



# **2011 TDP Volume 3 System Operations**

## Major Considerations



1. Realize quickly the smart grid objectives
2. Integrate grid control and unify market operations
3. Optimize access to RE sources
4. Standardize management mechanisms
5. Reinforce network security

## Major Considerations



### 1. Realize quickly the Smart Grid paradigm

- Implement SAS-based data collection/control;
- Avail of advanced EMS market modeling applications;
- Increase telecom bandwidth to end-point substations;
- Conform with IEC 61850 standards for protection equipment.

## Major Considerations



### 2. Integrate control of the Power Grid and unify Market Operations

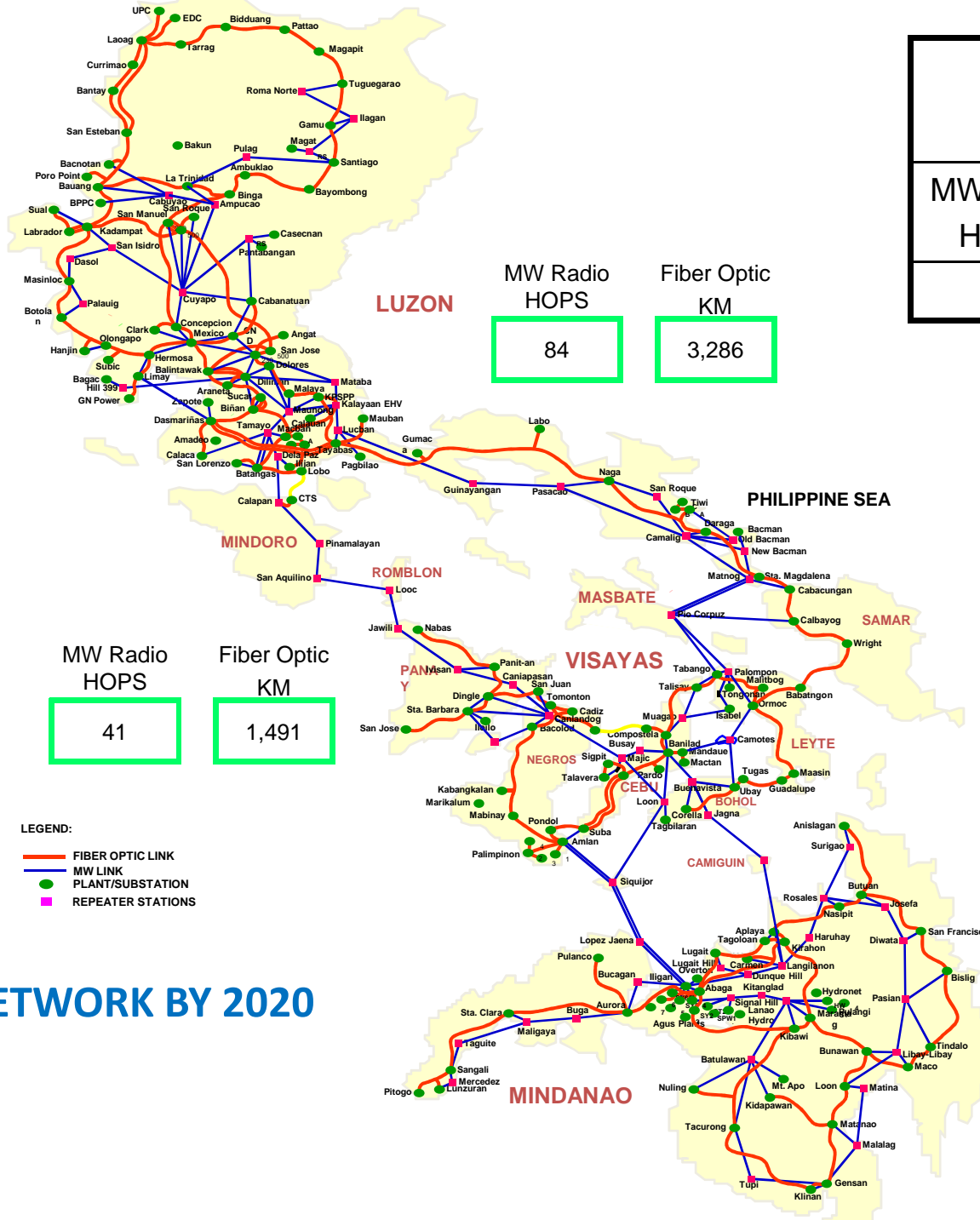
- Consolidate/synchronize SCADA/EMS operations;
- Establish access of RCC to the HVDC control system;
- Accelerate telecom backbone construction (e.g., OPGW retrofitting and submarine cable)
- Conform IT equipment with standards of access control.

## Major Considerations



### 3. Optimize access to renewable sources of energy

- Extend telecom backbone reach;
- Provide interfacing at anticipated service access points;
- Establish capability for integrating control systems of RE generators;
- Incorporate enhanced power quality measurement systems.



<b>2020 TOTAL</b>	
MW Radio HOPS	Fiber Optic KM
<b>188</b>	<b>6,917</b>

# TELECOM NETWORK BY 2020

## Major Considerations



### 4. Standardize management mechanisms

- Put in place an Integrated Telecom Network Management System based on industry-standard protocols;
- Incorporate stand-alone ACC operation for all Regions;
- Establish a centralized nationwide Protection Management System.

## Major Considerations



### 5. To reinforce network security

- Comply with Protection Philosophy;
- Implement Wide Area Monitoring System (WAMS) in SCADA/EMS;
- Use direct fiber links for reliable protection signaling;
- Secure IT network against internal threats;
- Ensure that physical infra complies with data center standards.

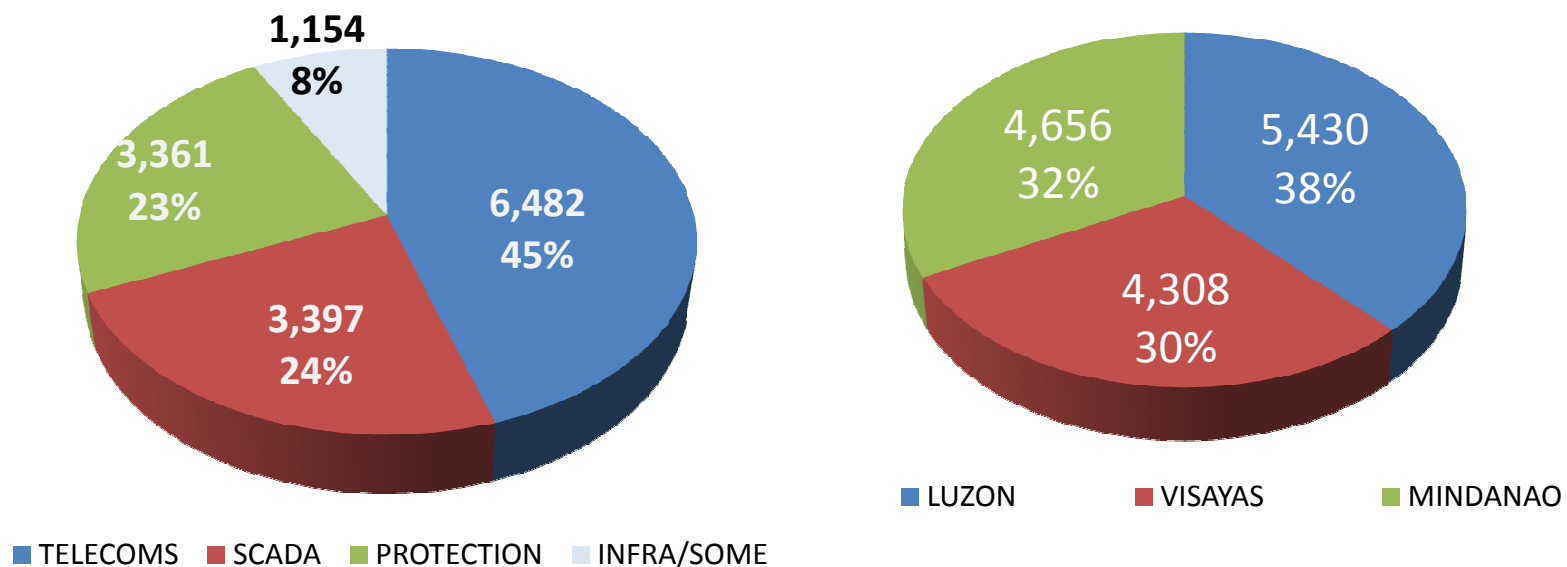
# Capex Cost Distribution



## CAPEX COSTS 2011-2020

IN MILLION PESOS

FUNCTION	REPLENISHMENTS	REHAB/UPGRADES	EXPANSIONS	TOTAL
TELECOMS	1,933	806	3,743	6,482
SCADA	952	342	2,103	3,397
PROTECTION	0	3,361	0	3,361
INFRA/SOME	304	265	585	1,154
TOTAL	3,188	4,774	6,431	14,394



**End of Presentation**