How energy efficiency can help Egypt meet its CO_2 abatement commitments after COP21

Cairo Climate Talks
Egypt

21st Feb 2016

COP21 – Main Elements

1. Mitigation
2. SD mechanisms
3. Adaptation
4. Loss & Damage
5. Finance
6. Technology
7. Capacity building & education
8. Transparency
9. Actions prior to 2020

Mitigation

- ✓ Prepare, communicate and maintain successive nationally determined contributions that it intends to achieve
- ✓ Pursue domestic mitigation measures with the aim of achieving the objectives of such contributions
- ✓ Communicate a nationally determined contribution every five years
- ✓ Provide the information necessary for clarity, transparency and understanding of NDCs
- ✓ Account for the nationally determined contributions

Capacity Building and Education

- Cooperate in taking measures, as appropriate, to enhance climate change education, training, public awareness, public participation and public access to information

Transparency

- Regularly provide a national inventory report
- Regularly provide a Information necessary to track progress made in implementing and achieving the NDCs
- Provide information related to climate change impacts and adaptation
- Provide information on financial, technology transfer and capacity- building support needed*
- Provide the above, as appropriate, no less frequently than on a biennial basis

Financing

- Developed country Parties shall provide financial resources to assist developing country Parties with respect to both mitigation and adaptation in continuation of their existing obligations under the Convention

Egypt INDC

- More efficient use of energy, especially by end users;
- Increased use of renewable energy as an alternative to non-renewable energy sources;
- Use of advanced locally-appropriate and more-efficient fossil fuel technologies, which is less-emitting, in addition to new generations of nuclear power;
- Energy efficiency is the cornerstone to be targeted by policy makers to decouple demand on energy and economic growth; and

Egypt INDC (Cont.)

- Phasing out energy subsidies within a period of 3-5 years. This policy is Implemented using four pillars, namely: set different prices for petroleum products based on energy generation efficiency; increase the efficiency of energy use; provide support to certain sectors to promote switching from conventional energy sources to clean energy sources; and apply the fuel subsidy smartcard system to ensure that subsidies are received by target beneficiaries.

Egypt GHG

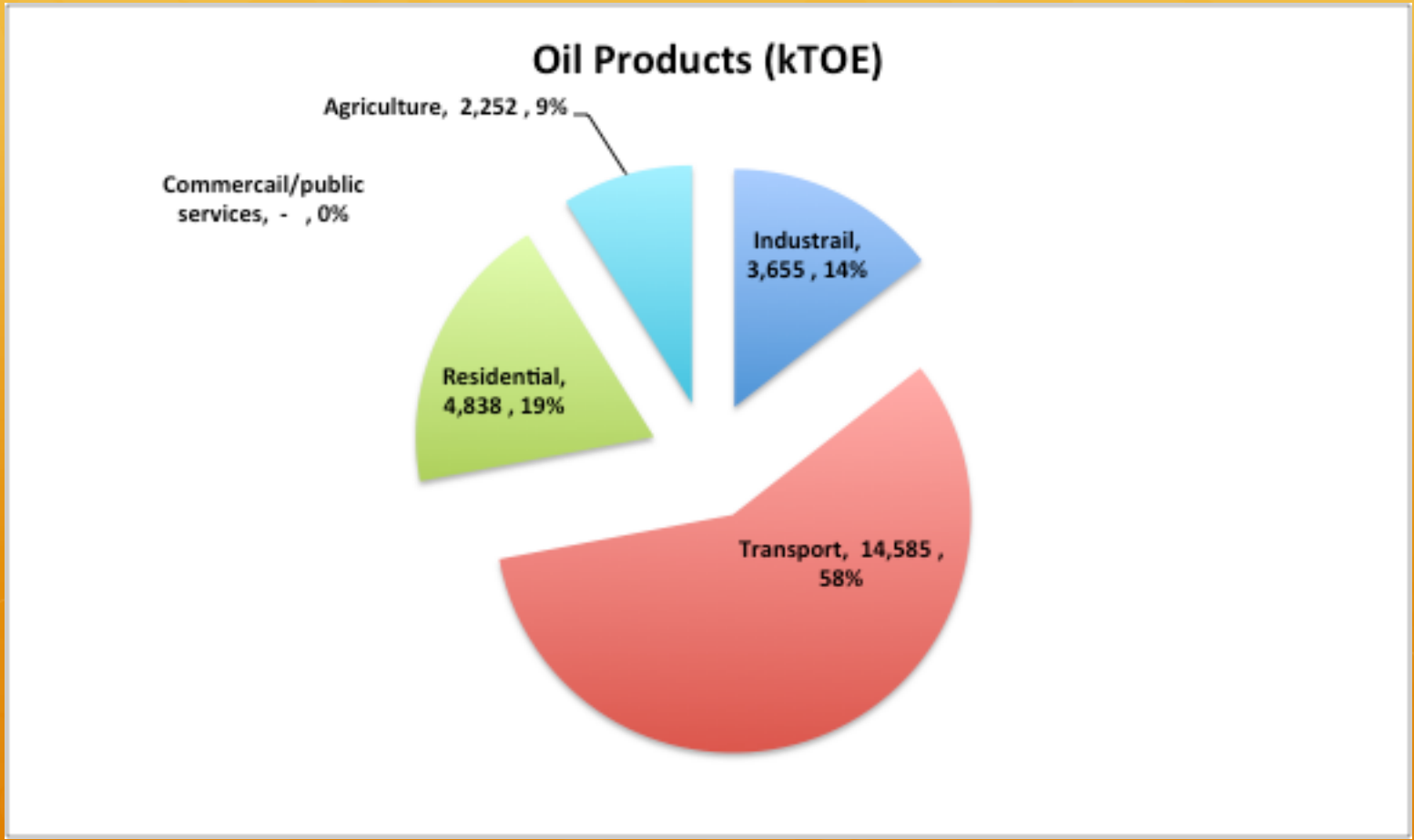
Sector	GHG emissions				GHG Emissions of the year 2000 relative to 1990
	1990 NC		2000 NC		
	M ton CO_{2e}/year	%	M ton CO_{2e}/year	%	
All energy (including fugitive emissions)	82.7	71%	116.3	61%	142%
Industrial processes	10.3	9%	27.8	14%	270%
Agriculture	17.9	15%	31.7	16%	177%
Waste	5.7	5%	17.5	9%	307%
Total	116.6	100%	193.3	100%	165%

Egypt - Sectorial Energy Consumption (2013)

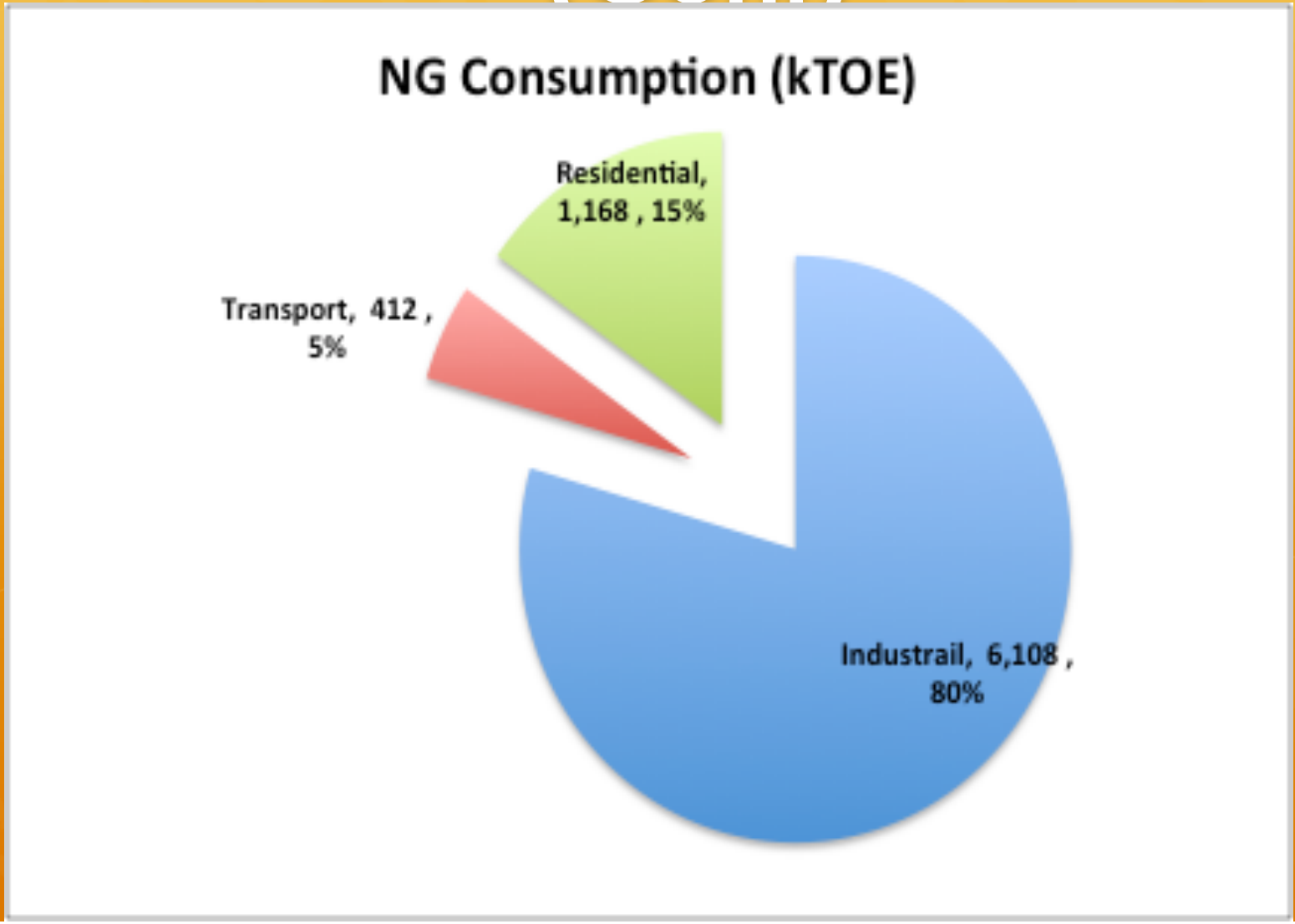
% of total (not including non-energy use of fuel)

	Coal	Oil products	NG	Biofuel	Electricity	Subtotal
Industrail	**100%**	**14%**	**79%**	**0%**	**29%**	**29%**
Transport	0%	58%	5%	5%	0%	32%
Residential	**0%**	**19%**	**15%**	**95%**	**43%**	**26%**
Commercail/	0%	0%	0%	0%	24%	6%
Agriculture	0%	9%	0%	0%	4%	6%
Subtotal	100%	100%	100%	100%	100%	100%

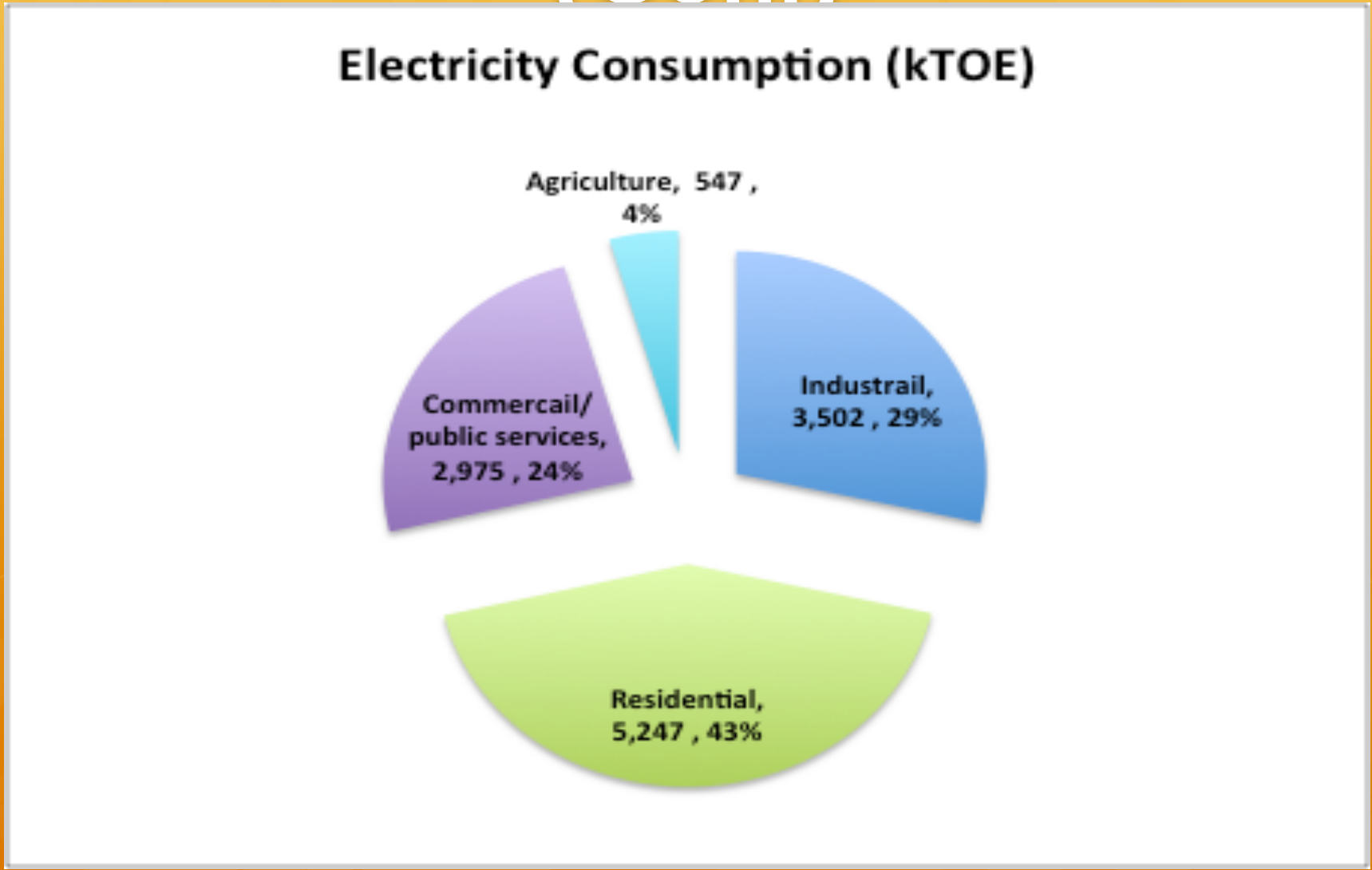
2013 Energy Consumption



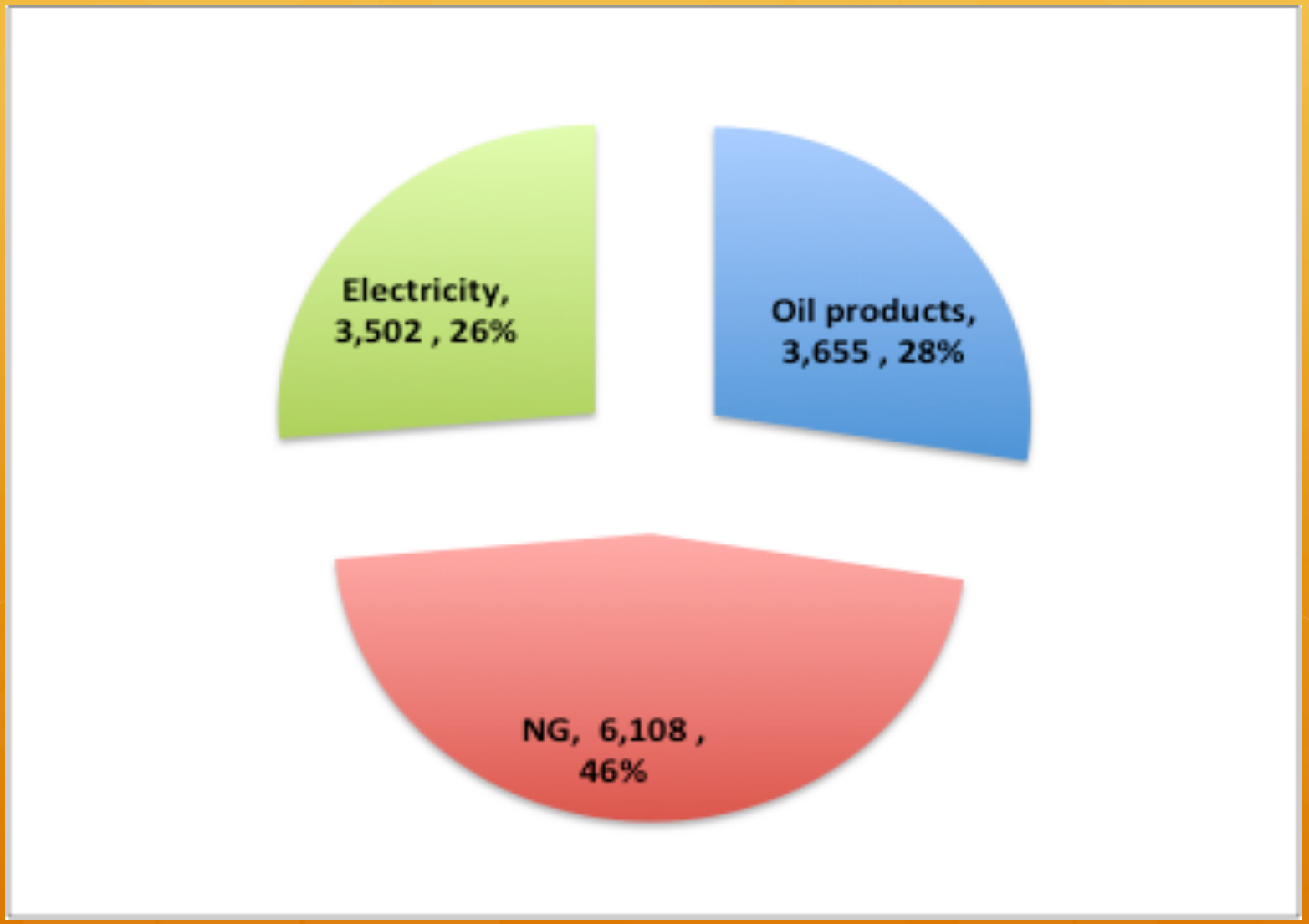
2013 Energy Consumption (Cont)



2013 Energy Consumption (Cont)

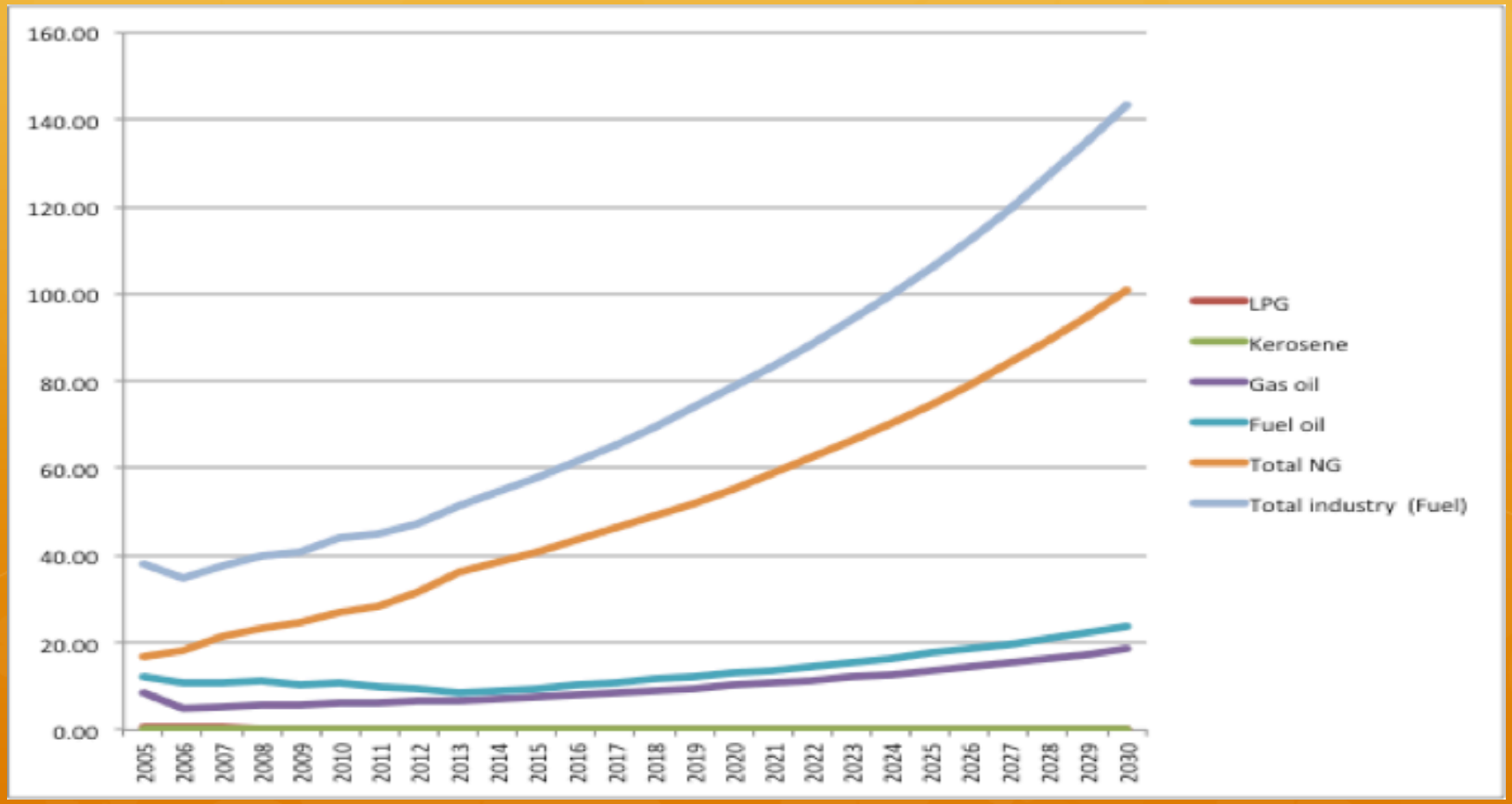


Industry Energy Consumption (kTOE)



Industrial sector

BL CO_2 emissions Fuel consumption for industry (m ton CO_2)



Possible EE Programmes

The table below shows the summary of the analysis: -

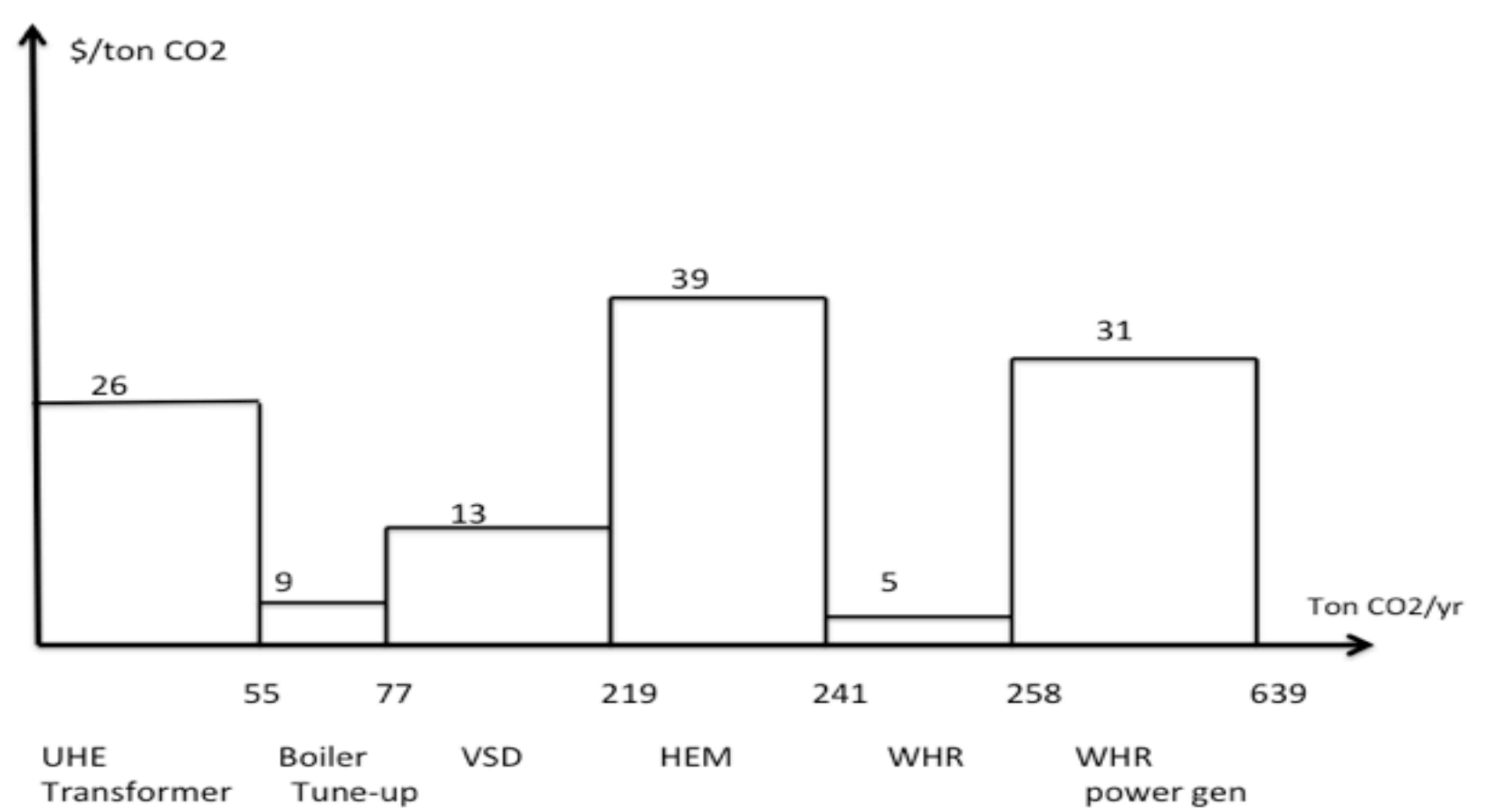
	UHE transformer (Arc Furnaces)	Boiler tune up	VSD	HEM	WHR	WHR-Power gen (Cement)
Reduction (k ton CO_2/year)	55	77	219	241	258	639
Cost of abetment ($/ton CO_2)	26	9	13	39	5	31
Investment cost (m $)	28	5	56	187	100	400
IRR%	15%	126%	42%	9%	37%	12%
NPV (m $)	22	87	246	19	190	138

High Level Analysis

2005 & 2016 baseline (BL) emissions and the percentage of CO_2 reduction by energy type

CO_2 Source	BL m ton CO_2 (2005)	Reduction in CO2 as a % from the 2005 BL	BL m ton CO_2 (2016)	Reduction in CO_2 as a % from 2016 BL
Fuel (two programmes)	38.05	0.9%	61.69	0.5%
Electricity (four programmes)	17.27	6.7%	22.85	5.0%
Total	**55.32**	**2.7%**	**84.55**	**1.8%**

Marginal abatement curve for the six proposed programmes.

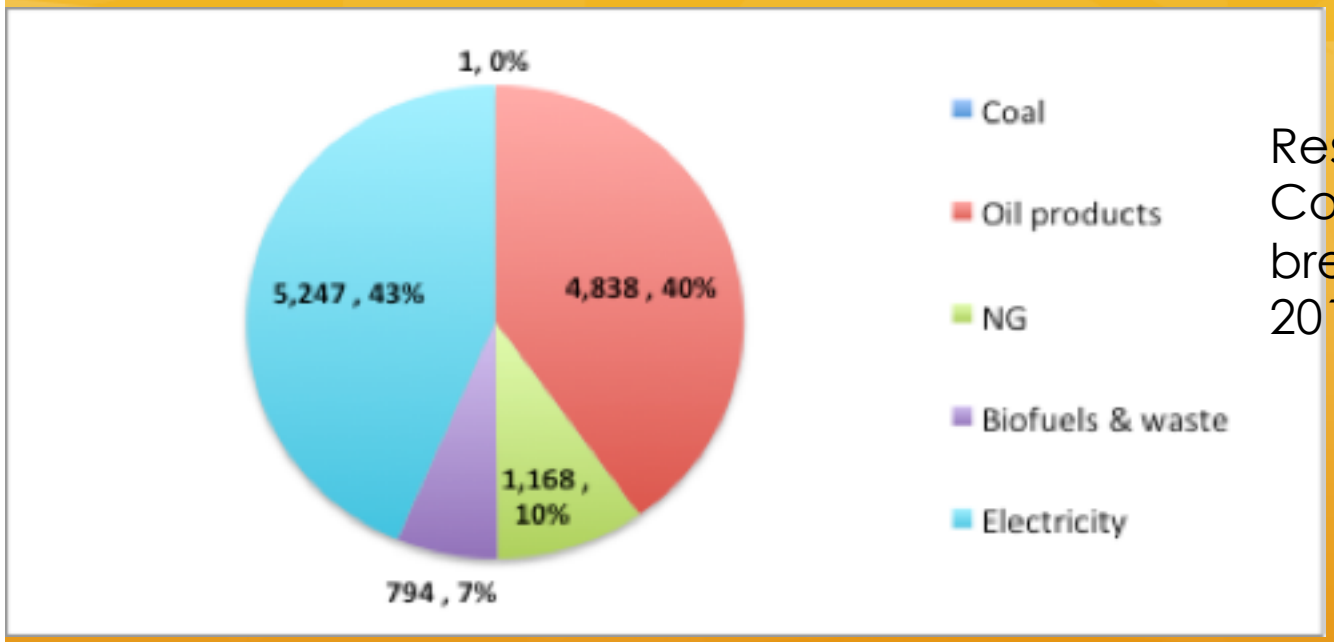


Example: Cement Industry

Country	Electric SEC (kWh/tonne)		Thermal SEC (GJ/tonne)	
Egypt	119	183%	4.3	158%
India	88	**135%**	3	**110%**
Spain	92	**142%**	3.5	**129%**
Germany	100	**154%**	3.5	**129%**
Japan	100	**154%**	3.5	**129%**
Korea	102	**157%**	3.7	**136%**
Brazil	110	**169%**	3.7	**136%**
Italy	112	**172%**	3.8	**140%**
China	118	**182%**	4	**147%**
Mexico	118	**182%**	4.2	**154%**
Canada	140	**215%**	4.5	**165%**
USA	141	**217%**	4.6	**169%**
World's Best	**65**	**100%**	**2.72**	**100%**
World Average (excluding Egypt)	**111**		**3.82**	

Cement industry consumes more than 16% of the total industrial ele. Energy consumption

Residential Sectort



Residential Energy Consumption breakdown in Egypt, 2013 (KTOE)

Financial analysis summary

Programme	Incremental cost (m EGP)	Annual Saving (m EGP)	Annual CO2 reduction (m ton)	Cost of abetment (EGP/ton CO2)	NPV	IRR%
LED, HE Ref & HE AC	10,725	2,730	4.50	(455)	18,834	26%
LED	528	2,421	0.50	(4,154)	30,025	446%
HE Ref	7,497	242	3.10	80	(8,041)	-9%
HE AC	2,700	67	0.80	127	(3,151)	-12%

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