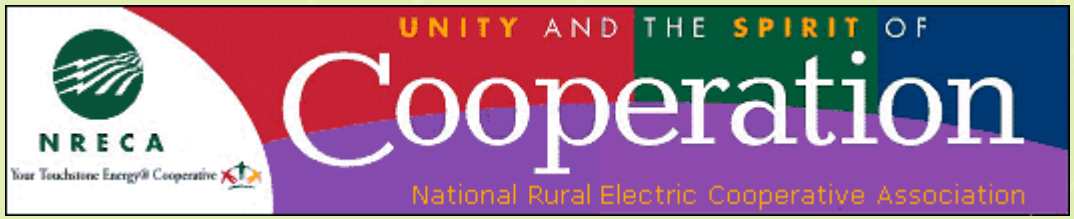


BROADBAND OVER POWER LINES

The Potential for Rural Utilities

July 28-29, 2003, Cincinnati, Ohio

FEW WORDS ABOUT EBA

- EBA PLC Corporation was chartered on February 2001.
- Mr. Ramón Campollo, Ricardo Sanchez Zelaschi, Jorge Lopez and Jorge Schcolnik are the shareholders.
- We won the involvement of banking institutions that allow us to tackle different projects, with the banks also serving as equity providers.
- Eight executive officers run the main areas in the company. Most of them are highly educated and have great experience in the corporate field.
- Our most significant achievement is clearly depicted in the slide entitled **WORLDWIDE EBA PRESENCE**.

FEW WORDS ABOUT EBA (II)

The shareholders are committed to providing proof of financial and economic strength, subject to being awarded as well as a condition for such award.

FEW WORDS ABOUT EBA (III)

FEW WORDS ABOUT EBA (IV)

We have achieved many key milestones, including:

1. Alliance with SENAO International Co, Ltd., the world's most experienced BPL/DS2 manufacturer
2. Alliance with TECNOCOM S.A., with the most extensive experience in BPL/DS2 deployment **(Endesa Trial in Zaragoza and Seville)**
3. Alliance with Global Crossing, which allows us to obtain connectivity through the largest optic fiber network, as well as a telephone service provider in some locations **(i.e. the United States)**
4. Software and hardware for Remote Management of both the PLC/DS2 network and the Energy Grid

FEW WORDS ABOUT EBA (V)

- Milestones for the future:

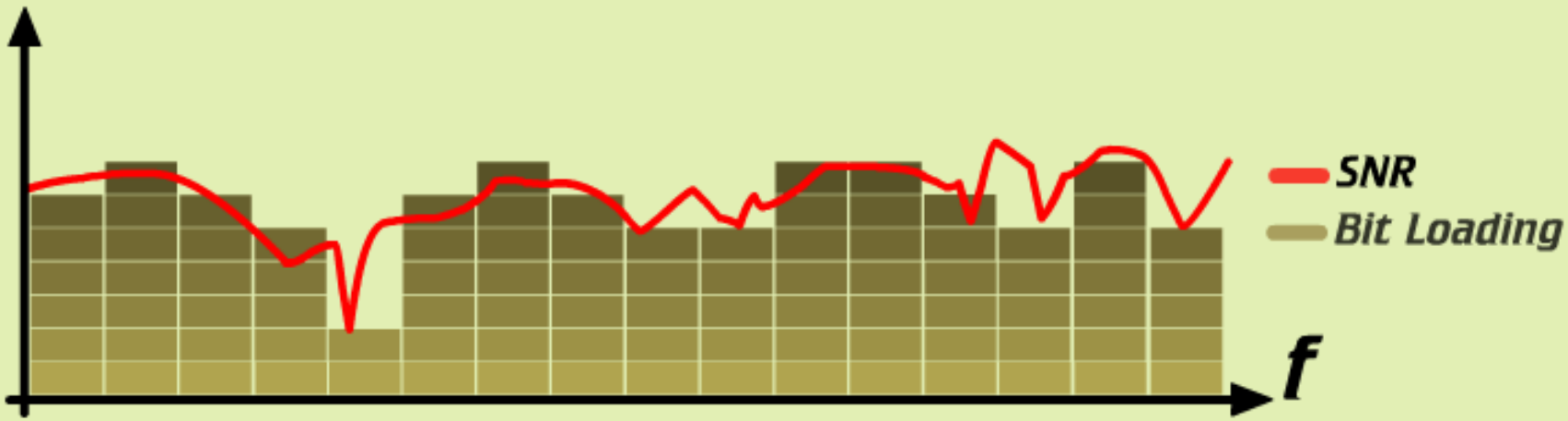
1. First commercial deployment in Guatemala, estimated to open in September 2003
2. Commercial deployment, Sao Paulo (Brazil), in Alphaville, estimated for October 2003
3. Commercial deployment in Prague, Czech Republic, estimated for late September 2003
4. Commercial deployment in Kaiserslautern, Germany estimated for mid-November 2003

EBA PLC Technology

- DS2 chipsets
  - 45 Mbps (currently)
  - 200 Mbps (available soon)
  - OFDM modulation
  - Master – Slave MAC
- MV & LV Solutions
- Standard interfaces
  - Ethernet
  - USB
  - Serial
- PLA management software (via SNMP)
- Flexible solutions
  - Plug & play PLC system
  - Customized solutions

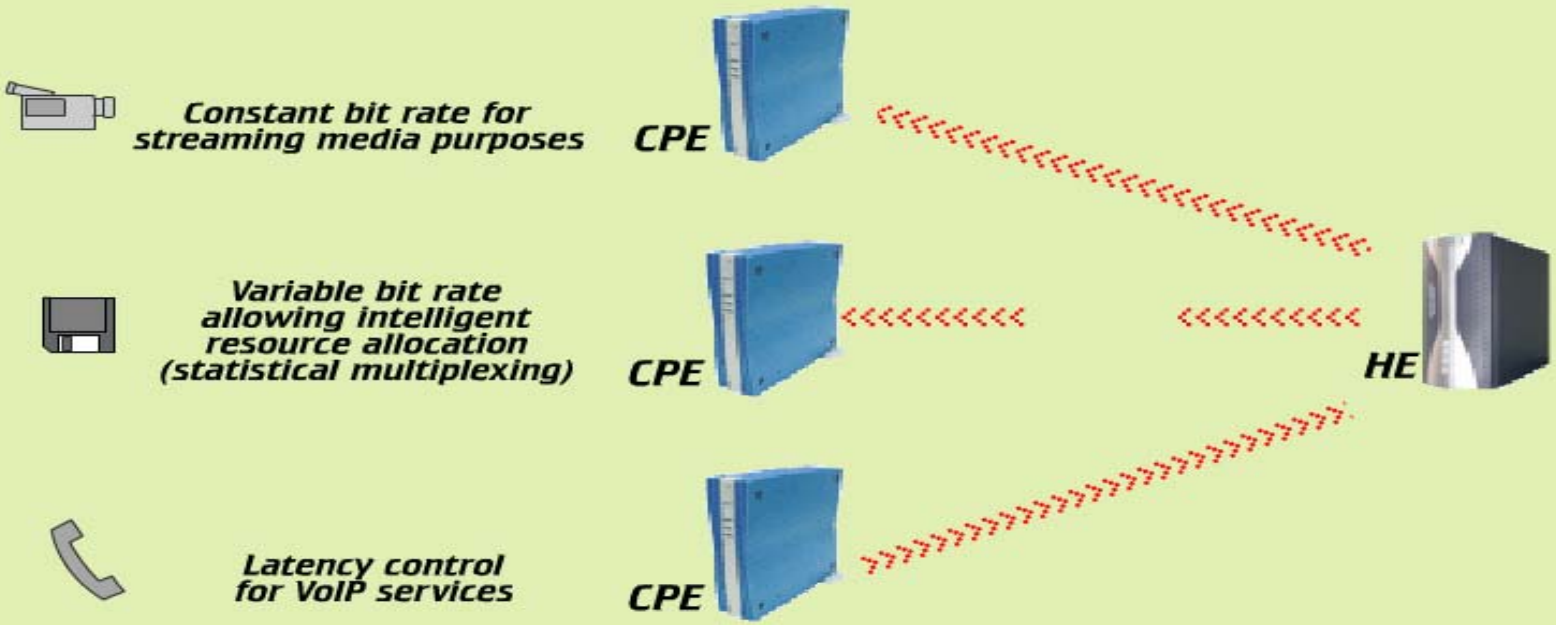
EBA PLC Technology (II)

- OFDM Modulation
  - Orthogonal Frequency Division Multiplexing (1280 carriers)
  - Adaptable data rate per subcarrier (BPC*) depending on SNR detected. *Bits per Carrier



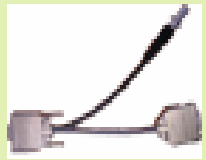
EBA PLC Technology (III)

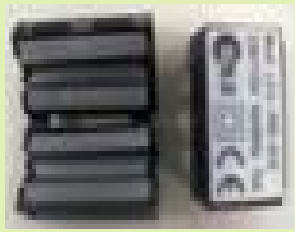
- **Media Access Control**
  - **Master/slave MAC controlled by the HE; upstream/downstream control**
  - **Supports variable and constant bit rate (VBR and CBR, up and/or down), and latency control**
  - **Quality of Service (QoS) per user**
  - **Differentiated services**



EBA PLC Technology (IV)

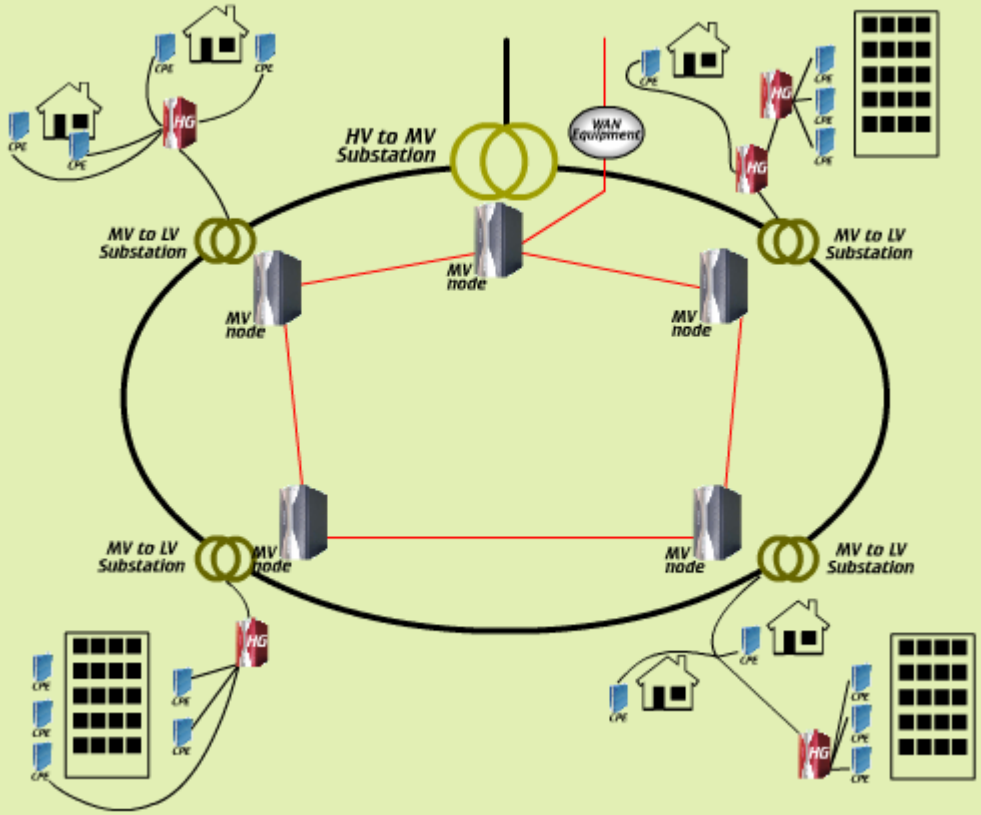
- **Coupling Techniques**
  - Inductive Couplers
  - Capacitive Couplers
- Multiple injection techniques
  - Coupling accessories
  - Distribution boxes / Signal splitters





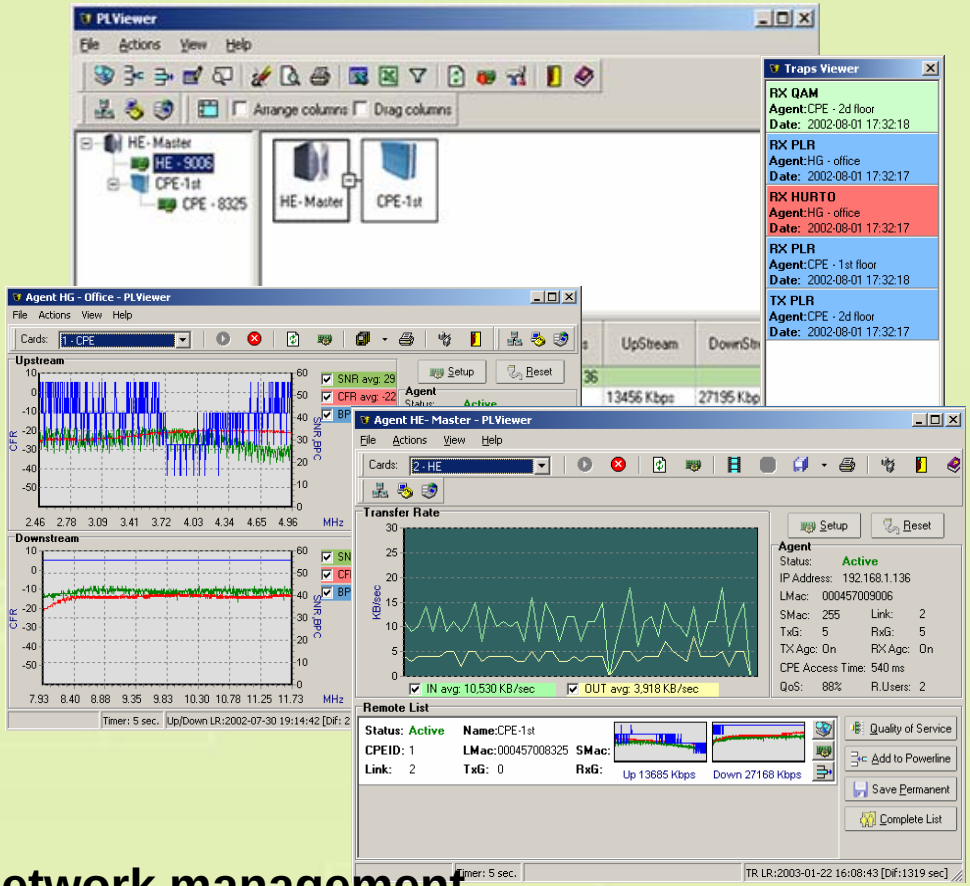
EBA PLC Technology (V)

- Network Topology



EBA PLC Technology (VI)

- PLA Network Management System



- **Designed for Powerline Networks**
- **Fast, easy information access and network management**
- **Based on SNMP (Simple Network Management Protocol)**
- **Historical data stored for statistics analysis**

EBA PLC Technology (VII)

- PLC Components
  - MV Node
    - **In different configurations:**
      - **MV master**
      - **MV repeater**
      - **Including LV master**
  - LV Master
  - LV Repeater
  - CPE
  - Capacitive Couplers
  - Inductive Couplers
  - PLA Network Management System

Our Business Model

- EBA's main business goal is building with the utilities a TMT (technology, media and telecommunications) company.
- When the utility is not interested in participating in the above business model, we propose a revenue-sharing agreement as compensation for the grid.
- If the utility is not interested in any of the above, we develop an in-building model.

Field Tests

- In most of our points of presence we have conducted field tests. Points include the following:

1. Rio de Janeiro
2. Sao Paulo
3. Prague
4. Lima (Peru)
5. Cuernavaca (Mexico)
6. Salta (Argentina)
7. Chartres (France)

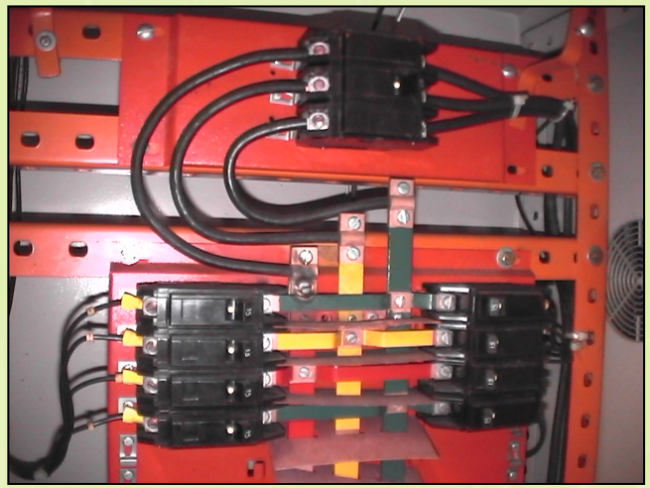
Field Tests (II)

Field Tests (III)

Salta – Overhead HG

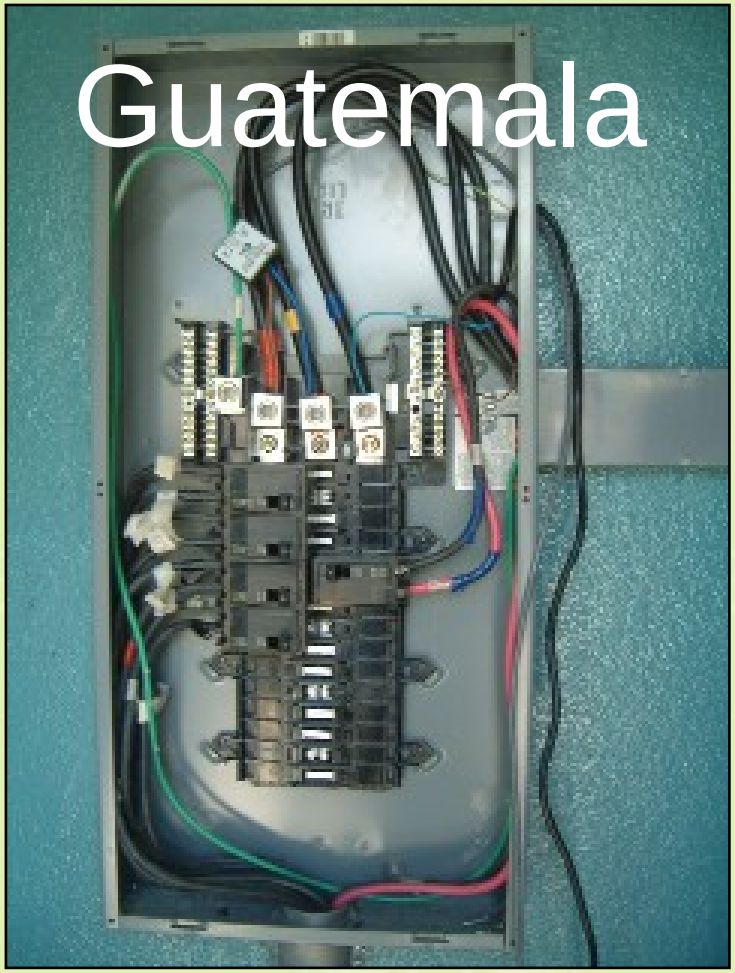
Field Tests (IV)

Curitiba



MV/LV
Transformer

Field Tests (V)



Field Tests (VI)

- Location: Campinhas, SP, Brazil
- MV Trial
- Overhead wires
- Distance achieved: 800 meters (0.5 miles aprox) without repeaters
- Performance: 15 Mbps physical layer

Field Tests (VII)

- Location: Guatemala City, Guatemala
- MV Trial
- Underground wires
- Distance: 350 meters (approx. 1/4 mile) without repeaters
- Performance: 25 Mbps physical layer

Markets & Economics

- *Targeted Markets*: Our solutions have been economically feasible in all cases to date. Low-density areas may require a multi-service package of products for enhanced economic attractiveness.

  Our preferred markets are utilities, but telcos and in-building required solutions are also part of our marketing strategy.

Markets & Economics (II)

- *Economics*: As with most of the technologies used in telecommunications, our solution requires an in-depth analysis of the topology and other related issues.

  In our vision, most of the economics are strongly related to services eagerly awaited by end users, due to the fact that our technology is not limited for external reasons **(weather, saturation, insecurity, etc).** The ability to provide multi-services is one of our great advantages, minimizing some of the adverse environments we may face.

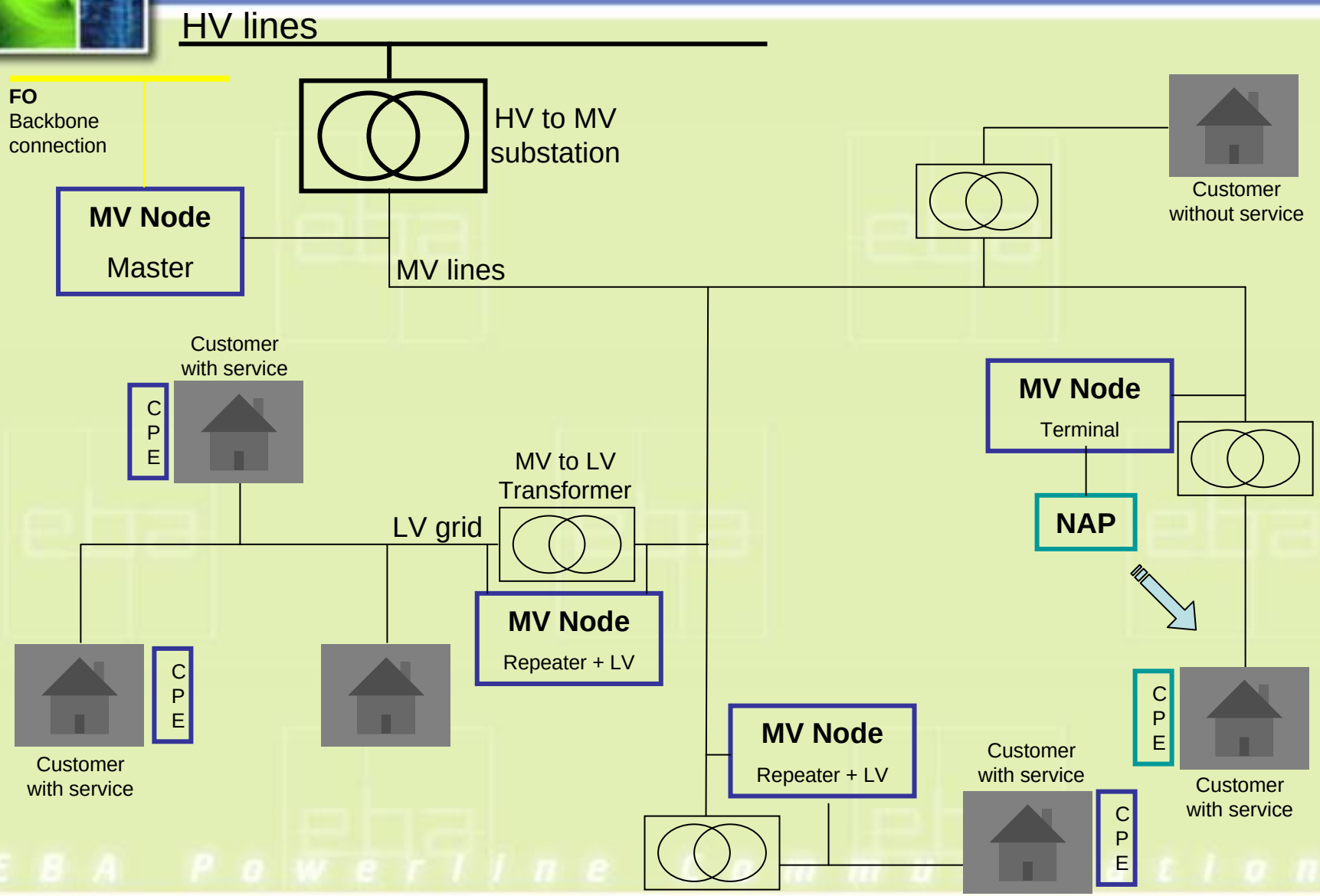
BPL in Rural Areas

CONSIDERATIONS

Each MV hoop covers a segment of the MV grid:

- There is no need for BPL equipment in between that segment if no customer requires service.
- MV/LV transformers belonging to customers that don't need service won't require BPL equipment.
- Only when a customer requires service is an MV node placed in its MV-LV transformer.
- If there are many customers per transformer, the BPL equipment cost is shared among these customers.
- The EBA system easily interfaces with third-party technologies if needed for special cases.

BPL in Rural Areas: Example



3rd Parties' Custom Appl.

- EBA PLC system features
  - **Open architecture**
    - **Embedded Linux platform**
    - **x86 Intel compatible or RISC host platforms**
  - **Standard interfaces**
    - **10/100 Ethernet**
    - **RS-232 serial**
    - **Internal PCI, mini PCI slots**
    - **USB**
  - **Other**
    - **Local storage**
    - **Other standard PC interfaces and features available**
- The mentioned features make it easy to develop or integrate third-party custom apps (i.e. utility apps) on demand if needed.

Performance (II)

- Each link can provide 27 Mbps in the downstream channel and 18 Mbps in the upstream channel.
- Expected performance is not only dependent on distance, channel attenuation and noise, but also on the number of taps. Thus it is difficult to provide a single formula that is useful for virtually any environment.

Performance (III)

Attenuation	Downstream	Upstream	Total (Mbps)
0	27	18	45
10	27	18	45
20	27	18	45
30	27	18	45
40	26.1	16.5	42.6
50	16.7	9.0	25.7
60	5.1	4.6	9.7
65	1.7	2.1	3.8

Performance (IV)

- Application-layer numbers, measured with FTP are:

Direction	FTP Throughput
Downstream	20.48 Mbps
Upstream	12.48 Mbps
Total	32.96 Mbps

Expected distances

- According to our experience:
  - LV: 250 meters
  - MV: 800 meters

- Field trials should be carried out to determine line conditions and calculate the expected distances for the various topologies.

FCC

- The strength of radiated electric fields is highly dependent on the injection mode, electrical cabling type and topology. Significant variations can be expected. Nevertheless, the limits of FCC (Federal Communications Commission) Part 15 are always met, even in the very worst cases (e.g. higher frequencies and close proximity to the transformer injection point with overhead cabling).
- “Power Mask” exclusive feature
  - Allows manual and precise configuration for frequencies to be used and the injected power
  - GUI Interface for PM set up via PLA

BPL Design

- BPL (or PLC) disadvantages
  - New technology
  - Each powerline (grid) is different.

- Design process
  - Carry out tests in different grids and conditions.
  - Deploy Fields Trials
  - Use test and field trial results to characterize the grid, and then extrapolate the results.

Thank you very much for this opportunity!