Energy Efficiency Financing: Lessons from Bangladesh

Monzur Hossain, PhD

Senior Research Fellow, BIDS, Bangladesh

and

Co-authors: Naoyuki Yoshino (ADBI) and Farhad Taghizadeh-Hesary (Waseda University, Japan)

To be presented at Energy Studies Institute, National University Singapore

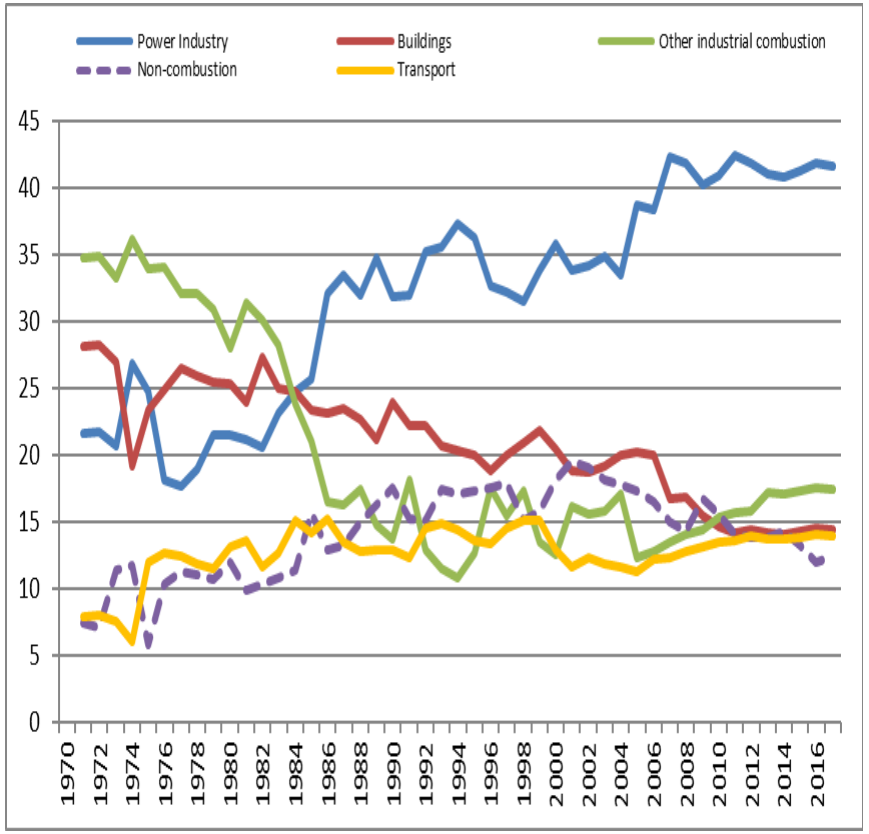
March 25, 2019

Context

- There is significant energy efficiency potential in industries in Bangladesh
- Natural gas being the main energy source—will be depleted soon
- Industries are the big customer of energy—about 50% of gas is consumed by industry
- 23% of power plants use modern equipment
- Demand from households is also enormous
- Lack of awareness and technical solutions
- Energy efficiency gains: Technology, Process and appliances
- Investment requirements: restructuring, technology adoption, imports
- Sources of financing: Commercial banks, public-private partnerships, non-bank financial institutions

Bangladesh's case for energy efficiency

- The Figure shows a clear pattern of the dominant role of CO2 emission from the power sector, which grew at an annual average rate of 8.8% per year (faster than average CO2 growth of 7.2%)
- The share in CO2 emission surged from 22% in 1970 to 44% in 2016.
- Future emission, these plus industrial production will play a dominant role.



Major Energy Efficient clients in Bangladesh

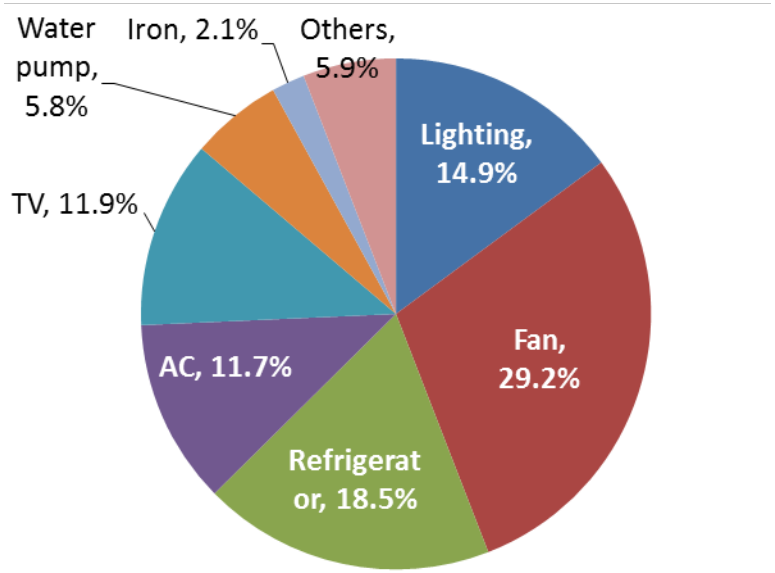
- **Households**:
- -About 80% of total 30 million households have access to electricity
- -About 4.5 million households have access to solar electricity
- -About 10% of the HHs use ICS, the rest 90% use biofuels
- --EEF: Light, Fan, AC, Refrigerator etc.
- **INDUSTRY**
- -Five industries are identified for EEF: brick making, textiles, steel, cement, and chemicals (either retrofit or completely new system); two additional—ceramic and agr-process
- -Industry is dominated by SMEs that needs energy efficient technologies

Energy Efficiency Investment Need in the Industry Sector

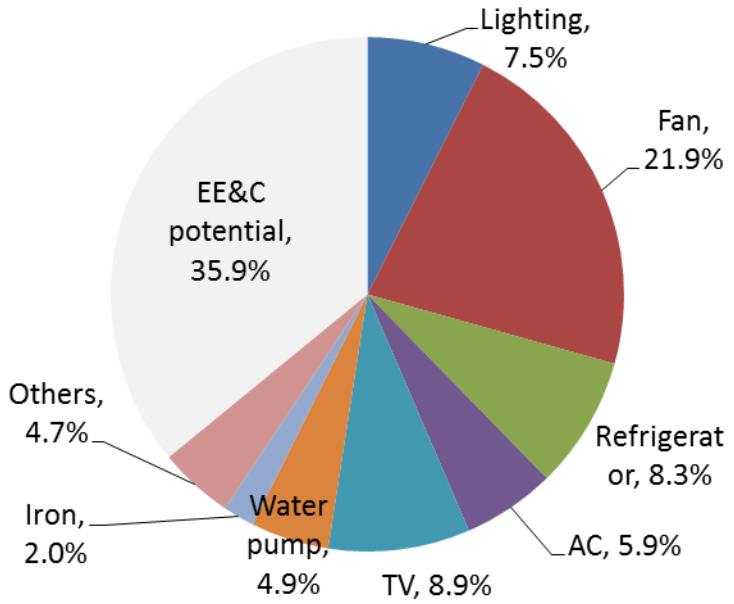
- IIDFC (an NBFI) arranged and completed Energy Audits in 120 industries from 06 different sectors.
- The audit concluded that, a total of USD 140 million investments in these industries to improve Energy Efficiency can result in annual savings of USD 43 million with a payback period of 03 years.
- This project has created scope for investment in energy savings in the energy scarce industrial sector of our country.

EE&C Potential of Residential Sector is estimated as 36%

Household Electricity Consumption by Appliance (Proportion of Wh)



Present situation

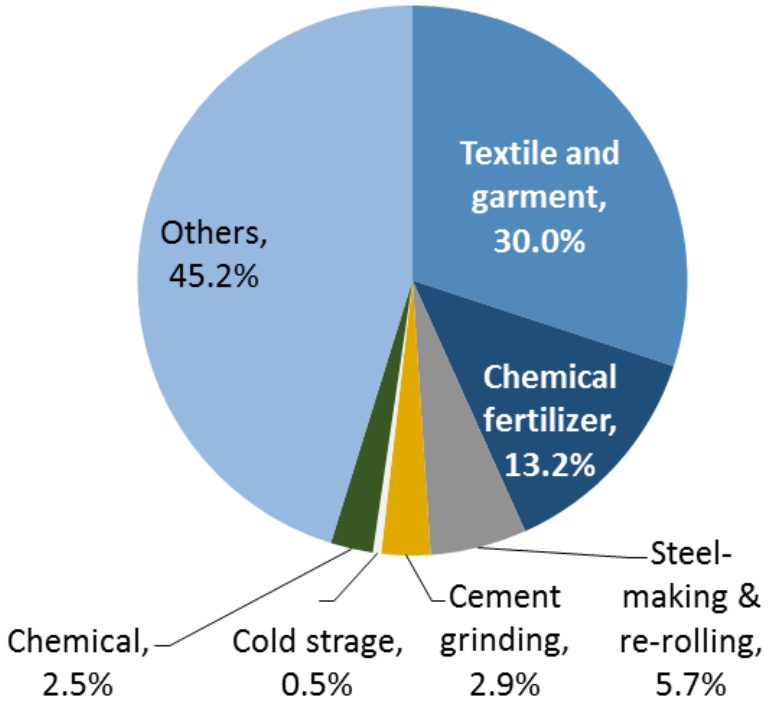


Replacing all appliances to EE types

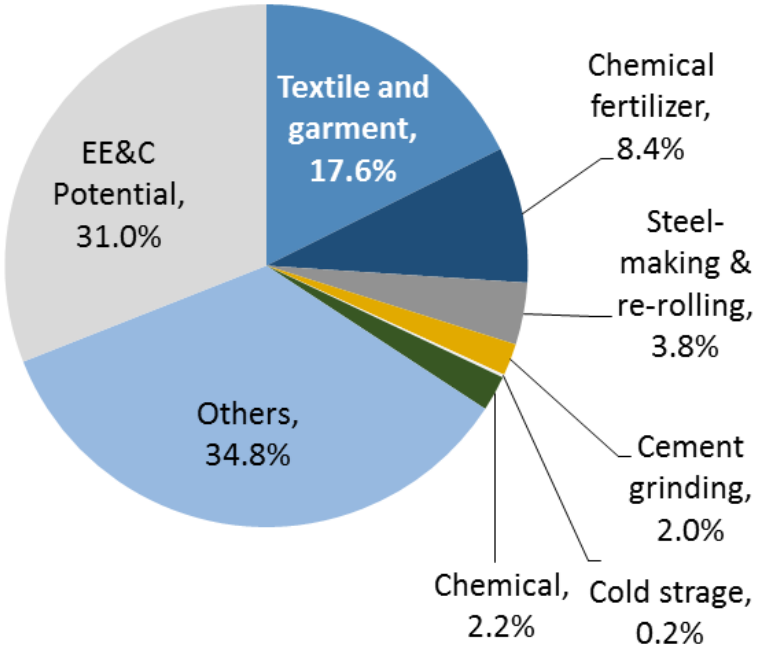
EE&C Rate			
Lighting	-50%	AC	-50%
Ref.	-50%	Fan	-15%
TV	-30%	Pump	-10%

Source; JICA Project Team 2014

EE&C Potential of Industrial Sector is estimated as 31%



A: Present energy consumption



B: EE case energy consumption

Green Financing Initiatives in Bangladesh

- Bangladesh has not yet incorporated any inclusive green/energy efficiency financing strategies,
- Bangladesh Bank has formulated some guidelines for commercial banks and donor supported programs: financing through concessional refinancing schemes and credit quotas for financial institutions
- In January 2016, the Bangladesh Bank set a mandatory 5% credit quota for direct green finance including EEF out of the total loan disbursement of all banks and financial institutions.

Status of Green Financing in Bangladesh, 2016 (in million BDT)

Category of green finance	SCBs	DFIs	PCBs	FCBs	NBFIs	Total
Renewable energy	44.4	4.2	1,605.0	182.0	3,660.2	5,495.7
Energy efficiency	10.1	0.0	2,394.3	0.6	125.3	2,530.3
Solid waste management	0.0	0.0	12.2	0.0	0.0	12.2
Liquid waste management	26.3	0.0	4,326.5	36.2	449.0	4,838.0
Alternative energy	160.0	0.0	164.8	0.0	9.2	334.0
Fire burnt bricks	1,003.8	25.3	5,353.9	0.0	775.0	7,157.9
Non-fire block bricks	0.0	0.0	169.8	0.0	40.0	209.8
Recycling and recyclable products	99.1	0.0	4,179.6	80.0	518.8	4,877.4
Green industry	380.0	0.0	4,106.2	283.6	256.0	5,025.8
Safety and security of factory	0.0	0.0	1,817.1	34.8	95.5	1,947.4
Others	290.1	0.6	467.9	151.7	19.3	929.6
Total	2,013.7	30.1	24,597.4	768.8	5,948.2	33,358.2

Existing EE Financing Terms

- PCBs and NBFIs are mainly financing energy efficiency projects with donor supports
- Major areas of support: Energy efficient equipment; Brick kilns; ICS; industries
- Financing up to 100% of equipment and machinery costs
- Maximum for 8 years
- Interest rate: 5-10%
- Similar types of institutions (NBFIs) are financing both Renewables and Energy Efficiency
- Terms and models are also the same for both types of financing
- Since NBFIs have greater exposure/experiences for Renewables, such experiences can be applied to EEF.

Key Barriers of Energy Efficiency Financing

- - **financing barriers** (high initial costs, long payback periods, financial institutions lacking energy efficiency expertise, and development costs being high relative to energy savings because projects are small and sometimes complex),
- - information barriers (lack of familiarity with energy efficient products, lack of awareness of benefits, and a perceived risk penalty when evaluating potential investments),
- -price distortions (the artificially low level of gas and electricity prices make energy efficiency projects in Bangladesh generally less profitable than in other countries),
- - technical and availability barriers (equipment may not be available or distribution networks and local capacity may not exist

Solar Homes Program in Bangladesh—Provide lessons for EEF

- IDCOL implemented this program and adopted 4.13 million—termed as one of the most successful RE program in the world
- It was a public-private partnership program as the program was implemented at the field level by NGOs
- IDCOL provided refinancing facilities to participating NGOs as well as provided subsidies to each module
- After 2013, an unregulated private market (imported from China) has emerged with cheaper PV modules
- This created huge distortion in the market—those who bought PV modules from IDCOL denied to pay the rest of the due instalments
- A total of BDT2000 cr. (BDT 20 billion) remained default and almost non-recoverable due to weak contract conditions with households—this amount is 3 times higher than IDCOL's paid up capital
- The program is now almost abandoned and govt. is considering writing-off the loan to IDCOL
- This case could be an interesting lesson for EE financing as both types of financing have similar modalities

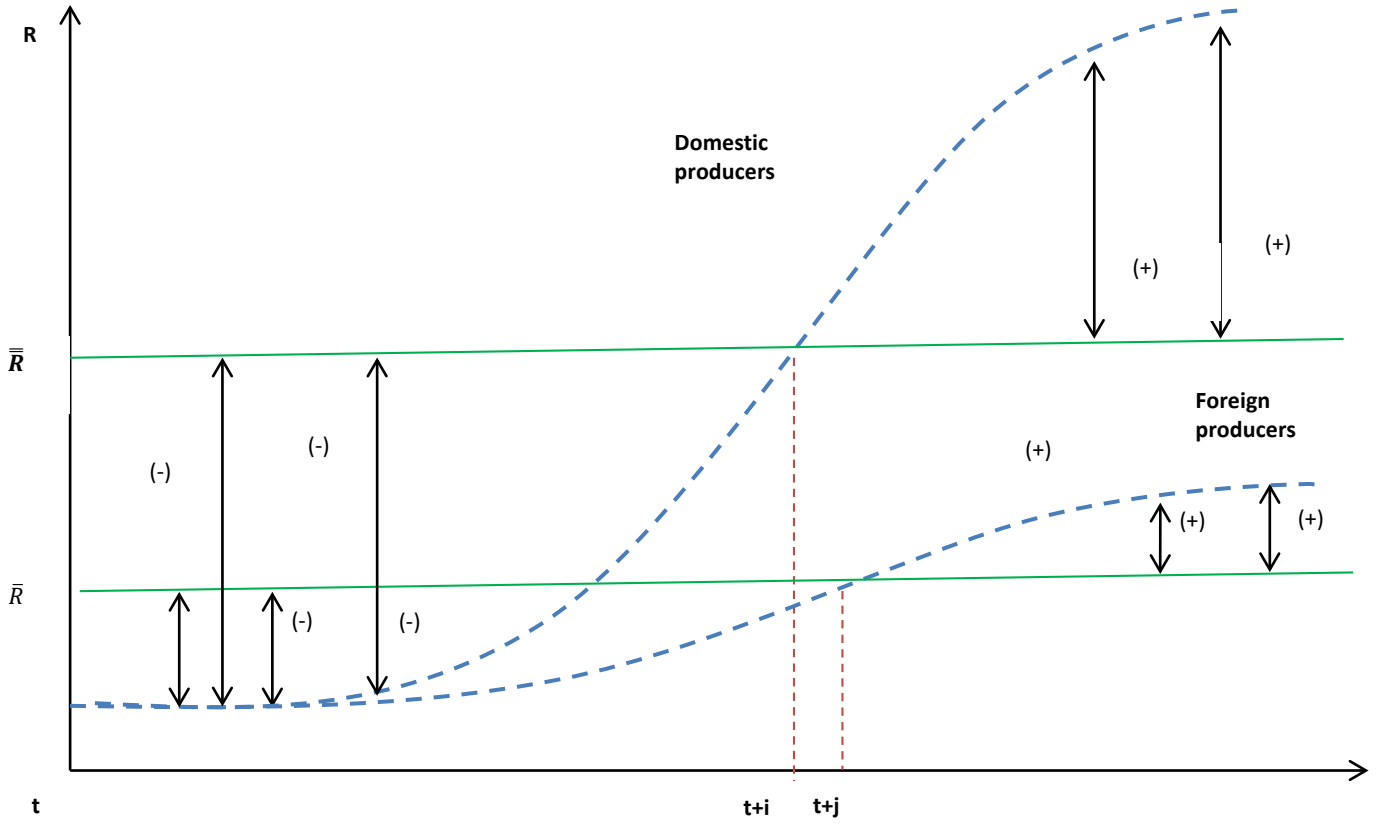
In search of market-based financing Instruments: Lessons for Singapore

- Low investment return and high risks in efficiency financing
- Private investment is low and discouraged
- Donor and government support and subsidies may not work in the long run
- Technological upgradation and market demand make the market volatile
- Dynamic adjustments of prices are required
- Quality Standard specification needs to be defined
- In absence of these factors, a donor-supported subsidized Bangladeshi SHS (RE) program already failed and therefore market-based solution is needed

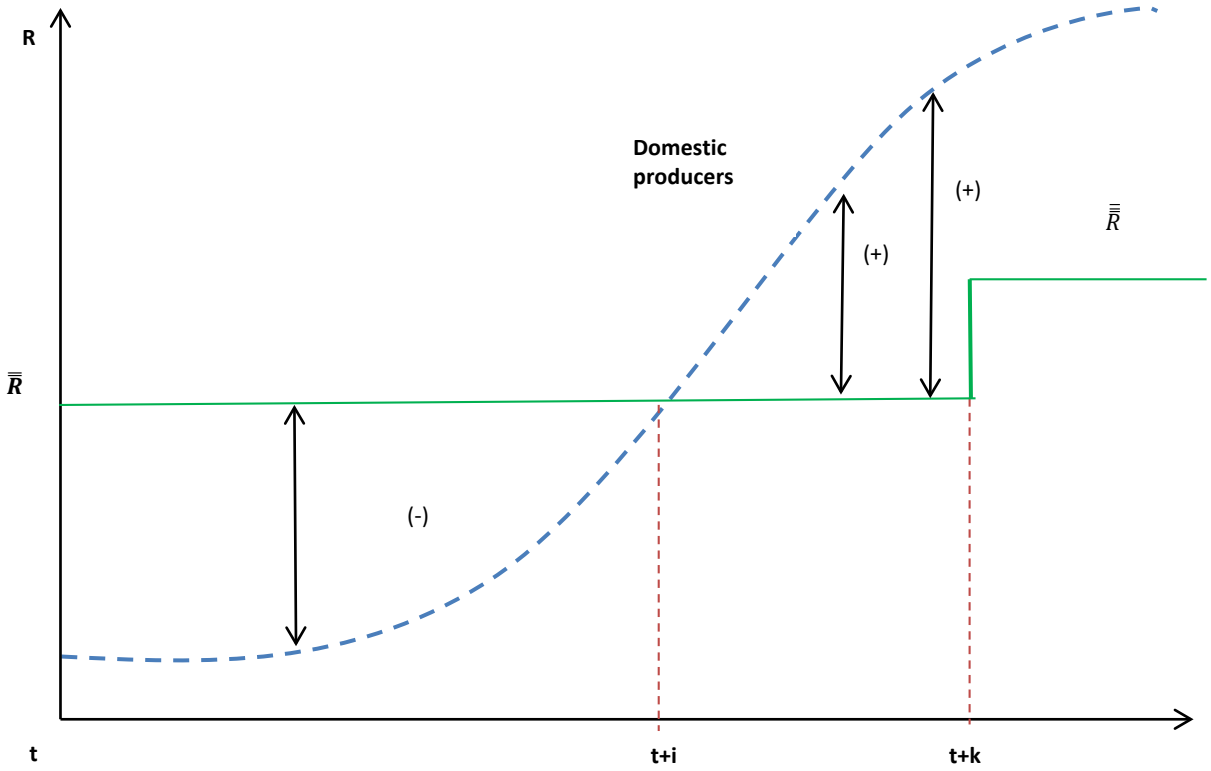
Market-based Instruments: A Model based on Spillover Tax Revenue

- A Standard specification has to be defined for different types of EE products
- Market has to be open for both private and public companies; local and foreign investors
- Considering higher costs of EE investments, government will set the prices at a lower level affordable to local consumers
- Government will provide subsidies for a certain period of time, which may be generated from long-term bonds and other sources
- This will be a win-win situation because the government will get higher benefits from spillover tax revenues from EE investments
- After the stipulated period, the government will withdraw subsidies

Model of market-based financing Solution

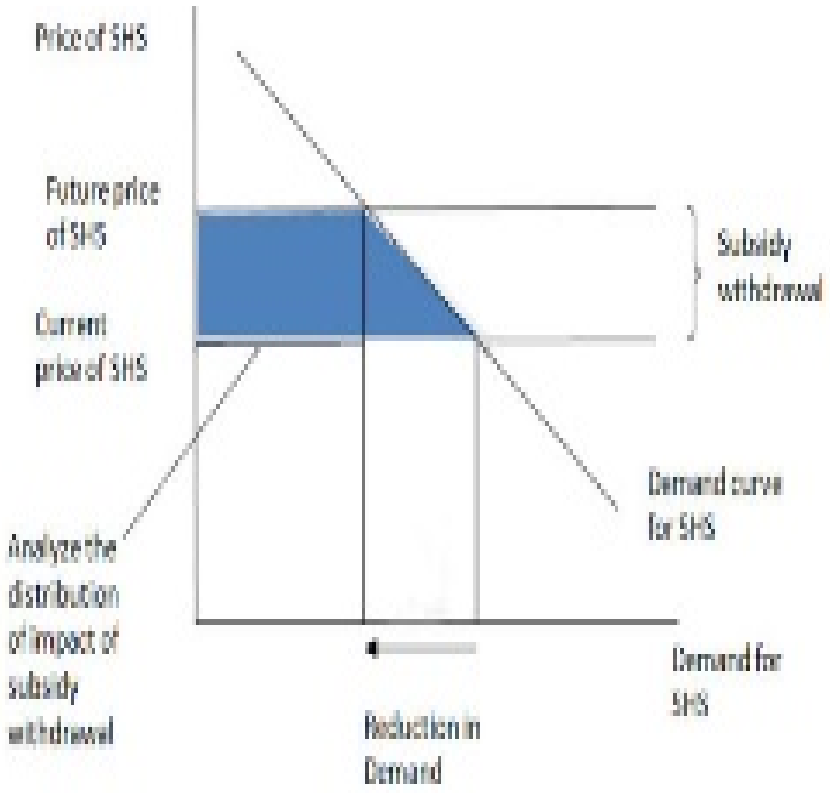


Market-based model cont…



Subsidy-withdrawal and market solution

- Subsidy withdrawal will increase prices
- Scale-efficiency and technological upgradation will shift supply curve downward again
- This will reduce prices at the level close to subsidized price



Conclusions and Recommendations

- Bangladesh's SHS program implemented by public-private partnership mechanism has failed due to piling up of default amount
- Public-sponsored program often lacks timely dynamic adjustments of the prices and standard qualities
- For financing EE projects, quality standard has to be specified
- Training of bank and FI officials needs to be conducted
- A proper institutional mechanism needs to be devised even the government wishes to provide subsidies
- Phase-out time of subsidies needs to clearly defined

THANK YOU