



CONSEIL INTERNATIONAL DES GRANDS RESEAUX ELECTRIQUES
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STUDY COMMITTEE D2
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**PLANNING AND DESIGN OF THE BACKBONE ROADM FOR MUTUAL USE
BETWEEN CHESF (SÃO FRANCISCO'S HYDROELECTRIC COMPANY) AND
RNP (BRAZILIAN NATIONAL RESEARCH AND EDUCATIONAL NETWORK)
BENEFITS, OPPORTUNITIES, SOLUTIONS AND CHALLENGES.**

RODRIGO LEAL (*)	VERNON WALMSLEY	OSWALDO ALVES
CHESF	CHESF	RNP
BRAZIL	BRAZIL	BRAZIL

(*) rodrigol@chesf.gov.br

The tendency of the electric sector by the development of "Smart Grid" and by remote operation of the components of the energy system, combined with growing demand for the implementation of new services over IP networks, push the transport layer for availability, flexibility and increasing transmission rates. In this way, it was necessary to elaborate a Business Plan to meet these new needs.

CHESF finished in the year 2012 the Telecommunication Director Plan and had been started your implementation with the transport layer. The network architecture of the first phase, which is under commissioning, is based on a regional ring structure with OTN ((Optical Transport Network) technology network elements with 10Gbps with optical carriers structured ODU-0 for flexibility in the sharing of capacity utilization the new systems.

However, with the advent of MP 579, later converted into law no. 12.873 / 2013, the economic situation of the companies of the Eletrobras changed, limiting the CAPEX for the continuity of the next phases. The solution found to building the infrastructure that the company needs with a realistic investment was to partner with the The Brazilian National Research and Educational Network (RNP), that Since 2002, it has been a Social Organization (OS) bonded to the Ministry of Science, Technology, Innovations and Communications (MCTIC) and maintained thereby together with the Ministries of Education (MEC), Culture (MinC), Health (MS) and Defense (MD). A pioneer in 1992 as a nation-wide network of Internet access in Brazil, RNP's main duty is to promote technological development and support research on information and communication technologies, by creating innovative services and projects and training professionals. For such, it provides the public institutions of research and higher and technology education advanced network infrastructure that facilitates collaborative research in several areas of knowledge.

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The technical cooperation agreement signed in 2016 will meet both needs, once besides direct benefits to CHESF, like an increased transmission capacity in 160 times, improved reliability and availability, it will to speed up the offering of advanced optical infrastructure for education and research, including research centers, colleges, hospitals and centres of technological education, integrating 100Gbps northeast to other regions of the country and abroad.

CHESF and RNP have different requirements for availability, functionalities and PoP (Point of Presence). In this way, both companies needed rethink their concepts, developing alternative solutions and collaboratively planning a lean architecture, but meeting their minimum requirements. The result of this joint effort was the decision by a network with ROADM technology (Reconfigurable Optical Add-Drop Multiplexer) with 40 lambdas, initially equipped with a lambda of 100Gbps for each company, covering 16 PoP of CHESF distributed by the Northeast and interconnected by optical rings that use WSON (Wavelength Switch Optical Network) protection, guaranteeing a fast reestablishment in cases of fault.

This paper aims to show the benefits of the partnership for CHESF and RNP from a technical, financial and social perspective; the opportunities generate by the project; the technical solution and the main challenges to establish the partnership and implementation.