IAEA
International Atomic Energy Agency

REPUBLICA DE NICARAGUA - AMERICA CENTRAL

Capacity building in Energy Planning and its Application for Addressing Climate Change Mitigation Targets

MINISTRY OF ENERGY AND MINES NICARAGUA

MSc. Carlos Emilio Sánchez Sánchez

Gobierno de Reconciliación y Unidad Nacional
El Pueblo, Presidente!

2021 ESPERANZAS VICTORIOSAS! TODO CON AMOR!

Ministerio de Energía y Minas

COUNTRY OVERVIEW. General Information

Capital	Managua
Official Language	Spanish
Recognised regional languages	english, miskito, rama, sumo, miskito creole, garífuna, rama cay creole
Government	Presidential Constitutional Republic
Area	130,373 km²
Population	6,486,201 (2019 estimate)
Highest point	2,438 metres / 7,999 ft (Mogotón)
Lowest point	0 metres / 0 ft (Pacific Ocean)
Longest river	750 km / 470 mi (Coco River)
Longest Lake	8,264 km² / 3,191 sq mi (Lake Nicaragua)

Nicaragua is located in the center of the Central America, in the northern tropical zone. The country has an area of 130,373.47 km², corresponding to 120,339.54 km² of mainland and 10,033.93 km² (7.6%) of lakes and lagoons.

COUNTRY OVERVIEW. National Energy Policy

Stretegic Level

National Guideline

Socioproductive Development

National Policy

Energy

Sectorial Guidelines

- ✓ To **ensure electricity supply at the national level**; with the expansion of infrastructures, the introduction of better technologies and active participation in regional electricity interconnection organizations.
- ✓ **Access to clean energy technologies**, including renewable energy sources, energy efficiency, and advanced and cleaner fossil fuel technologies.
- ✓ **Increase** electricity **generation capacity**, according to the National Indicative Plan.
- ✓ **Transforming** and **diversifying** the **electricity generation mix**.
- ✓ **Promote the exploration** and exploitation of hydrocarbons.
- ✓ Maintain and **promote** the **commercialization** of oil products.

NATIONAL DEVELOPMENT PLAN (NDP)

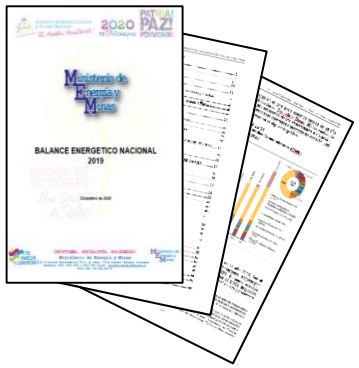
Legal Framework

- Electric Industry Law
- Energy Stability Law
- Promotion of Electric Generation with Renewable Sources Law
- Hydrocarbon Supply Law

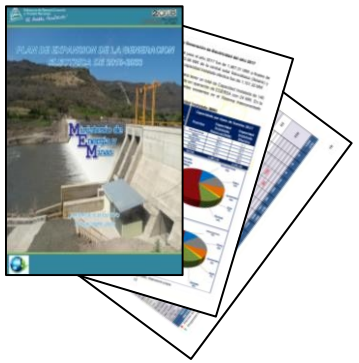
Institutional Framework

- Government defines and coordinates energy policy
- Enhanced participation of private investment
- Energy mix diversification
- Reduce share of imported oil
- Increase share of domestic sources
- Strong support to renewables
- Regional interconnection
- Strong support to energy efficiency in all sectors
- Universal access to modern energy services

Institutional Products



National Energy Balance

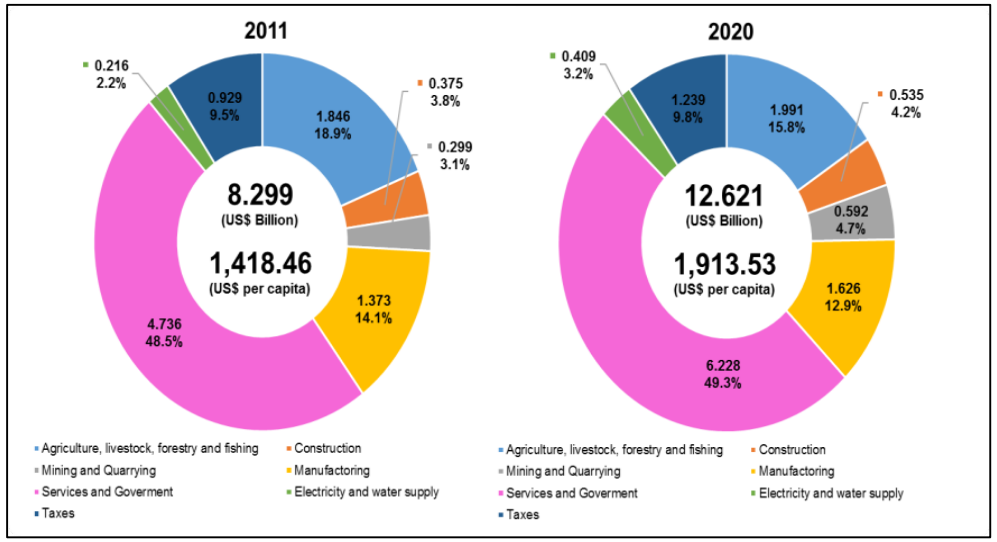


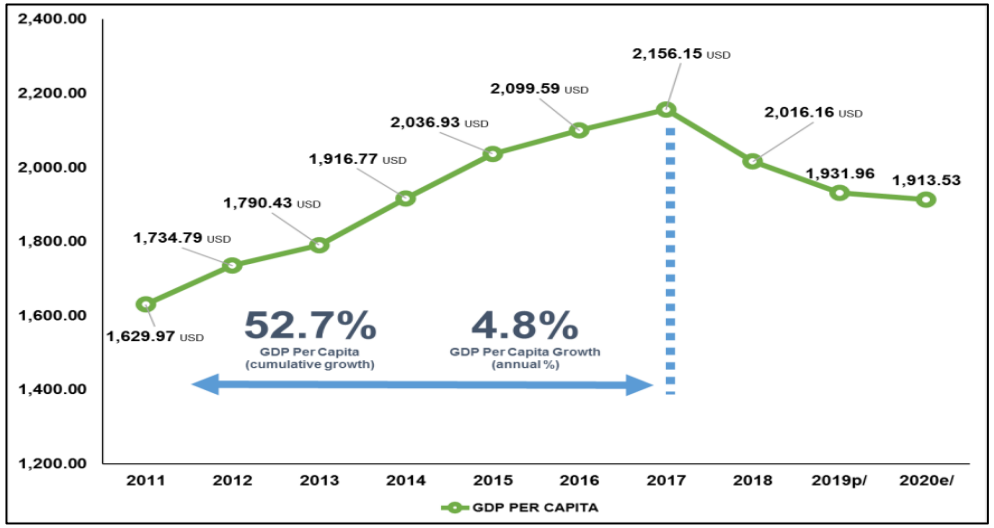
Indicative Plan for Expansion of Electricity Generation

Universal access to electricity

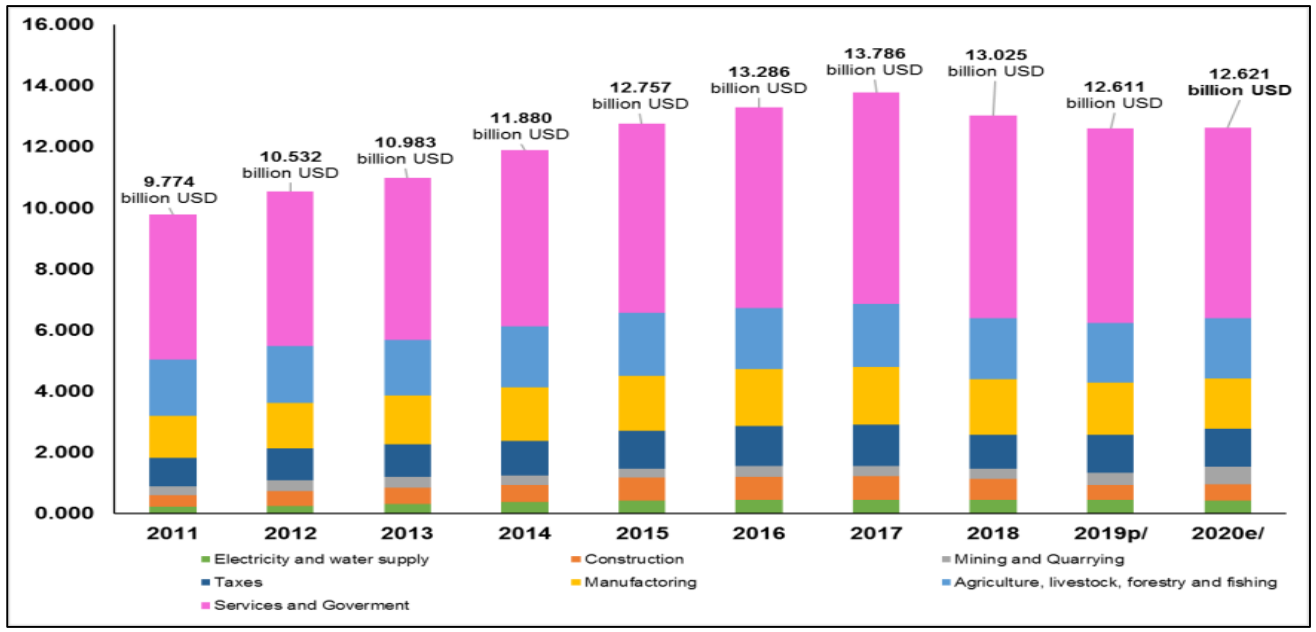
COUNTRY OVERVIEW. Population and Economic Data

ECONOMIC GROWTH





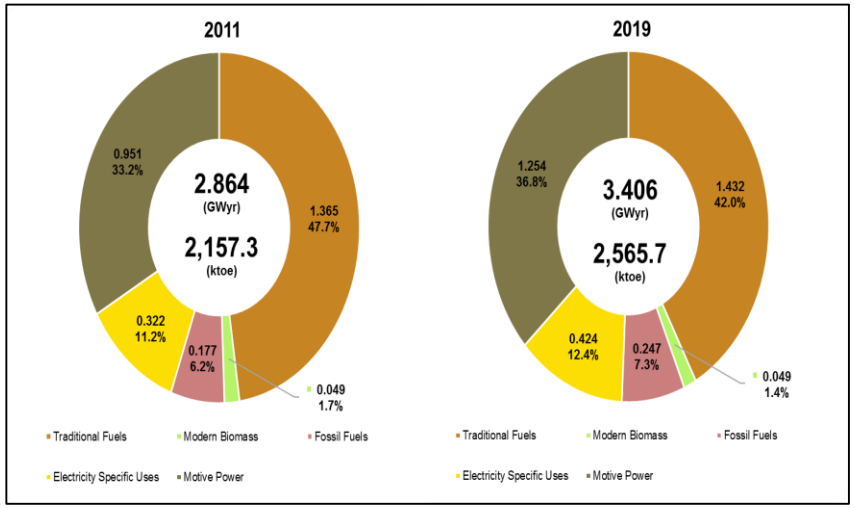
GDP Per Capita

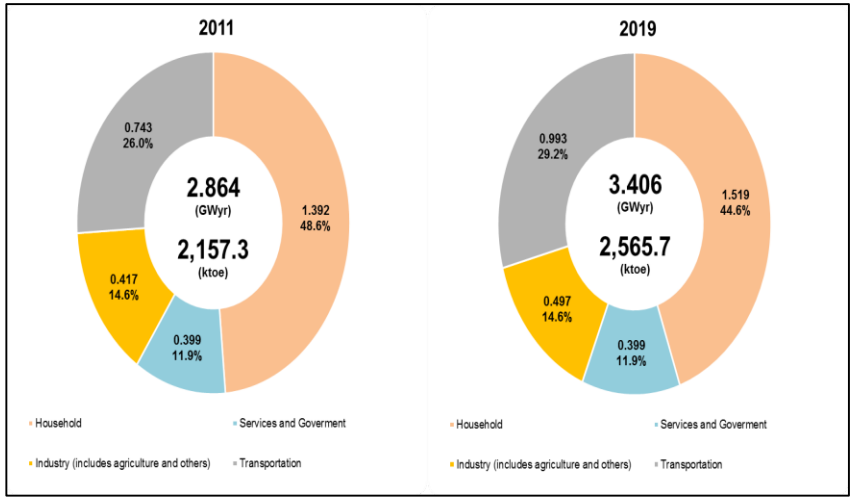


GDP by Activity

Services and Government, represents around 50% of GDP, Agriculture and Livestock, which represents around 15% and Manufacturing with 13%. Since 2009, Nicaragua experienced a **sustainable economy growth of 4.8%** per year; for this year 2021, **we expect a positive growth of the GDP over 4.5%.**

COUNTRY OVERVIEW. Final Energy Consumption





Energy Consumption

ENERGY CONSUMPTION

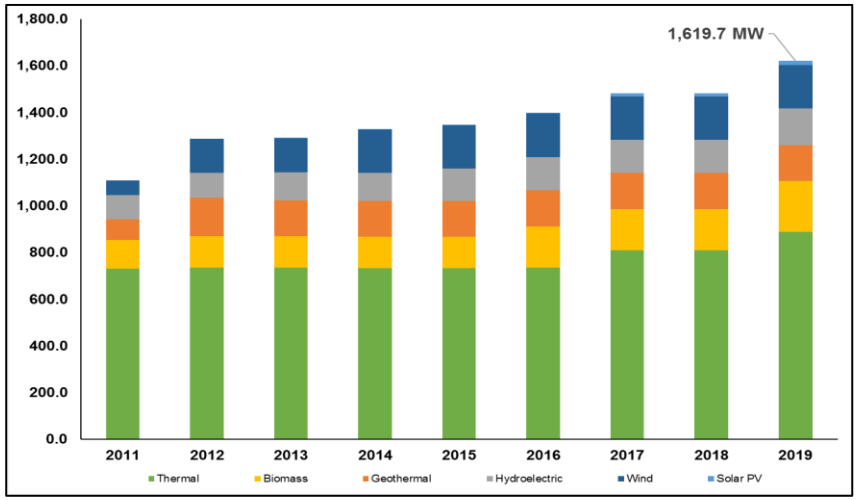
The final energy demand is characterized by a **high consumption of traditional fuels, mainly used for cooking in rural areas**, followed by motor fuels and electricity. Principal Sectors are households and transportation.

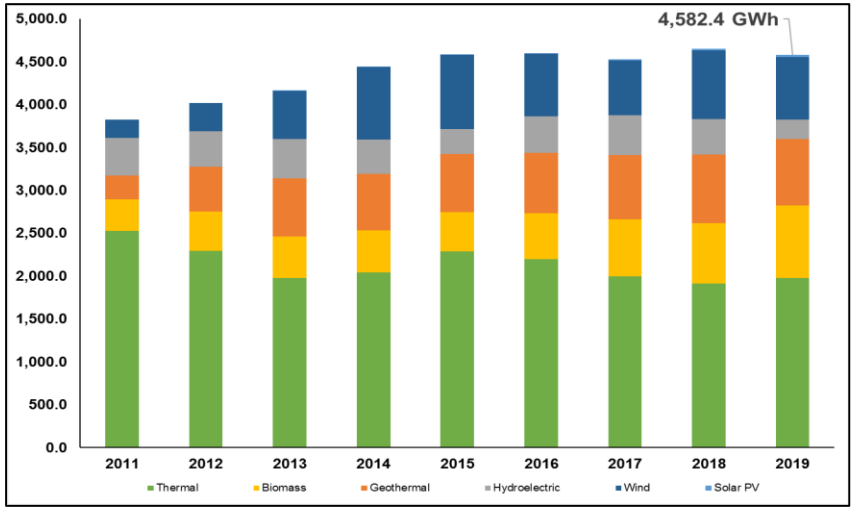
INSTALLED CAPACITY

From 2007 to 2020, 845.21 MW have been installed, of which 432.60 MW are based on fossil fuels and **412.61 MW based on renewable sources**.

ELECTRICITY GENERATION

Electricity generation percentage of renewable has increased from 25.0% in 2007 to **69.80% annual average in 2020**



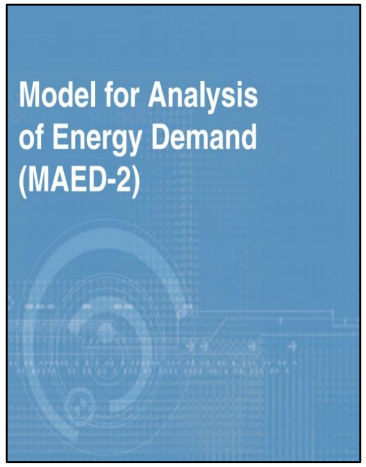


Electricity Generation and Installed Capacity

IAEA involvements: National and Regional Proyects

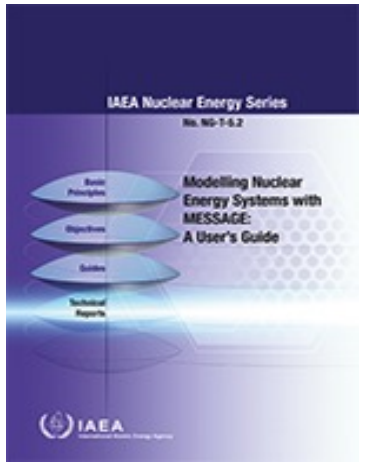
IAEA – RLA040

- 2008 - 2009
- Capacity Building for Sustainable Energy Development. Regional Project



IAEA – NIC2001

- 2014 - 2015
- Capacity Building for Financial and Environmental Studies. National Project



IAEA – RLA2015

- 2016 - 2017
- Support for the development of National Energy Plans in order to meet the energy needs of the countries of the region. Regional project

MAED

MESSAGE

IAEA – RLA2016

- 2018 - 2019
- Support in the Formulation of Sustainable Energy Development Plans at the sub regional level, Phase II

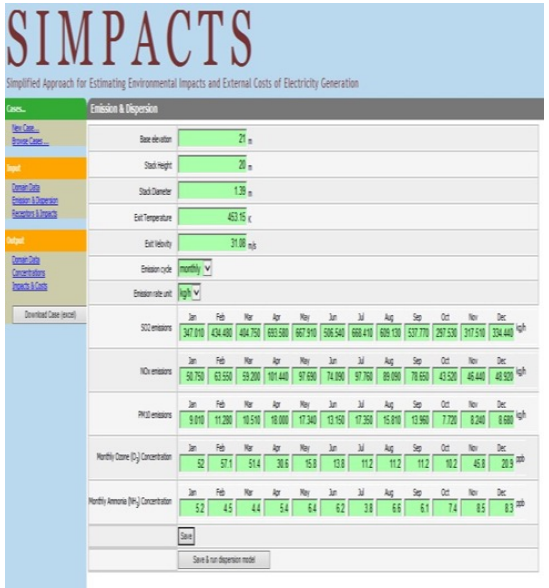
SIMPACTS
Simplified Approach for Estimating Environmental Impacts and External Costs of Electricity Generation

IAEA – RLA2017

- 2020 - 2021
- Support for the Formulation of Sustainable Energy Development Plans at the regional level. (ONGOING)

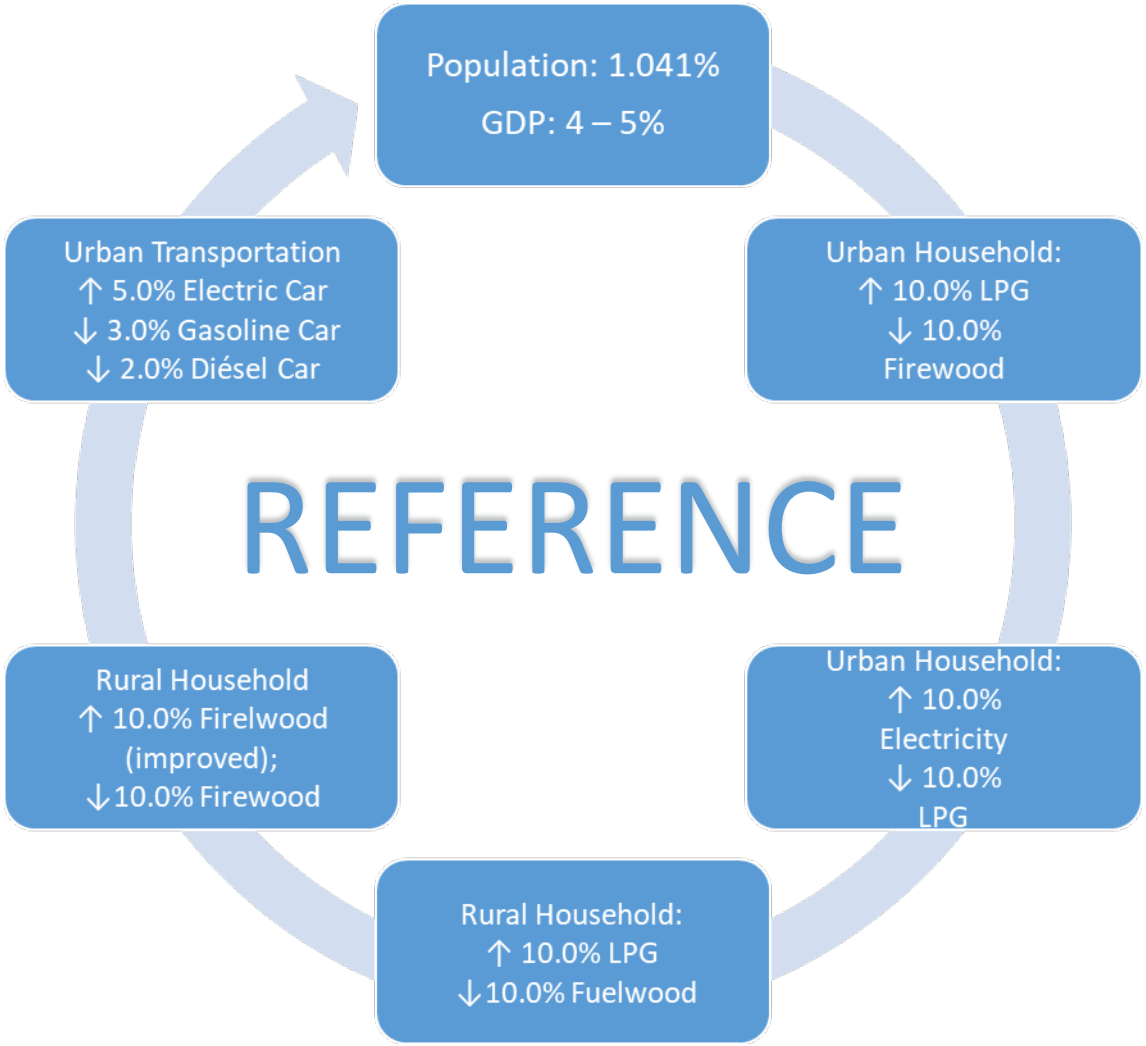
FINPLAN
A Model for Financial Analysis of Electric Sector Expansion Plans. Case Study: Geotermico Cosiguina V

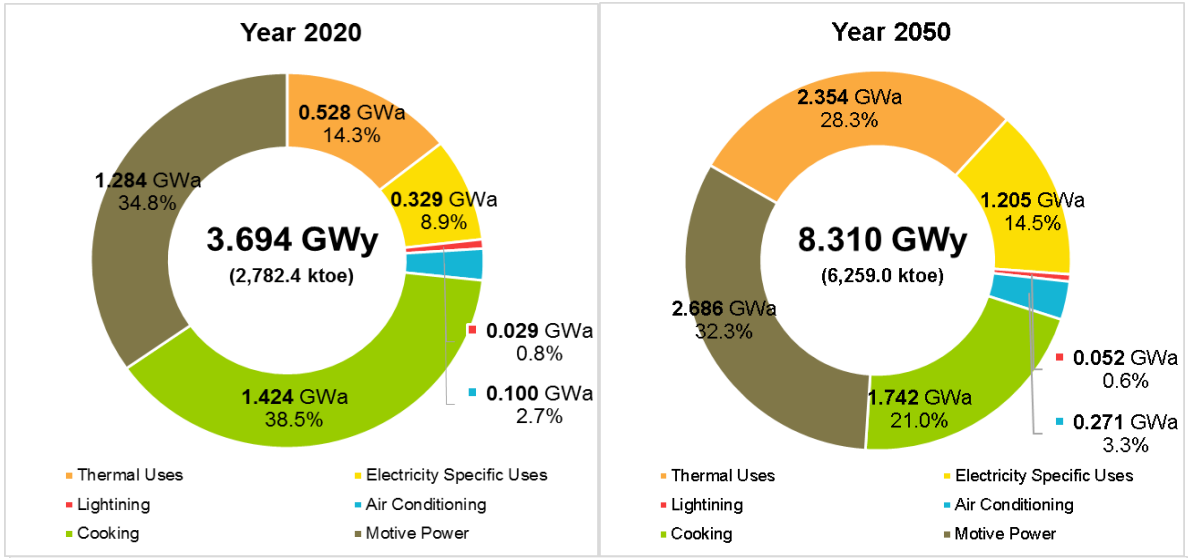
IAEA involvements: Resultant products

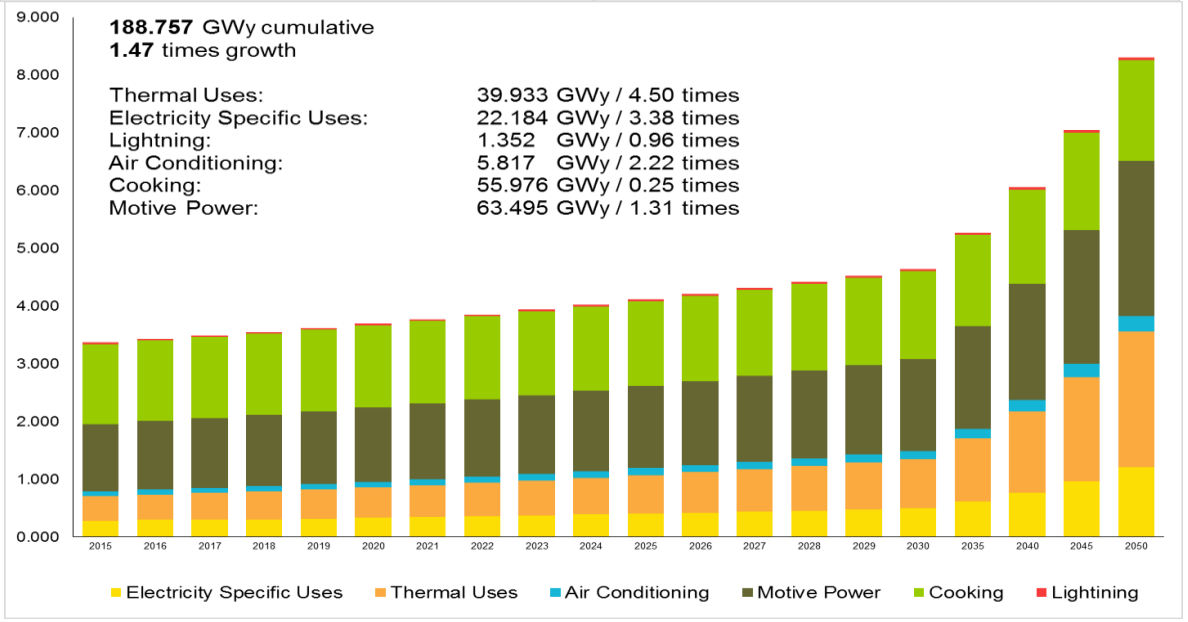


- ✓ Energy Demand Study 2015-2050.
- ✓ Energy Supply Study 2015-2050
- ✓ Study of Environmental Externalities.
- ✓ Study of Financial Analysis.

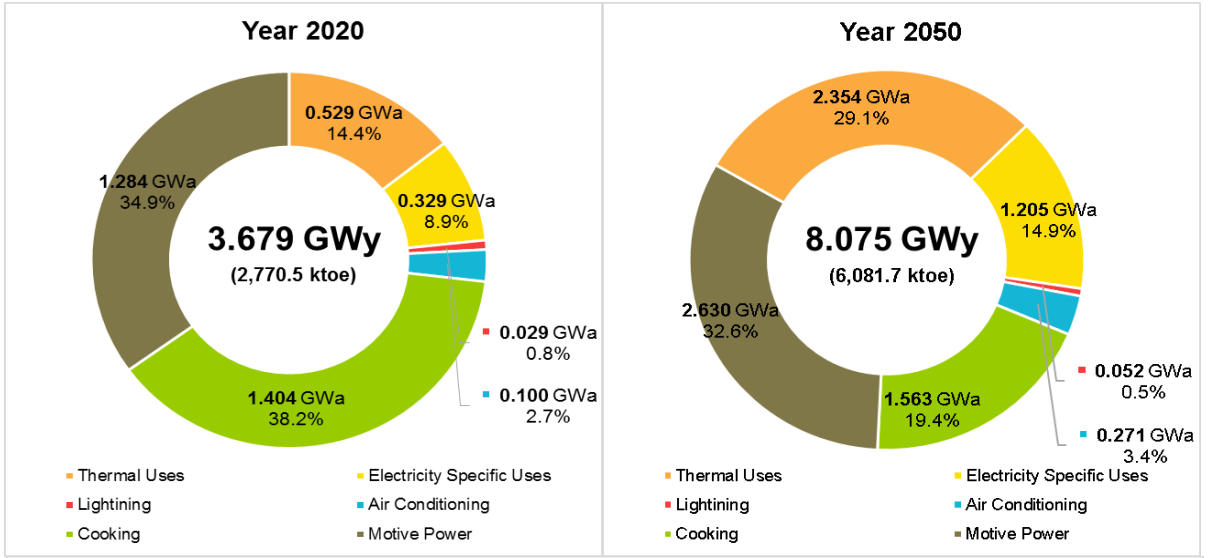
ENERGY DEMANDS ANALYSIS (MAED): preliminary Results

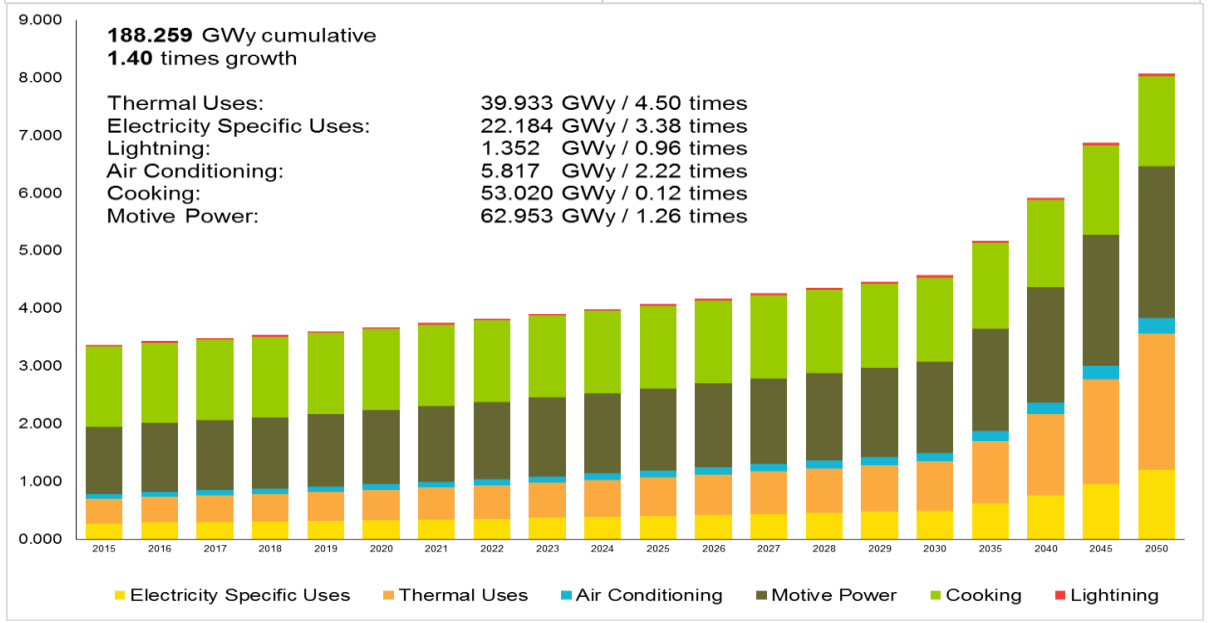






ENERGY DEMANDS ANALYSIS (MAED): preliminary Results

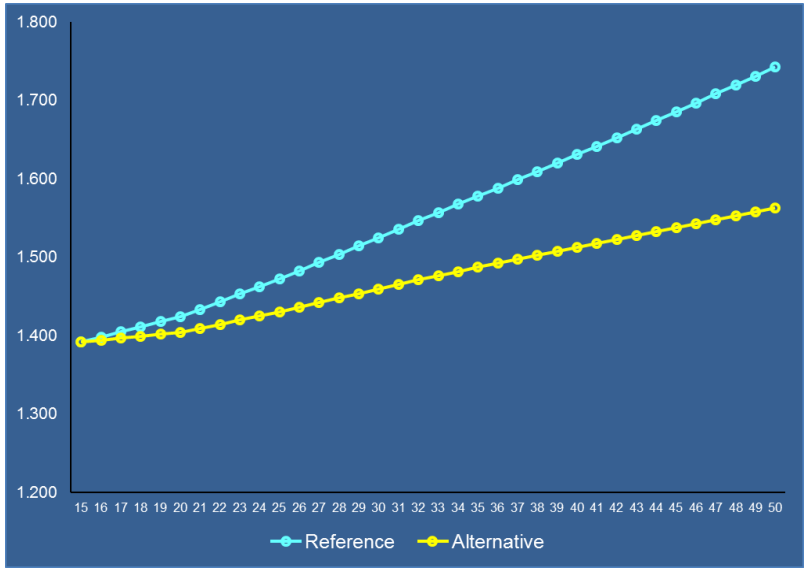


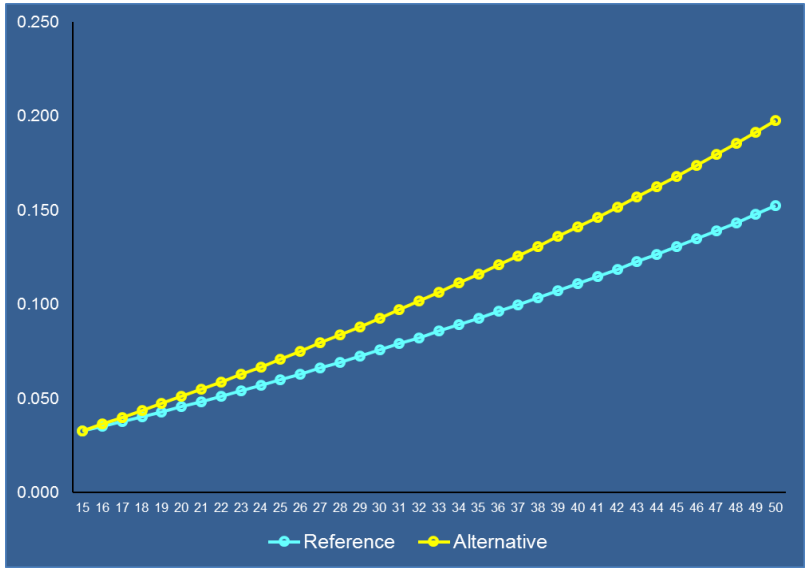


ENERGY DEMAND ANALYSIS (MAED). Preliminary Results

HOUSEHOLD

Final Energy Consumption for **COOKING**



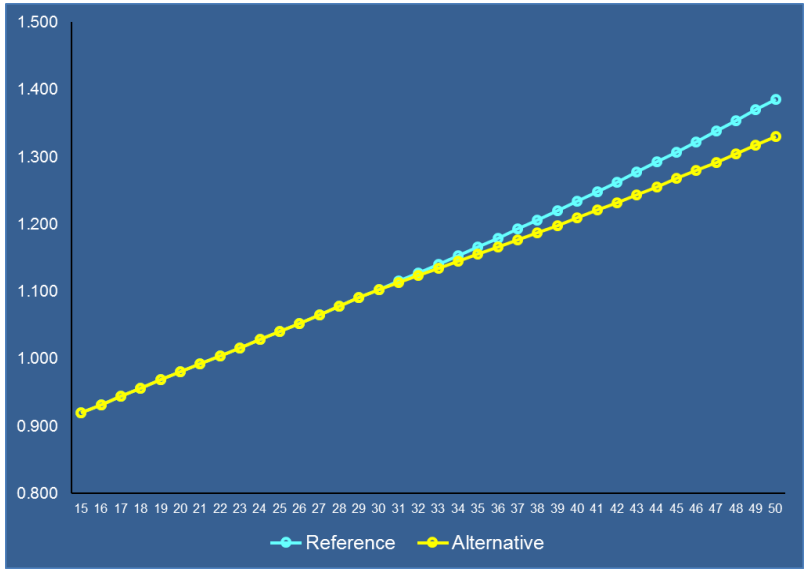


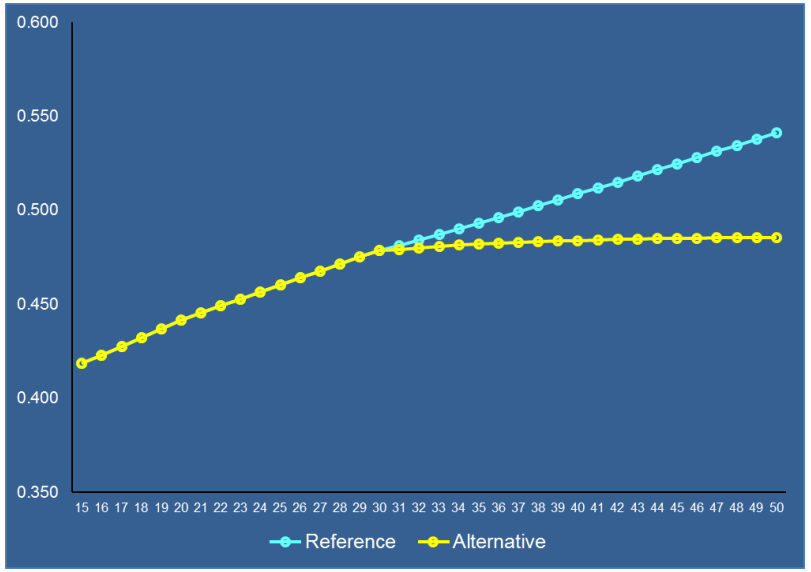
HOUSEHOLD

Final Energy Consumption for **MODERN BIOMASS**

TRANSPORT

Final Energy Consumption for **TRANSPORT**

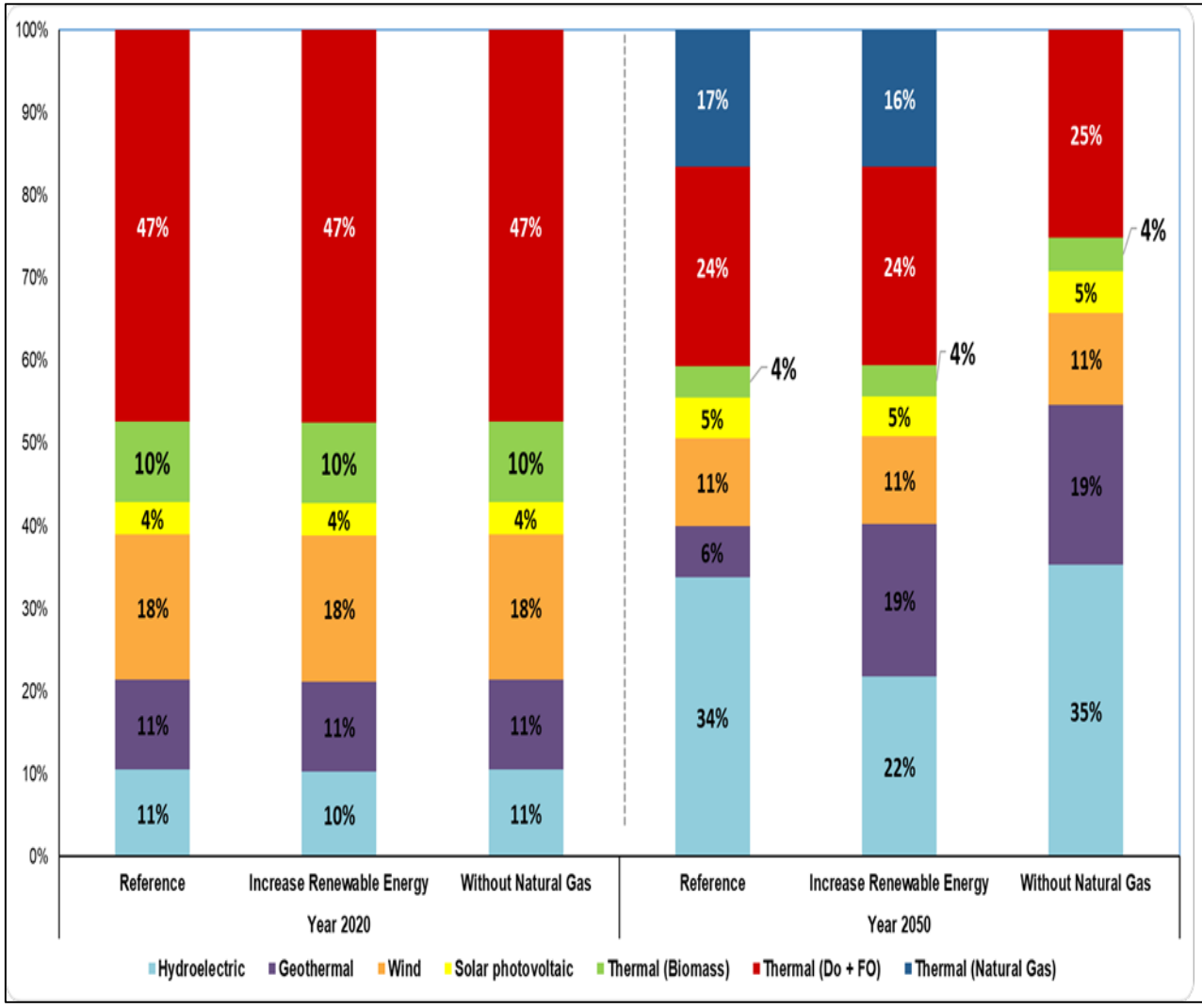




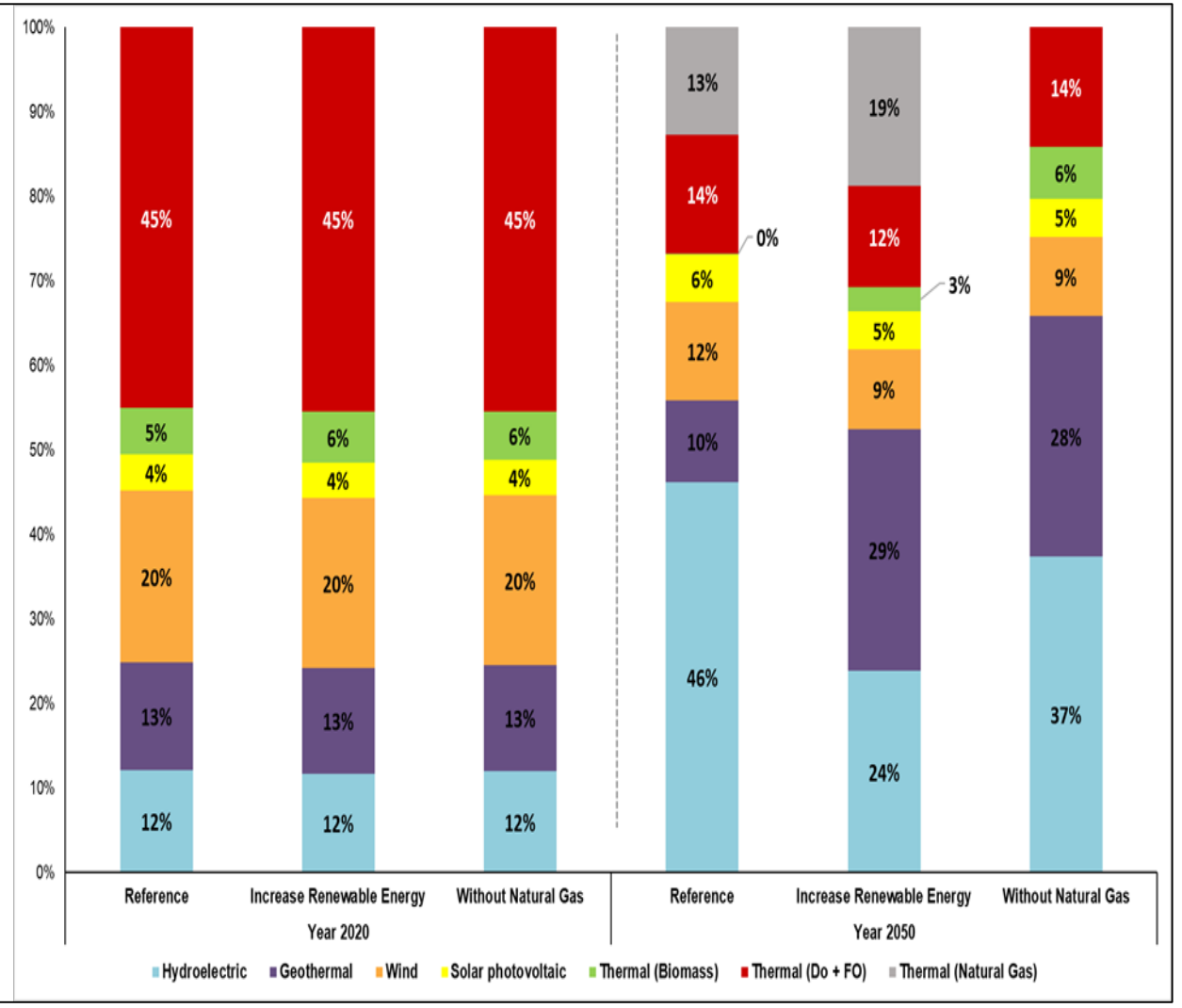
TRANSPORT

Final Energy Consumption for **URBAN TRANSPORT**

ENERGY SUPPLY ANALYSIS (MESSAGE). Preliminary Results

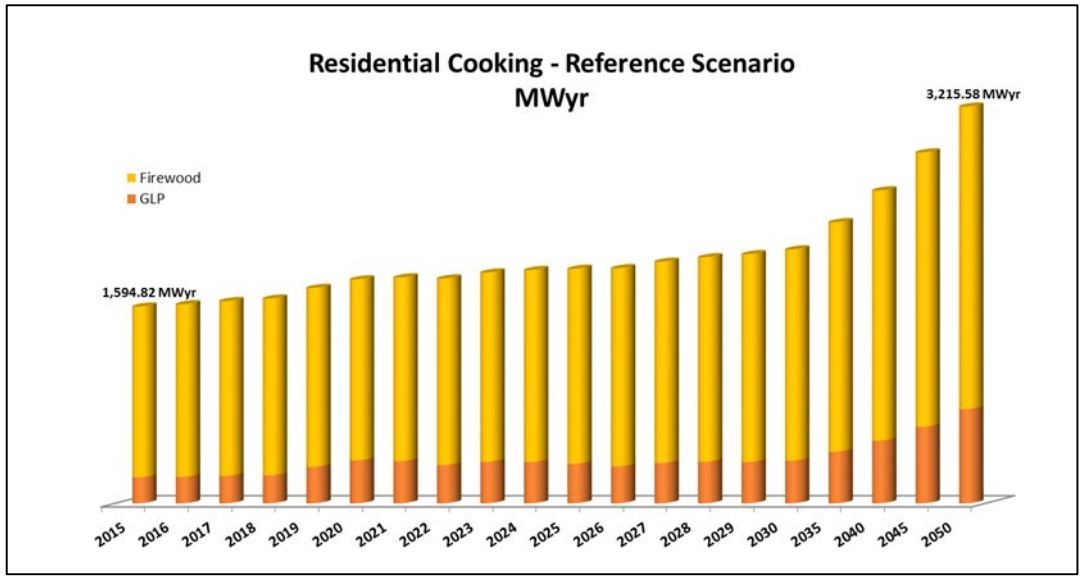


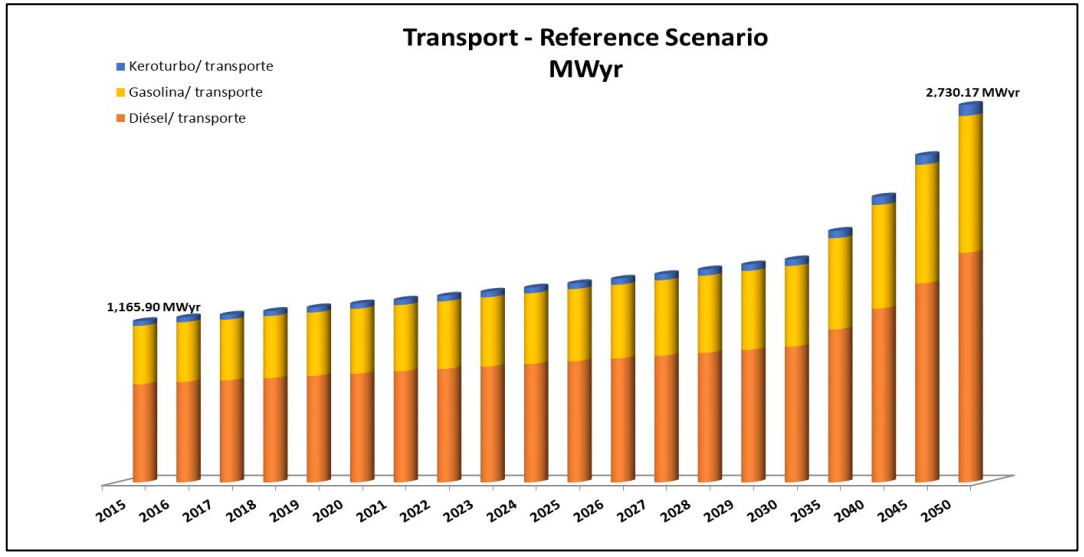
INSTALLED CAPACITY

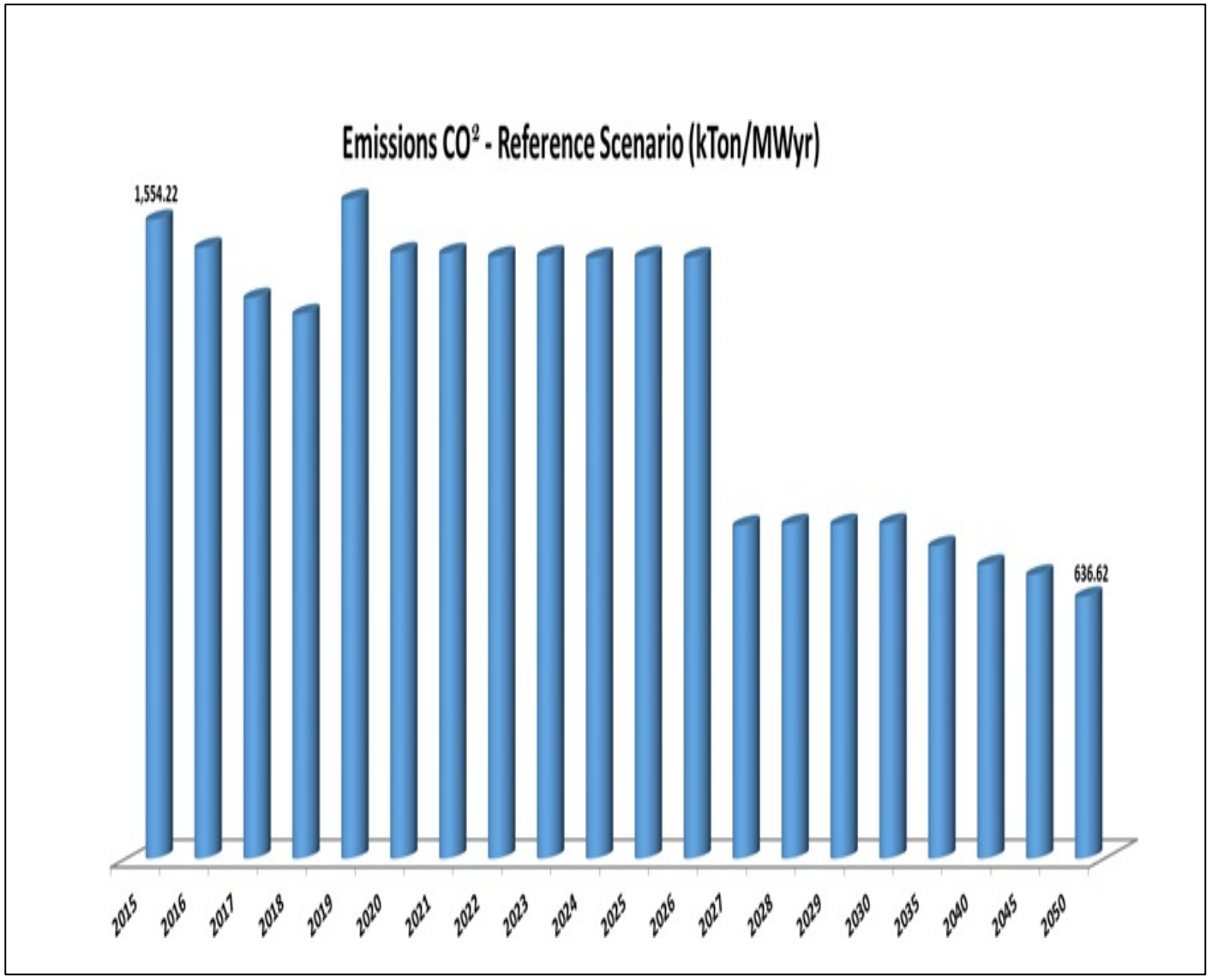


GENERATION MIX

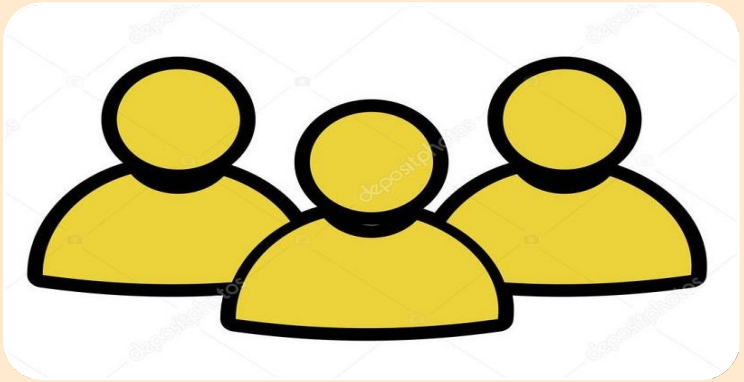
ENERGY SUPPLY ANALYSIS (MESSAGE). Preliminary Results

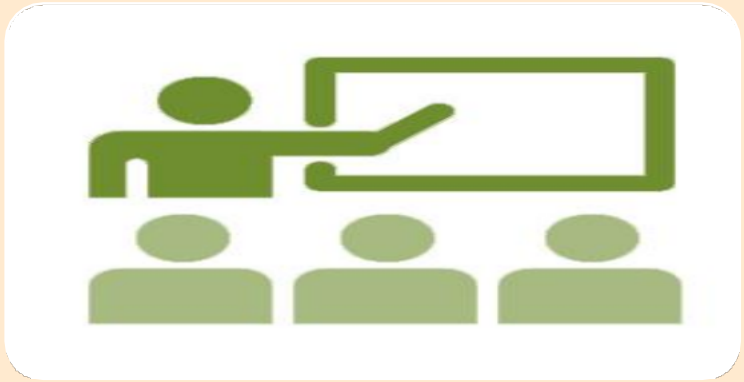


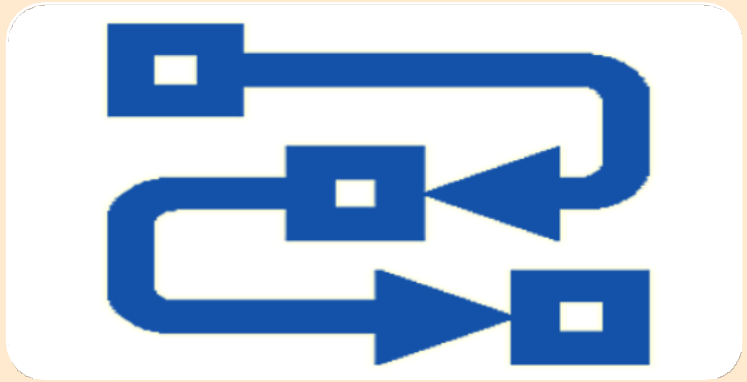




ACHIEVMENTS AND STATISTIC. CAPACITY BUILDING







Work Team

- ✓ Consolidation of national team of experts in energy planning
- ✓ Each member of this team participates in different models and tools for energy demand, supply and other analysis
- ✓ Each member leads an specific model or tool, but also participates in different analysis with different models

Workshop, Training courses

- ✓ With special support of the International Atomic Energy Agency (IAEA), building capacities for the team of experts is constant
- ✓ Other organizations involved in strengthening national capacity for energy planning are: OLADE, IEA, UNDESA

Procedures and Best Practices

- ✓ Energy planning is also being strengthened with the construction of procedures and best practices for the use of models and tools, but more specifically, for the analysis and construction of the necessary statistics. The team of experts is responsible for this task

LESSONS LEARNED AND FUTURE PLANS

Lessons Learned

- ✓The IAEA involvements and other capacity building projects have been decisive to develop and strengthen capacities for the team of planners.
- ✓To Acknowledge the importance of frequently reviewing the country's energy structure, identifying limitations with data, and stablishing a route of action to overcome those limitations in the future, is very important for the strengthening of energy planning.
- ✓There is an important improvement on the estimation of energy intensities, efficiencies and more detailed energy consumption.
- ✓Another important improvement has been the calculation of Greenhouse Gas (GHG) emissions. As a result, a guide was established for the estimation of these gases and collaboration with National Institution of Natural Resources has been established.

Future Plans

- ✓Continue strengthening national capacities in energy planning
- ✓Establish plans and strategies jointly with the Central American region, within the framework of the Regional Sustainable Energy Strategy
- ✓Manage financing at the regional level and with related organizations, for the execution of surveys and sector studies, in order to reduce the statistical gap
- ✓Improve linkages and alliances with other institutions responsible of statistics
- ✓Strengthen the analysis of GHG emissions

THANKS FOR YOUR ATTENTION