

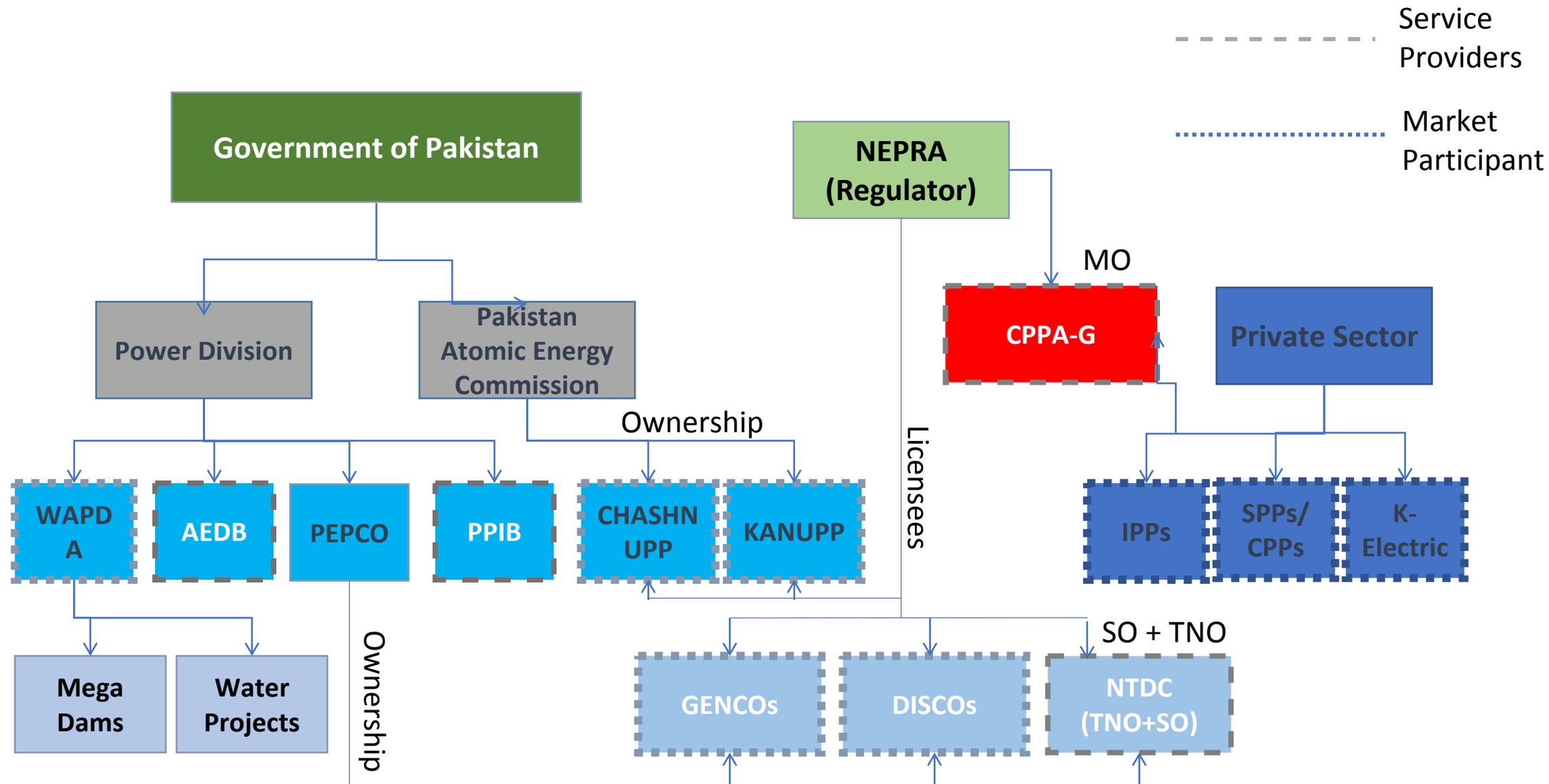
ENERGY POLICY COUNTRY REPORT PAKISTAN

COUNTRY PROFILE & ECONOMIC INDICATORS

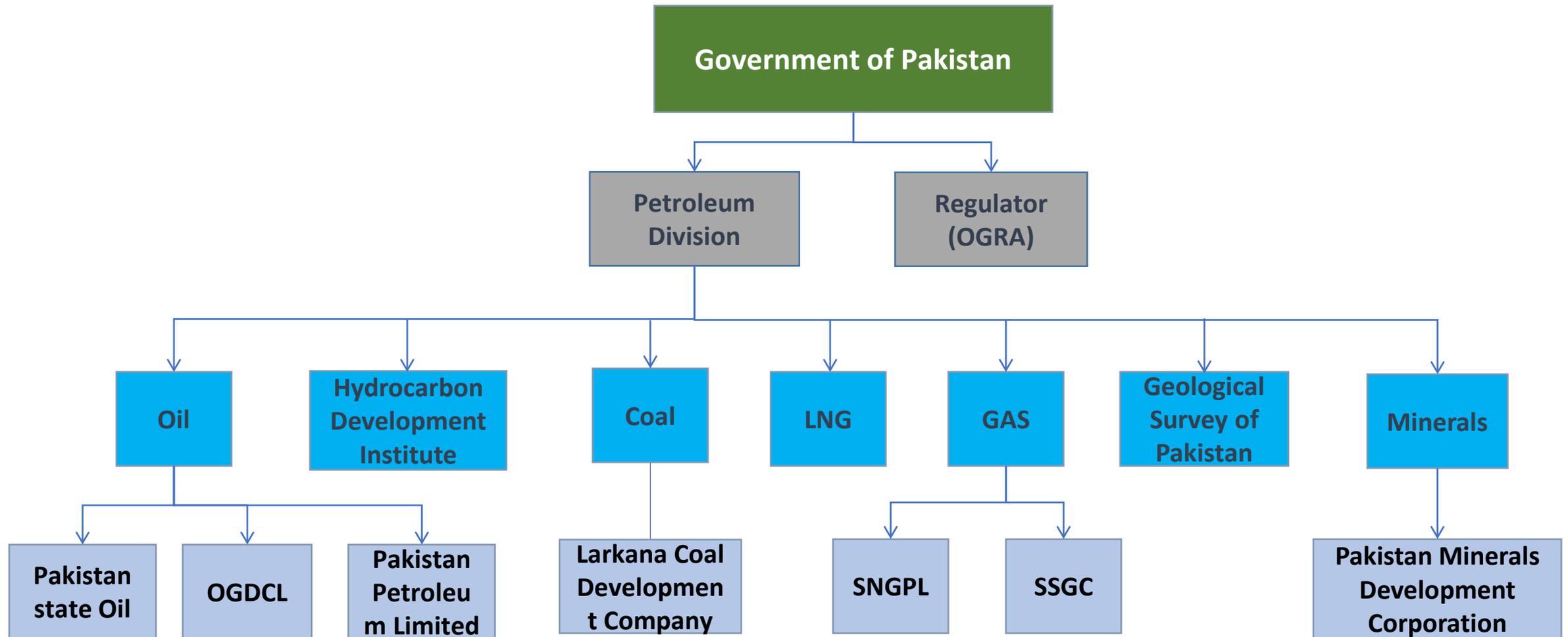


Country	Pakistan	
Federal Capital	Islamabad	
Area	881,913 Square KM	
Provinces	5	
Population	207 Million	
Urban	35%	
Rural	65%	
No of Households	32 Million	
GDP	272 Billion USD	
GDP Share		
Agriculture	19%	
Industrial Sector	21%	
Services Sector	60%	
Per Capita	1,357 USD	

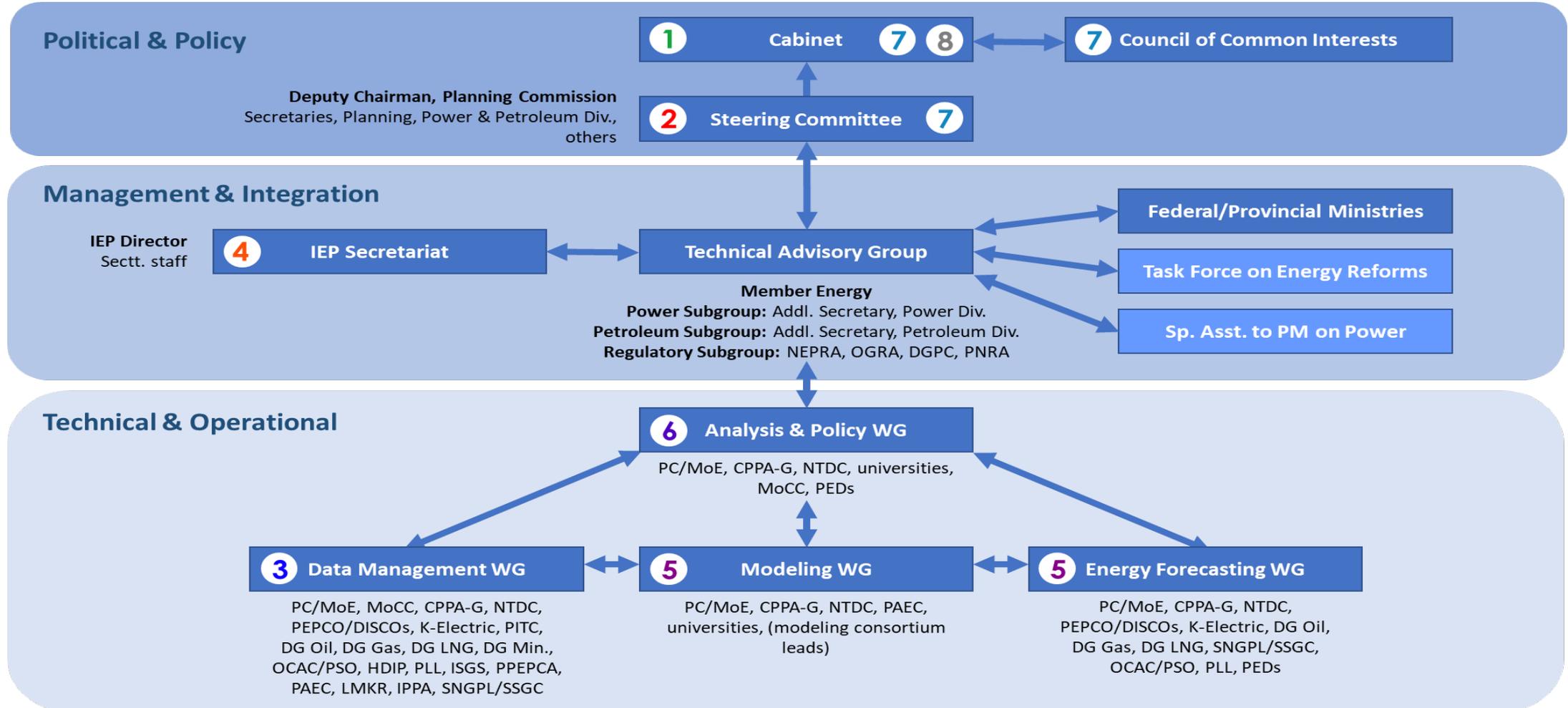
Power Sector's Organizational Structure



Petroleum Sector's Organizational Structure



IEP Structure (In Process)



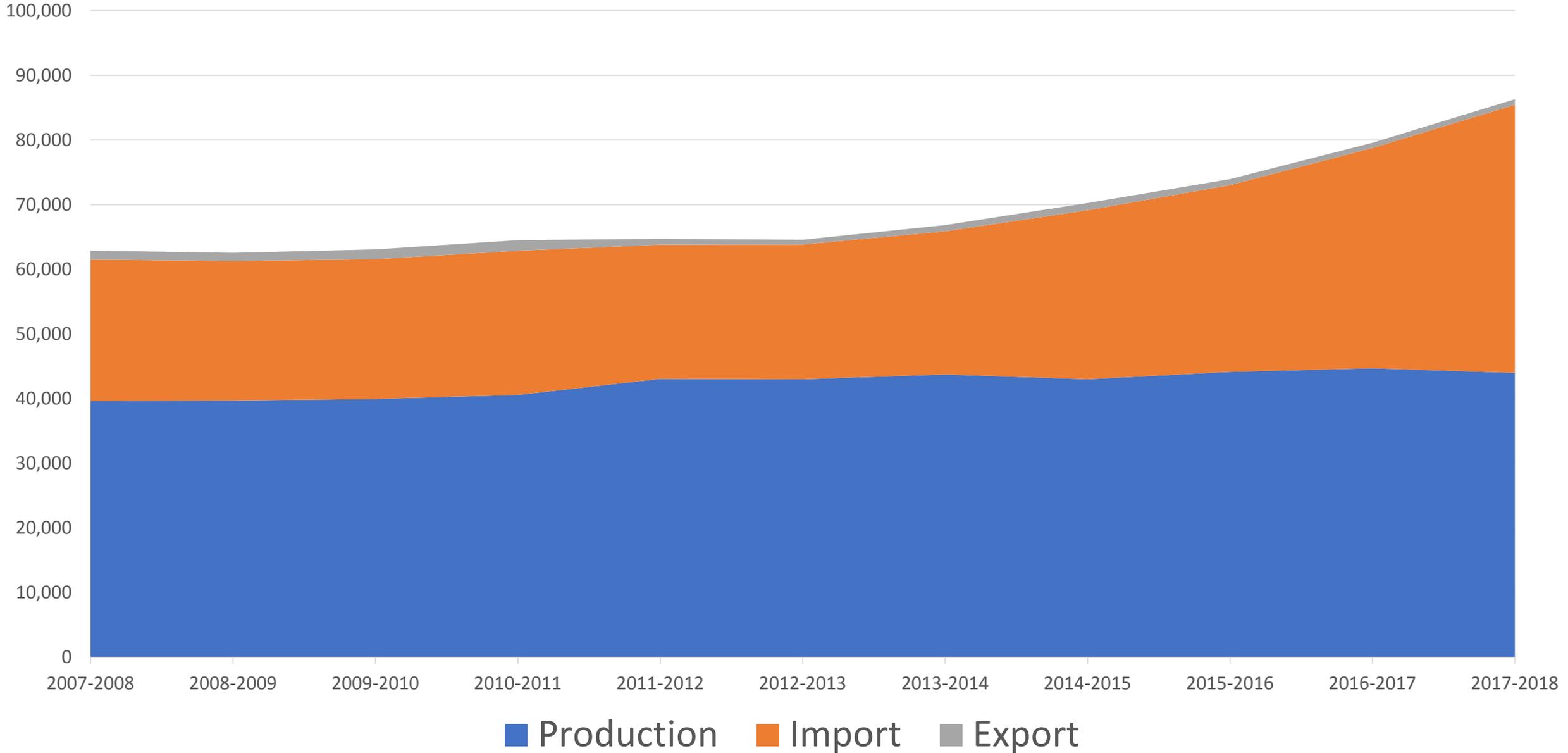
CURRENT ENERGY POLICY AND MEASURES

Currently, there is no Comprehensive Energy Policy available at the Country Level, however an Integrated Energy Plan (IEP) is being prepared with the help of USAID.

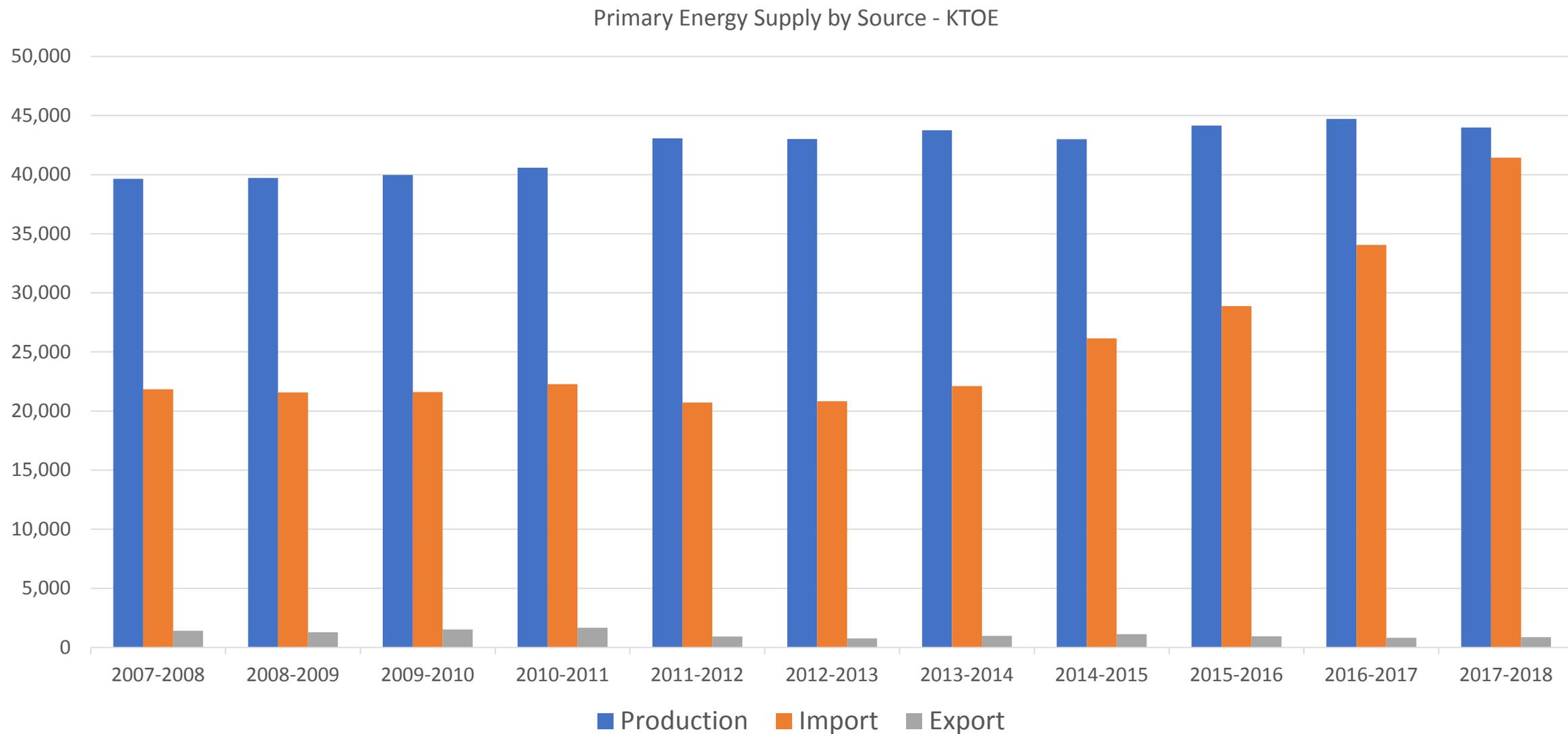
RESERVES OF ENERGY AND MINERAL RESOURCES

Reserves	Figures	Units of Measurement	K TOE
Oil	348	million barrels	46,670
Gas	15,411	million cubic feet	331,050
Coal	186,007	million tonnes	

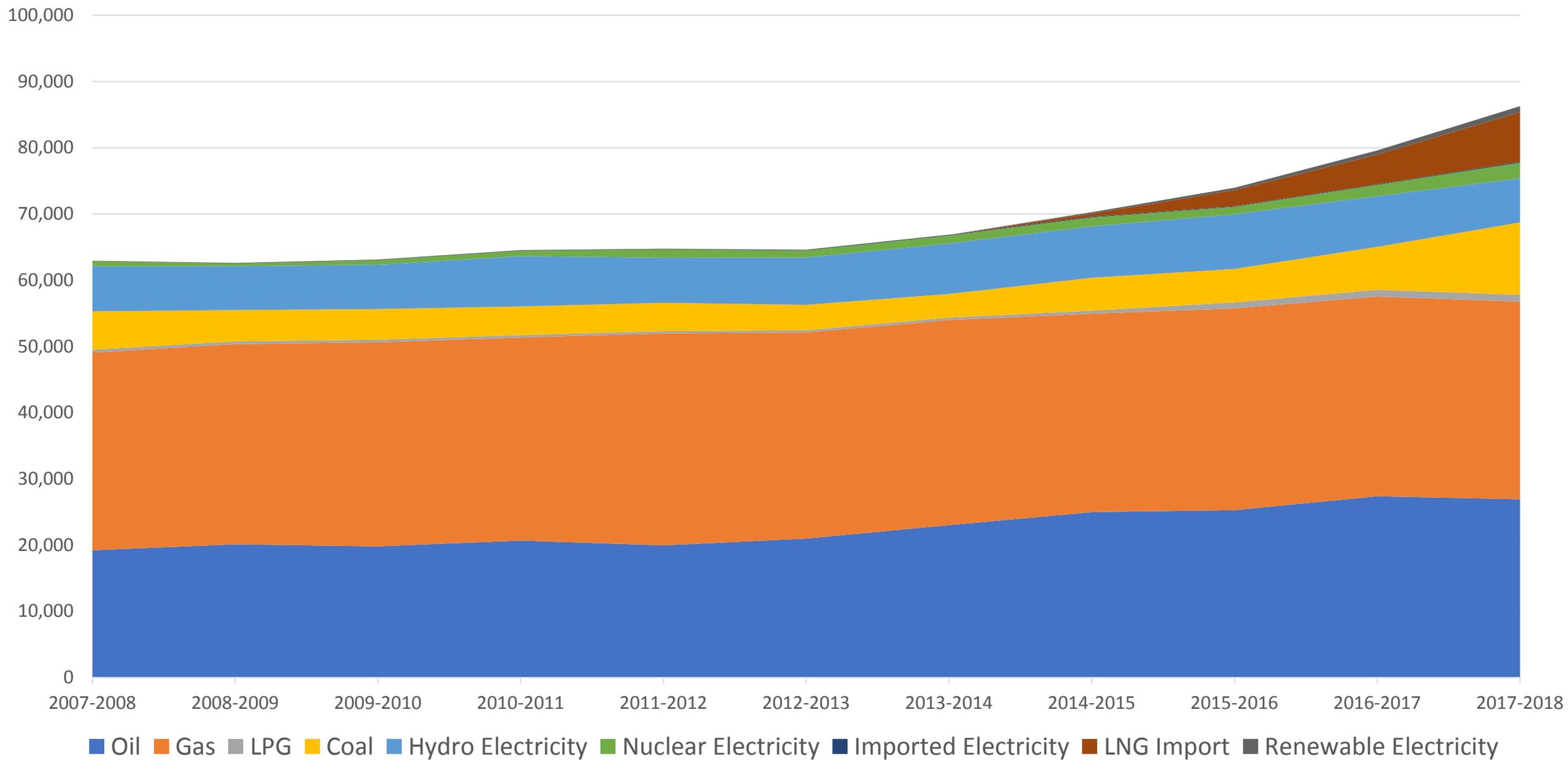
Primary Energy Supply by Source - KTOE



Primary Energy Supply by Source - KTOE

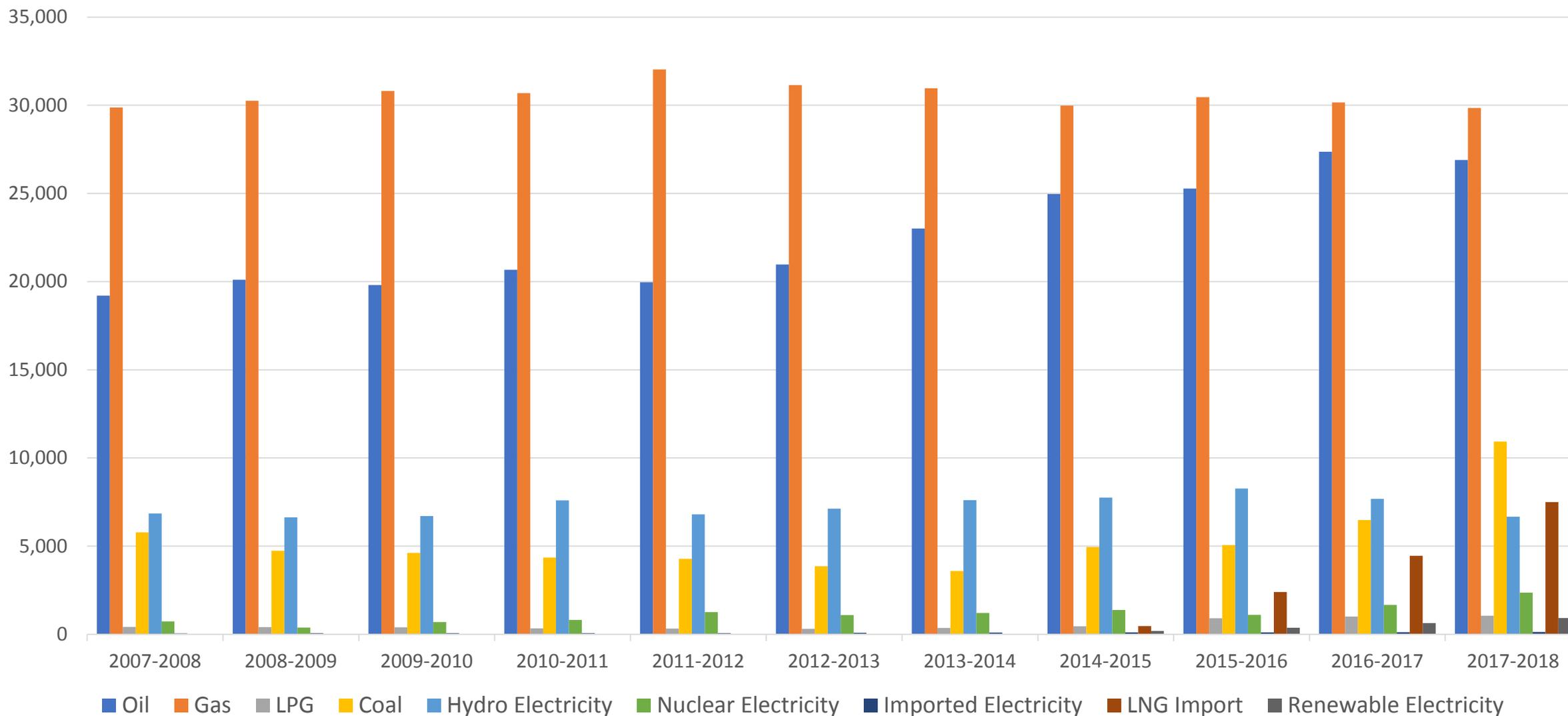


Primary Energy Supply by Energy Source - KTOE

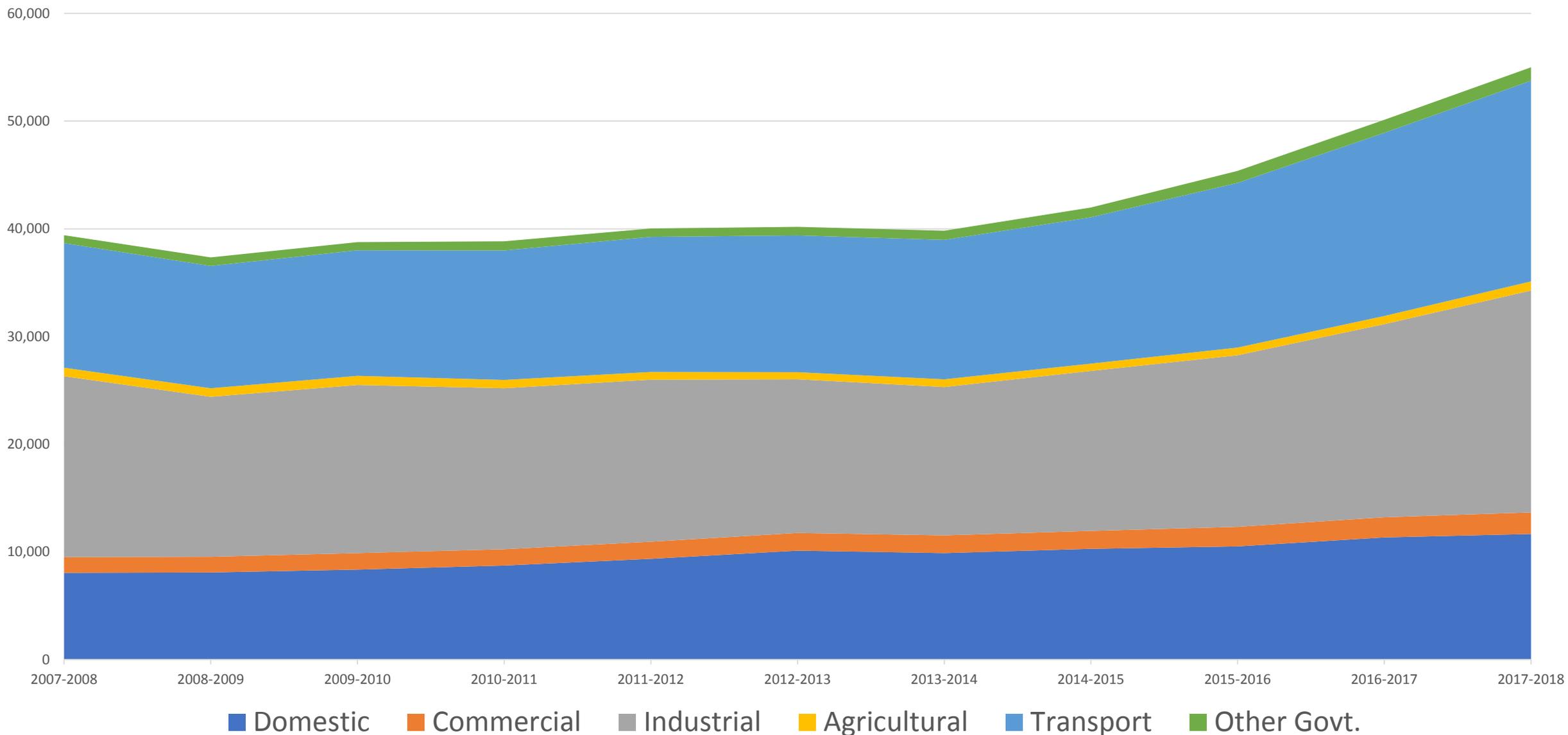


Primary Energy Supply by Energy Source - KTOE

Primary Energy Supply by Energy Source - KTOE

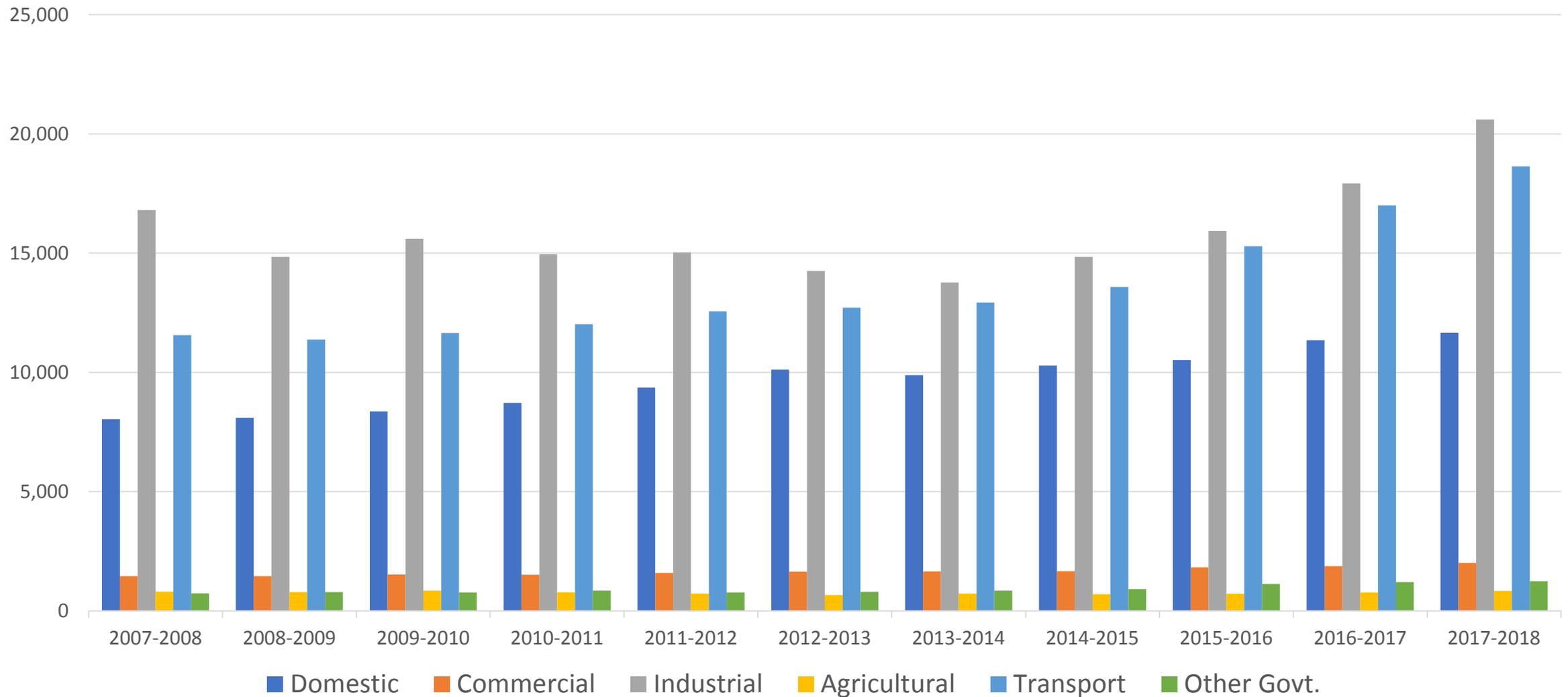


Final Energy Consumption by Sector - KTOE

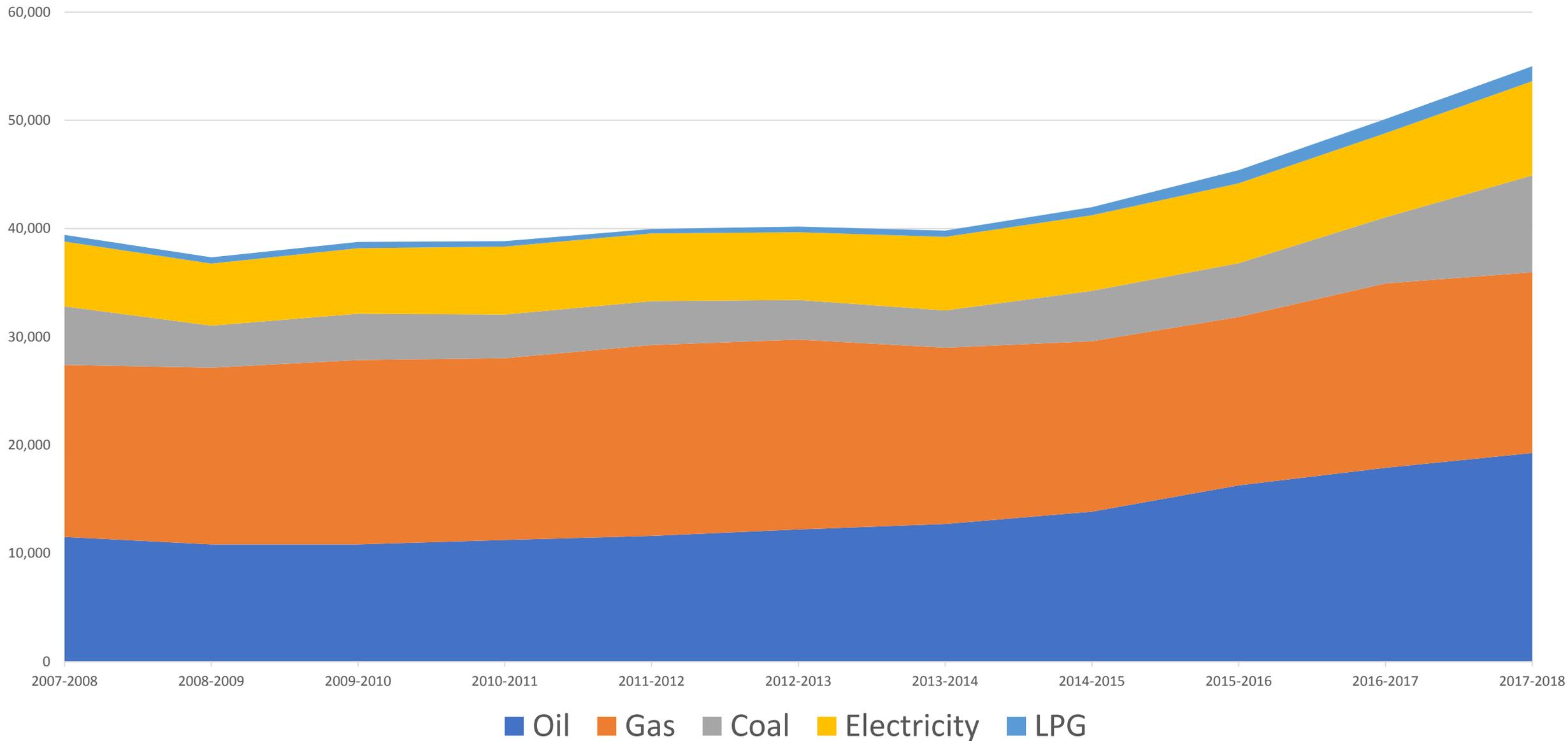


Final Energy Consumption by Sector - KTOE

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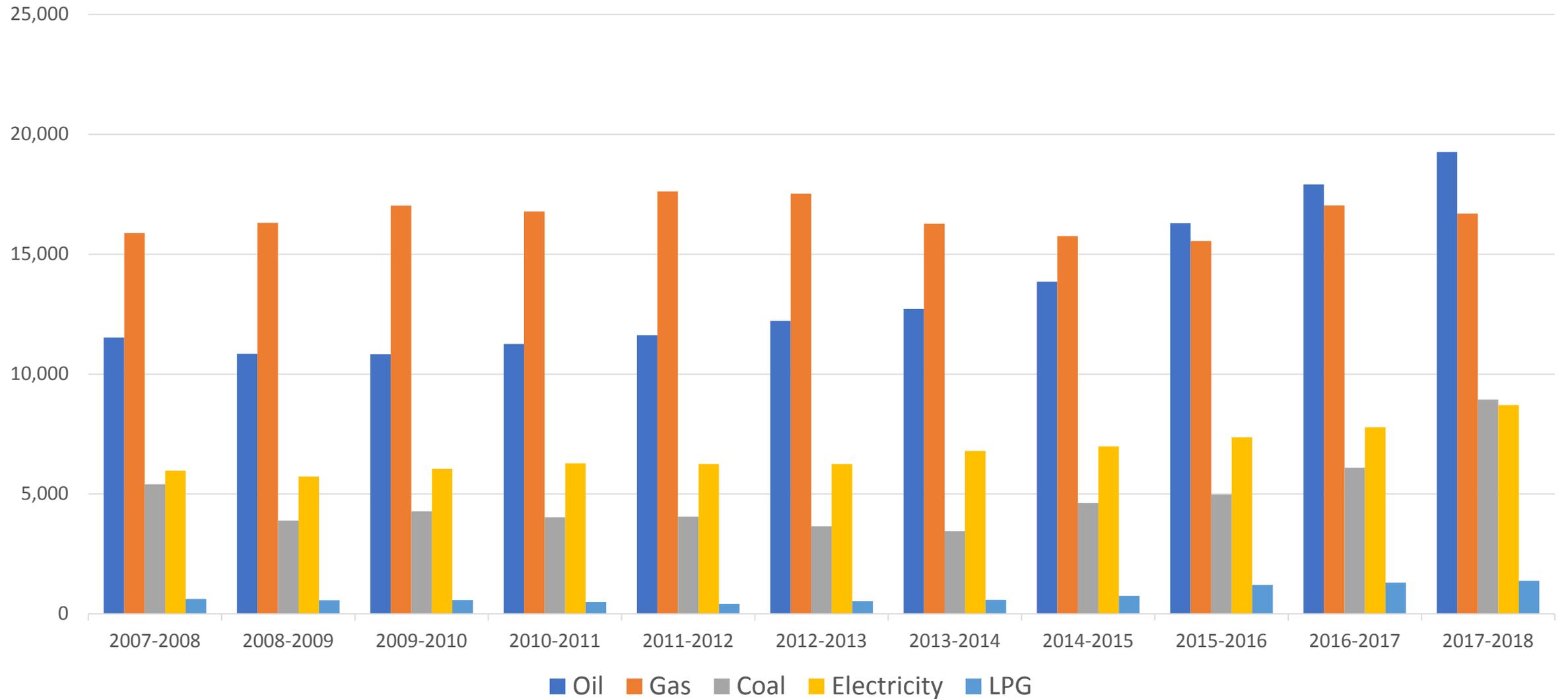


Final Energy Consumption by Source - KTOE

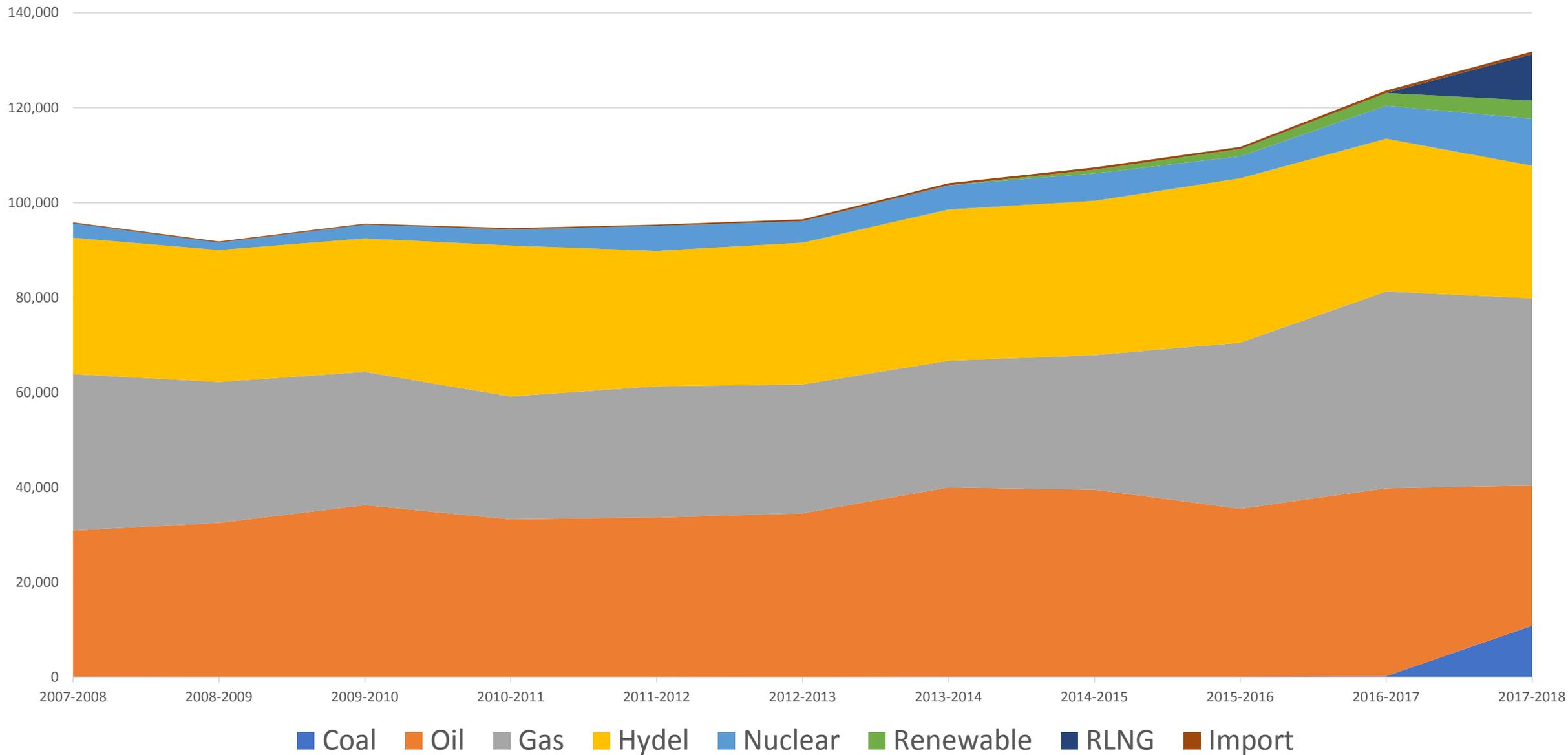


Final Energy Consumption by Source - KTOE

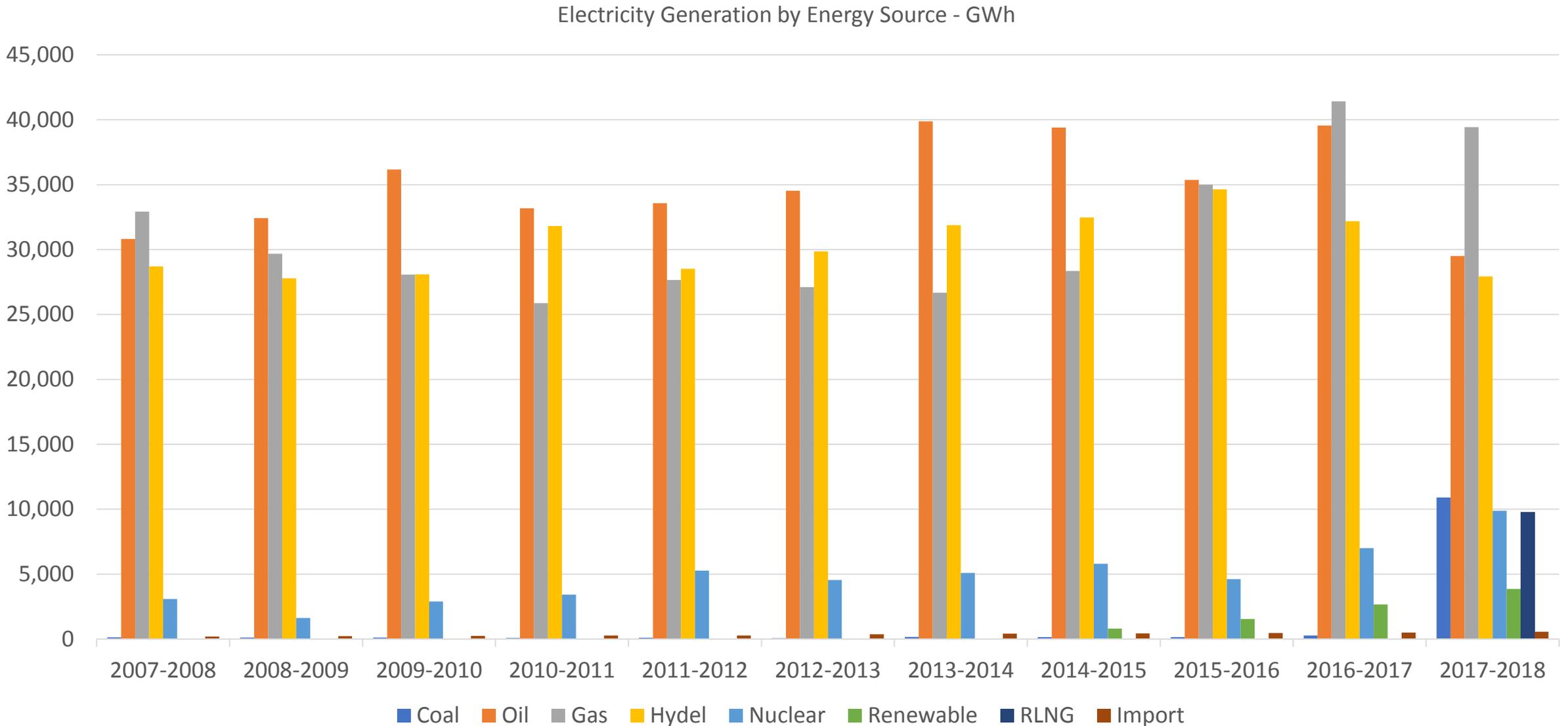
Final Energy Consumption by Source - KTOE



Electricity Generation by Energy Source - GWh



Electricity Generation by Energy Source - GWh

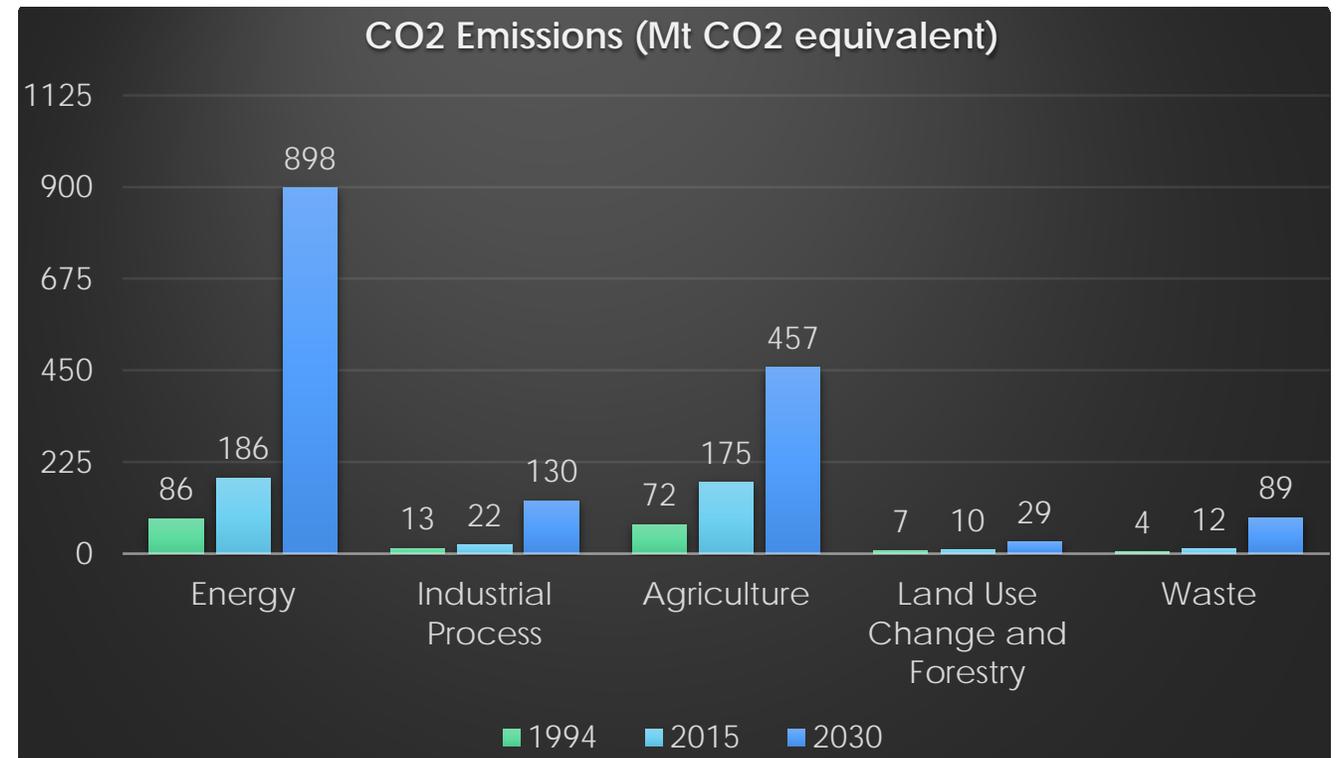


CO₂ Emissions

- CO₂ Emissions by Sector

CO₂ Emissions (Mt CO₂ equivalent)

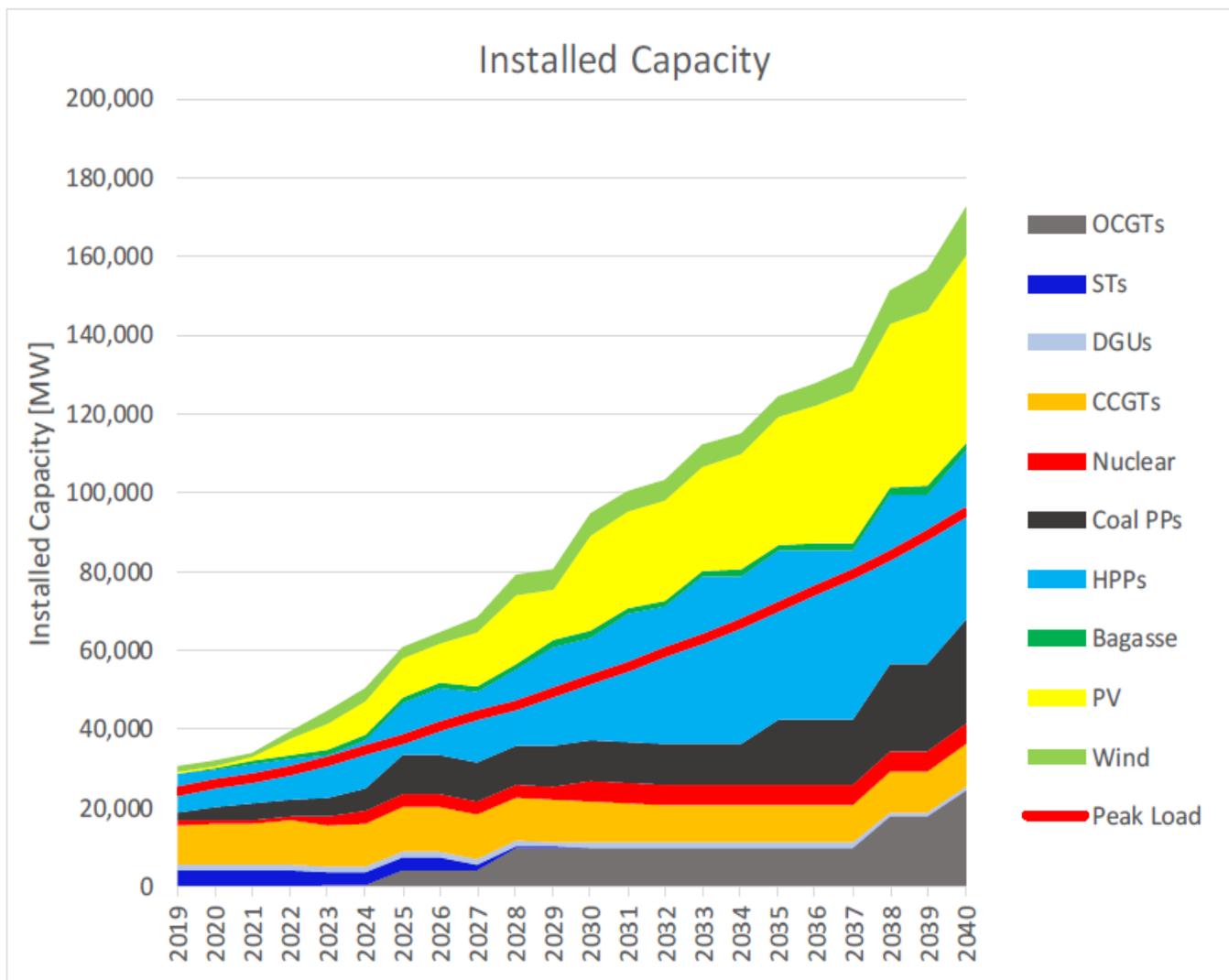
Source	1994	2015	2030
Energy	86	186	898
Industrial Process	13	22	130
Agriculture	72	175	457
Land Use Change and Forestry	7	10	29
Waste	4	12	89
Total	182	405	1603



ENERGY PRICES IN PAKISTAN

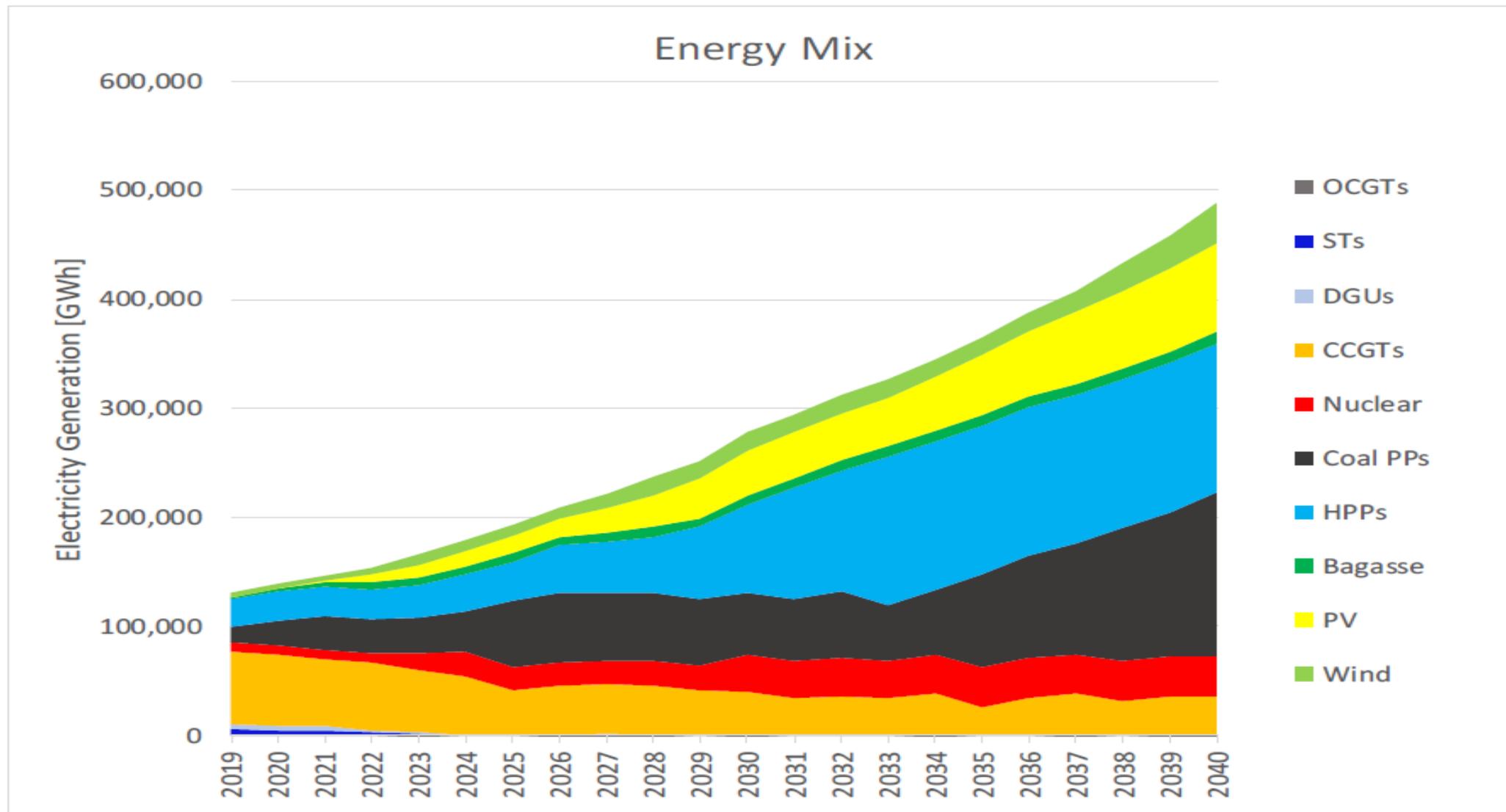
	2013	2014	2015	2016	2017	2018
Electricity(Cents/KWh)	12.01	11.53	12.15	12.25	12.02	13.17
Petroleum Products(Cents/Ltr)	86.83	89.20	70.39	58.63	64.96	93.32
Local Gas USD /MMBTU	4.81	4.96	4.25	3.82	5.43	5.47
RLNG - USD /MMBTU					7.00	8.00
Coal USD/MT					120.00	135.00

FUTURE FORECAST FOR CAPACITY MW - 2040



Installed Capacities [GW]				
	2019	2025	2030	2040
OCGTs	0.0	4.2	9.9	24.1
STs	4.0	3.2	0.0	0.0
DGUs	1.5	1.5	1.3	0.9
CCGTs	10.1	11.1	9.7	11.3
Nuclear	1.2	3.3	5.2	5.2
Coal PPs	1.9	10.1	10.4	26.1
HPPs	9.8	16.9	32.8	43.2
Bagasse	0.3	1.4	1.6	2.0
PV	0.4	9.9	24.3	47.6
Wind	1.2	3.0	5.4	12.4
TOTAL	30.3	64.6	100.6	172.9
VRE share	5%	20%	30%	35%

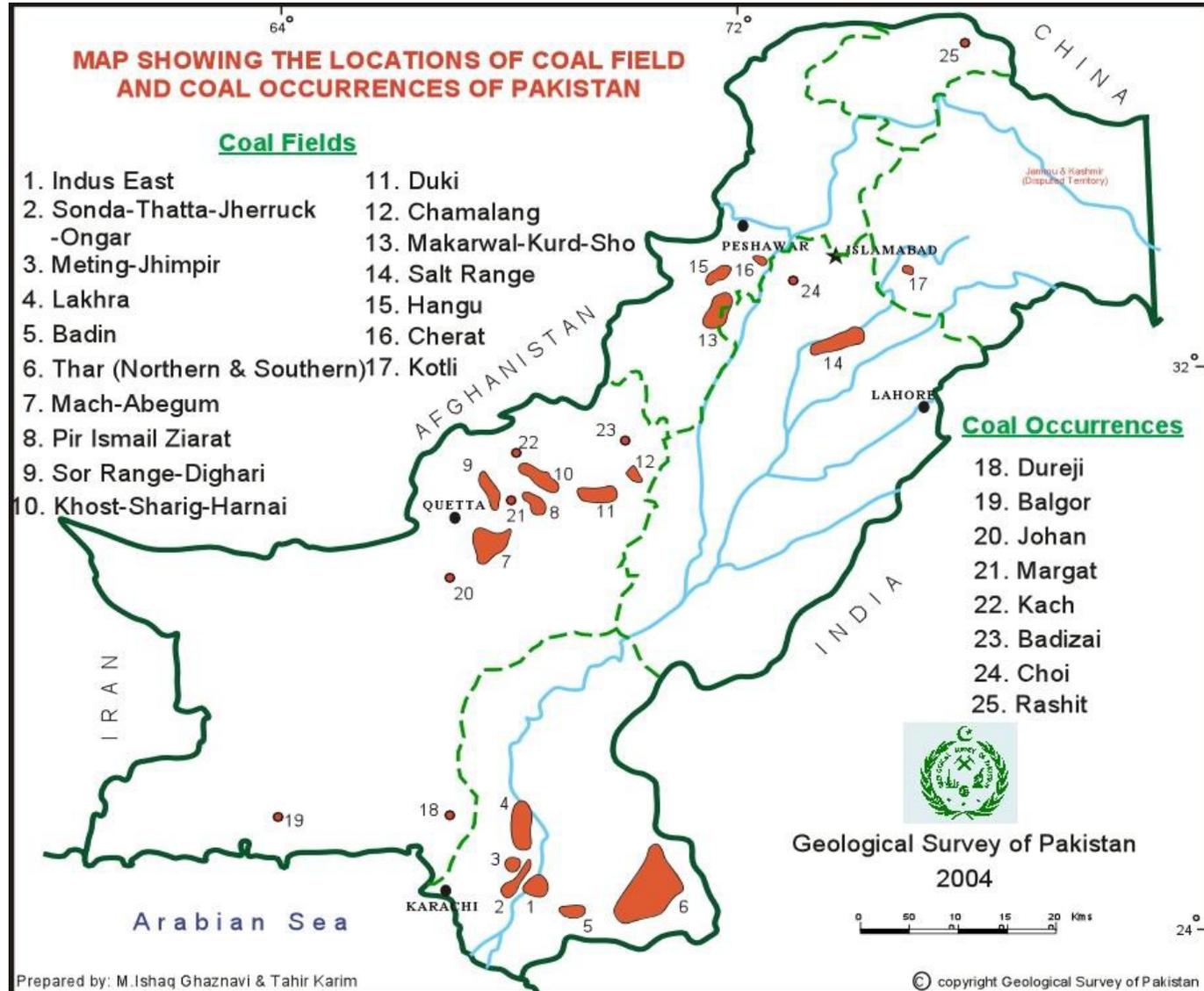
FUTURE FORECAST FOR ENERGY MIX GHW - 2040



COAL POTENTIAL OF PAKISTAN

Province	Million Tons
Sindh	186,000
Punjab	235
Balochistan	217
KPK	90
Azad Kashmir	9
Total	186,551

Thar, Sindh
175 Bn Tons
94% of total Reserves of Pakistan



ENERGY OUTLOOK UP TO 2050

Other Energy Outlook data is not available as no such forecast is being prepared, however an Integrated Energy Planning process has been initiated with funding from USAID and in near future will be able to have such data available.

Energy-related investment for domestic and overseas

- ESTIMATED INVESTMENT IN ENERGY SECTOR IS MORE THAN 100 BILLION USD IN FUTURE
- MAJOR PORTION OF THE INVESTMENT WILL BE OVERSEAS
- OVER THE LAST 5 YEARS AN INVESTMENT OF MORE THAN 25 BILLION USD HAS BEEN MADE IN PAKISTAN ENERGY SECTOR
- MAJOR DIRECTIONAL CHANGE IS TO PROMOTE LOCAL MANUFACTURING AND TRANSFER OF TECHNOLOGY TO AVOID PRESSURE OF FOREX
- AREAS FOR INVESTMENT INCLUDES:
 - GENERATION
 - TRANSMISSION
 - DISTRIBUTION

Major difficulties and bottlenecks in formulating energy policies

1. There is no clarity of roles at Govt level that who is the Policy Maker and Who is implementer.
2. No Coordination among responsible entities under any framework to manage overall energy situation.
3. Non-Availability of data regarding demand and supply forecast of energy.
4. Lack of Capacity in following areas:
 - Data Analysis
 - Financial /commercial assessments
 - Technical assessment
 - Legal and other procedural matters

Bottlenecks In Formulating Energy Policies

No Coordination Between Energy Departments And Academia

Lack Of Infrastructure

Deficiencies Of Resources

Poor Administrative Setup

Poor Intellectual Base

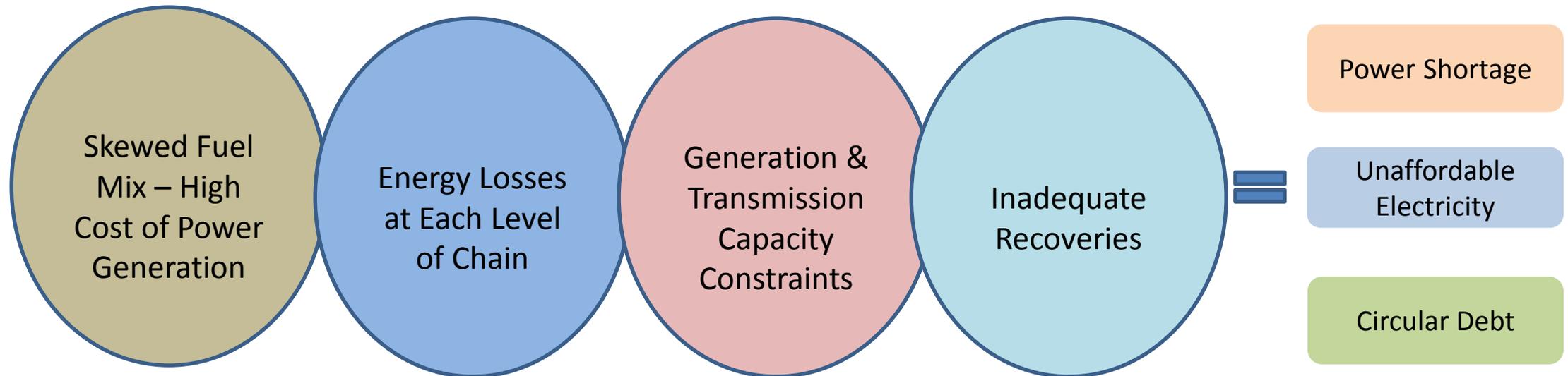
Inadequate And Unreliable Data

Reliance On Single Energy Modelling Criteria

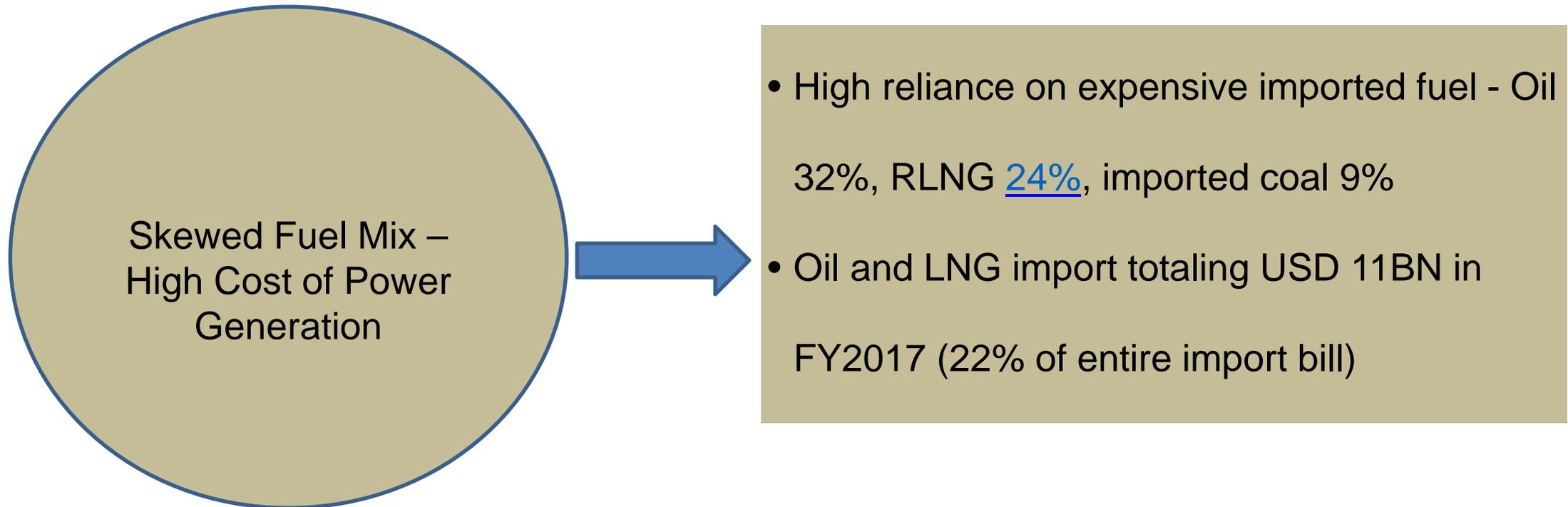
Overlapping Functions Of Various Energy Departments

Limited Research In Energy Sector

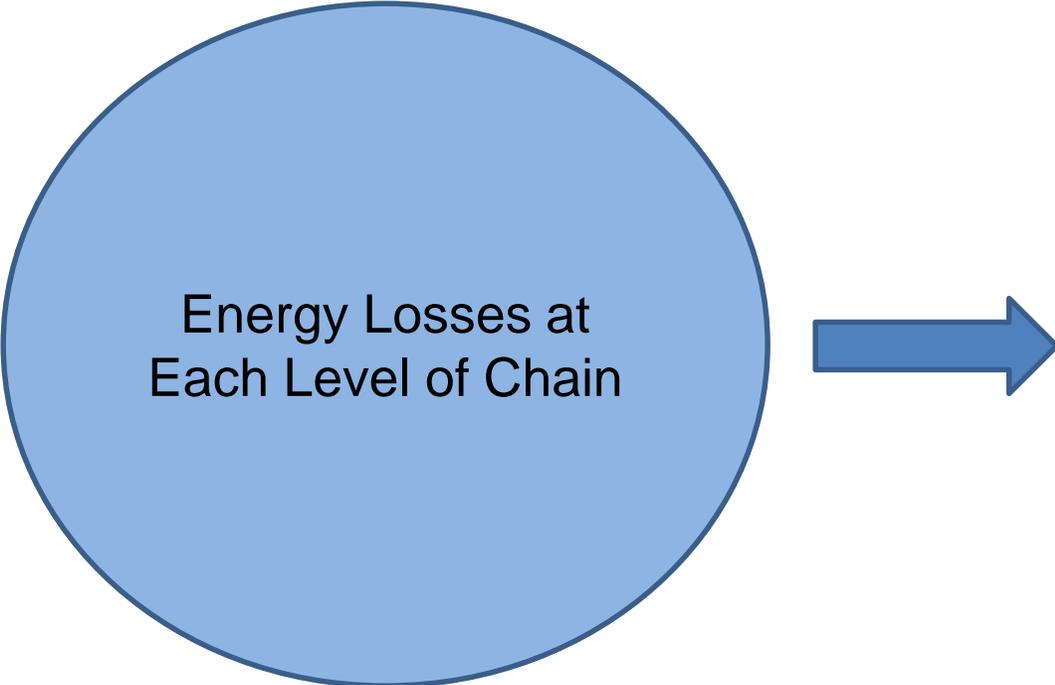
GENESIS OF POWER CRISIS IN PAKISTAN



GENESIS OF POWER CRISIS IN PAKISTAN



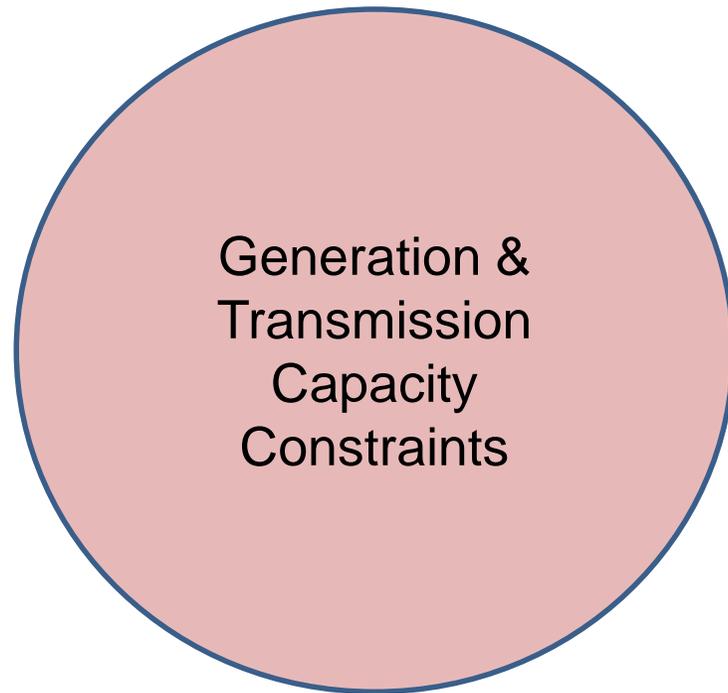
GENESIS OF POWER CRISIS IN PAKISTAN



Energy Losses at
Each Level of Chain

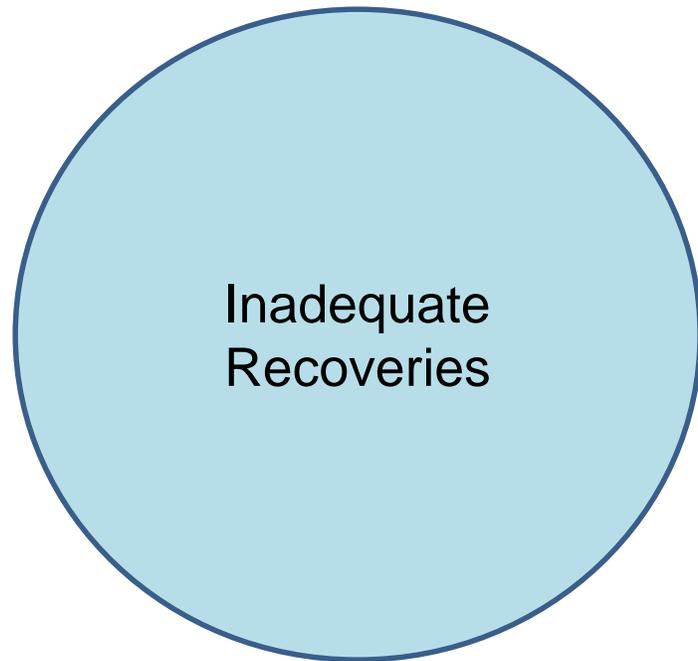
- Pakistan's power T&D losses stand at 19.6% which is highest in the region
- Pakistan's weighted average consumer power tariff @ 12.51 Cents/kWh, highest in comparable countries .

GENESIS OF POWER CRISIS IN PAKISTAN



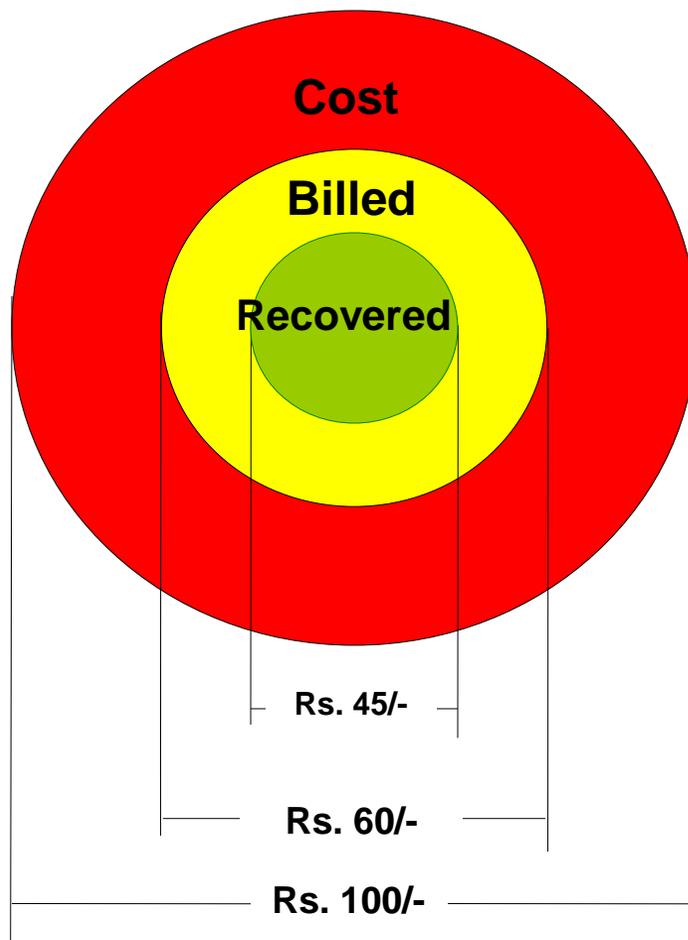
- Only about 3000 MW Capacity added during 2004 – 2013
- Minimal addition or augmentation in transmission network
- A shortfall of 5,000 to 7,000 MW experienced in the years 2013 to 2016

GENESIS OF POWER CRISIS IN PAKISTAN



- huge shortfall of recoveries in Discos ~ PKR 80 Billion in FY 2015-16
- In addition to losses, the Revenue shortfall in Discos around PKR 30 Billion/Annum
- Adding on to ballooning of Circular debt

CIRCULAR DEBT CRISIS

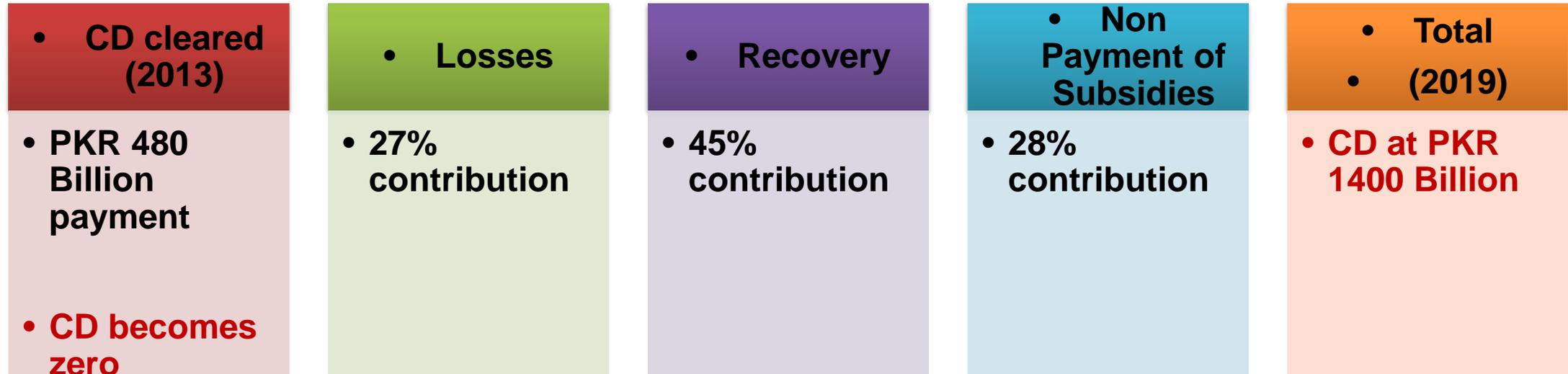


- Old Power Plants
- Operation on low efficiency
- Steam Power Plants
- Less Combined Cycle Power Plants
- Bad Governance
- Technical & administrative losses
- Theft
- Inefficiency

BUILD-UP COMPONENTS

- Difference between PPA committed prices and recoveries from consumers
- Capacity payments to IPPs
- Non-payments of committed subsidies by the federal government
- High Transmission & Distribution losses and Theft
- Dollarized return for IPPs
- Compounding of interest on delayed payment to IPPs

ELEMENTS CONTRIBUTED TO BUILD-UP



Subject to study and Order of Study with Reasons

Order	Subject	Reasons
1	Institutional Framework for Policy Making	In Pakistan there is no institution which has specialized role of policy making, its monitoring and continuously updating with changing requirement.
2	Data Collection Mechanisms	There is no comprehensive data available to conduct any kind of analysis for preparation of Energy Policy and Implications
3	Policy Making and Its Economic Integration	How the Energy Policy is connected with the economic priorities of the Govt, in particular case of Pakistan where we have huge pressure on balance of payment.
4	Data Modelling/ Simulations	What are the specialized tools being used to determine optimal energy mix and conduct sensitivity analysis for informed decision making.
5	Conversion of Policy into Plans and Monitoring of Implementation	Once the Policy is formulated there should be clear responsibilities of the institutions to implement the policy or propose for any revision in timely manner.
6	How the Private Sector is encouraged to the areas of Govt Priorities	In case the central govt is purchaser of energy then it can manage the energy mix but when its free market for energy how the govt preferred energy mix can be encouraged.

WAY FORWARD

- **Integrated power policy & plan in consultation with all stakeholders**
- **Improve Power Generation mix by prioritizing indigenous, affordable and clean fuel / technologies**
- **Realistic future load assessment & timely generation / transmission planning**
- **Competitive power market in view of global trends**

WAY FORWARD

Promotion of energy conservation & efficiency

Optimum use of Local Coal Resource – Mine Mouth & Upcountry

Gradual transition towards open power market

Retirement of Circular Debt – Reduction in T&D Losses, affordable generation, improvement in recoveries and balance in contractual obligations

Thanks