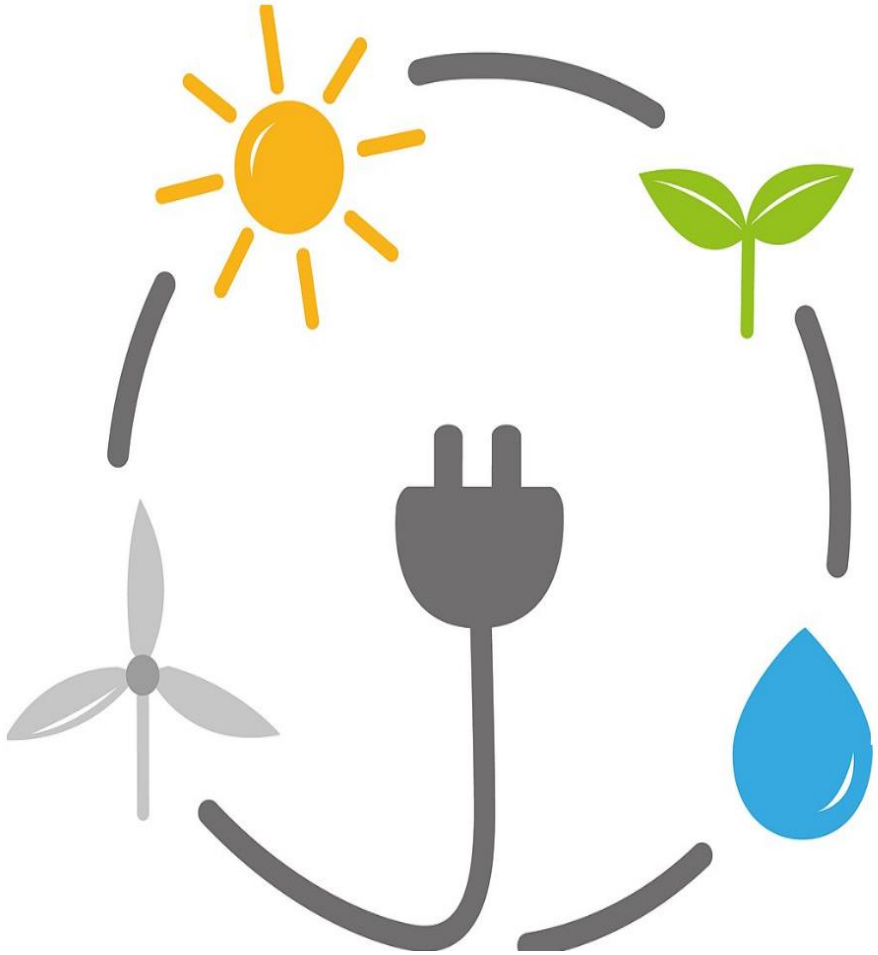
Société Tunisienne de l'Electricité et du Gaz

الشركة التونسية للكهرباء والغاز



The Tunisian Smart Grid

A Support to Integration of Renewable and Green Energy

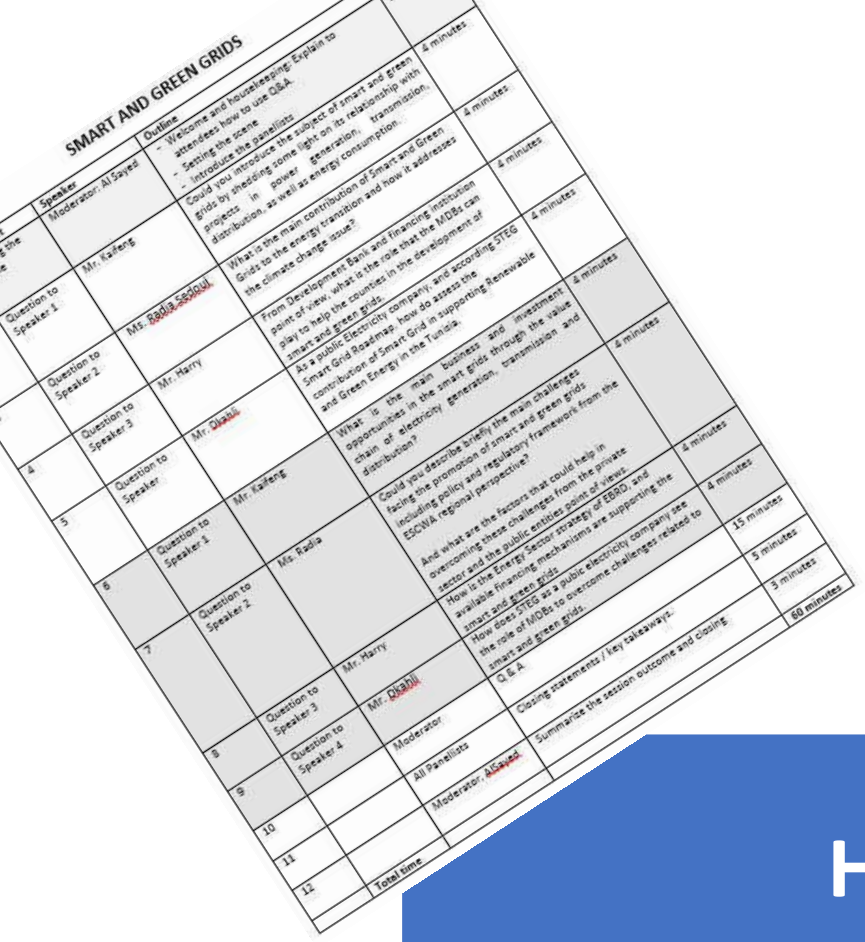
(*According Smart Grid Roadmap of STEG*)

Global Infrastructure Forum 2020

Building a resilient future post COVID-19

Session : Smart & Green Grids

October 8th, 2020



SMART AND GREEN GRIDS

	Speaker	Outline	
	Moderator: Al Sayed	- Welcome and housekeeping: Explain to attendees how to use Q&A - Setting the scene - Introduce the panelists	4 minutes
Question to Speaker 1	Mr. Kaifeng	Could you introduce the subject of smart and green grids by shedding some light on its relationship with progress in power generation, transmission, distribution, as well as energy consumption.	4 minutes
Question to Speaker 2	Ms. Badia Sadaoui	What is the main contribution of Smart and Green Grids to the energy transition and how it addresses the climate change issue?	4 minutes
Question to Speaker 3	Mr. Harry	From Development Bank and financing institution point of view, what is the role that the MDBs can play to help the counties in the development of smart and green grids.	4 minutes
Question to Speaker	Mr. Okabil	As a public Electricity company, and according STEG Smart Grid Roadmap, how do assess the contribution of Smart Grid in supporting Renewable and Green Energy in the Tunisia.	4 minutes
Question to Speaker 1	Mr. Kaifeng	What is the main business and investment opportunities in the smart grids through the value chain of electricity generation, transmission and distribution?	4 minutes
Question to Speaker 2	Ms. Radia	Could you describe briefly the main challenges facing the promotion of smart and green grids including policy and regulatory framework from the ESCWA regional perspective?	4 minutes
Question to Speaker 3	Mr. Harry	And what are the factors that could help in overcoming these challenges from the private sector and the public entities point of views	4 minutes
Question to Speaker 4	Mr. Okabil	How is the Energy Sector strategy of EBRD and available financing mechanisms are supporting the smart and green grids	15 minutes
	Moderator	How does STEG as a public electricity company see the role of MDBs to overcome challenges related to smart and green grids	5 minutes
	All Panelists	Q & A	3 minutes
	Moderator: AlSayed	Closing statements / key takeaways.	60 minutes
		Summarize the session outcome and closing	
		Total time	

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الشركة التونسية للكهرباء والغاز

Question to Speaker

How does STEG as a pubic electricity company see the role of MDBs to overcome challenges related to smart and green grids.

4 minutes

INTERNATIONAL CONTEXT

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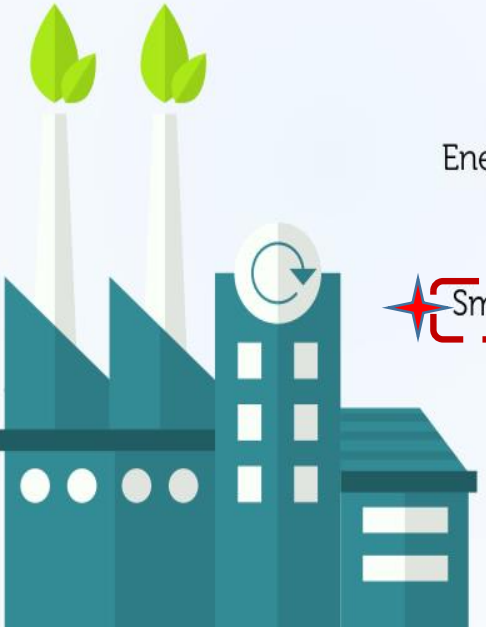

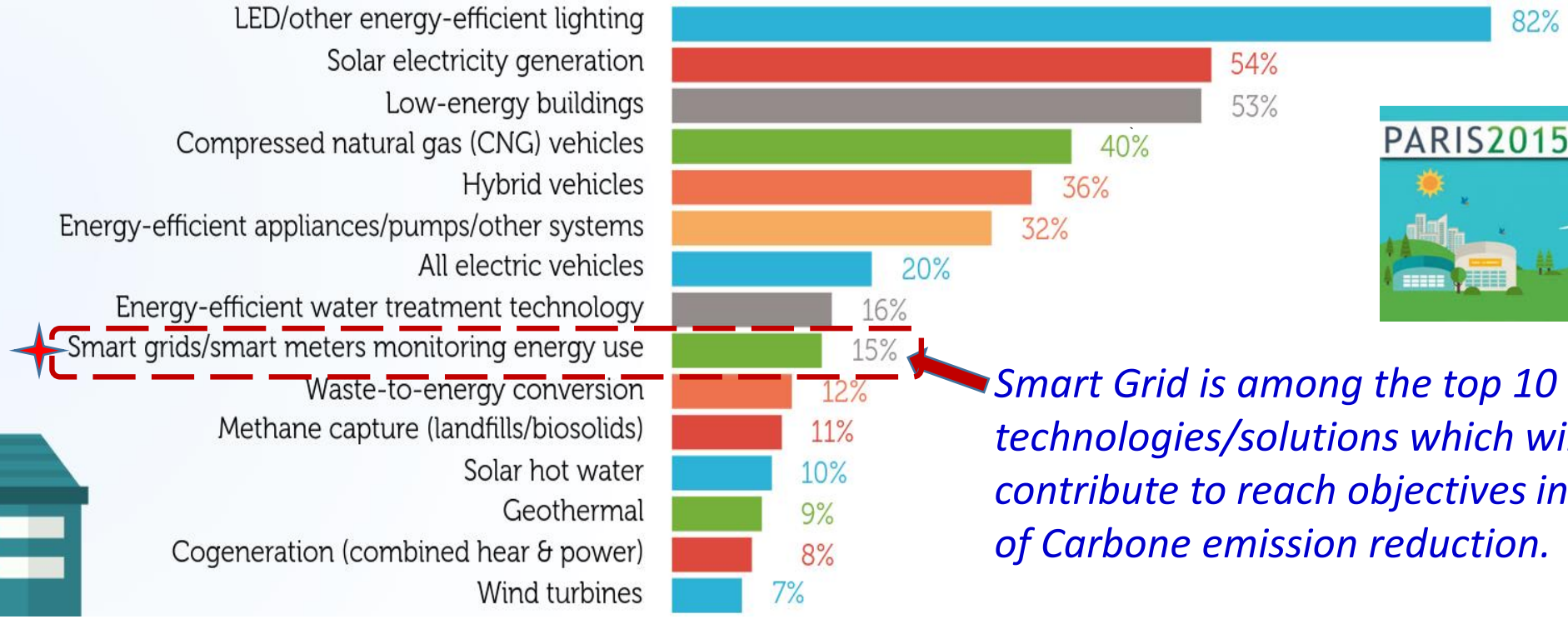

Smart Grid is among the top 10 of main technologies/solutions which will contribute to reach objectives in terms of Carbone emission reduction.

Economic and Social Council

Commission on Science and Technology for Development

Twenty-first session

Geneva, 14–18 May 2018

The role of science, technology and innovation in increasing substantially the share of renewable energy by 2030

E/CN.16/2018/2

" *… As renewable energy technologies increasingly rely on digital technologies, a key future research area is the digitalization of energy systems that become more connected, intelligent, predictable and sustainable*"

TUNISIAN CONTEXT / CHALENGES

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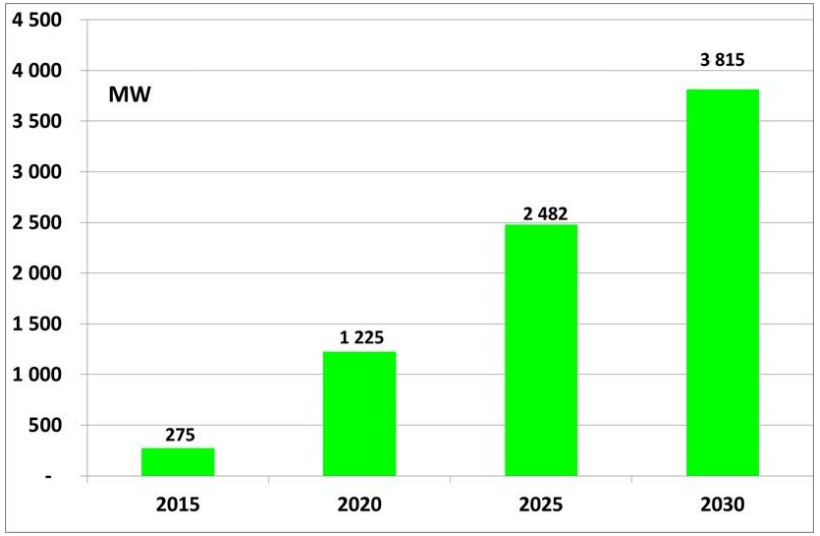
- **Customer Experience: Billing system has to be improved.**
- **Power Losses /Energy losses**
- **Sustained increase of the summer demand peak**
- **30% Renewable Energy / in 2030 with DER (Distributed En. Resources)**

2019

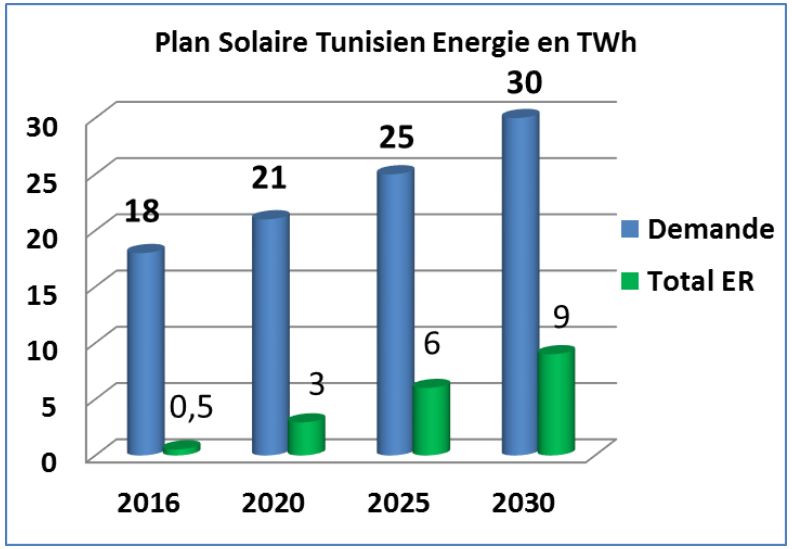
- Total installed Power : **5 680 MW**
- Production : **20 220 GWh** (STEG + IPP)
- Annual Peak: **4 247 MW** *(2018: 4025 MW)*
- Elec Customers : **4 142 369**
- Gas Customers : **926 020**

H2030 …

Projected Renewable Installed Power



Projected Production



Constraints :

- **Intermittency**
- **Forecasting Challenges**
- **DER/ Prosumers**

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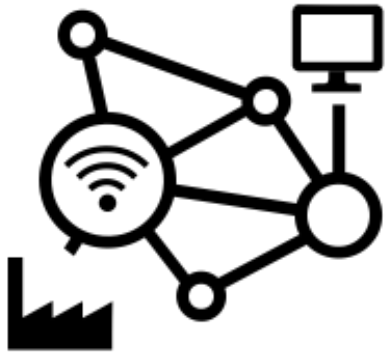
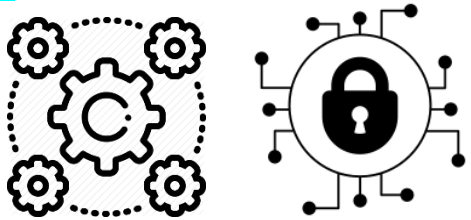
E2E Chain: Power System (Generation- T&D.. C&DER)

IT&T

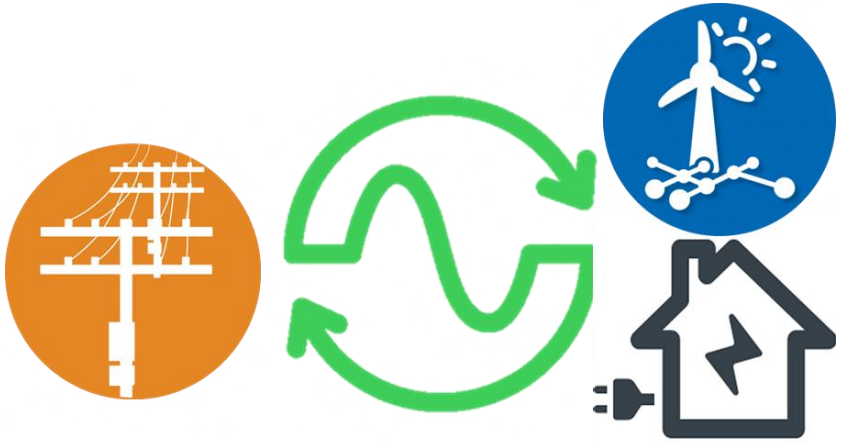
Sensors /IoT Meters





Advanced Grid Management

- Bidirectional Energy Flow
- DER/ Prosumers



Business Objectives
Process Transformations

Objectives

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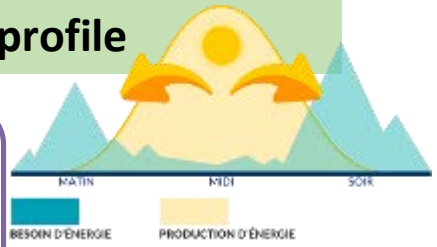
1- Improving of billing system, quality of service and reduction of non-payment

- Customer Information
- Remote meter reading
- Remote Change / Limitation of Subscribed Powers
- Prepayment.

2- Mitigation of technical and non-technical Power Losses

- Fraud/Theft Detection, illegal Meter handling, ...
- Power Losses Location;
- Reducing errors of man reading.

3- Optimization of The production-demand balance and improving of the load profile



- Load management Contracts
- Incentives : Time of Use
- DLC : Direct Load Control

4- Promote the massive integration of renewable energies and Distributed Energy Resources (DERs)

- Monitoring of RenE (DER);
- Forecasting tools to manage Intermittence
- Congestion/ Power Quality management

Smart Grid Roadmap

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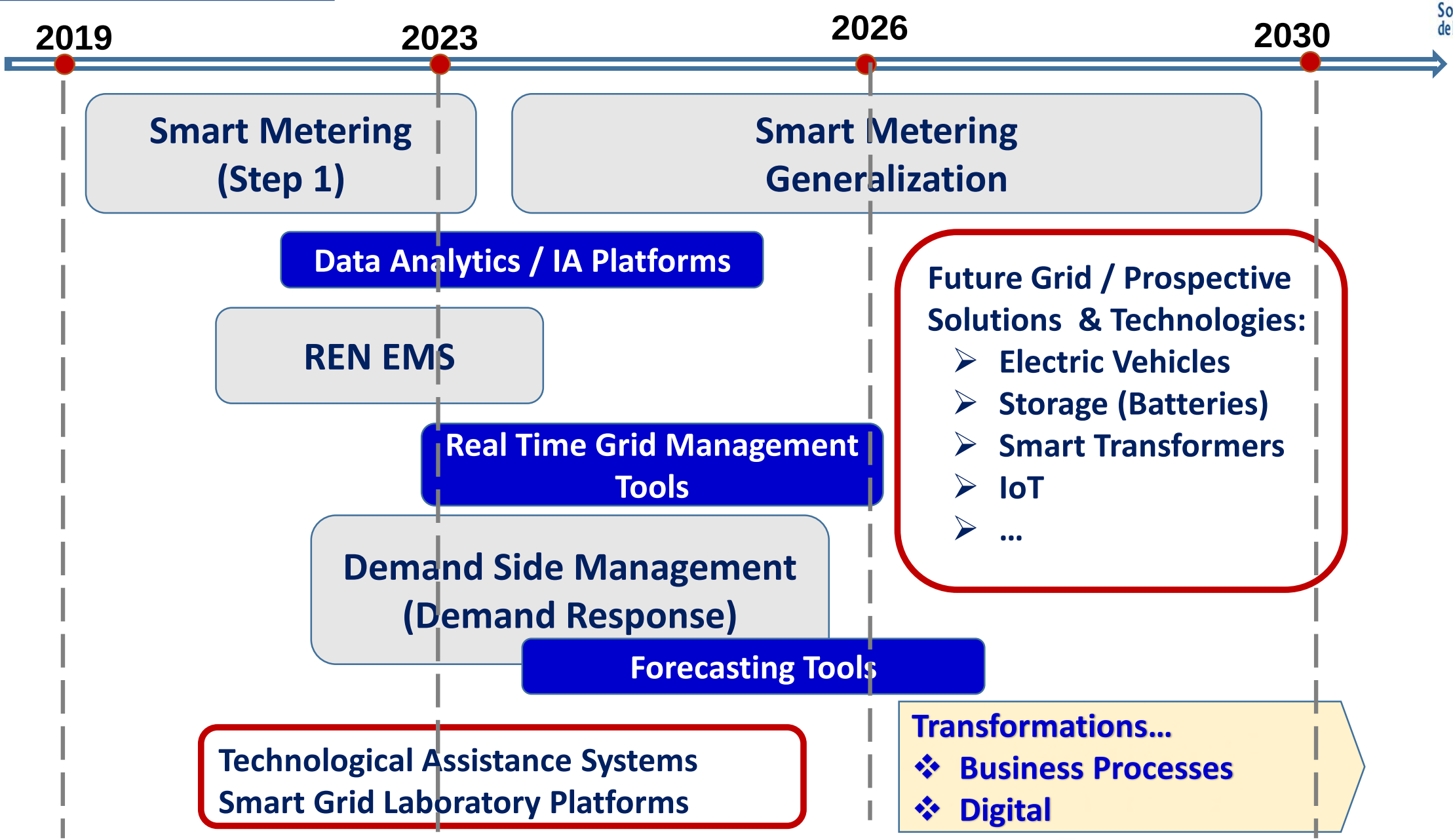

Smart Grid Roadmap

Technological Initiatives

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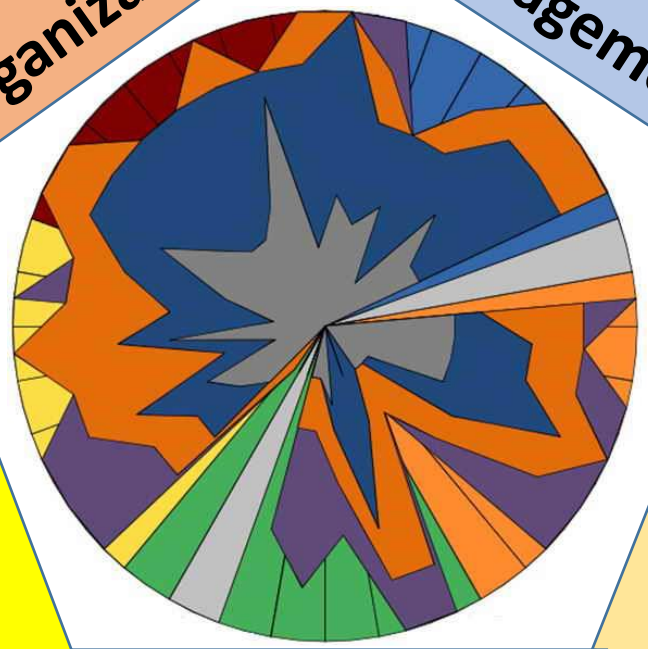
- Billing
- Net Metering
- Energy Efficiency
- EV Tariff

- Cyber-Security
- Reporting, BI
- Data Analytics



- Technical PL
- Power Quality
- Reactive Power
- Micro-Grid

- Maintenance
- Default Prediction
- Value Management

- EV
- Storage
- DER

Ren & Green Focus
14 Techno Initiatives

Next Business Process: Monitoring, Control, Forecasting, Modelling, Analysis

Digital Transfo: Customer, Technology & Business Process

Smart Grid Roadmap

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Methodology

Studies: Techno Benchmark/ CBA/ Action Plans

POC/ Progressive Rollout

REX toward Generalization

Capacity Building & Knowledge Management

Applied to Smart Metering

CBA

	NTL Target	AMI + Demand Response	
		20% IHD	100% IHD
ROI	8 Years	7 Years	6 Years

Smart Grid Roadmap

Prioritized Infrastructures / Architecture

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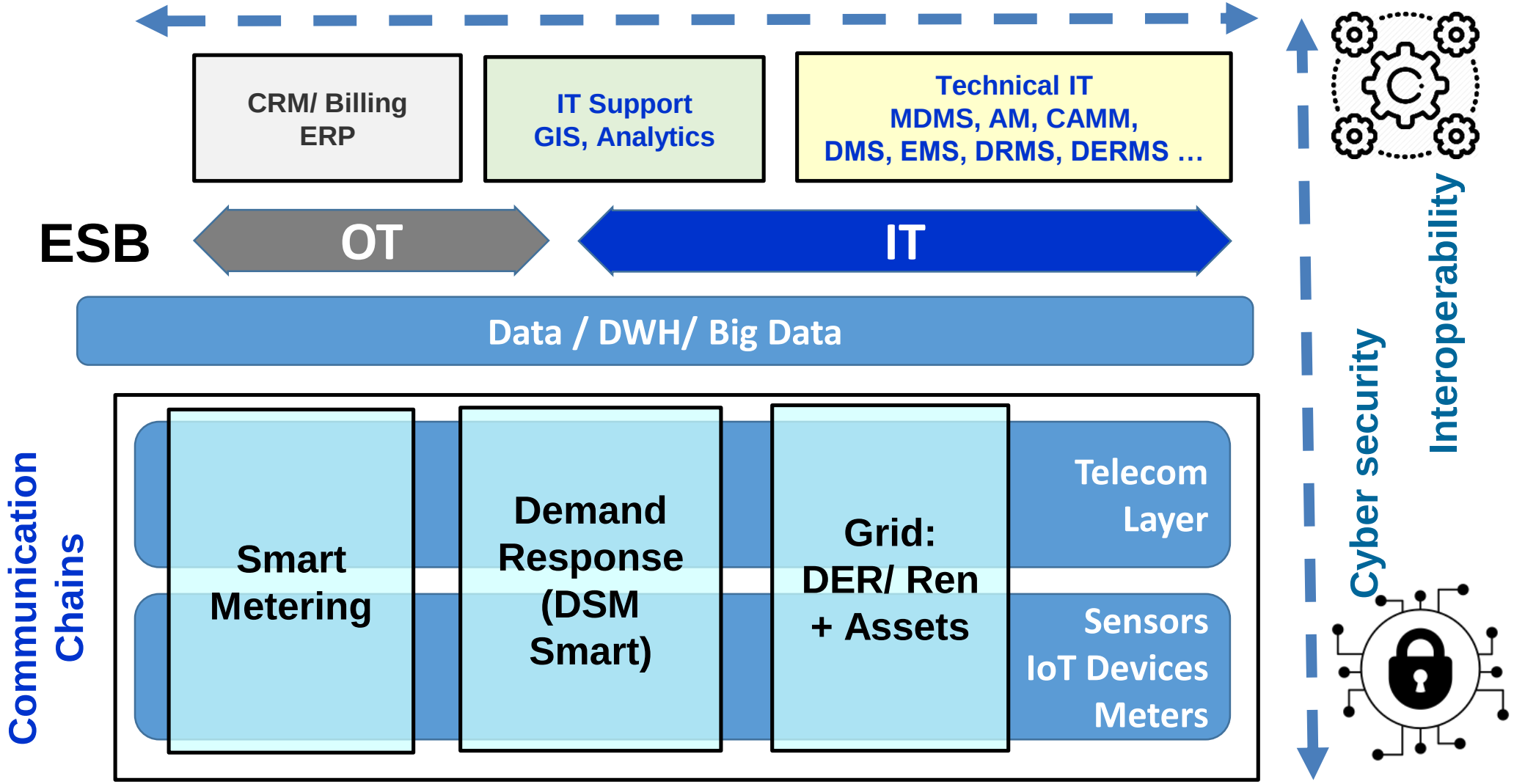

Smart Grid Roadmap

Contribution to reach objectives

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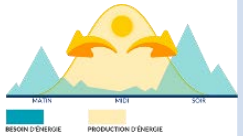
Objectives	Infrastructures: Smart Metering	Infrastructures: Demand Response	Infrastructures: Ren Dispatching
 Customer Experience	★★★★	★★	★
 Energy Losses Reduction	★★★	★★★	★★
 Generation /Consumption (Global Load Curve)	★★	★★★★	★★★
 Renewable Integration	★	★★★	★★★★

★★★★ Main Contribution ★★ Support the Objective

★★★ Average ★ Small contribution

Smart Metering Project

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Step 1

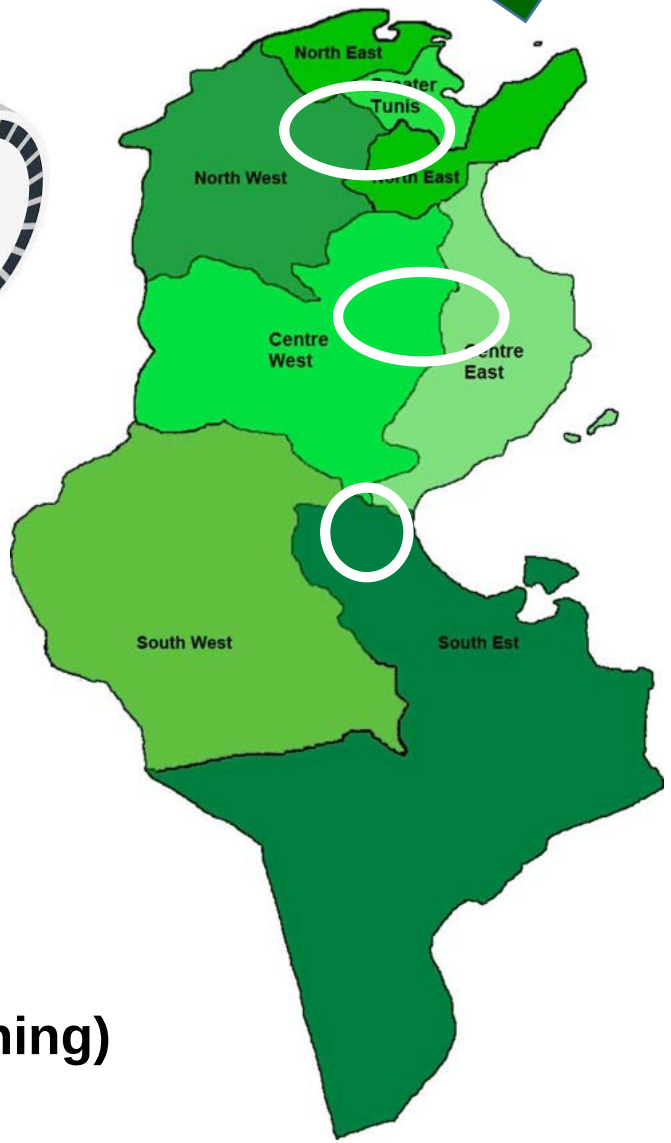
The Scope (2020-2023)

Electric Meters

- LV/ Regular : 400 k Meters
- LV / High Portfolio: 6000 Big Consumers
- MV: 20k C&I Customers

Gas Meters

- ~100k LP Consumers



Related Projects

- GIS Project (Sfax)
- 7 DAS/DMS
- New EMS Infrastructure/Platform (For Ren Dispatching)

Smart Metering Project

Uses Cases

Ren & Green Focus

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At least 3 use cases will be implemented in Smart Metering Project (Step 1) with relation to Energy Efficiency & Renewable Integration…

i. **Small Producer Management (Roof Photovoltaic)**

ii. **Control of the LV Renewable integration rate of Small Producers (BT)**

iii. **Demand Side Management (IHD / Demand Response)**

Possible thanks to functional & technical performances of the Infrastructure…

- **Technical Specification of Meters (TOU, Net Metering, 4Q Load/Power, …)**
- **Performances of IT System (Meter Data Management System & CRM)**
- **KPI of Telecommunication Chain**

Metering Data will also contribute to EMS Performances as an Analytics Assets.

PERSPECTIVES

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Next Steps

- ❑ **REX, KM of Step 1 Projects**
- ❑ **Preparing Generalization ….**
  (5M.Elec & 1M.Gas)
- ❑ **Developing New Infrastructures & Platforms:**
  - Demand Response System
  - Smart Grid Laboratory
  - Data Analytics / AI Platform
  - BI (Project Management)
- ❑ **Capacity Building Strategy**

Collaboration Topics

- ❑ **Connection with R&D and Innovation Environment**
- ❑ **Partnership to conduct Studies**
- ❑ **Technological Partnership for POC & Demos**
- ❑ **Financing Partnership Opportunities**

INTERNATIONAL TRENDS

COVID-19 Impacts and Practices

Potential Pandemic Response New Topics

EPRI ELECTRIC POWER RESEARCH INSTITUTE

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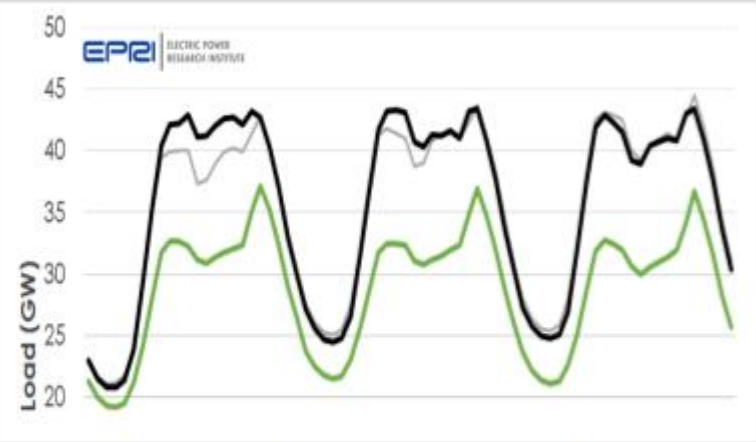
Pandemic Ops Strategies

- Tools and processes to enable remote/decentralized grid Ops
- Evolving "normal" processes to mitigate potential impacts
- Increased automation of tasks

Telecom and Cyber Security

- Cyber secure solutions to enable remote grid operations
- Impacts/solutions to Telecom System bandwidth (5G, et. al.)

Demand Analysis and Load Forecast Impacts



- Normalized impacts per load class (R/C/I, data center, etc.)
- Load forecast impacts and algorithm improvements
- Hosting capacity for critical loads

CONCLUSION

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- Smart Grid is a support to Integration of Renewable & Green Energy
- Contribution of Infrastructures (Smart Metering/ DSM Smart/ Ren Dispatching) have to be estimated and valued
- Step 1 STEG Projects (2020-2023: Smart Metering, GIS, DAS/DMS) will permit the assessing the contribution and evaluate the value in the Tunisian context
- It is planned to implement several use cases to target Ren & Green Energy integration
- Next Infrastructures and platforms (Demand Response, Data Analytics and Laboratory Systems & Solutions) will enhance Performances and maximize benefits
- Partnerships are required to exchange experiences and optimize Projects portfolio.

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الشركة التونسية للكهرباء والغاز

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