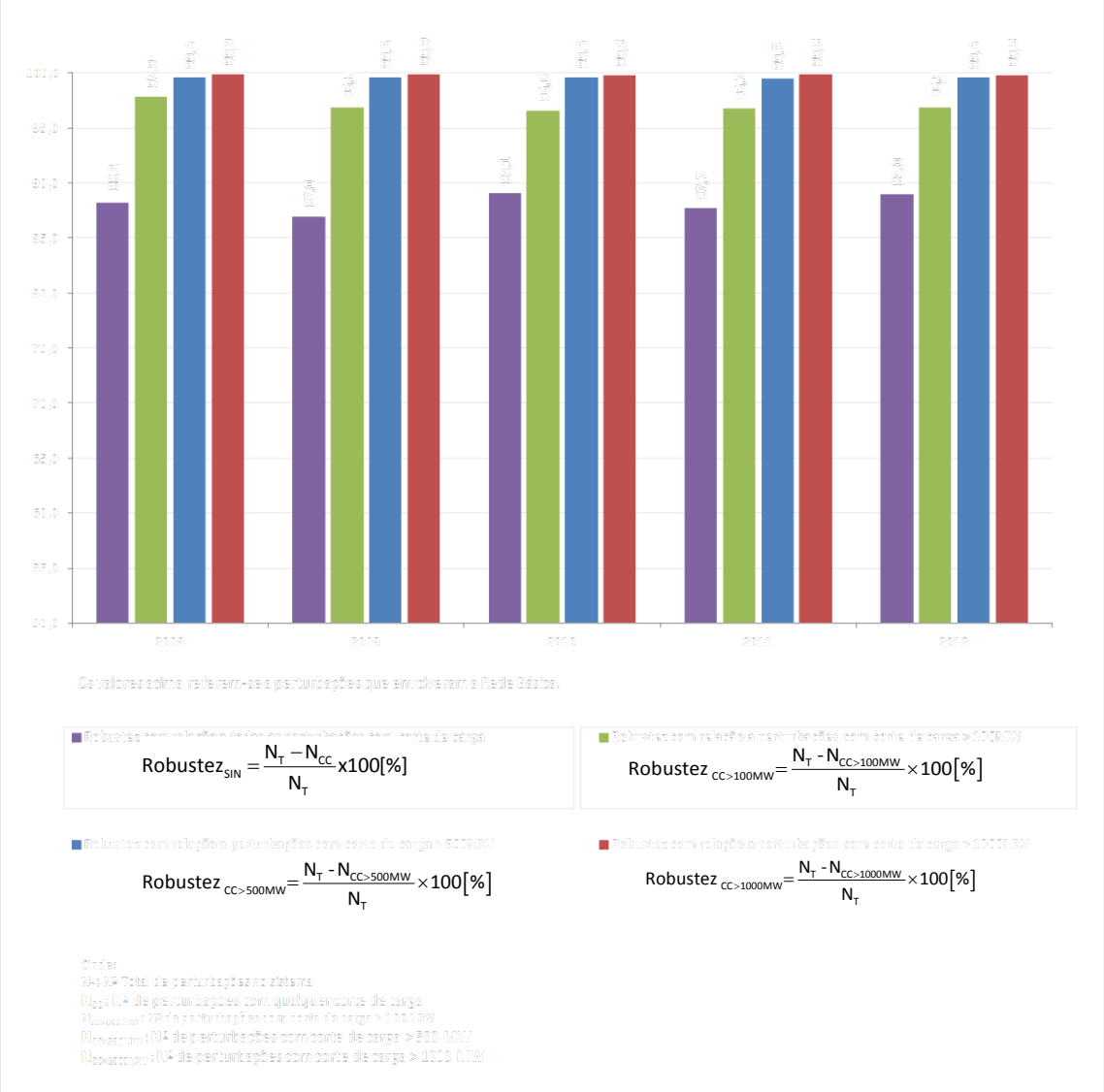
BIPS Robustness Indicator

The electrical security compliance achieved in 2012 can be translated by the performance indicators of the BIPS. An indicator quite representative is robustness, because it relates the disturbances in BIPS with the supply to the loads. The value of this indicator is given by the ratio between the number of disturbances with a certain level of load cut and the total number of disturbances.

Considering that the total of disturbances in 2012 was 2,629, we have the following values for robustness indicator:

- for any load cut - robustness was 89.0%;
- for load cuts above 100 MW - robustness was 96.9%.
- for load cuts above 500 MW - robustness was 99.6%.
- for load cuts above 1,000 MW - robustness was 99.8%.

Is noteworthy that the robustness indicators calculated in 2012 remained at the same level of previous years, from 2008 to 2011.



2.10 – Management of Major Disturbances Verified in BIPS in 2012

2.10.1 – Disturbance with Origin in SS Imperatriz

On September 22, at 3:49 pm, a disturbance with origin in a monophasic short circuit in the span in Reactor No. 11 connected to bus 500 kV of substation Imperatriz involved the automatic shutdown of various equipment and transmission lines in the North and Northeast. The disturbance was extinguished by the tripping of protections of remote terminals, due to non-performance of the protections associated with the span of the reactor, resulting in the loss of synchronism of systems North and Northeast over the rest of the BIPS. In the North and Northeast regions there was a dec rease in frequency, with consequent performance of all stages of the Regional Scheme for Load Relief - ERAC of these regions, resulting in the shutdown of 3,918 MW of load.

Main actions and measures implemented:

- Review of ERAC of North and Northeast regions, considering the viability of adjusting it to avoid that the minimum frequency value corresponding to the shutdown of power plants are met in order to keep them connected to the system and thereby ensure continuity of the supply of a greater amount of charges.
- Adequacy of bar 1 differential protection system of 500 kV substation Imperatriz and reactor No. 11, for compliance with established in item 6.1.4 of Submodule 2.6 of the Grid Procedures, regarding the overlapping of the zones of protection.

2.10.2 – Disturbance with Origin in SS Foz do Iguaçu

On the 3rd of October at 8:55 pm, the explosion followed by fire of grounding transformer caused a short circuit in one of the autotransformers of substation Foz do Iguaçu - 60 Hz. The disturbance resulted in complete loss of the transformation and the consequent separation of generation in 60 Hz of Itaipu hydroelectric plant of the Brazilian Interconnected Power System - BIPS. There was action of ERAC in the South / Southeast / Midwest and Acre / Rondônia, which resulted in the shutdown of 3,332 MW of load.

Main actions and measures implemented:

- Replacement of the protection relay relating to the scheme against overload of AT04 autotransformer bank, whose poor performance was responsible for the aggravation of the disturbance.
- Restoration of dielectric insulating capacity of the affected area by cleaning and washing of the *bay* reached by flames and soot.

2.10.3 – Disturbance with Origin in SS Brasília Sul

On the 4th of October at 1:02 pm, monophasic short circuit in transmission line 138 kV Samambaia - Brasilia Norte, caused by fire, was eliminated by the action of the protection of that line, resulting in automatic shutdown of various transformers and transmission lines in Distrito Federal. There was total loss of loads served by substation Brasilia Sul, in an amount of approximately 900 MW.

Main actions and measures implemented:

- Implementation of new operating procedures for the transfer of loads from Águas Claras of substation Samambaia to substation Brasilia Sul. To avoid overload of circuit 3 of 138 kV Brasília Sul - Brasília Norte, only a portion of the priority load of Águas Claras, around 15 MW, will be transferred to substation Brasilia Sul.

- Adequacy of SEP in Brasilia Norte, which now operates only on account of overload in any transmission lines at 138 kV Brasília Sul - Brasília Norte (circuits 1,2 and 3) or Samambaia - Brasilia Norte.
- Implementation of operating procedures on 138 kV grid from CEB, regarding the procedures and operating limits involving circuits 1, 2 and 3 from 138 kV TL Brasília Sul - Brasília Norte, 138 kV TL Samambaia - Brasilia Norte and substation Águas Claras at 138 kV, from CEB.
- Activation of three pole automatic restart on 138 kV Brasília Sul - Brasília Norte (circuits 1, 2 and 3) and Samambaia - Brasilia Norte.

2.10.4 – Disturbance with Origin in SS Samambaia

On the 19th of October at 2:29 pm, the breaking of the connection of current transformer associated with the 345 kV bars tie breaker of substation Samambaia caused an imbalance between supply and load on 345 kV busbars, resulting in the shutdown of various equipment and transmission lines of substation Samambaia, causing load cuts totaling 300 MW.

Main actions and measures implemented:

- Incorporation of part of 138 kV transmission system of Brasilia area to the Operation Grid, aiming to expand the area of ONS operation in the electrical system of 138 kV in this region.
- Establishment of operating procedures involving all lines and substations of the transmission system 138 kV of the area Brasília which have merged into the Grid Operation.

2.10.5 – Disturbance with Origin in SS Colinas

On October 26, at 00:14 (GMT), there was a two-phase short circuit on disconnect switch insulating series capacitor bank from the circuit 2 of the transmission line at 500 kV Imperatriz-Colinas, in substation Colinas terminal. The contingency was atypical because, according to the oscillographic records and measuring the short circuit lasted approximately 12 seconds, due to the unavailability of the protections of all circuits 2 of the trunk 500 kV of North - East Interconnection.

Consequences and system restoration

Primary and alternative protections of 500 kV TL Imperatriz - Colinas C2 did not act because they were with their trip commands inhibited due to an incident unnoticed when running remote reconfiguration. Consequently, there was tripping of remote rear of transmission lines adjacent to the failure, except for the 500 kV TL Colinas - Miracema C2, which failed to act for the same reason. In order to completely eliminate the defect, it was necessary the tripping of other transmission lines farther from substation Colinas, as the transmission lines 500 kV Gurupi-Miracema, on the south

side of Colinas, and the lines of interconnection North / Northeast from substation Imperatriz.

The delay in the elimination of the short-circuit electrically located next to bus 500 kV of substation Colinas caused a significant impact on the dynamic operation of the BIPS. The system suffered oscillations and subsequent loss of synchronism, which culminated in the separation of the North and Northeast regions among themselves and in relation to the Southeast, South and Midwest, which remained operating interconnected. The separation of the North and Northeast led performances of the respective Regional Schemes for Load Relief - ERAC, to balance load x generation, with interruption of 11,789 MW of load.

The process of restoration started immediately and was carried out in a gradual and coordinated way. The power failure lasted an average of 241 minutes in the states of Rio Grande do Norte, Paraíba, Pernambuco, Alagoas and Sergipe. Other states have had interruptions for periods less than 200 minutes: Pará, Tocantins, Maranhão, Piauí, Ceará, Bahia and Goiás.

Main actions and measures implemented:

The Disturbance Analysis Report (PAR), sent to CMSE and ANEEL presents a list of twenty-five actions, some already completed and several under implementation with deadlines and responsibilities of acting according to the three key goals pursued by ONS:

- work proactively, strengthening, wherever possible and practicable, the security of the system:
- minimize the domino effect when the problem occurs, and
- reduce the time of restoration.

The insulating disconnect switch of Series Capacitor Bank of substation Colinas terminal, circuit C2 of the transmission line 500 kV Imperatriz-Colinas, has been submitted to a series of tests, conducted in Cepel and CESI - Centro Elettrotecnico Sperimentale Italiano – SpA.

Among the measures already taken by the company which owns the facilities, as a result of the disturbance and the test results, stands out a review of the procedures for the implementation of adjustments and remote settings and equipment maneuvers procedures.

2.10.6 - Disturbance with origin in SS Itumbiara

On December 15, at 5:55 pm, occurred the automatic shutdown of five of the six generating units in operation at Itumbiara plant due to electromagnetic interference in the protection circuit.

As a result of these shutdowns, responsible for the rejection of 1,025 MW of load in the BIPS, by setting due to the busbar physical arrangement, type "modified ring ", in Itumbiara plant substation, at 500 kV TL Emborcação - Itumbiara, in this terminal, and local AT53, 500/345/13,8 kV autotransformers bank, 500 kV side, were off simultaneously

The severity of the disturbance resulted in the loss of synchronism between systems Acre / Rondônia and North / Northeast / Midwest, and the latter with the South / Southeast.As a consequence, 230 kV, 345 kV and 500 kV trunks circuits were disconnected by remote tripping and tripping for sync loss, due to electromechanical instability checked, which was more pronounced in Minas Gerais.In addition to the transmission lines, gerating units of various hydraulic and thermal power plants in BIPS have also been switched off.

Main actions and measures implemented:

- Furnas is implementing improvements in shielding the control circuit of electric protections of generating units of Itumbiara plant, which prevents the penetration of outbreaks in the substation, and performances undue protections.

- A working group involving experts from ONS, Cepel and agents has been constituted to verify weaknesses in the engineering of BIPS substations considered strategic for the operation, with the aim of proposing configuration, physical or equipment adjustments in order to ensure greater operational reliability to these facilities and BIPS.

2.10.7 - Definition of new restoration corridors

Fluent restoration is a procedure that allows the restoration of major load centers of the electrical system in a fast, simultaneous and independent way, minimizing load interruption time. This kind of procedure can be performed by substations operators, usually without the interference of the operation centers, with minimum communication possible and in accordance with procedures predefined in studies.

ONS, in conjunction with the agents, set and maintains updated fluent restoration corridors for the restoration of the main load centers in the country, having completed the analysis related to the Northeast throughout 2012.

The deployment of the new features of self-healing *(black-start)* the plants in the Northeast region has enabled the design of four new fluent restoration corridors:

• Luiz Gonzaga Area: Its source of self-healing is Luiz Gonzaga power plant, for priority service of the metropolitan region of Fortaleza.In this corridor are also restored loads of Southwest and West of the Northeast region, which are recomposed from Sobradinho hydroelectric plant.The West area serves primarily loads of the metropolitan region of Teresina.

• Xingó Area: Its source of self-healing is Xingó hydroelectric plant for priority service of the metropolitan areas of Recife, João Pessoa, Natal, Maceio and Aracaju.

• Paulo Afonso IV Area: Its self-healing source is Paulo Afonso IV power plant, for priority service of the metropolitan region of Salvador.

• Itapebi Area: Its self-healing source is Itapebi hydroelectric plant, for priority service of loads of southern Bahia.

2:11 - Evolution of processes and methodological improvements

In the field of energy models and methodologies, ONS developed an alternative method for calculating the meta-levels at the end of the dry season in the Northeast and North, through a decision support system - contemplating the future conditions of the generator, when the large run of river plants of Amazon basin are in operation.

It was completed in 2012 by CEPEL, with the support of ONS, the improvement of computational models of medium and short term planning and scheduling of the operation, NEWAVE and DECOMP, to represent the power generation in LNG plants, in which signaling precedes the dispatch within two months, within the logistics of transporting the fuel.

The implementation of dynamic reservoir drawdown routine in hydraulic simulator Hydroexpert was completed with the support of Copel, required to the operation of the reservoir system of Iguaçu River Basin. Given the adoption of Hydroexpert in preparing the Daily Defluxion Program - PDF, part of the Power Operation Daily Program - PDE, the implementation of the hydraulic validation feature of this computational application has initiated this year.

In the area of hydrometeorological forecast, the use of NEURO model associated with the model CPINS in the process of preparing PMO, for inflow forecasting in the incremental stretch between Três Marias and Sobradinho plants, in São Francisco River, was completed by ONS and authorized by ANEEL.The study of application of the model SMAP for Parnaíba River basin in the upstream of the plant Itumbiara has been completed, and it has been submitted to public consultation by ANEEL, in conjunction with the study held in 2011 with this same model to the basin of Rio Grande basin, in incremental stretches of Marimbondo and Água Vermelha plants.

It is worth mentioning the completion of the project for evaluation of new alternatives to the weather forecast, with the participation of the Center for Weather Forecasting and Climate Studies - CPTEC of INPE and Ceará Foundation for Research and Culture. This assessment included a new parameterization of ETA model currently in use in the process of inflow forecasting for PMO, and the new model BRAMS, which features characterize the type and land use adapted to conditions in Brazil. The study will bring important contributions to the improvement of precipitation forecast adopted in the process of predicting flows through rainfall-runoff models to a week ahead.

At the end of the year, as an additional resource for improving forecasts of weather conditions within the BIPS, ONS implemented the climate forecast model CAM 3.0, from U.S. National Center for Atmospheric Research - NCAR. The implementation of this model by ONS using processors in cloud computing will allow obtaining forecasts of precipitation anomalies in the basins of interest discretized monthly until three months ahead and updated periodically in accordance with the interest of the planning of the operation within the BIPS.

Continuing the implementation of the strategic action of Organon as an assessment tool for secure operation of the BIPS, in 2012 models and improvements added in this program have been revised, with emphasis on the construction of a security region for monitoring the operation of 440 kV system in São Paulo.

The database component models for electromechanical simulations of Organon has been reviewed, with emphasis on CC link associated with Itaipu, resulting in significant improvement of the program response, compared with the program ANATEM.

The incorporation of the representation of special protection schemes in the calculation of the security area and monitoring violations of criteria of maximum field voltage - and maximum operating time of over-excitation limiters - resulted in significant gains for automating the analysis limits of transmission trunk 765 kV Itaipu.

The monitoring functionality in the security area on portable devices with Internet access resources was made available, provisionally, by the Data Registration for External Relations (CDRE) system - ONS. Preliminary tests have also been performed to assess the feasibility of using Organon in cloud environment with very promising results.

Throughout 2012, the activities scheduled for deployment of RTDS simulator (Real Time Digital Simulator) to support the operation of Madeira river plants transmission system have been continued. To the team of two engineers was added a new professional whose primary responsibilities were directed to check the conformity of HVDC controllers' models, as well as supporting studies that will be demanded.

It also held the reception of cubicles-replica of the converters back to back and the dipole controllers manufactured by ABB, associated with the drainage system of Madeira River Complex generation. This set of equipment has been accompanied of

RTDS panels, and its installation has been held at ONS Central Office, in Rio de Janeiro. After commissioning of this set of equipment, and with the aim of training for their use, ONS technical staff has been trained, involving simulation in RTDS, specific training geared to the operation of ABB equipment and advanced training in the application PSCAD (Power Systems Computer Aided Design) to analyze the transient behavior of the system.

It was concluded in 2012 the stage of research project for development of methodology for medium and long term load forecasting .This step of the methodology allows to exclude the effects of random and non-economic factors such as atypical temperatures, losses in the basic grid and variations in the number of days and holidays, load behavior. Thus, the evolution of the load shall reflect only the economic factors, becoming an important tool for the consolidation of load forecasting.

2:12 - Transmission Administration

2.12.1 - Expansions and Reinforcements

In 2012, the Plan of Expansions and Reinforcements in Basic Grid - PAR and Annual Plan for Expansions and Reinforcements of Transmission Facilities not members of the Basic Grid - PAR / DIT have been issued, presenting the view of ONS on t he expansion and reinforcement of the Basic Grid and other transmission facilities - DIT needed to maintain the proper performance of the grid and ensure the full functioning of the electricity market in the period 2013-2015. In this cycle, determinations established by Resolution No. 443, issued by ANEEL in 2011 are already incorporated in studies of PAR, concerning the distinction between improvements and reinforcements in transmission facilities.

Similarly to previous cycles, studies that give rise to PAR and PAR-DIT are conducted under Special Groups that include the participation of all stakeholders and the Energy Research Company - EPE. Then they are forwarded to the Ministry of Mines and Energy - MME to be reconciled with the Transmission Expansion Program - PET prepared by EPE. After this alignment and proper validation by MME, the proposed expansions and reinforcements in the basic grid and other transmission facilities are consolidated in specific documents submitted to ANEEL, so that it starts the process for a concession or authorization of transmission facilities.

To implement the expansions and reinforcements in the basic grid under PAR for the triennium 2013-2015, an investment of R $ 8 .5 billion is estimated, considering the costs provided by ANEEL.

In the period 2013-2015, the expansions and reinforcements correspond to an approximate total addition in new transmission lines in the order of 8600 km and 20,500

MVA in transformation capacity, shown in the table below. These values are the result of the addition of 45 lines and 124 new transformer units:

TRANSMISSION LINES	
Voltage (kV)	Total (km)
765	----
500/525	6,567
440	78
345	----
230	2041
Total	8,608

TRANSFORMERS	
Tension kV (*)	Total (MVA)
765	500
500/525	7,922
440	2,033
345	2,733
230	7,334
Total	20,522

(*) Refers to the high voltage side of the transformer

It is noteworthy that, of the group of works indicated in PAR, a total of 3100 km in 7 transmission lines and 16,750 MVA regarding 54 transformation units have been granted to 31/12/2012.

Among the main works proposed in this PAR to the basic grid, we highlight the following works:

Region Sul and Mato Grosso do Sul

LT 230 kV Candiota – Bagé 2 (RS)

SE Lajeado 3 230/69 kV (RS)

LT 230 kV Lajeado 2 – Lajeado 3 (RS)

LT 230 kV Lajeado 3 – Garibaldi (RS)

SE Vinhedos 230/69 kV (RS) - (sectioning of LT 230 kV Monte Claro – Garibaldi)

SE Santa Maria 3 230/138 kV (new patio 138 kV and TR 230/138 kV) (RS)

LT 230 kV Santo Ângelo – Maçambará C2 (RS)

SE Pinhalzinho 230/138 kV (SC)

LT 230 kV Foz do Chapecó – Pinhalzinho (RS/SC)

SE Curitiba Norte 230/138 kV (PR)

LT 230 kV Curitiba Norte – Bateias (PR)

SE Curitiba Norte 230/138 kV (PR)

SE Ivinhema 230/138 kV (New patio of 138 kV and TR 230/138 kV) (MS)

SE Campo Grande 2 230/138 kV (PR)

Southeast / Midwest

LT 500 kV Araraquara 2 – Itatiba (SP)

SE Fernão Dias 500/440 kV (Nova) (SP)

LT 500 kV Araraquara 2 – Fernão Dias (SP)

LT 500 kV Assis – Marimbondo 2 (SP)

SE Três Lagoas 2 440/138 kV (Nova) (SP)

LT 500 KV Estreito – Itabirito 2 (MG)

LT 500 kV Itabirito 2 – Vespasiano 2 (MG)

LT 230 kV Barro Alto – Itapaci C2 (GO)

SE Macaé (New patio of 138 kV and ATRs 345/138 kV) (RJ)

SE Feijó 230/69 kV (AC)

LT 230 KV Rio Branco – Feijó C1 (AC)

SE Cruzeiro do Sul 230/69 kV (AC)

LT 230 KV Feijó - Cruzeiro do Sul C1 (AC)

SE Jaru (New patio of 138 kV and TR 230/138 kV) (RO)

North / Northeast

LT 230 kV Imperatriz – Porto Franco C2 (MA)

SE Chapadinha II 230/69 kV (Nova) (MA)

LT 230 kV Miranda II – Chapadinha II (MA)

LT 230 kV Coelho Neto – Chapadinha II (MA)

SE Tomé Açu 230/138 kV (Nova) (PA)

SE Castanhal 230/138 kV (Nova) (PA)

SE Maracanaú 230/69 kV (Nova) (CE)

SE Gilbués II 500/230/69-13,8 kV (New patio of 230 kV and 69 kV and TRs 500/230 kV and 230/69 kV) (PI)

SE Bom Jesus II 230/69-13,8 kV (Nova) (PI):

LT 230 KV Gilbués II – Bom Jesus II (PI)

LT 230 kV Bom Jesus II – Eliseu Martins (PI)

SE Barreiras II 500/230 kV (New patio of 230 kV and TR 500/230 kV) (BA)

(Sectioning of LT 230 kV Bom Jesus da Lapa – Barreiras)

SE Rio Grande II 230/138 kV (Nova) (BA)

LT 230 kV Barreiras II – Barreiras (BA)

LT 230 kV Barreiras – Rio Grande II (BA)

SE Currais Novos II 230/69 kV (Nova) (RN)

LT 230 kV Lagoa Nova II – Currais Novos II CD (RN)

SE Milagres II 500 kV (Nova) (CE)

LT 500 kV Campina Grande III – Ceará Mirim II C2 (PB/RN)

Regional Interconnections

LT 500 kV Itatiba – Bateias (SP/PR)

LT 500 kV Rio Das Éguas – Luziânia (BA/GO)

LT 500 kV Barreiras II – Rio Das Éguas (BA)

LT 500 KV Luziânia – Pirapora 2 (GO/MG)

SE Luziânia 500 kV (GO)

The following works were in process of granting at the time of issuance of PAR:

SE Gilbués II 500 kV (Nova) (PI)

SE Barreiras II 500 kV (Nova) (BA)

LT 500 kV Miracema – Gilbués II C1 e C2 (TO/PI)

LT 500 kV Gilbués II – São João do Piauí (PI)

LT 500 kV São João Do Piauí – Milagres II C2 (PI/CE)

LT 500 kV Gilbués II – Barreiras II (PI/BA)

LT 500 kV Barreiras II – Bom Jesus da Lapa II (BA)

LT 500 kV Bom Jesus da Lapa II – Ibicoara C2 (BA)

LT 500 kV Ibicoara – Sapeçu C2 (BA)

LT 500 kV Presidente Dutra – Teresina II C3 (MA/PI)

LT 500 kV Teresina II– Sobral III C3 (PI/CE)

LT 500 kV Milagres II – Açu III (CE/RN)

SE Açu III 500/230 kV (Nova) (RN)

LT 500 kV Luiz Gonzaga – Milagres II C2 (PE/CE)

With relation to the Plan for Expansions and Reinforcements in Other Transmission Facilities - PARDIT cycle 2013-2015 highlights the following proposed works, shown in the tables below:

New transmission lines - DITs	
Voltage (kV)	Length (km)
138	253
88	01
Total	254

Summary of Proposed Works	Total
Construction of new transmission lines (km)	254
Refurbishing / rebuilding / reconductoring / sectioning of existing lines (km)	935
Adequacy of buses / *bays*	41
Installation of *bays* (*)	118
Installation / adaptation of substation patio	6
Installation of reactive compensation capacitor (Mvar)	778
Installation / replacement of transformers (MVA)	148
Installation of other equipment (**)	40

(*) Includes the new bays LT

(**) Switch-disconnectors, protection, limiting reactors, among others.

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2.12.2 - Access to the Grid

In 2012, 78 Access Opinions have been issued and other 49 have been reviewed for connection of the following projects:

- 5 hydroelectric plants;
- 12 thermal plants;

- 12 wind farms;
- 3 free consumers;
- 45 distributors new connections;
- 1 international interconnection (Import / Export).

Also noteworthy was the development in 2012 of:

- 288 Access Documents with the objective of enabling the technical capability of enterprises to participate in the auction A-3 in 2012, which was subsequently canceled;
- 58 Access Information Documents in compliance with ANEEL Resolution No. 390 of 12-15-.2009;
- 13 Impact Assessment in the Basic Grid and the Other Transmission Facilities - DIT Documents due to the connection of a generation plant in the distribution grid;
- 14 Assessment Document for increase of distributor MUST to meet the request of increased demand, and
- 20 Assessment Documents on Studies of Voltage Quality.

2.12.3 - Analysis of Basic Project Compliance

Based on the consolidated document PAR / PET, MME sets the new transmission facilities to be auctioned or authorized by ANEEL.

Responsible for the bidding process for new transmission projects, ANEEL prepares documentation that makes up the writing - which is included in the "Technical Annex", elaborated by ONS. This attachment is of great importance because it defines all the characteristics and technical requirements that must be met by the entrepreneur, in order to ensure their performance when integrating to the BIPS.

In sequence, ONS verifies the compliance of the basic project of the facilities with the requirements in the technical annexes of the bidding documents and the ones contained in the Grid Procedures. This analysis is embodied in the document "Technical Opinion on analysis of the basic grid facilities compliance as effectively implemented", a document of great importance for the integration of new facilities to the BIPS. In 2012, the technical requirements for 21 lots of auctioned projects have been defined, and a total of 71 compliance analysis of basic projects of new transmission facilities have been held.

For the projects authorized, ONS produced that same year about 60 documents with the features and basic technical requirements of these facilities.

Altogether, the compliance of the characteristics of the basic facilities as effectively deployed for 68 transmission projects have been approved in 2012.

2.12.4 - Transmission Georeferenced Information System

Based on the needs identified in studies of expansions and reinforcements and consolidated by MME - in a document entitled "Consolidation of Basic Grid Works" - begin the process of monitoring the proposed works through a system consisting essentially of preparing geoelectric maps, registration of new facilities in Technical Data Base - BDT and reports of monitoring of works.

In order to unite the graphic representations of geoelectric maps, already consolidated in the electricity sector, to existing dynamic information on BDT, an application was developed in GIS technology, which provides information of the BIPS in a single environment, via Internet, in an easy, fast and interactive way, making it easier to search for information.

Widely used by agents and institutions in the sector, this system had in 2012 about eight thousand accesses to geoelectric maps and about fifteen thousand accesses to information registered therein.

2.12.5 - Transmission Contracts

The transmission contracting process coordinated by ONS involves the development of two major contracts: CPST - Contract for Transmission Services and CUST - Contract of Use of the Transmission System.

CPST is celebrated between the transmission utility and the Operator - ONS, aiming to establish the terms and conditions which will govern the administration and coordination, by ONS, of the provision of transmission services by the transmission utility to BIPS.

CPST is also the instrument of granting through which the transmission utility allows ONS to perform all acts necessary and sufficient to represent it before users in Contracts of Use of the Transmission System - CUST and its safeguard mechanisms .

CUST is celebrated between the user, ONS and transmission utilities, represented by ONS, and any and all agent connected to the transmission system or that will make use of it. CUST, in general, aims at establishing the terms and conditions that will regulate the use of the Basic Grid by users.

It is worth noting that, in 2012, another important milestone was reached in the integration of Santo Antônio and Jirau, members of the Madeira River Hydroelectric Complex and recognized throughout society as an important structuring project for the

country, with the celebration of Contracts of Use of the Transmission System - CUST for these plants.

Also deserves mention the contracting for the use of the transmission system of another major structuring project the country, Belo Monte, since it was celebrated the CUST on Pimental plant- secondary powerhouse of Belo Monte power plant with 233.1 MW of installed capacity. The contracting of the use on the main powerhouse of Belo Monte plant, with 11,000 MW of installed capacity, will occur between 2014 and 2015.

With respect to contracts, 31 new contracts for Provision of Transmission Services - CPST, 107 new Contracts of Use of Transmission Systems - CUST, 108 new contracts for Connection to Transmission Systems - CCT and Sharing Facilities Contracts- CCI were signed in 2012.

Among these, we highlight the celebration of 79 CUSTs regarding wind generation projects, which represents an important milestone in the process of insertion of this renewable energy source in the Brazilian energy matrix.

In this context, is of great relevance the performance of ONS with the Grant Authority, ANEEL and agents in order to provide the necessary adjustments in the transmission contracts aiming at meeting the provisions of Provisional Measure No. 579, current Law no. 12,783, which extended the concessions of generation, transmission and distribution of electricity and demanded these adjustments.

2.12.6 - Monthly Calculation of Services and Charges

The Monthly Calculation of Transmission Services and Charges - AMSE basically involves the calculation of revenue to be paid to Transmission service providers (transmission utilities and ONS) and charges for use of the Transmission System - EUST and Sector to be charged for each user of the Basic Grid and Border Grid.

The process of AMSE considers all parameters needed for the calculations of revenue (Annual Revenue, Adjustment Installment of Previous Cycles, among others), charges (tariffs, demands and contracted generation), as well as all the variables involved (Variable Installment due the unavailability of facilities; Financial Additional due to Overtaking Demand; New Agents; ONS Modulated Budget; Revenue from New Works).

AMSE ended the year with 105 transmission utilities and 278 users, 272 permanent and six temporary. The total charges and revenues paid in the year amounted to R $ 13.603 billion.

The payment of utility receipts transmission has started in 2012, according to ANEEL Resolution No. 454/2011, which established the criteria and conditions for the commercial operation of reinforcements and expansions of transmission facilities to be integrated to the BIPS.

2.12.7 - Metering System for Invoicing - SMF

In 2012, about 3,500 technical opinions were issued relating to basic projects and commissioning reports for metering system for invoicing, which corresponds to a monthly average for the year of approximately 290 documents.

2.12.8 - Tariffs for Use of the Transmission System - TUST and Use of Distribution by Generation System - TUSDg

Between April and June 2012, it was prepared the data infrastructure required for the issue of TUST and TUSDg by Superintendences of Transmission Regulation and Distribution Regulation, respectively. In 2012 has been prepared data infrastructure to calculate TUST to cycles 2013-2014, 2014-2015 and 2015-2016 and made available on ONS website, for use by agents in their prospecting costs of new projects.

In 2012, 3,748 accesses to these information infrastructures have been made by the various agents and entrepreneurs.

2.12.9 - Book on Transmission

To celebrate the important milestone of 100,000 kilometers of transmission lines of the Basic Grid in Brazil, the book "The Management of the Transmission System in Brazil" was published in May 2012 by Fundação Getúlio Vargas. This publication consolidates in a single document, all the experience accumulated in the transmission segment, since the restructuring of the Brazilian Electric Sector, held in 1998.

The book presents all the themes and processes related to the transmission system and is intended to serve as a reference for all those who directly or indirectly participate in this segment, including the technical staff and sectorial institutions and the various professionals working in universities, laboratories and research centers.

The book on Transmission was organized by ONS with the collaboration and support of the Energy Research Company - EPE and the Brazilian Association of Infrastructure and Basic Industry, Abdib, and the Brazilian Association of Large Enterprises of Electric Power Transmission, Abrate.

3 - MANAGEMENT RESULTS IN 2012

3.1 - ONS Institutional Relationship

In 2012, ONS continued its institutional relationship with the society, concentrating its focus on clarifying the most relevant issues related to the operation of the BIPS.

It is worth noting the intense relationship and coordination with the Ministry of Mines and Energy and the Brazilian Electricity Regulatory Agency within the Power Sector Monitoring Committee, which allowed seeking feasible solutions to ensure the security of supply of electricity at the lowest cost.

The industry associations have also been the focus of ONS relationship actions. Lectures were given by the operator in several industry associations - COGEN, ABRACEEL, CNI Infrastructure Council and FIESP - to present the results of studies, as well as to discuss other matters of mutual interest. One of the main forums for relationships with associations was the 9th National Meeting of the Electricity Sector Agents, important event of the electricity sector in which ONS participated.

ONS participated in other events in 2012 that helped strengthen the relationship with specific segments of the external public:

- 2º ENERGEN Latin American;
- Wind Forum Brasil 2012;
- II Encontro Internacional de Inovação Tecnológica Sustentável;
- 6º ENOP - Encontro Nacional de Operadores de Sistemas Elétricos;
- 1ª Exposição e Forum Internacional sobre Centro de Operação e Controle das Empresas de Energia Elétrica;
- 25º Encontro de Negócios da Duke Energy International;
- 2nd. Hydro Power Summit Latin America;
- 1º Curso sobre o Setor Elétrico para a Magistratura;
- Panorama da Energia Elétrica no Rio Grande do Sul;
- Sustainable Energy for all Latin America and t he Caribbean da Conferência Rio+20;
- Curso de Regulação e Negócios no Setor de Energia Elétrica;
- Seminário Internacional de Integração Elétrica na América do Sul GESEL/UFRJ;
- XIII Forum Nacional de Energia e M eio Ambiente no B rasil – Senado Federal;
- VIII Conferência de Centrais Hidrelétricas;
- Large Disturbances Workshop - 2012 Cigré Session;
- 2012 Brazil Wind Power;
- 2012 Energy Summit;
- Camara Oficial Española de Comercio em Brasil;
- American Chamber of Commerce – Brazil;

- XIV Congresso Brasileiro de Energia;
- XII EDAO – Encontro de Assuntos da Operação;
- Seminário Cresce Brasil – Federação Nacional dos Eletricitários;
- WIND LATAM Brasil;
- Comercialização de Energia Eólica no Mercado Livre – CCEE.

The detailing of the procedures and implementation of the Plan of Communication Management in Crisis Situation was continued in 2012, which aims to improve the communication of the operator with its stakeholders at critical moments in order to preserve its image and reputation. The Plan establishes policies and procedures to be followed in the event of temporary interruptions in the supply of electricity to the consumer market and was constructed after a *bechmarking work* performed with large national companies and the operators of systems participating in the GO 15.

With the goal of keeping society informed on the conditions of energy supply and the results of operation of the BIPS, ONS kept the relationship with the media, both through interviews of its CEO, and with the explanations provided by the communication staff. The percentage of favorable exposure of ONS in the press in 2011 was 86.3%.

ONS *website* received an average of 2,443 visits per day during the year, confirming its importance as a tool for the dissemination of the technical activities of the Operator and relationship with the Internet. The Contact Us section of the site received an average of 127 visitors' posts per month.

ONS activities on the centralized operation of the BIPS aroused the interest of other segments of the external public, especially students, technicians in the industry and foreign technicians, assisted by Institutional Visitation Program. Several foreign delegations were received at the Central Office. At National Center for System Operation, in Brasilia, there were 20 visits, with 355 visitors. In the Southeast Regional Operation Center in Rio de Janeiro, there were 29 technical visits, totaling 302 visitors. In Florianópolis, eight technical visits were held in the year and in Recife, three.

There was an increase of the integration and cooperation in carrying out activities, studies and joint projects with CCEE and EPE, as established in the existing Operational Agreements, contributing to the increased efficiency of the Brazilian electricity sector.

3.2 - Relationship with Agents and Integration of New Facilities

In 2012, total Agents Associated with ONS reached 321 members (number 14% higher than the previous year, 282 agents), demonstrating the growing role of the operator as

manager of a network of institutions and facilities involved in the operation of the BIPS and the increasing complexity of processes conducted in this activity. To level these Associate Agents about the activities performed, ONS held four Technical Meetings ONS / Agents in 2012, two in Recife (May 30 and December 5) and two in Florianópolis (July 19 and December 11). Moreover, in Florianópolis, in October 2012, a meeting was held with wind and hydroelectric generation agents, considering the expected entry into operation of its plants by the end of 2014.

881 Release Terms for entry into operation of transmission facilities, and 402 Statements of Attendance to the requirements of the Grid Procedures for generation facilities have been issued in 2012. The classification of Operation Mode of 156 plants was also carried out, 38 are classified as Type I, 3 as Type II-A, 1 as Type II-B and 114 as Type III.

In 2012, the capture process was redesigned, aiming at a more efficient approach to the agents whose works are included in the horizon of up to 36 months ahead. The actions developed involved both the regional centers, as the technical areas of ONS and counted on the participation of new agents who were integrating the electricity sector, and also agents participants of the sector who were integrating new facilities to the BIPS .

In 2013, there are already planned for April and May, the first meetings of funding for the winners of the auctions conducted by ANEEL in December 2012.

3.3 - ONS International Strategic Relationship

3.3.1 - GO 15 - Sustainable and Reliable Power Grids

In 2012, the association representing the major Electrical Systems Operators changed its name from Very Large Power Grid Operators to GO 15 - Sustainable and Reliable Power Grids, reflecting the concern of its members in its explicit aim of contributing to the increased reliability and sustainability of their electrical systems.

In the period 2011/12, the chairmanship was exercised by the President of Reseau de Transport Electricité, France. In the period 2012/13, took office the CEO of PJM Interconnection, United States. For the period 2013/14, has been appointed President of the GO 15 ONS' CEO.

ONS kept participating in this group, once it is considered a relevant forum to the treatment of matters of interest to the operation of the Brazilian electric system. ONS participated directly in the work carried out regarding the issues that were prioritized, taking over coordination on some of these issues:

- Integration of renewable sources;
- DC systems at extra-high voltage (800 kV);

- Security *versus* cost in reliability assessment;
- Best practices for restoration of large systems;
- Overcoming levels of short circuit in equipment and facilities;
- Specification and evaluation of the application Phasor Measurement Units (PMU) and
- Communication.

Considering the expected evolution in the composition of demand and supply of electricity in the world, ONS also follows issues that will certainly have important repercussions for the operation of the BIPS in the future, such as:

- Development and penetration of electric vehicles;
- Energy storage systems;
- Evolution of the concept and implementation of SmartGrid, and
- New models for load forecasting.

3.3.2 - Comisión de Integración Energética Regional - CIER

ONS has been participating in major events sponsored by CIER. In this context, we highlight the 47th Meeting of Senior Executives of CIER, held in the Dominican Republic when ONS participated as a lecturer and desk coordinator.

Moreover, as the Brazilian representative in the Working Group of Market Operators and Administrators, ONS has actively participated in Operation Subgroup consisting of the main operators in Latin America. Another highlight is the participation in the development of major projects, such as project design SIGER / Atlas, which aims to develop a data manager system for regional energy integration and a r egional geographical georeferenced atlas and Latin America Operators Referencing Project, in order to know the best practices and, therefore, seek continuous improvement of processes.

ONS' CEO, in the cumulative function of President of CIER, has been seeking to strengthen alliances with a view to promoting regional electric integration, particularly in the context of MERCOSUR countries, especially the expansion of the interconnection between Brazil and Uruguay, process led by MME.

3.4 - Moving to New Facilities

ONS began in 2009 the process of moving from its facilities in Rio de Janeiro, Recife and Florianopolis. After an analysis of the structure available in the buildings and current studies considering projections about its future and growth estimates for 2020, a plan was drafted to the organization's needs in which it was taken into account market values.

The locations of the new facilities have been chosen: Cidade Nova neighborhood, in Rio de Janeiro, the neighborhood of Santo Amaro, Recife, and Office Park complex, in Florianópolis. The buildings are in an advanced stage of construction according to lease contracts ONS signed with their owners-entrepreneurs.

Lease contracts involve technical, legal and business peculiarities.

There is an attached Descriptive Memorial where they are established the details of the basic supply suited to the needs of the operator.

Complementing the basic supply, ONS needs for its operation that several other requirements are met, called trousseau items.

In Recife and Florianopolis the building installations, civil and architectural, and electromechanical, electrical, hydraulic and redundant air conditioning infrastructures, fire protection and security and automation systems are already finalized. It remains to complement indoor facilities, the trousseau items charged to ONS: office environments and meeting rooms, auditorium, operations room environment, data center and telecommunication rooms.

In Rio de Janeiro, the building installations and electromechanical infrastructure are 80% completed and the building already has occupancy permit. Additional works have been initiated in charge of ONS.

Functional characteristics of the enterprises

The buildings have been designed by observing the horizontality of office spaces, emphasizing the integration of teams, with the support of infrastructure and finishes seeking a bias of visual identity, targeted to energy efficiency and sustainability, combined with the comfort of users.

Since in all localities facilities include office environments and operating environments, new facilities will have common features and different sizes, depending on the number of employees in each location.

The Occupation Plan emphasizes the continued operation of the final activities of ONS ONS and because of that, the building infrastructure was designed within the discretion of duality and reliability of international standard Uptime, TIER III level, following international practices in operators systems facilities.

In December 2012 was being developed internal communication plan aimed at guiding users on the procedures for moving and adaptation to new environments.

For the moving logistics specialists, especially for transfer of IT assets, minimizing risk of damage and delays, have been contracted.

The occupation of the building in Florianopolis is expected in the first half of 2013 and in Rio de Janeiro and Recife, soon followed.

3.5 - 2010-2013 Action Plan

ONS annually prepares its Action Plan for the next three budget cycles, in order to ensure the appropriate technical and business conditions to fulfill its responsibilities in the coordination and control of the operation of the generation and transmission of electricity in BIPS, under the supervision and regulation of ANEEL.

The Action Plan is structured in accordance with the strategic guidelines, as well as programs and related projects, considering the following aspects:

- The strategic goals and their challenges and priority actions;
- Expenditures for their respective programs and projects to be developed in the period, continuing the improvement and the constant updating of the operator in terms of technology, corporate processes and technical procedures;
- Guidelines for preparation of work programs for each of the areas of the Operator.

The strategic objectives approved by the Board for the cycle are:

I. The resources for power security management of the BIPS..
II. Increase the capacity for prevention and management of crisis situations.
III. Improve performance as manager of networks of agents and their facilities.
IV. Enhance the management capacity for the full exercise of the functions allotments.
V. Get recognition for the results and benefits achieved.

To achieve the strategic objectives, the Action Plan includes a current portfolio of 45 projects, grouped into nine programs.

Among the results achieved during the year 2012, should be highlighted the following projects:

- Continuity in the implementation of the Project ONS New Facilities in Florianopolis, Recife and Rio de Janeiro.
- Attainment of Project REGER, whose main objective is the provision of energy management system for installation in ONS Operation Centers.
- Development of Basic project of Madeira Transmission System.
- Career Trajectories Program.

3.6 - Risk Management and Grid Procedures Management

Risk management and Grid Procedures management involve activities whose goal is to continuously improve the processes carried out by ONS, in order to make them safer and more efficient while preserving the requirements of transparency and fairness.

With regard to the management of the Grid Procedures, in 2012 *the process of review* and referral of new versions of 143 submodules has been completed, revised in 2011

and 2012, with the participation of agents and associations. Such new versions will be the subject of a public hearing to be held by ANEEL in 2013 for entry into force.

With regard to Risk Management, from the guidelines of ONS Strategic Planning, analyzes were carried out in 2012 aiming at improvements and reduction of vulnerabilities in various finalistic and corporate processes. In this sense, it is worth mentioning the analysis of the following processes and their control mechanisms: Inflow Forecasting, Monthly Calculation of Services and Charges, Management of Transmission Contracts, Calculation of associates' contribution, Recruitment and Selection of Personnel and Supply Management.

It was given continuity to External Audit of the input data of the PMO and its revisions, and this audit has also covered data on inflow forecasting as determined by ANEEL. It was also given continuity to External Audit of data compiled by CNOS used by CCEE and the electric energy planning processes, being issued by the auditing firm Assurance Reports on all months of the reporting period, showing the adequacy of procedures performed. The auditing firm also indicated opportunities for improvement that have been or are being implemented by ONS, in order to ensure continuous improvement of the processes performed.

Based on the results obtained from the analysis of internal improvement opportunities and existing controls into their processes, ONS has been making regular and systematic monitoring of their exposure, enabling a more effective preventive action.

3.7 - Personnel Management

Throughout 2012, the management strategy of personnel defined by ONS Board focused on priority actions for the development and retention of its employees - aiming at the preservation of specific tasks related to finalistic activities and sustainability of the Operator. The established focus represented a significant challenge, given the high level of competition in the market for hiring qualified professionals, especially within the formation of Electrical Engineering. ONS ended the year 2012 with its own staff consisting of 745 employees.

From January to December 2012, there were 34 employee terminations, 23 voluntarily, due to the attractiveness of the market. From this total, 65.2% occurred in Rio de Janeiro, 13% in Brasilia, 17.4% in Florianópolis and 4.4% in Recife. The main reason for these moves is a hot market scenario in the power sector, with large companies that are establishing themselves in the country, besides public examinations.

For ONS, this reflects the need to accelerate the movement in the career of junior and full professionals, an issue that deserves special attention by the Board, through development and recognition programs, as well as the emphasis on maintaining the competitiveness of remuneration of the professional operator with respect to the market.

With the aim of contributing to social inclusion and to align the performance of ONS with legislation (Law No. 8.213/91), in compliance with the quotas for persons with

disabilities, the Operator is striving to publicize, recruit, select PCDs and admit new professionals on its staff - it hired three new professionals PCD throughout the year.

Implementation of strategies for managing personnel defined by the Board in 2012 - capture, development and retention of its employees - is embodied in the following lawsuits:

REVIEW OF ORGANIZATIONAL VALUES

Aimed at strengthening ONS organizational identity, ONS Alignment of Organizational Values Plan has been developed, which included the review of values designed during the formation of the Operator. From a methodology which allowed the participation of all employees, it was established, in a s hared way, eight values that should guide organizational behavior: Commitment, Trust, Equity, Excellence, Integration, Recognition, Respect and Transparency. In order to ensure the practice of values in everyday organization, these new values have been entered in selection, development and evaluation of human resources processes, as well as in recognition programs.

CAREER TRAJECTORIES

Given the purpose of improving the management tools and meet the expectation of the employees identified in the Organizational Environment Research, the implementation of the Career Trajectories Program has been honored in 2012, characterized by three major milestones: classification of employees on track career (Management , Business Support, Institutional Affairs, Technological Development, Planning and Operation - Technical and Professional), dissemination of the skills required for the performance at each position and the evaluations for competence in the performance management cycle in December.

Aiming to guide managers in the daily theme Career with their teams, in a practical way, there were five classes of managerial training in Rio de Janeiro and Brasilia, comprising 64 managers from all locations.

JOB AND REMUNERATION MANAGEMENT PLAN - PGCR

In 2012, the work on the structural review of PGCR has started, coordinated by the Board of Directors, having been set up within the organization a working group with the participation of employees from all locations and boards. The proposed restructuring of PGCR included the following topics: separation of Market Bypass and Merit Granting (horizontal and vertical movement), review the Structure of Career Systems for Specialists and Senior and Plenums Professionals; revaluations of positions and adequacy of Program Organizational Performance. The structural proposition of PGCR sent to ANEEL has been approved in its entirety, and the remaining steps should be completed during 2013.

KNOWLEDGE MANAGEMENT

Special attention is being given to this subject, whose goal is to strengthen initiatives to promote an organizational culture that values the dissemination, uptake and retention of knowledge – ONS main asset.

Among these actions are:

a) Mentorship Program

It's been conducted the second round of the Mentorship Program, attended by 13 pairs of professionals, with an emphasis in technical and management allotments. The goal of the program is to disseminate the competencies (knowledge, skills and attitudes applied to the ONS context) from the most experienced professionals to young professionals, and create learning networks in the organization, from the mentor training with full conditions to guide other professionals in their careers. It contributes to the formation of a new generation of professionals aligned with the organization's values.

b) Technical Succession Program

The program was implemented as a pilot and conducted with the participation of seven experts who have critical knowledge for the organization. Adopting a methodology that includes the development of Action Plans for the management of such knowledge, the program aims at the preparation and training of new professionals as well as socialization and dissemination of knowledge now concentrated in a few people. The goal is to plan the transfer of knowledge, in order to minimize the impact of the output of highly qualified expertise in ONS.

c) Compartilhar Program

Aims at promoting the dissemination of knowledge of topics related to the business of ONS through lectures, thus expanding the pool of technical and management information. These lectures are recorded and become part of the Library. Thus, the program contributes to the integration and sharing of information, experience and knowledge.

CONSTRUIR PROGRAM – ONS trainee and internship program.

The program aims to identify and attract young professionals, as well as maintain a database of potential talent that may hold positions in the organization and industry. In 2012, 25 trainees have been admitted, of whom 20 higher education and five technical level. The selection process of trainees involved the participation of 1,527 candidates.

By owning rigorous process of recruitment and selection and align with organizational values and skills, Construir program has been a major source of funding for junior professionals under the Operator. This can be identified in five recent hiring of trainees, although 2012 cycle (in progress).

In 2012, 27 trainees have been admitted, mainly distributed in finalistic areas.

TRAINING PROGRAMS

The training activities are structured into specific programs, distributed between Corporate Actions and Individual Actions, as detailed below:

- CORPORATE ACTIONS:

Mais Valor Program

Mais Valor is the internal development program aimed at promoting training courses to ONS employees taught by their own professionals, cost virtually nil. It discusses topics of interest of the organization, aligned with its strategic planning. In 2012 there were five courses: Project Management (two classes), HVDC - Module I (two classes); Dynamics and Security Power Systems (one class); Optimization Models Applied to the Operation Planning of BIPS (one class) , and Substations and High and Extra High Voltage Electrical Equipment (a class). The courses have been taught at the Central Office, Recife and Florianopolis.

CAISE - Training Institutional Aspects of the Electricity Sector

Result of extensive study, which took into account the strategic objectives of the organization and training of future participants, CAISE had structural and qualitative reformulation in 2011, when its content has been distributed into four modules: Organizational Skills, Fundamentals of Electricity Sector, Institutional Aspects and Strategic Alignment, Course Conclusion Work.

The program in 2012 was directed to the group of expert professionals, seniors and full, being recognized by MEC as Long Duration Course - MBA (360h - 396h). Counted with the participation of 30 students nominated by their respective Boards.

Development and Certification Program for Operators - Development of Operation

In 2012, the Development and Certification Program for Operators went through a review process improvement and alignment with the Career Trajectories Program, Skills and Organizational Values in pursuit of growth and organizational sustainability. Thus, several enhancements and improvements have been implemented, highlighting the Review of Operator Profile, aligned with Organizational Values and skills, Technical Career Axis- Planning and Operation, the Review of Tools and Techniques of Behavioral Assessment and Profile / potential and the inclusion of Evaluation Committees with the participation of managers and real time engineers.

In 2012, the Certification Program has expanded its scope and became Operation Development Program, also involving the Real Time Engineers. All the professionals working directly in the activities of the operating room, covering a total of 108 operators and 22 engineers, participated in a structured development program from two main inputs, which are: the Cultivation of Values and O rganizational Skills, Career

Trajectories Axis and the results and analysis of the "Study Report on Adherence to Profile and Mapping of Potential" prepared by the Institute for Certification of Operators Pieron.

It is noteworthy that the Development Program Operation comes to meet a general purpose, which meets the requirements of the Grid Procedures (Submodule 10.1 - Procedures Manual Operation: Conceptualization General), approved by ANEEL, which enables operators to perform their functions in the control room.

Integration Program for New Employees

The program covers employees from both external and internal recruitment. In 2012, there were two classes of the Integration Program for New Employees with the Board, and four classes of Enterprise Integration, for a t otal of 47 new employees in the company properly acclimatized.

GESEL - Study Group of the Electricity Sector (UFRJ)

ONS has established, in 2010, a successful partnership with GESEL / UFRJ, having as objectives: to expand and consolidate basic knowledge about the Brazilian electric sector, from a viewpoint of the economic approach of ONS technical staff; contribute to integration processes, and assist in increasing productivity and retention of these professionals.

In 2012, a new class of the course has initiated, with approach for Plenum engineers. The program consists of seven modules each with two classes, taught in monthly meetings, a total of 56h.The first class was held on September 24 at the Institute of Economics of UFRJ. Twenty-seven employees including plenum and newly promoted senior, are currently attending.

Secretarial Development Programmed (PDS)

The target audiences of this program are administrative assistants of the board and executive management. In the year 2012 there have been actions development covering 20 em ployees, with the following modules: Module 1: Organization of Documents and Information, 2nd module: Immersion in Excel - 2007 and Quality in Communication - Business Writing Workshop.

- INDIVIDUAL ACTIONS:

Individual Development Plan (IDP)

This program is critical to qualify the employees in the areas in which they operate and in the medium term, to prepare them to take on other challenges in their careers. In 2012 almost all employees received training.

Long Term Courses

The long-term courses - hourly equal or higher than 180 hours - cover post-graduate, masters and specialization, with priority for courses related to the final activities of ONS. From January to June 2012, nine employees took long courses and for the period July/2012 - June/2013, 14 employees are being trained.

PERFORMANCE MANAGEMENT

The differential of ONS Performance Management in 2012 happened for alignment and adjustment of the Career Trajectories Axis Program, Skills and Levels of Complexity. This was the 1st cycle of PM in which managers rated their employees on goals, skills and attitudes, and feedback practice and record. Managers conducted the self-assessment of skills and attitudes. In turn, employees rated managers only in attitudes and self-assessed competence and attitudes, also taking the opportunity to register their feedback.

HEALTH MANAGEMENT PROGRAM

Due to the nature of the responsibilities of ONS in requiring professionals with high seniority, the age profile of the employees has an average above the levels observed in the market. Given this peculiarity, particular attention was paid to the investment in the health of employees; actions have been undertaken aimed at physical, mental and social balance of workers, with emphasis on the dissemination of preventive guidelines, vaccination campaigns and sponsorship of sport events for employees. Besides aiming to good health of ONS employees, these actions also aim to reduce the costs of collective policy Health Insurance

RECOGNITION PLAN

By completing the 4th cycle completion, the Reconhecer + Program obtained a total of 40 nominations. Of these, seven (07) were chosen in the categories Knowledge Management and Innovation - divided into two subcategories, namely: Technology Challenge and Process Improvement. Reconhecer + aims at formally recognition of ONS employees, rewarding promoters of winning stocks by excel in their contribution to the organization, according to the categories of the Award.

Another initiative was the awarding of the highlights of the year, whose actions were elected by the Executive Project Review of Organizational Values, the Practice of Technical Teams in Response to the Events of September and October, the Additional Measures to Increase Security of BIPS and Interconnection Tucuruí-Macapá-Manaus.

3.8 - Telecommunication and Information Technology

To exercise its statutory duties and the fulfillment of its institutional mission, ONS developed a s eries of studies and actions to be performed on the system and its

agents which involves the intensive use of information processing relying heavily on the use of IT.

The main results of the actions undertaken by corporative IT in 2012 include:

- **Implementation of *Cloud Computing* Tool**

The successful experience with the pilot project adopted in Newave signals new technological levels for the electricity sector, with positive impacts in other mathematical models. *Cloud Computing* is a tool that enables access to programs, services, and files, as well as the processing of large volumes of data remotely, through an Internet provider. This concept is being adopted by corporate IT in its 2012 strategic plan focusing on Mathematical Models, Mobility, Electronics Collaboration, *Backup and Restore, Business Intelligence* and Recovery in Case of Disaster.

For Newave, in a case of Monthly Planning of Operation - PMO, showed a reduction of approximately 40% at run time. The expectation is that this project has a great impact in the form of intensive processing and mathematical models throughout the electric sector.

Further tests are being conducted with the Community Atmospheric Model - CAM, developed by the National Center for Atmospheric Research (NCAR) in the USA. It is a climate model that needs high processing performance and plenty of disk space.

Models Organon and DECOMP are also being tested in the organization. The latter will be processed in a distributed environment in 2013, following the same path of Newave. A test case whose resolution time took 35 minutes in the computing environment had resolution time of 3 minutes when running in the cloud.

- **Application Systems Projects completed**

Throughout 2012, major projects and development actions of support systems to finalistic areas that contributed significantly to the management of data and information have been completed, among which:

✓ Disturbances System Analysis Project - SPERT, which guarantees the improvement in quality of disturbances analysis process, treatment and receiving of oscilographic files.

✓ Load Forecast System for Energy Studies Project - SPCEE, which deals with the Implementation of Models for Data Treatment. It supports the improvement of the process and increases the quality of load forecasts.

✓ Exporter XML Common Information Model (CIM XML) Project, which ensures the integration and updating of data of the grid available in the Technical Database - BDT with the database source of REGER.

✓ Daily Production Scheduling System Integration - PDP to enable the functioning of the Supervision and Control SSC- REGER with current SSC routines and load limits through ETL processes for use in Real Time by REGER.

✓ Automation of the process of the thermal generation involving agents and ONS regional centers, generating reliability gain and productivity.

✓ Compliance with Resolution No. 454 of ANEEL establishing criteria and conditions for the commercial operation of reinforcement and expansion of transmission facilities to be integrated into the BIPS, with impacts on ONS processes and systems.

✓ Automation Integration between the r of Electric Power Commercialization Chamber and the Operator of the new Compensation and Settlement System-SCL.

✓ Review of the methodology of Project Management and ONS first stage of implementation of the Management System Project EPM 2010 to improve project management systems development, as well as support to decision of project portfolio of Corporate IT.

✓ Completion of the first phase of ONS System Development Methodology automation project, with the deployment of Microsoft Team Foundation, initiating actions to increase agility and improve the quality of development and maintenance of systems.

- **Advances in Information Security**

Due to the strategic and critical aspect of Information Security for ONS, special attention was given to the preparation of the terms of the Policy for Use and Security of Information and Organization Associate Assets. In addition, a security device has been implemented (Web Application Firewall) that increases the level of protection of ONS web applications against cyber-attacks.

- **Advances in Infrastructure**

In 2012, ONS completed the implementation of the new Service Desk system and the integration of modules Management and Monitoring of server infrastructure, system applications, local network and telecommunications links that allow the performance of proactively in the analysis, detection and repair of possible outages and performance degradation of the environment.

3.9 - Purchase Management

In 2012 ONS continued to improve processes control and monitoring of purchase, giving full transparency to expenditure on acquisitions of goods and services by the Organization.

The major initiative in 2012 was the beginning of the deployment tool GCVC (Contract Life Cycle Management), which allows the control of the requests, with workflow by visualizing their internal customers, the purchase of goods and services, controls and checklists of contracts registered in the corporate system - enabling monitoring of contractual balances, validity periods and adjustment clauses, as well as the Supplier Management. This action aims to automate and integrate the current controls, reducing operational workload and freeing professionals for jobs that require greater analysis and complexity.

3:10 - Building Administration Management

With the decision to move from building facilities in Rio de Janeiro, Recife and Florianopolis to new facilities, it has been initiated in 2012 ONS **Building Administration Management Project**, which aims to manage centrally the buildings of the four locations, seeking gains in scale and higher quality services.

3:11 - Economic and Financial Management

The economic and financial management of ONS in the year 2012 continued the process of improvement of budgetary control, resulting in the optimization of financial resources from the charges for use of transmission and the contribution of its members.

The financial statements have been prepared and are presented in accordance with accounting practices adopted in Brazil, which comprise the pronouncements of the Accounting Pronouncements Committee (CPC) and in accordance with the instructions contained in ONS Accounting, established by ANEEL.

Budget for the Year

ONS economic and financial budget, approved by ANEEL through ANEEL Resolution No. 3,033, of August 16, 2011, for the period July 2011 to June 2012, was R$ 451,489 thousand, of which R$ 235,375,000 planned for the period ended December 31, 2011 and R$ 264,178,000 provided for six months ended June 30, 2012.

The budget for the period from July 2012 to June 2013, approved by ANEEL Resolution No. 3 828, of November 20, 2012, was R$ 511,219 thousand, consisting of R$ 237,034 thousand for the six months ended December 2012 and R$ 274,184 thousand for the six months ending on June 30, 2013.

Thus, the budget for the period January-December 2012 amounted to R$ 501,212 thousand, of which R$ 37,402 thousand corresponds to a project for the new facilities of the Operator. Budget accomplishment reached R$ 421.284 million, amounting to a percentage of 84% for the year.

ONS Sources of Funds

Under Article 34 of the Bylaws, as amended by Resolution No. 1,888, of April 22, 2009, are sources of ONS funds:

I. Contributions of its members, in proportion to the number of votes at the General Meeting, including the Parcel "A" for purposes of transfer pricing and collected by other members and agents of the electricity sector that are not subject to transfer pricing.

II. Funds from the budget prepared by ONS and approved by ANEEL:

a) Transferred by members and agents of the electricity sector connected to the basic grid, whose values are included in the tariff for use of the Transmission System (TUST) and Parcel "A" of the Electric Power Service Rates;

b) Collected by other members and agents of the electricity sector not subject to transfer pricing;

c) Other income authorized by ANEEL.

To viability of its budget, ONS used resources of charges for use of transmission and associates' contribution collected, having billed R$ 408 million and R$ 13,898 thousand, respectively, during the year 2012.

Balance Sheet

Among the variations in the balance sheet, 2012, we highlight the items of fixed assets, intangible assets and labor obligations, detailing the events which occurred during the year are shown in items 10, 11 and 19 of the Notes to the Financial Statements.