Developments in Research and Education Infrastructure for Latin America

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Chairman of the Board CLARA
CEO CUDI

This project is funded by the European Union

A project implemented by CLARA

Major developments are under way

- **Latin America (CLARA)**
- **Mexico (CUDI)**

Vision

- **A collaboration system of Latin American NREN´s based on advanced networking for research, education and innovation**

Objectives

- **Develop the network (Red CLARA) to connect LA NREN´s**
- **Establish links among LA NREN´s and between LA NREN´s and other blocks**
- **Develop network services**
- **Cooperate for scientific and technological development of the region**

Organization

- **Started in June 2003**
- **Non profit corporation based in Uruguay**
- **16 countries are members**

Alice and CLARA are born

- **May 2002: LA-Europe Madrid summit of heads of state pledge cooperation in Information Society projects**
- **June 2002: Heads of LA academic networking efforts meet with EEC and European counterparts in Toledo. Toledo Declaration is signed**
- **March 2003: EEC approves information society cooperation funding through the ALICE project**
- **May 2003: CLARA charter is signed in Valle Bravo, México**
- **November 2004: Network is launched in Brazil**

The WHREN/LILA Project

- **WHREN: Western Hemisphere Research and Education Network**
- **LILA Links Interconnecting Latin America**
- **IRNC Project funded by NSF and leaded by FIU and CENIC in the US.**
- **CLARA, CUDI, RNP, ANSP from Latin America**
- **Acquired IRU of Dark fiber Tijuana-San Diego. Running GbE on top of it. (to Pacific Wave)**
- **2.4 Gbps Sao Paulo-Miami shared with CHEPREO & ANSP (to Atlantic Wave)**

Alice 1

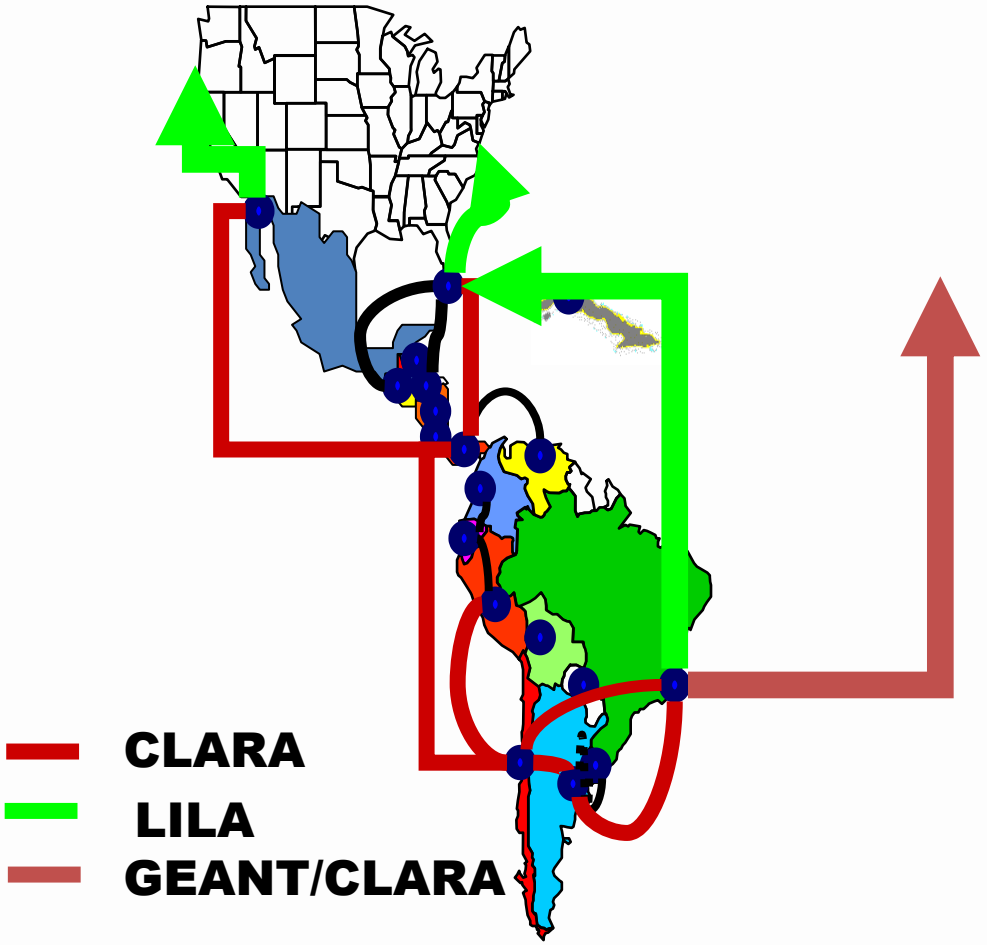
- **80% 10 Million Euros contributed by EC. 20% 2.5 million Euros contributed by LA NREN´s**
- **Project management entrusted to Dante**

2007-2008

- **Last year of European funding in 2007**
- **Management resposabilities endorsed fully to CLARA**
- **Reconfiguration of the network to reflect end of funding**
  - **Use Miami as a new hub because of significatly lower prices**
  - **Panama- Miami link to close a South American link**

RedCLARA September 2008

- STM-1
  - PANAMA-SANTIAGO; SANTIAGO-B AIRES; SANTIAGO-SAO PAOLO; BUENOS AIRES-SAO PAOLO;PANAMA-MIAMI
  - LIMA-SANTIAGO
  - EL SALVADOR-MIAMI, GUATEMALA-MIAMI
- DS-3; E3
  - BOGOTA-GUAYAQUIL; GUAYAQUIL-LIMA; CARACAS-PANAMA; MONTEVIDEO- BUENOS AIRES
- STM-4
  - SAO PAOLO-MADRID
  - SAO PAOLO-MIAMI-NEW YORK (Part of STM-16 LILA)



The scenario during 2008

- The RedCLARA Network currently connects 12 countries
- All links at least 34 Mbps,
- New funding, ALICE2, has been contracted. 4 year poject.
  - 12 million euros provided by EC
  - 6 million euros provided by LA NREN´s
- CLARA has taken over from Dante the management of contracts for the regional network
- The link to Europe is co-funded by GEANT and CLARA

ALICE2

Proyecto ALICE2

- **Aims to acquiere long term infrastructure and sustaintability. Acquisition of dark fiber IRU´s**
- **Focus efforts on Millenium Development Goals**
- **Resources to connect Bolivia, Cuba, Honduras, Nicaragua and Paraguay**
- **Create funded regional SIG´s to promote applications and participation in FP7**
- **Management, technical and training support for emerging NREN´s**

RedCLARA2. Comercial Internet

- **Commercial Internet pricing in the poorest LA countries is prohibitive**
- **Interest in providing commercial Internet through CLARA**

RedCLARA 2009

- **CLARA2 tender will take place in March**
- **Link to Europe should increase to 2.5 Gbps**
- **Will be in the market for Panama-Miami, Panama- Santiago and Panama- Mexico links, IRU´s**
- **STM1 links from Central American countries to Miami**

Regional developments

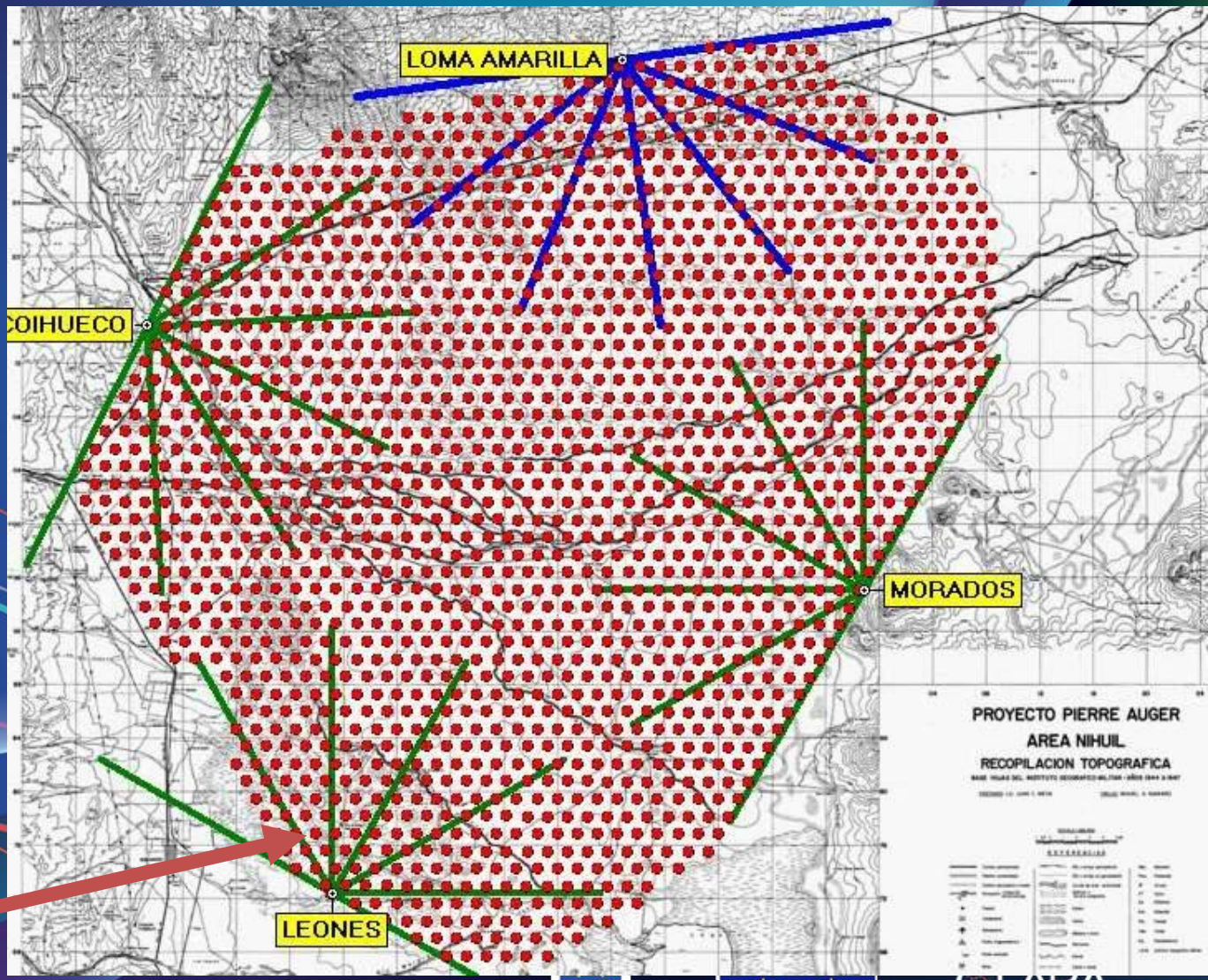
High capacity link between Argentina and Chile

- **Agreement between CLARA-InnovaRed-RNP, AugerAccess and Silica Networks will allow a first 10 Gbps “lambda” by mid 2009 between Buenos Aires and Santiago**

Proyecto Argentina-Chile

The Auger Observatory

- **~ 3000 Km² covered**
- 160 cosmic ray detectors
- 24 telescopes in 4 buildings



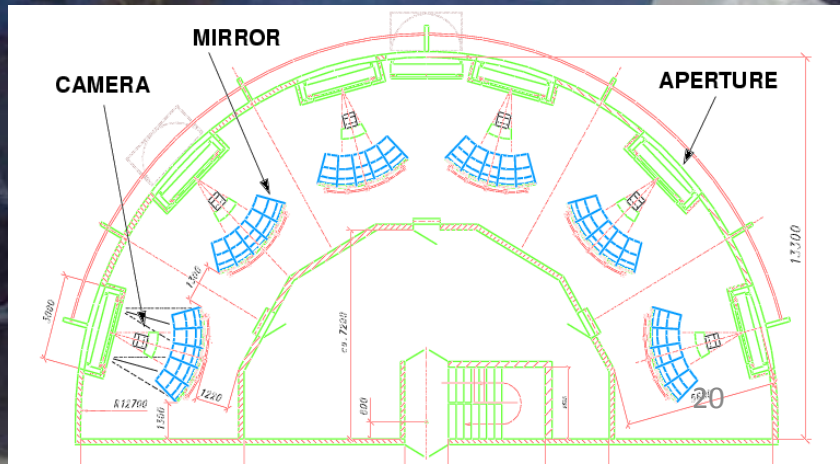
Malargüe

50 km

This project is funded by the European Union

A project implemented by CLARA

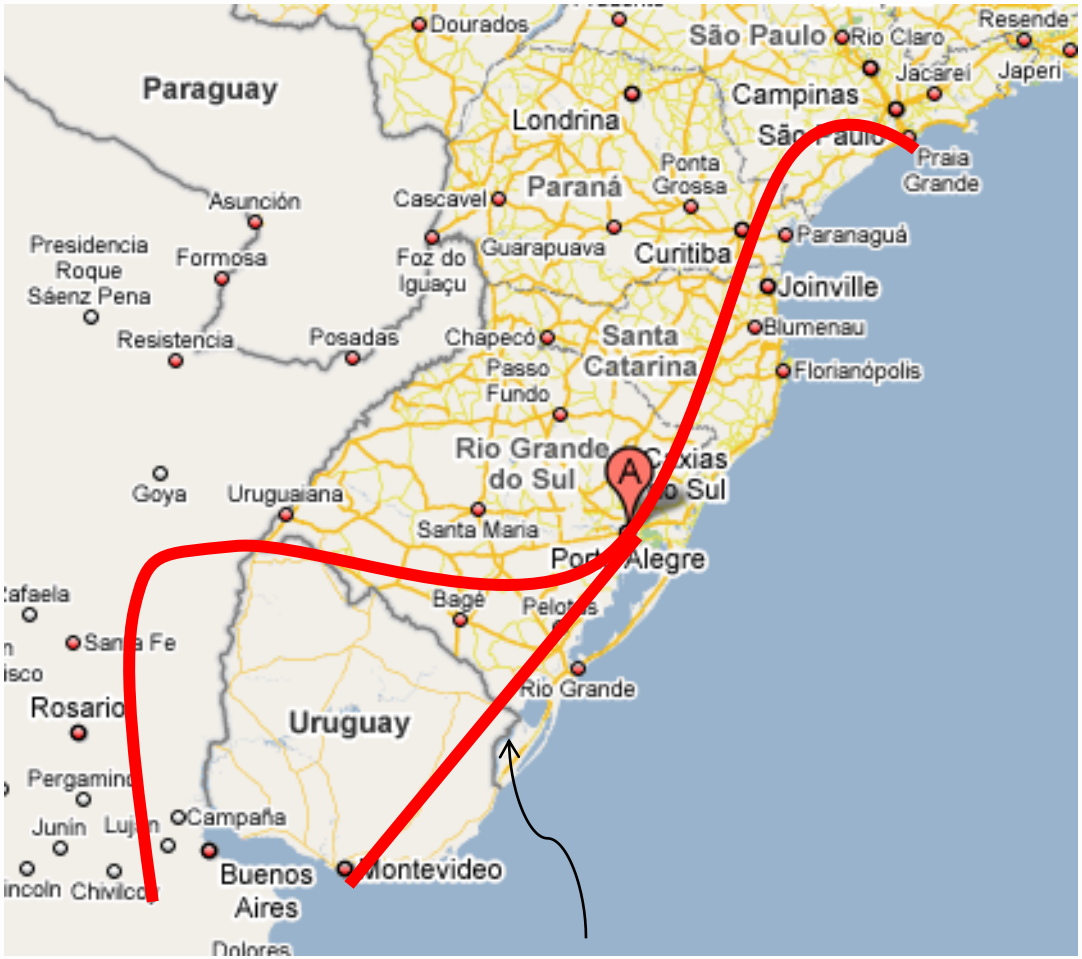
6 Telescopes (30° x30°)



Mercosur Proyect

- **Brasil will contribute US$ 10,000,000 over 3 years to finance conections in the Mercosur region, in addition to ALICE 2 funding**
- **Link Buenos Aires-Rosario-Uruguaiana-Porto Alegre-Sao Paulo espected to be operational by mid year 2009.**
- **Planning to acquiere dark fiber between Uruguay and Brasil**

Mercosur Project



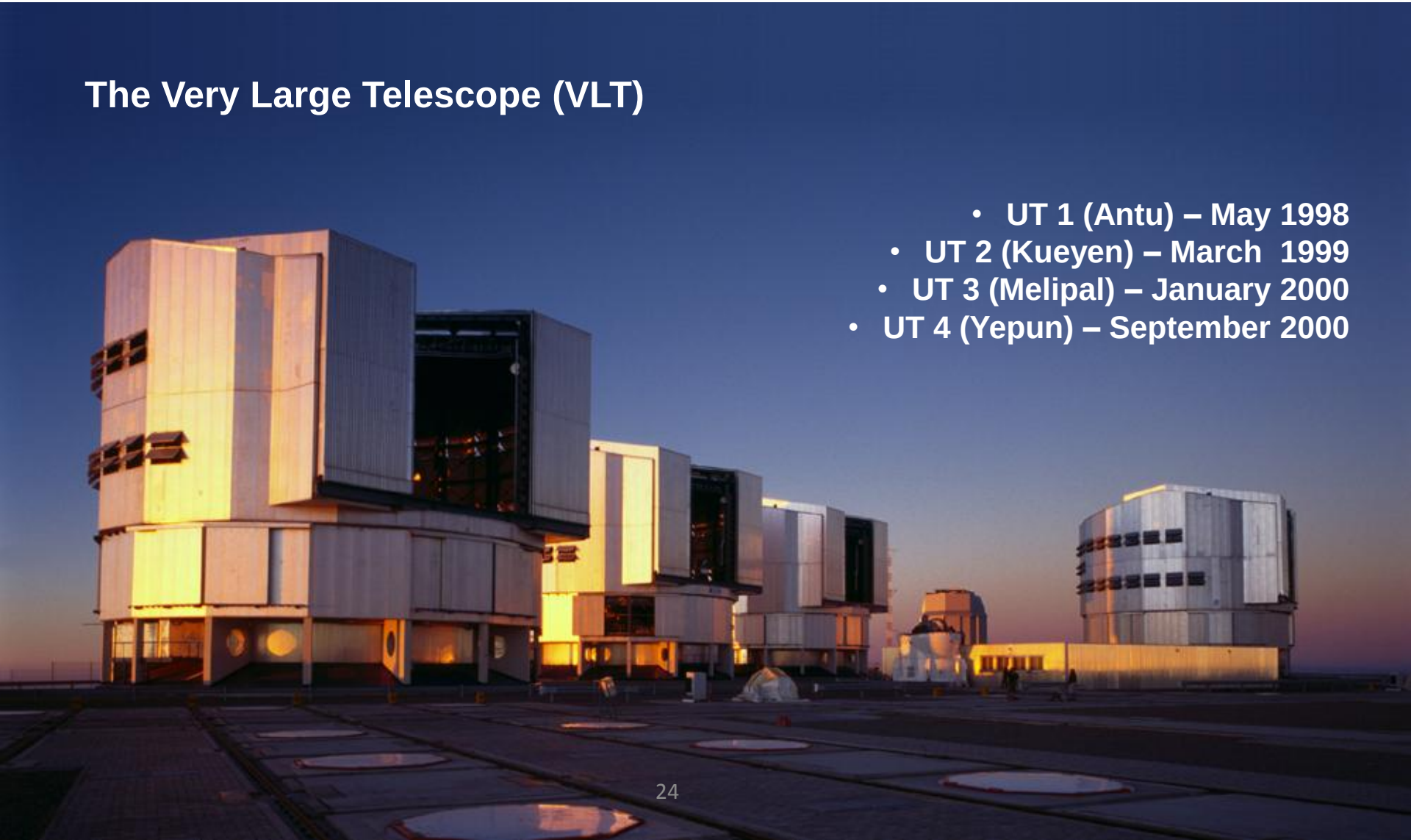
EVALSO project (Enabling Virtual Access to Latin American Southern Observatories)

- **Install FO from Antofagasta to Cerro Paranal**
- **Sinergy with REUNA. Will share capacity**
- **Possibility of reaching Peru. Capacity sharing agreements to reach Arica. IRU´s are available to reach Peru, Ecuador and Colombia**

ESO – Cerro Paranal

ESO
European Organisation for Astronomical Research in the Southern Hemisphere

The Very Large Telescope (VLT)



- UT 1 (Antu) – May 1998
- UT 2 (Kueyen) – March 1999
- UT 3 (Melipal) – January 2000
- UT 4 (Yepun) – September 2000

Fibre from Antofagasta to Santiago

Developments in Mexico

- **The Mexican government has announced its intention to undertake a major connectivity project**
  - **Increase the capacity of the Mexican NREN**
  - **Provide connectivity to a majority of public school buildings (≈ 200,000) and health centers (≈20,000)**

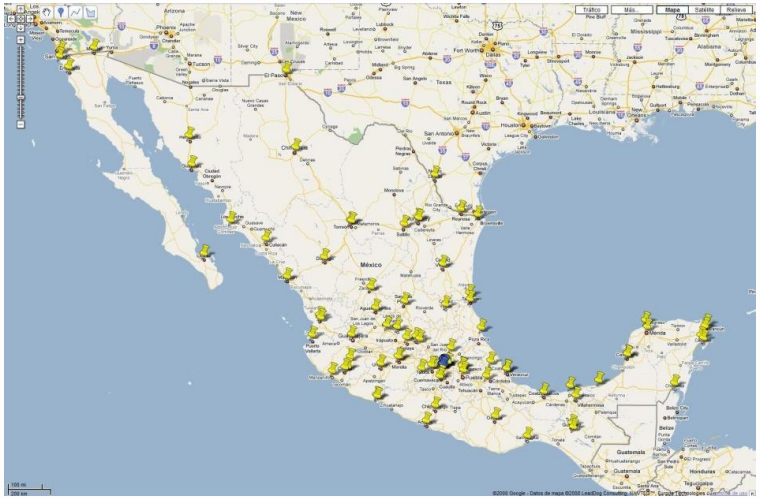
Major policies

- **Develop the backbone**
- **Build a Wimax distribution network**

Develop the backbone

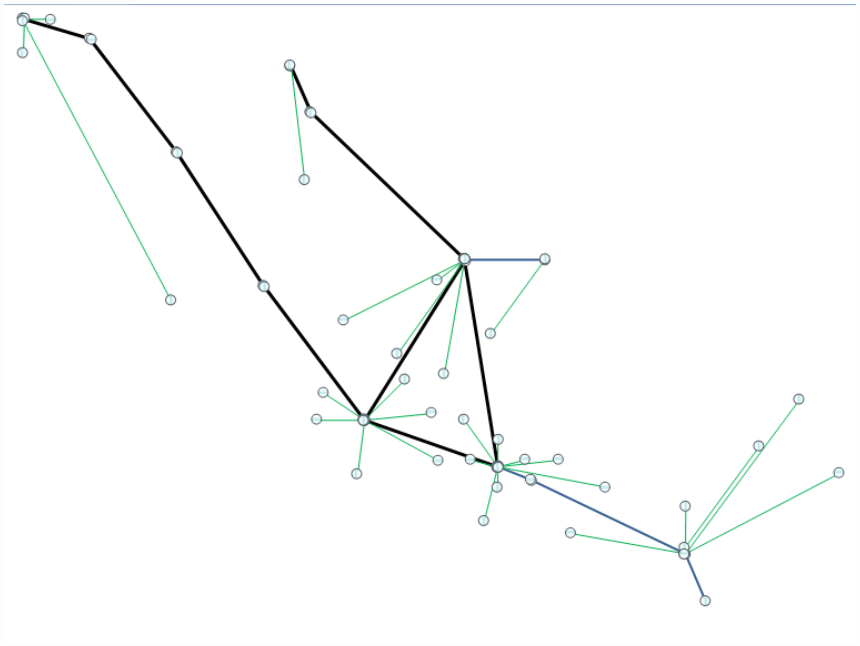
- The Mexican government owns and operates the electric grid.
- The Comisión Federal de Electricidad has 22,000 kilometers of OPGW fiber throughout Mexico
- The ministry of Communications and Transport has nnounced that it will contract capacity with CFE to create a National Network for Broad Band promotion

Points of presence of the CFE fiber network



Tne new backbone

40 links to major cities of at least 1 Gbps



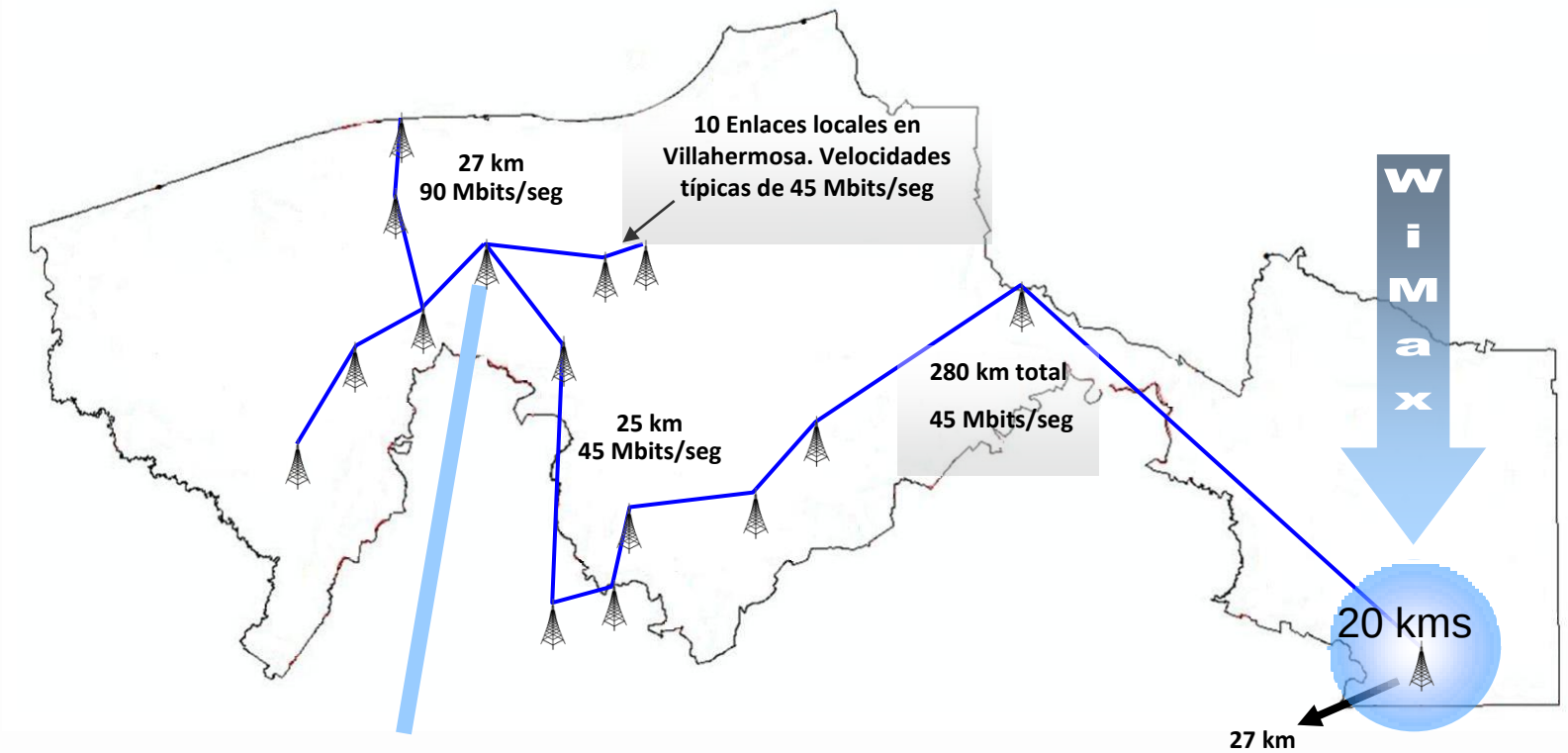
10 Gbps		
No.	Origen	Destino
1	Hermosillo	Tijuana
2	Culiacán	Hermosillo
3	Guadalajara	Culiacán
4	México, D.F.	Guadalajara
5	Guadalajara	Monterrey
6	Monterrey	México, D.F.
7	Monterrey	Cd. Juárez

2.5 Gbps		
No.	Origen	Destino
1	México, D.F.	Puebla
2	Puebla	Tuxtla Gutiérrez
3	Tuxtla Gutiérrez	Tapachula
4	Monterrey	Matamoros

1.0 Gbps		
No.	Origen	Destino
1	Tijuana	La Paz
2	Tijuana	Ensenada
3	Tijuana	Mexicali
4	Guadalajara	Tepic
5	Guadalajara	Pto. Vallarta
6	Guadalajara	Colima
7	Guadalajara	Morelia
8	Guadalajara	Guanajuato
9	Guadalajara	Aguascalientes
10	Monterrey	Saltillo
11	Monterrey	Durango
12	Monterrey	Zacatecas
13	Monterrey	San Luis Potosí
14	Ciudad Juárez	Chihuahua
15	Matamoros	Cd. Victoria
16	México D.F.	Toluca
17	México D.F.	Cuernavaca
18	México D.F.	Chilpancingo
19	México D.F.	Veracruz
20	México D.F.	Xalapa
21	México D.F.	Tlaxcala
22	México D.F.	Pachuca
23	México D.F.	Querétaro
24	Tuxtla Gutiérrez	Oaxaca
25	Tuxtla Gutiérrez	Chetumal
26	Tuxtla Gutiérrez	Mérida
27	Tuxtla Gutiérrez	Campeche
28	Tuxtla Gutiérrez	Villahermosa

The Wimax distribution network

Use existing infrastructure. Tabasco University



Backbone CUDI (Internet 2)

GOBIERNO DEL ESTADO DE TABASCO

RIDING THE WAVES OF INNOVATION

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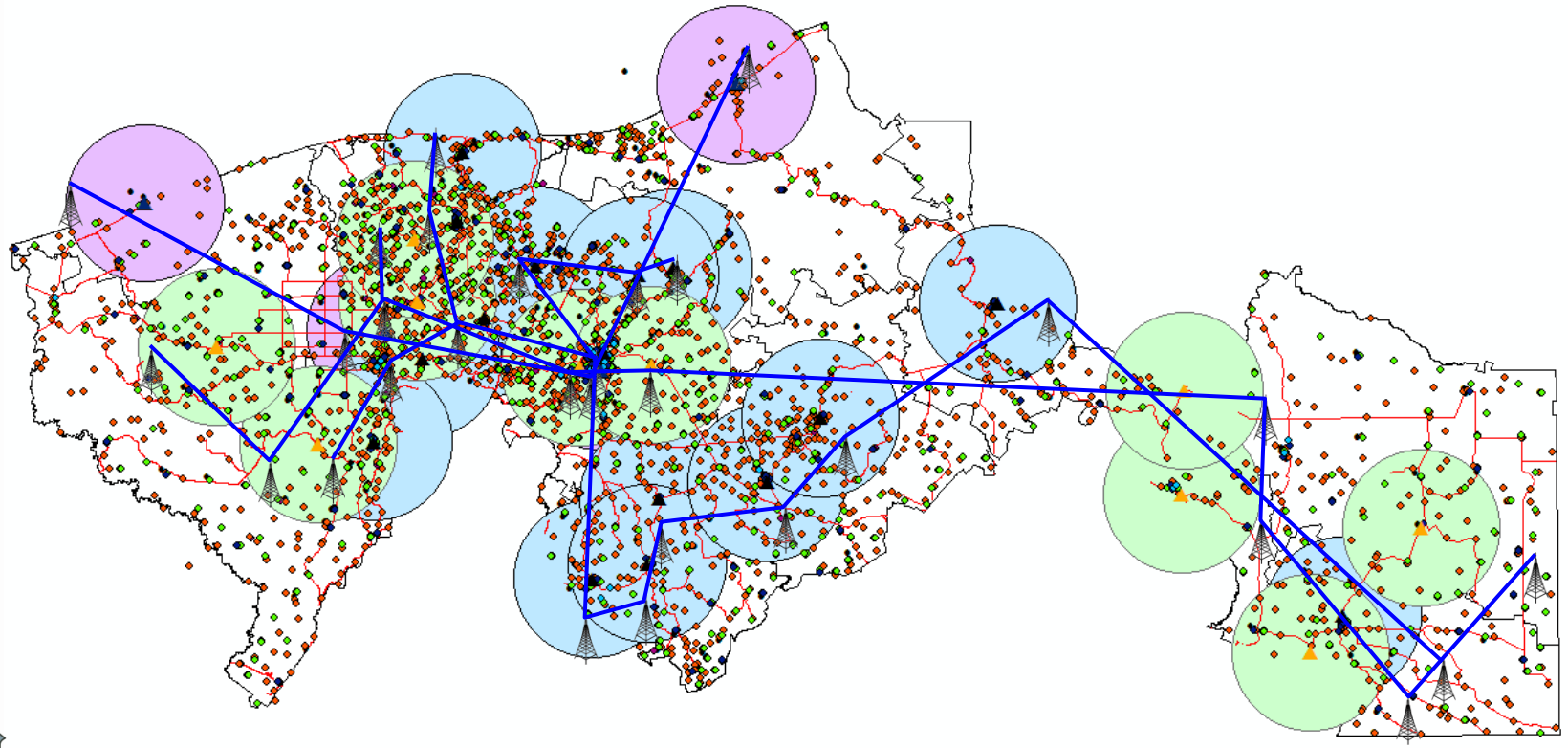
In a typical state you can connect most of the sites using existing radio infrastructure

- **Cobertura Total (30 radio-bases)**



GOBIERNO DEL ESTADO DE TABASCO

- Los círculos de cobertura son ilustrativos y están sujetos a las condiciones de la línea de vista entre el sitio remoto y la radio-base así como a la condición del espectro radio eléctrico.
- La ubicación de las radio-bases de la UJAT es con base en aproximaciones, por lo que debe ser confirmada dicha ubicación por parte de la Universidad.

RIDING THE WAVES OF INNOVATION

alice2 CLARA

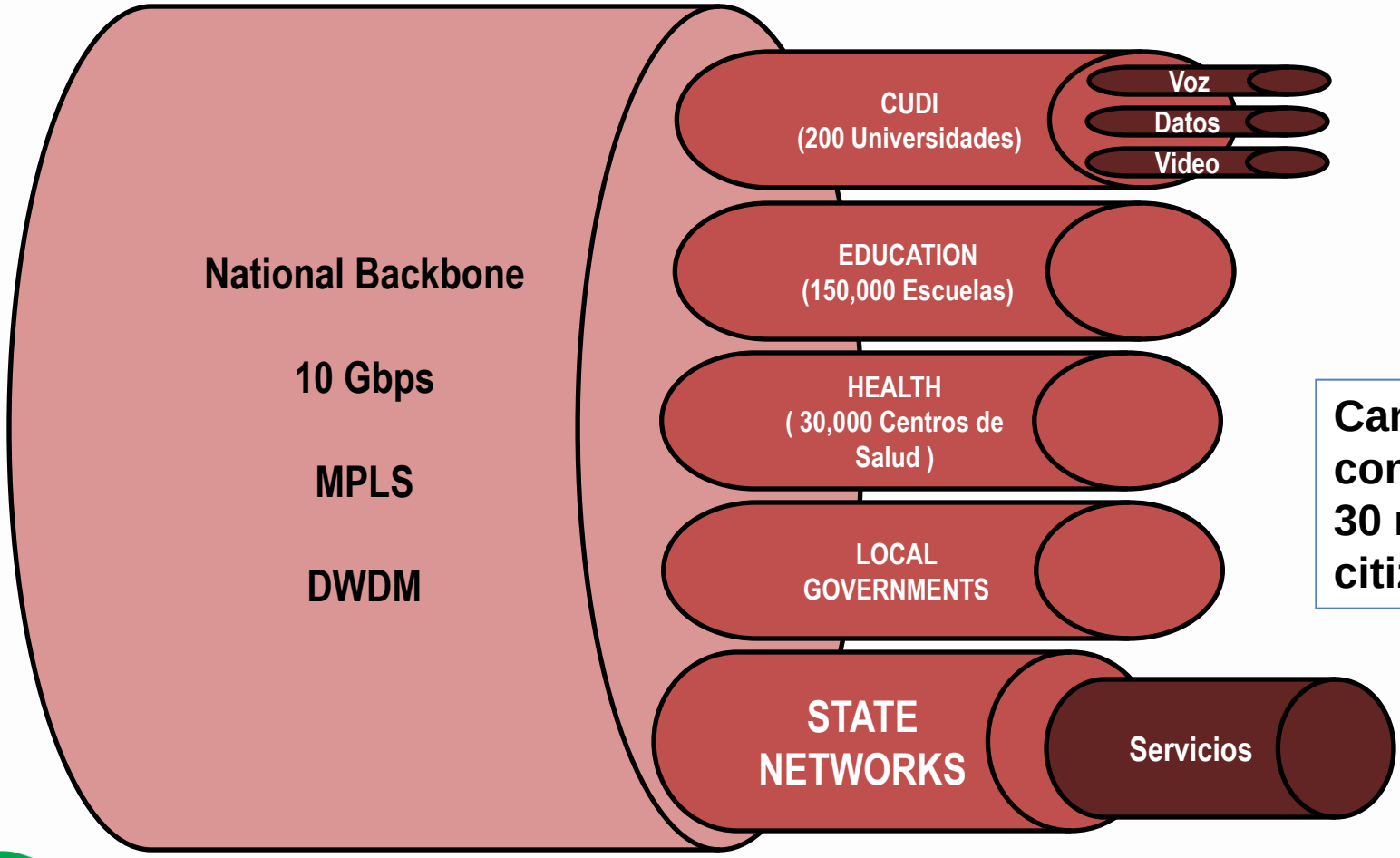
Costs

- Less than 2,000 US dollars per connected site
- (Monthly cost of a simmetrical 2 Mbos link from Telmex is 2,000 US dollars per month)

Basic timeline

		Stage 1	Stage 2	Stage 3
Date		jun-09	dic-09	dic-11
Conected cities		7	32	32
Backbone bandwidth		1 Gbps	10 Gbps	10 Gbps
Internet 1	•schools	0	50,000	150,000
	•health centers	0	7,500	30,000
	•Govert. offices	0	2,500	10,000
	•University campuses	7	200	300

The backbone will serve multiple stakeholders



Can impact connectivity of 30 million citizens

Central América

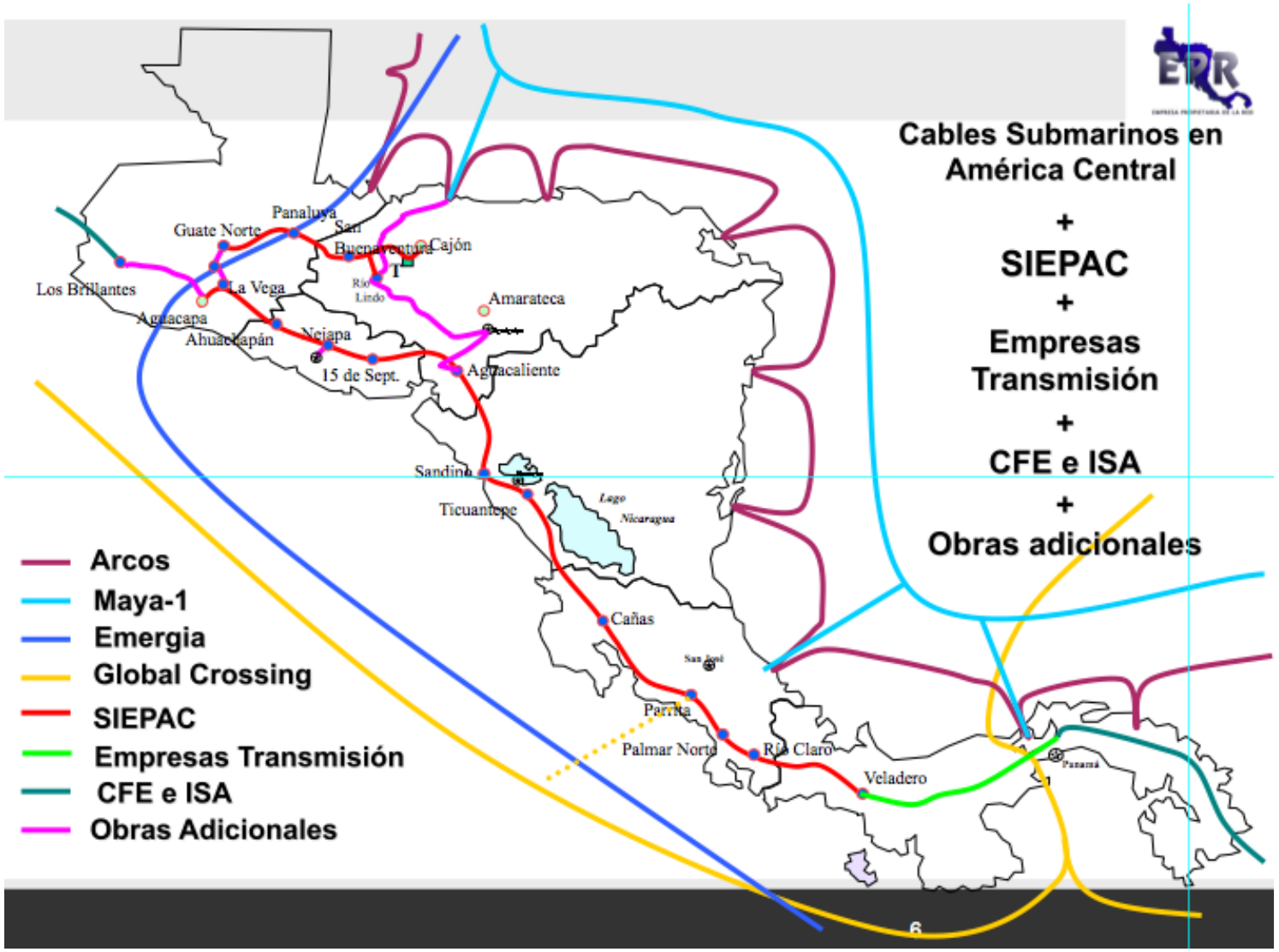
- **Plan Puebla Panamá is building an electrical network with 36 fiber OPGW. Interamerican Deveolopment Bank funding in place. Completion expected by 2010.**
- **Aiming to secure a fiber pair to interconnect Central American NREN´s to Mexico and Colombia**
- **Joint investment with CUDI could allow connecting Guatemala to Mexico and the US**

LINEA SIEPAC
PRIMER SISTEMA DE TRANSMISION REGIONAL

País	KMS
Guatemala	279
El Salvador	285
Honduras	270
Nicaragua	321
Costa Rica	490
Panamá	150
Total	1795

300 MW de capacidad
28 bahías en 15 subestaciones
Cable OPGW de 36 fibras

Visión general



The CKLN-CLARA connection

CKLN Signs EU Financing Agreement for C@ribNET

The Caribbean Knowledge and Learning Network (CKLN) signed a financing agreement of €10 million with the European Union (EU) for C@ribNET. This funding supports the second phase of the C@ribNET project which involves the procurement and implementation of the regional high-speed, fibre optic network.

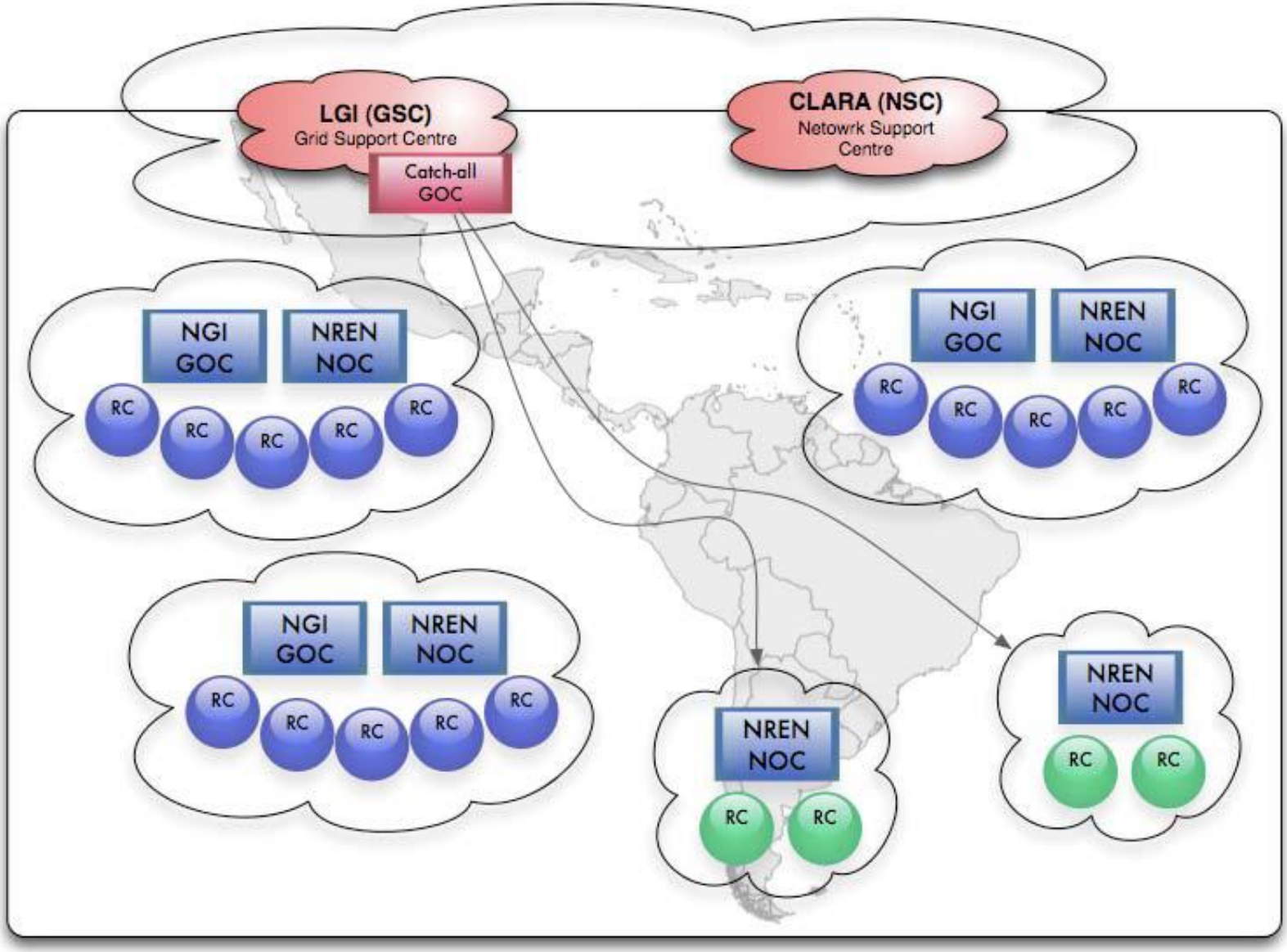
Ken Sylvester, chief executive officer, CKLN mentioned that these funds will supplement what CKLN received earlier this year from the IDB to conduct infrastructural assessments for the implementation of the C@ribNET project in CARIFORUM countries.

"This second component of work will include the provision of network equipment, network links, network engineering and operations," he explained.

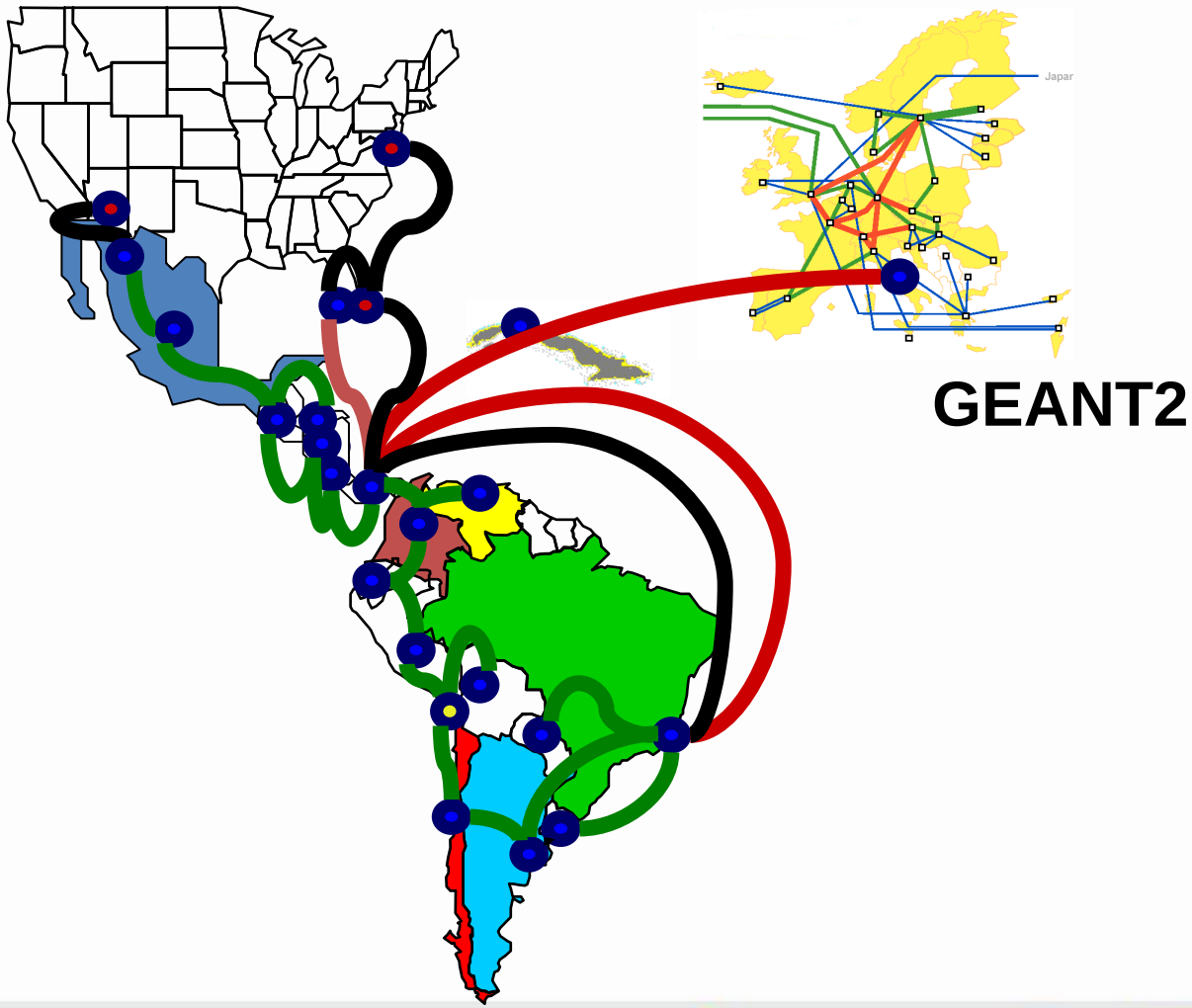
CLARA will work with CKLN on:

- Engineering
- Governance
- NOC
- Applications
- Sinergy

The Latin American Grid Initiative (LGI)
(http://documents.eu-eela.org/record/1119/files/)



CLARA diagram



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