La transizione energetica nelle città: un progetto integrato e sostenibile per il TPL elettrico

Sonia Sandei, Head of Strategic Development
Enel X
Genova, 31/05/2019
The evolution of the energy sector

Decarbonization

Renewables penetration by 2040: 60%

By 2040, electricity will be the first source of energy consumption: share of 38%

Digital electricity infrastructure investments: +45% between 2014 and 2016

New customer needs lead to customized services development with sustainable approaches

The energy sector is experimenting a deep transformation

Digitalization and customer centricity will change the sector paradigm

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The evolution of the energy sector

New customer needs

Decarbonization

Electrification

Digitalization

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A new Global Business Line: Enel X
Our portfolio of solutions in the 4 Global Product Lines

- **e-Industries**
  - Consulting and auditing service
  - Distributed generation on/off site
  - Energy efficiency
  - Demand response and demand side management

- **e-Mobility**
  - Charging infrastructure (public & private)
  - Maintenance and other services
  - OEM back-end integration
  - Vehicle Grid Integration

- **e-Home**
  - Installation, maintenance and repair services
  - Automated home management
  - Financial services
  - Home 2 Grid

- **e-City**
  - Smart lighting
  - Fiber optic wholesale network
  - Distributed generation & energy services
  - Demand response and demand side management

**Flexibility**
Our Recent Acquisitions
Targeted M&A operations to deliver in the new energy ecosystem

Acquisition of Demand Energy and its best in class platform for the behind-the-meter distributed resources and storage management.

New industry understanding with the acquisition of EnernNOC, world’s largest provider of demand response and energy intelligence software.

Acquisition of EMotorWerks, developer of the market leading smart EV charging platform – Juice Net – that interfaces with local utilities & grid operators to optimise EV charging costs, reduce peak load and balance renewables.
The energy ecosystem we want to build
Flexibility throughout the entire energy system

The Energy as a Service value chain

Best positioned to serve new customers’ needs
e-Mobility
How electric cars can help us in building the new energy ecosystem

Car manufacturers

Demand Response

Interruption of a charging session in progress or deferred startup of the charging session; aggregation of each single start and stop is equivalent to the contribution of an interruptible heavy energy consumer.

Ancillary services through Vehicle 1 Grid

Modulation of a charging session in order to provide frequency regulation services. It increases the flexibility of the network and helps mitigate overload risks or increase the capacity of renewables.

Ancillary services through Vehicle 2 Grid

Return of power from car battery to the network; it is used for frequency regulation. Each car contributes with the power that the bidirectional charging station makes available.

Energy 2 Grid

Return of energy from the car battery to the electricity grid can allow the supply of portions of the network in emergency conditions or participate in the wholesale energy markets.

Product developments

How electric cars can help us in building the new energy ecosystem
We are pushing ahead because...

- **Secured partnerships** with key committed carmakers and stakeholders
- **e-Mobility as an opportunity of industrial development** in Italy
- **First mover** in the e-Mobility Revolution

By 2022 14,000 infrastructures installed
By 2022 14,000 infrastructures installed
Up to 300 M€ CAPEX by 2022
FROM THE BUS TO THE SMART CITY

THE SANTIAGO CASE AND BEYOND
PUBLIC TRANSPORT AS BACKBONE OF THE CITY

1. INCREASING URBANIZATION
2. HIGH PERCENTAGE OF PEOPLE TRAVEL TIME IN PRIVATE CARS AND FEW IN PUBLIC TRANSPORT
3. INCREASING CITY CONGESTION AND POLLUTION

PASSenger-Kilometres Traveled Per Year, Index: Current Demand=100

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1.731 billion
3.968 billion
6.419 billion
PUBLIC TRANSPORT AS BACKBONE OF CITY SERVICES

Citizen engagement

Urban Services

An efficient and sustainable Public Transport System that opens a window of opportunity in urban development
CHILE CONTEXT

18.7 OF CITIZENS
POPULATION WITH 16 REGIONS

GDP
(USD 305.556 MILLION)
CHILE’S ECONOMY RANKS 5TH IN LATIN AMERICA,
BASED ON THE REGION’S GDP

MAIN INDUSTRIES
MINING | AGRICULTURE | AQUACULTURE
FINANCE | FOREST | TOURISM

BIGGEST PRODUCERS
OF COPPER, LITHIUM AND
NON-CONVENTIONAL
RENEWABLE ENERGIES
CHILEAN TRENDS

ENVIRONMENTAL AWARENESS
REDUCE CO2 IN THE CITIES.

DIGITALIZATION
CUSTOMERS WITH MORE INFORMATION AND TECHNOLOGY ACCESS.

CUSTOMER CENTRICITY
EMPOWERED AND DEMANDING USERS

QUALITY OF LIFE
HIGHER DEMAND FROM PEOPLE IN MORE AND BETTER PUBLIC AND PRIVATE SERVICES
ENEL X CAPTURES THESE TRENDS AND TRANSFORMED THEM INTO A NEW TRANSPORT SYSTEM THAT CONNECTS ALL SERVICES RELATED TO A SMART CITY

SUPPORTED BY:

CHILE’S GOVERNMENT ELECTROMOBILITY STRATEGY
GROWTH OF DIGITALIZATION AS THE CORE CONNECTION OF SMART CITIES
THE GROWING NEED TO REDUCE CITY POLLUTION

GOAL BY 2040:

TURNING CHILE’S ENTIRE PUBLIC TRANSPORT SYSTEM INTO 100% ELECTRIC FLEETS
ENEL X TOOK THE CHALLENGE

OF BEING A RELEVANT PARTNER IN URBAN DEVELOPMENT
SANTIAGO PUBLIC TRANSPORT SYSTEM
AN OPPORTUNITY FOR CHANGE

6,627
BUS FLEETS INSERTED IN TRANSANTIAGO

INTEGRATED PAYMENT SYSTEM
FOR ALL PUBLIC TRANSPORT USERS.

2.9MM
AVERAGE TRANSACTIONS PER USER ON WORKING DAYS.

INFRASTRUCTURE
OF TRUNK LINES AND FEEDERS IN ALL SYSTEMS.
STRATEGY TO TRANSFORM
SANTIAGO’S PUBLIC TRANSPORT SYSTEM

OPPORTUNITIES
TO RENEW THE EXISTING DIESEL-BASED FLEET

ALLIANCES
WITHIN THE PUBLIC AND PRIVATE SECTORS
ENEL X | METBUS | BYD

INVOLVING
ENEL’S INTERNAL STAKEHOLDERS AND PUBLIC ENTITIES.
SOME GOOD RESULTS

- MORE COMFORT: A/C, WIFI, NO NOISE
- CLIENT SATISFACTION: RANKS 6.3 OUT OF 7 ACCORDING TO THE LATEST POLLS AND 84% SATISFACTION RATE
- LOWER EVASION RATES DUE TO BETTER SERVICE
- EMISSION REDUCTION: +15 TONS OF CO2 PER ELECTRIC BUS
- QUALITY OF LIFE (ENVIRONMENT): 100 TIMES LESS NOISE POLLUTING THAN DIESEL BASED BUSES

DEVELOPMENT OF URBAN INFRASTRUCTURE
1ST Electric Bus Terminal in Latin America

Renewable Energy Certificate
Self-generation thanks to a photovoltaic installation
Smart charging stations

**Terminal 1**
37 e-bus chargers (80Kw each)
Smart charging system
1.5MW installed energy

**Terminal 2**
65 e-bus chargers (80Kw each)
Electric charging system
2.7MW installed energy
IMPLEMENTING E-BUS BUSINESSES

AND CHARGING INFRASTRUCTURE

OPENS DIFFERENT BUSINESS OPPORTUNITIES FOR THE DEVELOPMENT OF URBAN INFRASTRUCTURES IN THE CITY, IMPROVING QUALITY OF LIFE FOR CITIZENS.
NOT JUST kWh
GETTING CLOSER TO CITIZENS AND COMMUNITIES
E-BUS PROJECT RESULTS

FINANCIAL NUMBERS

5,1 MM €
E-BUSES + INFRASTRUCTURE GROSS MARGIN

24,7 MM €
CASH OUT

PROJECT DEVELOPMENT

100
E-BUSES

100
CHARGERS

7 GWH
ENERGY / YEAR

2
ELECTRIC BUS TERMINALS, ONE OF THEM WITH PHOTOVOLTAIC SOLUTIONS
ENEL X E-BUS BUSINESS GROWTH AS A PILLAR FOR ENEL GROUP

Consultancy

Enel X
Non Enel X

Competitive advantage for Enel X if included in the offering, risk to be evaluated accordingly.

Vehicle/Battery Second-Life / Disposal

E-Buses
Fleet Financing
O&M

Engineering
EVSE
Installation
Energy Management and VGI
System Integration
O&M

Enhanced bus shelter
VAS
Energy efficiency in bus depot

DSO Network development
MARKET Energy supply
DEVELOPMENT IN LATAM

**E-bus drivers:**

- e-buses cost is competitive with Diesel and does not require additional subsidies.
- 100 bus fleet has sufficient size to address sceptics concerns over e-bus scalability.
- Similarities in transportation models and close cooperation between authorities, facilitates the transfer to other countries.

**E-bus in Latam reach 346 Units (112 awarded to Enel):**

- Awarded: Medellin (64), Buenos Aires (8 w/Enel smart charge), Cali (26), Chile (213 –incl 112 for Enel), Sao Paulo (15, charge in tender process), Ecuador (20)

**Tenders in preparation 2019 (529 units):**

- (Enel X is following all of them)
- Chile (208), Sao Paulo (+50), Bogotá (30), Arequipa (76), Cali (135), Uruguay (30)
BARCELONA AN EU FUNDED PROJECT PAVED THE WAY FOR FURTHER DEVELOPMENT IN THE CITY

2017

UNDER THE SCOPE OF THE EUROPEAN FUNDED PROJECT ZEUS.

OVERNIGHT CHARGING IN TMB DEPOTS WITH 50 KW ENEL CHARGER.

OPPORTUNITY CHARGING WITH A 400 KW ULTRAFAST CHARGER CONNECTED TO THE BUS WITH A PANTOGRAPH (PRODUCED BY EKOENERGETICA IN ACCORDANCE WITH ENDESA DESIGN).

TWO 18M LONG ARTICULATED SOLARIS URBINO FULL ELECTRIC BUSES.

THE BUS LINE IS H16 WITH A LENGTH OF 12 KM.

2018

6 PANTOGRAPHS INSTALLED IN 2018.

TENDER WON BY ENDESA/ENEL.

DEPOT INSTALLATION FOR AUTOMATING THE CHARGING PROCESS.

50 KW MAX POWER PER PANTOGRAPH.

CHARGERS CONTROLLED BY THE TMB SYSTEMS.
DEVELOPMENT IN EUROPE

HOW

Project Financing

Promote integrated offering to Municipalities and Public transport operators

“Lobbying” with relevant stakeholders to push for full service tenders

Public Tender

Catch available funds to support fleet financing
Final remarks

- Diversification of Enel X offering is key to address this market
- Think broad on urban services
- Export best practices from LatAm to rest of the World
- Develop partnerships to keep leadership in LatAm
Thank You!