

# **Pakistan's Intended Nationally Determined Contribution (INDC) 2016**

**By**

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# Pakistan's Intended Nationally Determined Contribution (INDC) 2016

## Composition of Pakistan's Delegation From Ministry of Climate Change

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# Pakistan's Intended Nationally Determined Contribution (INDC) 2016

## Sequence

### I. Introduction

- Brief facts about Pakistan (National Context)
- Pakistan's commitments under Paris declaration, 2016.

### II. Pakistan's Energy Sector

- a. Traditional sources of energy (Energy Mix)
- b. Present energy crises
- c. Energy sector emissions

### III. Mitigation potential in energy sector

### IV. Conclusion

# Pakistan's Intended Nationally Determined Contribution (INDC) 2016

## I. Introduction

### ❖ Brief Facts / National Context

- Total area of Pakistan: 796,095 sq.km
- Exclusive economic zone of 24,000 sq.km and additional continental shelf area of about 50,000 sq. km
- Bordering China, India, Afghanistan and Iran, Pakistan is one of key countries of region.
- Current population estimated to be 195.5m Pakistan is sixth most populous country of the world.

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- Pakistan is 2<sup>nd</sup> most urbanized country of South-Asia.
- At an average Economic growth rate of 4.9% from 1952-2015, current GDP of Pakistan stands at nearly 284 b; classifies Pakistan as a lower middle income country.
- Investment in Power generation, energy distribution and China Pakistan Economic Corridor (CPEC) will provide significant boost to country's economy.

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## ❖ Pakistan and Its Commitment Under Paris Agreement

- Limiting global temperature increase to between 1.5-2.0 °C, a Universally eulogized panacea for global warming.
- The landmark Paris Agreement entered into force on November 04, 2016.
- Pakistan ratified the Agreement in Nov, 2016. As part of int'l climate policy regime, national govts obligated to submit their INDC to achieve stabilization of GHG emissions in the atmosphere.

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- Pakistan's vulnerability to adverse impacts of climate change widely recognized; despite its diminutive contribution to GHG emissions (0.8%) and ranked 135<sup>th</sup> in list of global emitters.
- Based on latest GHG inventory of Pakistan (2014-15) growth in emissions of different sectors has been fairly constant.
- Over last 20 yrs (1994-2015) overall increase in emissions has been 123% approx. with Energy and agriculture sector accounting for 90% of total emissions.
- Pakistan's INDC derives its strength from Pakistan's vision 2025, a major policy document which provides a roadmap for national development until the year 2025.

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- Vision 2025 envisages adding 25,000 MW of electricity to the national grid by 2025 - the elimination of current energy demand - supply gap by 2018.
- Optimizing energy mix of oil, gas, hydro, coal, nuclear, solar, wind and bio-mass are some of key priorities of the policy.
- Pakistan INDC outlines broad range of Adaptation and Mitigation measures that can lead Pakistan to a climate compatible and low carbon development pathway.
- However availability of technical / financial resources from global partners and int'l development & finance institutions are required.



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## II. Pakistan's Energy Sector

### a. Energy Mix

- With Per Capita oil equivalent use of just 482 kg (including traditional bio-mass fuels) in year 2014, Pakistan one of lowest ranked countries of the world in terms of energy use.
- The Energy Mix of the country shows a pre-dominant share of natural gas. (which stands at about 44 percent of total commercial energy requirement; the remaining comes from hydro power and fossil fuels with a small portion from renewable sources.

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- Prevailing Energy Crisis, and growing demand necessitates exploitation of all domestic sources of energy including coal, hydro, wind and solar.
- The use of nuclear and domestic coal based energy in Power generation sector seems inevitable in future

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## **b. Prevailing Energy Crisis**

- Prevailing energy crisis of Pakistan can be characterized in two ways:-
  - 1) Lack of access to sustainable energy sources and products (energy poverty).
  - 2) Power sector (electricity) demand and supply gap.
- Long term solution to energy crisis is to be based on tapping into domestic sources of energy including coal, hydro and nuclear for power generation to maximum extent.

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- Share of nuclear based electricity is set to grow from a mere 750MW (3% of present 25000MW installed capacity) to 9,630 MW (8% of an immensely large energy pie).
- Given that nuclear power produces zero emissions, the planned addition of nuclear power into overall energy mix is calculated to avoid an annual 21.7 to 56.8m tons of CO<sub>2</sub> equivalent by 2030.

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- Peak demand supply gap in the electricity sector currently amounts to over 5600 MW.

**Table-1: Power System Information of Pakistan (2014-15)**

Installed Capacity	National Transmission and Distribution (NTDC) System (MW)	Karachi Electric System (MW)	Whole Country (MW)
Nominal Installed Capacity (MW) at end of June 2015	22,360	2,463	24,823
Generation Capability at System Peak Demand	16,500	2,632*	19,000** (approx)
Peak Demand (MW)	21,701	3,056	24,757
Peak Demand Deficit (MW)	5,201	424	5,625

\* Generation capability is higher than the nominal installed capacity due to an import of 650 MW from national transmission and distribution system (NTDC).

\*\* Peak generation capability of NTDC and Karachi Electric System are not coincident; thus can not be simply added.

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- The govt's energy policy (2013) states that all domestic sources of energy including coal, hydro, natural gas, wind and solar will be fully utilized in bridging the power sector supply shortfall.
- Planned addition to the Total installed capacity and prescribed energy mix will have an impact on the projected emissions of energy sector.

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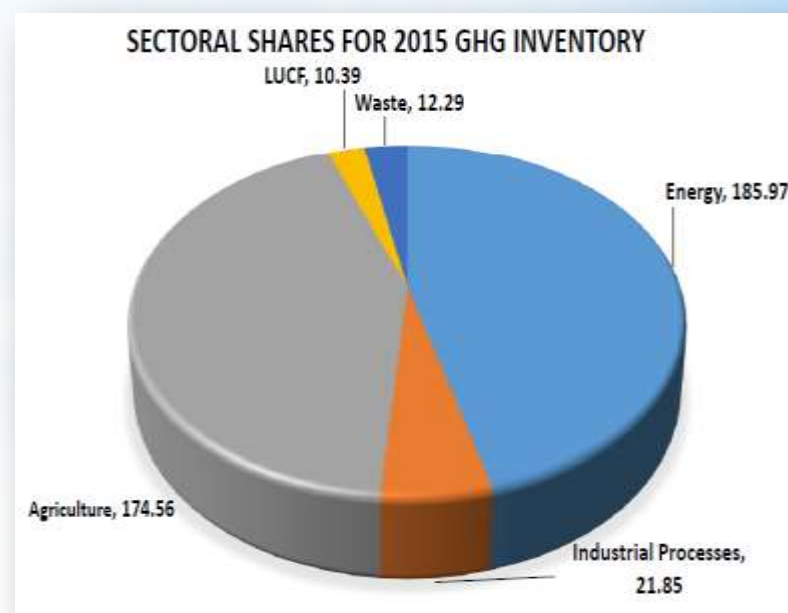
## c. Energy Sector Emissions

- Energy is currently the largest contributing sector in Pakistan's emissions profile contributing nearly 46% to total emissions and its share is likely to grow in future (898 MT CO<sub>2</sub> equivalent).
- Emissions by Sectors; Based on national GHG inventory for 2014-15, the total GHG emissions of Pakistan add-up to 405 MT CO<sub>2</sub> equivalent.
- The inventory quantifies emissions of five key GHG contributing sectors of the economy which are: **Energy, Agriculture, Industrial Processes, Land use, Forestry and Waste.**

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Table 2: Inventory of GHG Emissions (in MT CO<sub>2</sub>-equivalent)

Sectors	1994	2008	2012	2015
Energy	85.8	168.47	171.44	185.97
Agriculture	71.63	125.97	162.86	174.56
Industrial Processes	13.29	18.54	19.59	21.85
Land Use Change & Forestry	6.52	9.29	9.67	10.39
Waste	4.45	7.24	10.55	12.29
<b>Total</b>	<b>181.7</b>	<b>329.51</b>	<b>374.10</b>	<b>405.07</b>





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## III. Mitigation Options in Energy Sector

- Widespread potential for mitigation exists in all sectors of national economy.
- The Energy Sector offers most promising mitigation potential, subject to availability of requisite funding and technologies.
- An overview of mitigation potential and mitigation options in Energy Sector of the economy are presented in following slides.

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Table 3: Mitigation Options in Energy Supply Sector

Options	Justification for Ranking / Priority
<b>High Priority</b>	
Increase in grid efficiency	<ul style="list-style-type: none"><li>• Significant transmission and distribution losses in the country (18% of total generation in 2015).</li><li>• Efficient grid would lead to cost savings + significant GHG mitigation potential.</li></ul>
Improvement in coal efficiency	<ul style="list-style-type: none"><li>• Improving the efficiency of planned coal-based power generation could lead to GHG mitigation.</li></ul>
Large scale and distributed grid connected solar, wind and hydroelectricity	<ul style="list-style-type: none"><li>• These three options have potential as low carbon sources of energy.</li><li>• Are cost effective.</li></ul>

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Table 3: Mitigation Options in Energy Supply Sector

High Priority	
More efficient irrigation motors and pumps (electric)	<ul style="list-style-type: none"> <li>• Inexpensive</li> <li>• Big impact</li> <li>• Current inefficiency presents untapped potential for great improvement</li> </ul>
Replace incandescent bulbs with LEDs	<ul style="list-style-type: none"> <li>• Relatively inexpensive</li> <li>• Large impact, as bulbs cover the vast majority of the lighting market</li> <li>• Provides tangible and visible benefits to a very large portion of population</li> <li>• Per device cost is quite low</li> </ul>
Efficient stoves	<ul style="list-style-type: none"> <li>• Very cheap</li> <li>• Very large impact</li> <li>• Provides tangible and visible benefits to a very large portion of population</li> <li>• Per device cost is significantly low</li> </ul>
Efficient water heaters	<ul style="list-style-type: none"> <li>• Cheap</li> <li>• Per device cost is very low</li> <li>• Average to large population coverage</li> <li>• Average efficiency gains per device</li> </ul>
Replacement of Boilers/ Furnaces	<ul style="list-style-type: none"> <li>• High Efficiency</li> <li>• Low GHG impact</li> <li>• Long Technical Life</li> </ul>

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Table 3: Mitigation Options in Energy Supply Sector

Medium Priority	
Efficient space heaters	<ul style="list-style-type: none"> <li>• Per device cost is quite low</li> <li>• Population coverage in lower middle class</li> <li>• Average efficiency gains per device</li> </ul>
Efficient FTLs	<ul style="list-style-type: none"> <li>• Average savings per unit</li> <li>• FTLs cover a relatively small part of the lighting market (20-25%)</li> <li>• Per device cost is very low</li> </ul>
Efficient refrigerators	<ul style="list-style-type: none"> <li>• Average existing inefficiencies, so average potential.</li> <li>• Cost per device is high</li> </ul>
Efficient air conditioners	<ul style="list-style-type: none"> <li>• Only part of the population impacted</li> <li>• Average existing inefficiencies, so average potential</li> <li>• Cost per device is significantly high</li> </ul>
Low Priority	
Improve roof insulation	

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## IV. Conclusion

- Pakistan reiterates its commitments/obligations towards, the UNFCCC and Paris Agreement and the objective to limit the average global temperature increase to 1.5 to 2.0 degree centigrade.
- As explained in Pakistan's INDC, a number of Mitigation / Adaptation measures being undertaken with domestic resources.
- These measures can be intensified in coming years with expected availability of Int'l climate finance, technology development and transfer as well as capacity building.

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**THANK YOU!**