gridspertise

accelerating your electric future

AMI rollout plan & challenges

Distribution Utility Meet 2022

Bhubaneshwar, India. 17 Nov.'22

Presentation Flow

01 Enel & Gridspertise Overview

02 Approach for large AMI rollout plan

03 Challenges & Learnings

a. Customer engagement

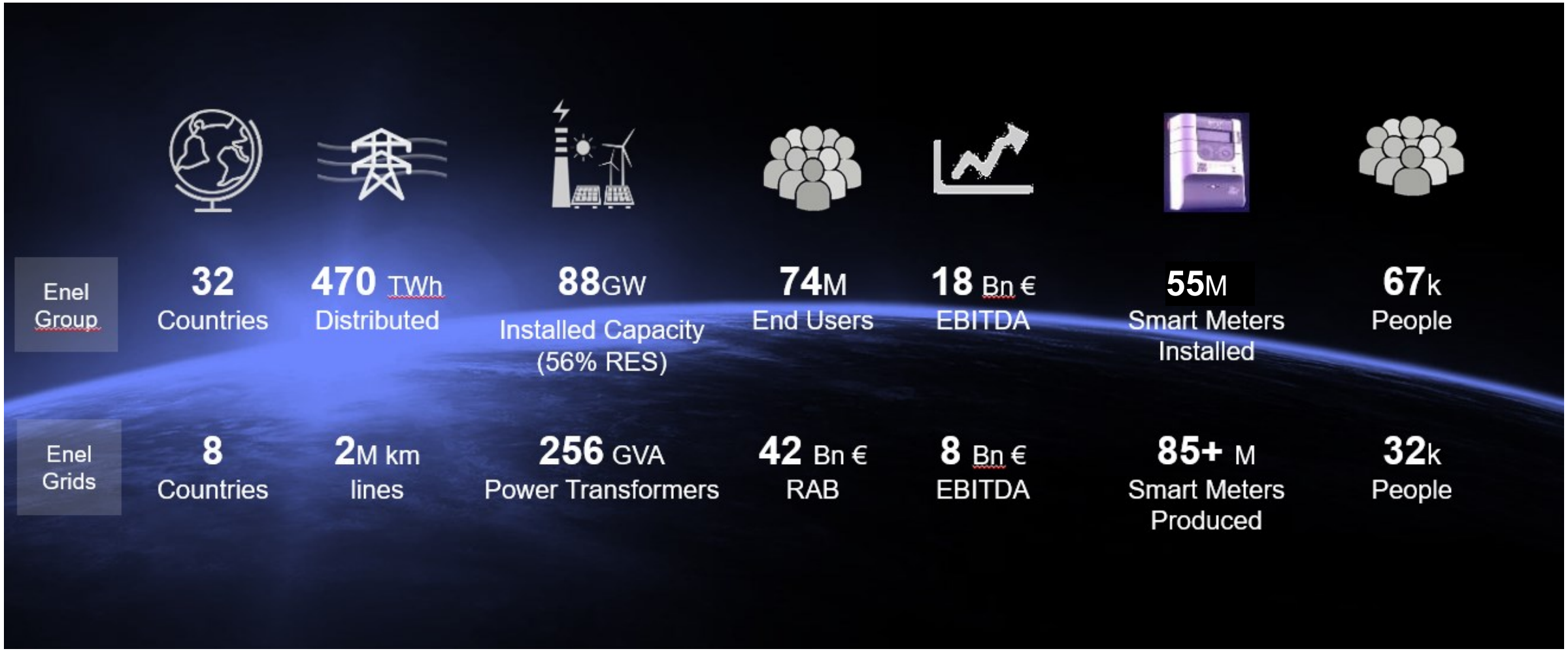
b. Management of existing meters

c. Capacity building - field force competency development

04 Sum up

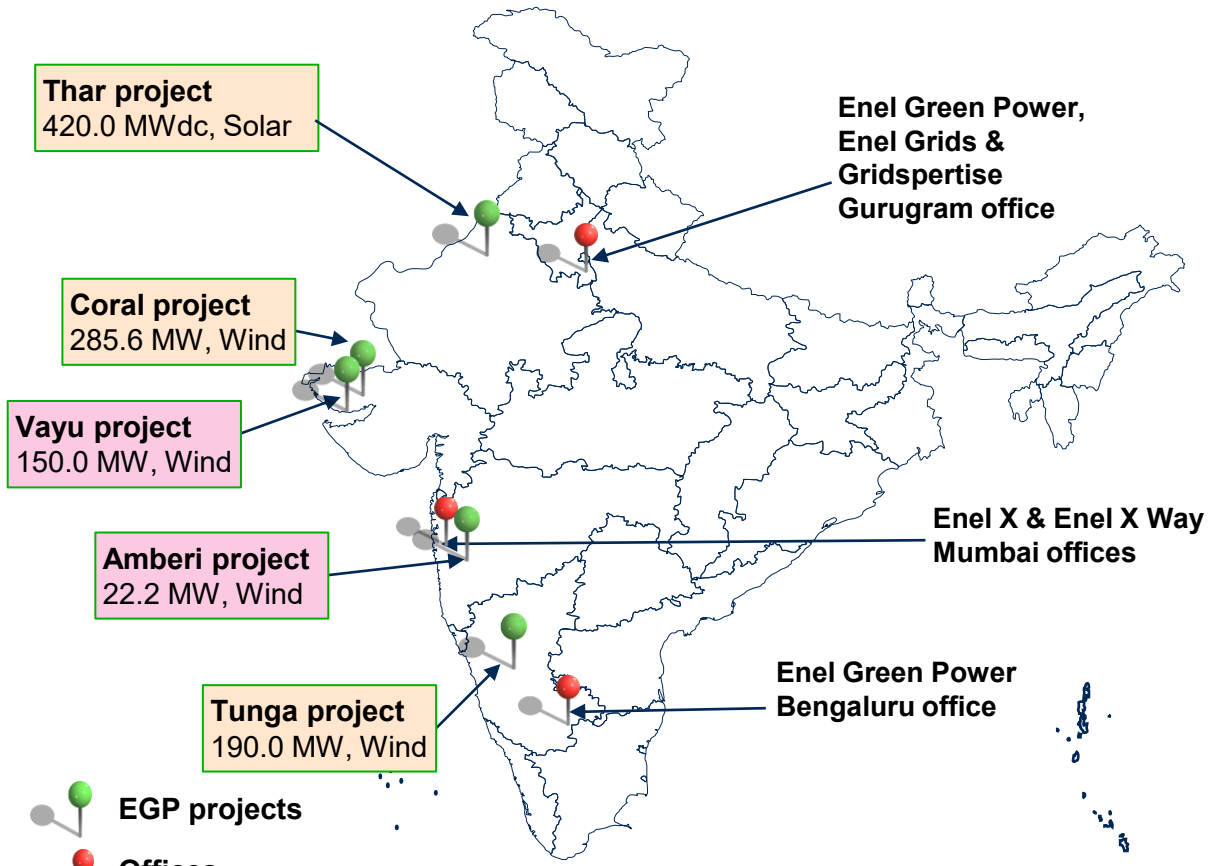
1. Enel Group overview

Enel Group


Enel Group
32 Countries
470 TWh Distributed
88GW Installed Capacity (56% RES)
74M End Users
18 Bn € EBITDA
55M Smart Meters Installed
67k People
Enel Grids
8 Countries
2M km lines
256 GVA Power Transformers
42 Bn € RAB
8 Bn € EBITDA
85+ M Smart Meters Produced
32k People

Enel presence in the network segment

Enel Group in India



- ✓ **Enel Green Power** has offices in Gurugram and Bengaluru
- ✓ Enel Green Power has fully operational wind power plants of 172MW and following under construction projects (partially operational) won through SECI :
  - 285 MW wind project *("Coral" project)*
  - 190 MW wind project *("Tunga" project)*
  - 420 MWdc solar project *("Thar" project)*

- ✓ **Enel Grids & Gridspertise** are co locate with Enel Green Power in Gurugram and are geared up for respective business opportunities in the power distribution space.

- ✓ **Enel X** has office in Mumbai providing backend support to Enel X global Demand Response and Energy Intelligence Software solutions. Exploring opportunities in city e-bus space.
- ✓ **Enel X Way** has a JV office in Mumbai with Sterling & Wilson for e-mobility charging business in India.

Introduction to Gridspertise

Gridspertise overview

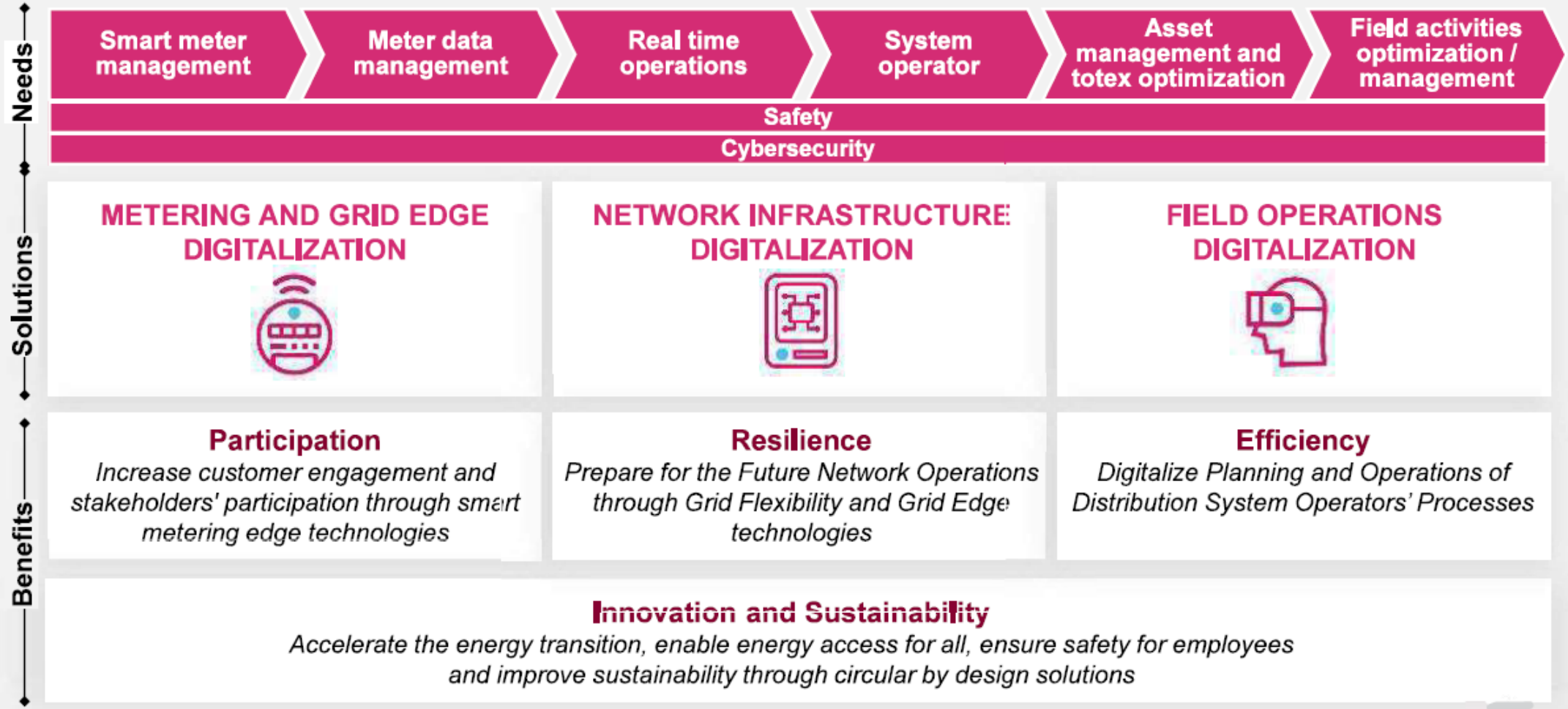
Gridspertise is **carved out of Enel Grids** with an aim **to develop & offer cutting edge sustainable technological solution to Discoms globally**

Gridspertise **consolidates Enel Grids domain knowledge** in developing & operating smart grids

It **inherits** all technical know-how, R&D centers/labs & IPR's from Enel

Gridspertise is **leveraging** its inherited **competency** & **assisting** Discoms globally in **Digitization** of electricity distribution networks

Gridspertise addresses Discoms need through its sustainable cutting edge solutions along 3 business transformation area



2. Approach for large AMI rollout plan

Success stories

Enel/Gridspertise Success stories and Smart Metering long journey

Telegestore project (Italy)

32M e-distribuzione + 5M other DSOs

2001

Telegestore

Cervantes project (Spain, Romania)

12M e-distribuciòn (Spain)
1M e-distribuzie (Romania) and other DSOs

2008

Cervantes

Open Meter project (Italy)

25M e-distribuzione (rollout on-going)

2017

Cervantes project (Latin America)

Pilots in Argentina, Chile, Peru & Colombia

2018

Enel Open Meter

Sales to other DSOs

ARETI (2M), UNARETI (1M) and others

2019

JOBI project (Brazil)

150k pilot in Sao Paulo
5M rollout to be started in mid 2022

2020

Smart Meter Brazil **Nexy 2nd Gen**

NEXY project

First installations in **Chile** and **Spain**

2022

G3 Meters

BIS certified for **India**

2023

G3 Hybrid

Indian Smart metering deployment vision

Scale & its widespread Impact

Facts which all of us will unanimously agree -

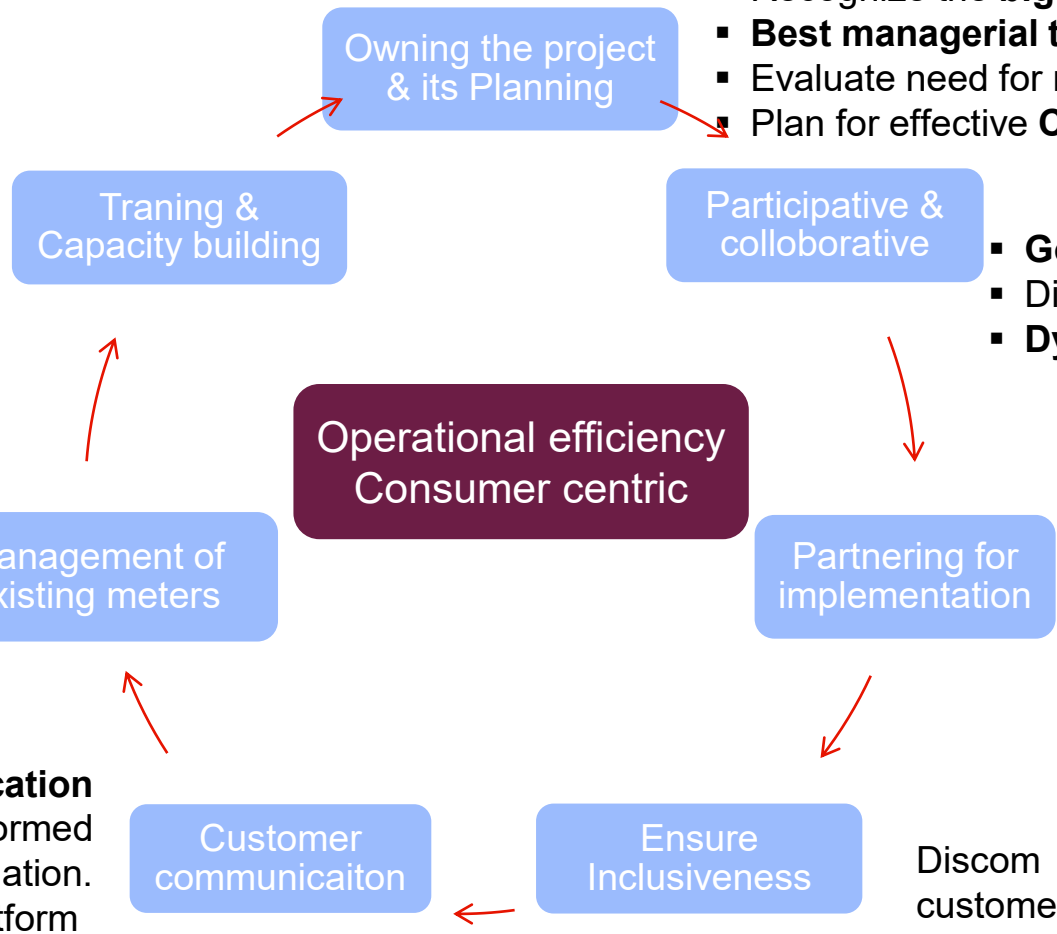
- Globally it is the **largest** Smart meter deployment plan - Project as massive as this is witnessed **once in few decades**
- Will **touch every Indian household** - Project requires a **customer centric** approach
- Has a potential to completely **transform the way interaction happens between consumers & Discoms**
- For success of the project it calls for **proper execution planning & participation** by all key stakeholders

Technology adoption is going to be the backbone for Discoms revival & its future operations

Deployment Approach

- Recognize the **big picture** & **own the project**
- **Best managerial talent** to be part of **project**
- Evaluate need for **revisiting Business processes** & **Pilots**
- Plan for effective **Change management**

- Plan **Training** of field & back office staff for new processes
- Design customized **short term certificate courses** to ensure efficient running of system in future



- **Government** & **Regulators**
- Discom core team to **ensure** effective transition
- **Dynamic PMO -** Disocm, SI & solution partners

- Derive benefits from **competancies** of various solution partners/vendors
- Proper **planning** & **workflow design**
- Each player to **recognize** end goal

Work for **Innovative solutions** for management of existing meters

Devise **well defined communication process** Customers to be informed before, during & post installation. Capture on Mobile Work Force platform

Discom & SI to **include** Govt., Regulator, customers, vendors, contractors etc. through consultations, pilots and programs like consumer awareness, manpower training etc.

3. Challenges & Learnings

a. Customer engagement

b. Management of existing meter

c. Capacity building - field force competency development

a. Customer awareness and communication plan

Phase I

Preparation phase

- ✓ **Inform customers** about benefits of smart meter deployment - Joint approach by various key stakeholders
- ✓ **Educate** public, media and other energy market players - build positive environment
- ✓ **Provide a timeline** of smart meter installations – Helps in aligning various activities
- ✓ **Explain the process** associated with the smart meter installation and seek suggestions – Involve in the process
- ✓ **Clarify why the Discoms is installing** smart meters

Communication before project initiation gives a feel of ground reality and provides sufficient time for any corrective action

a. Customer awareness and communication plan

Phase II

Installation phase

- ✓ **Installers/Electricians** needs to be trained on **how to interact** with consumers and **what to communicate** about operation and benefits of the smart meters – based on standard template
- ✓ **Electricians** represent the Company. They must **know how to approach issues** that may arise with customers at site
- ✓ A site inspection could be undertaken before any work and **customers should be notified in advance** about when replacement of existing meter with Smart meter will take place
- ✓ **Written instructions** on how to use the smart metering are **sent to customers** (or left after installation)
- ✓ **Copy of report** of replacement of existing meter with Smart meter to be given to the consumer

Installer to be fully equipped to approach issues expected to be encountered on site

a. Customer awareness and communication plan

Phase III

Post installation

Customer support, complaint handing and fault resolution

✓Provision to enable Customer to **provide feedback** on the complete smart meter installation process

✓Customers to have **clarity to whom to contact** if they have issues and where to redress

✓Customer is provided with **issues resolution details**

✓**Time taken for resolution** of Customer issue can be shared with customers

✓**Analysis** of Customer feedback may to made public

Proper Communication before, during and after installation of smart meters plays an important role in acceptance & success of project

a. Communication Plan preparation – example

Triptych

Customer communication + diptych

Informative poster

Substitution poster

Reconnection sticker

Show-rooms

Note: Substitution poster is a one-to-one communication (SMS, emails, bills, …); Show room can be done in malls, customer service centers

b. Management of existing meters

Circular Smart Meter Plan - Towards Group's Net Zero Ambition

For the Smart Meter manufacturing,

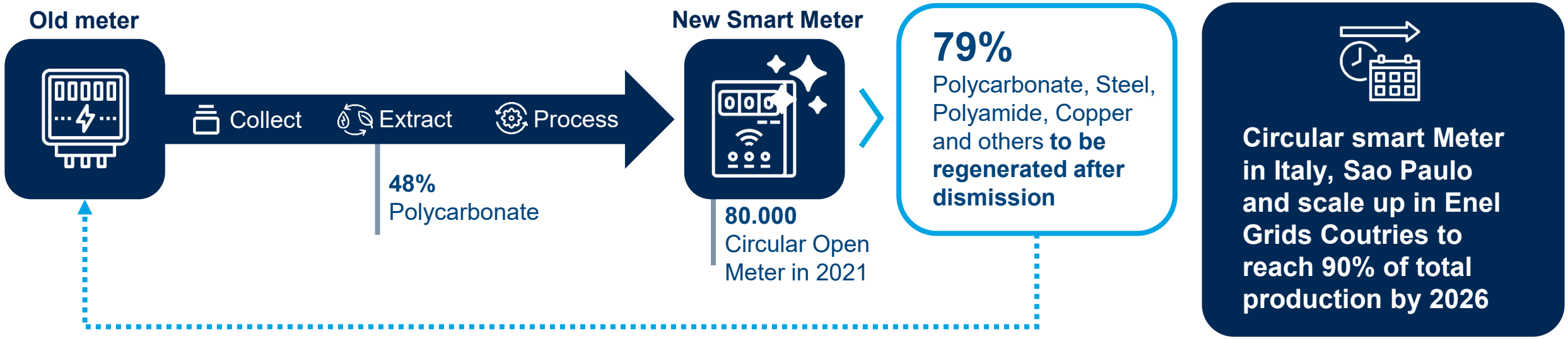
- **>85% of Global Warming Potential** *(GWP)* **is caused by production of Printed Circuit Board Assemblies** *(PCBAs, including components and soldering processes)*
- Use of **polycarbonate is about 10 %** of the overall GWP impact

End-of-life processing of the PCBAs of smart meters allows **recycling of basic metals**: gold, copper, silver, tin which can be recycled in any possible supply chain requiring them.

Recovery of polycarbonate from old smart meters allows to get material specifically and directly usable in Circular Smart Meter production - use of **regenerated resins could reduce overall SM emissions upto 6**% along the lifecycle

Circularity by design

- Achieved technical approval for using the recycled material assuring stable quality and continuity of the business
- The trade-off between cost & benefit of usage recycled raw material
- Driving contract manufacturer of new equipment to use recycled raw material



KPI

- Environmental impact reduction along the value chain
- Reduce use of virgin materials in grid assets
- Increase resilience of Supply Chain
- Social impacts of circular economy approach on local supplier
- Zero Landfill & towards a new waste management approach

b. New End of Life technical specification for dismantling

Increasing e-waste value – descreasing CO_2 emissions

Aligned with Group's commitment to **Sustainable Development**: Gridspertise is explorings ways to recover **precious metals** *(i.e. Au, Si, Pt)* and **rare earth elements** *(i.e. Nd, Pr, Dy, Gd, Ce, La, Sm)* from its **e-waste**.

End Goals: minimise landfill waste, descreasing CO2 emissions, increase e-waste value, redifining roles in the end of life process

Experimental pilot is being launched to evaluate new options for e-waste disposal.

Nd: Neodymium
Ce: Cerium
Pr: Praseodymium
La: Lanthanum
Dy: Dysprosium
Sm: Samarium
Gd: Gadolinium

b. New Smart Meters Design

Re-design smart meters to increase the circular economy value

Gridspertise recently launched a challenge to innovators, creators & inventors to re-design its smart meters

Challenge focused not only on **the material used** but also on innovative solution to **decrease the use of plastic**, change specific components to more **sustainable alternatives** and **lower the number of components** required in mass installations.

Presently in the process of acquiring intellectual property that was deemed valuable towards this endavour.

c. Capacity building to ensure smooth operations

TRAINING

- Installation procedure & methodology
- Installation work update in WFM app
- Operational controls
- Non-conformities identification
- Behavioural for consumer interaction
- Health and Safery regulations
- Effects of electricity on humans
- Protective equipment and tools
- Environmental legislation

…and more topics

EQUIPMENT

Insulated gloves

Insulating helmet with protective visor

Clothing (class 1 or 2) covering parts of the trunk and limbs

INSTALLATIONS

We develop procedures according to different countries, training our people fitting the local requirement of every installation.

Pilot in Turkey (single phase meter)

DCU Pole installation

DCU Substation installation

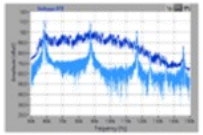
Meter installed at single house

Pilot in Sauti Arabia (poly phase meter)

DCU installation in box wall mounted

Meter installation in box wall mounted

Meter installed in a building



Signal measured at a specified meter

Noise level measurement

UPDATE

Continuous update to ensure procedures are adequate and followed on field

c. Capacity building

Projecting Industry requirement and participating

For **training and professional placement** of young people Enel / Gridspertise launched various programs like, "Energie per Crescere" *(Energy for Growth)*

To meet need for specialized **technicians for energy transition & network digitization.** Involving younger generations is essential in opportunities created during transition phase

To encourage convergence of training & work together with partners, through specific programs tailored to needs of managing increasingly smart and digital electricity grids

A continuous process to be adopted for growth

Sum Up

Key Takeaways

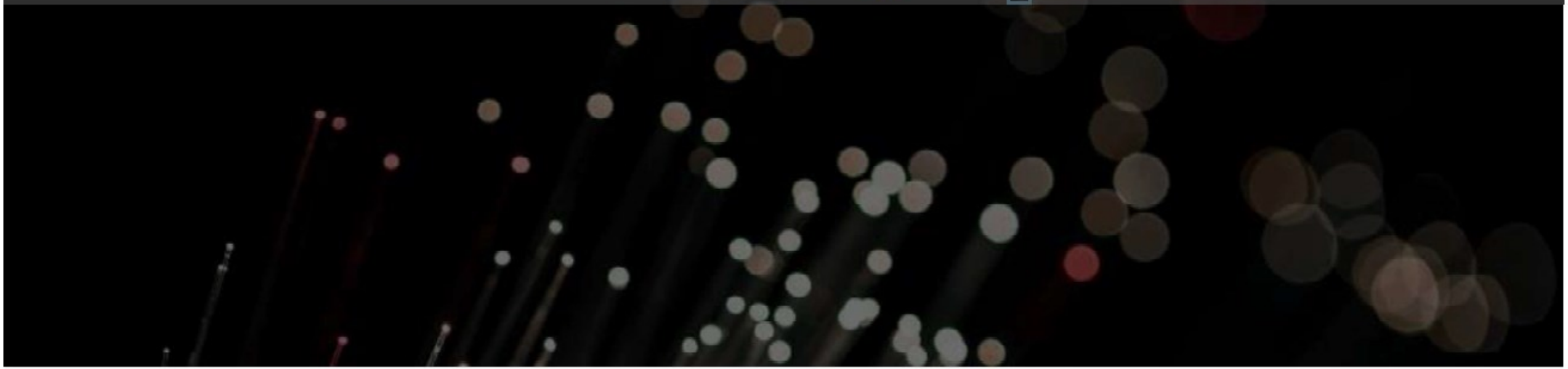
1. Indian smart metering program needs a **participative** & **partnering** approach
2. **Customer centric** approach is key to success
3. For long term sustenance **capacity building** needs to be given due focus
4. From environment point of view **management of existing smart meter** needs to evolve
5. Gridspertise has **smart metering deployment & operations experience of more than two decades**

gridspertise

Gridspertise: Trusted partner for the DSOs of the future

Our mission:

Upgrade grid users' experience
through **cutting edge sustainable solutions**
for the **digitalization of electricity distribution network**



Discover more at www.gridspertise.com