

Workshop on promoting clean and affordable energy to empower women

**Gender and renewable energy
deployment: Evidence from Uzbekistan
using micro level data**

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Economic background

- Uzbekistan - a lower-middle income country endowed with significant number of hydrocarbons (including natural gas, coal and oil reserves) (IEA 2010, 2014) and with population exceeding 32 million is the most densely populated country in the CA region.
- Uzbekistan uses twice as much energy to produce one unit of GDP as neighboring Kazakhstan, and six times more than that of Germany (ADB, 2011). The lion's share of the country's energy (over 86%) is generated by fossil fuels, despite Uzbekistan's possession of an enormous potential for renewables, specifically solar and wind power.
- Considering the expected completion date of the nuclear plant in 2028, we believe that solar photovoltaic and other renewable energy sources could step in to fill the growing energy demand-supply gap in nearest future.

Literature

- *Gender distribution in employment of Green sector (Baruah, 2015; Pearl-Martinez, 2017)*
 - Gender inequality
 - Wider socially progressive policies
 - Enhancing women's opportunities
- *Renewable energy deployment and gender role in the household (Karekezi, 2002; Ding, 2014;)*
 - Labor intensity
 - Health status
 - Living standards
 - Indoor smoke pollution

Literature

- *Gender and public acceptance of renewable energy sources*
 - No statistical significant impact (Abdullah, 2011; Sardinau, 2013; Lee, 2016; Ribeiro, 2018; Ntanos, 2018)
 - Female population has higher willingness to pay for Renewable energy sources (Nakano, 2018;)
 - Male population has higher willingness to pay for Renewable energy sources (Zarnikau, 2003; Bollino, 2009)

Aim of the research

- Analyze impact of gender on Public acceptance of renewable energy sources
- Examine separately what factors drive female and male' s willingness to pay more for renewable energy sources.

Data

- This study employs primary individual and household data obtained in three regions of Uzbekistan, namely Kashkadarya region, Khorezm region and Samarkand region.
- To ensure random sampling across individuals and households, interviewers from three different regional groups randomly selected the households and surveyed one household heads from each household. Samarkand team 173, Kashkadarya team 169 and Khorezm team surveyed 151 respondents.

Methodology

- Stata software
- Perception index
- Probit regression analyses

Summary statistics

	Male	Female
WTP	0,50	0,48
Alternative energy source	0,32	0,18
Electricity cut off	0,87	0,82
Car	0,53	0,16
Household Size	50,41	50,06
IQ	86,07	86,75
Education	0,65	0,58
Household head	0,89	0,37
Age	43,87	41,78

Perception

	Male	Female
Replace traditional index	0.44 (0.33)	0.44 (0.32)
Safety index	0.34 (0.42)	0.33 (0.33)
Harm plants	0.00 (0.42)	0.13 (0.47)
Harm animals	0.01 (0.42)	0.08 (0.49)
Harm people	0.07 (0.46)	0.14 (0.45)
Continuous index	0.41 (0.38)	0.35 (0.41)
Credit index	0.31 (0.32)	0.25 (0.30)
Cheap index	0.35 (0.40)	0.35 (0.30)
Knowledge index	0.57 (0.33)	0.58 (0.28)
Efficiency index	0.35 (0.38)	0.29 (0.37)
Observations	416	

Estimation outcome for total sample

	(1) Necessity	(2) Income	(3) Knowledge	(4) Full
Gasoline generator	1.34*** (0.05)			1.18 (0.32)
Electricity off	1.04 (0.83)			1.02 (0.91)
Car		1.28** (0.07)		1.27* (0.13)
Household size		1.09*** (0.01)		1.08** (0.06)
logIQ			0.80 (0.67)	0.74 (0.55)
Education			1.04 (0.79)	1.07 (0.68)
Household head			1.01 (0.96)	0.97 (0.88)
age			1.02*** (0.00)	1.02*** (0.01)
female			1.00 (0.98)	1.14 (0.54)
Kashkadaryo	0.71*** (0.04)	0.67*** (0.02)	0.66*** (0.02)	0.70** (0.06)
Khorazm	1.05 (0.76)	1.02 (0.90)	0.97 (0.84)	1.05 (0.78)
N	376	370	350	336
pseudo R²	0.03	0.04	0.05	0.07

Estimation outcome for female

	(1) Necessity	(2) Income	(3) Knowledge	(4) Full
Gasoline generator	1.78 (0.23)			1.35 (0.59)
Electricity off	4.51*** (0.02)			3.76** (0.07)
Car		1.78 (0.22)		1.46 (0.42)
Household size		1.18* (0.14)		1.20* (0.14)
logIQ			1.54 (0.76)	0.75 (0.83)
Education			1.22 (0.61)	1.07 (0.86)
Household head			0.47* (0.11)	0.44** (0.07)
Age			1.06*** (0.01)	1.04** (0.09)
Kashkadaryo	1.09 (0.85)	0.78 (0.57)	1.34 (0.55)	1.57 (0.40)
Khorazm	1.62 (0.25)	1.50 (0.35)	3.28*** (0.04)	2.66** (0.07)
N	60	60	56	54
pseudo R²	0.15	0.11	0.16	0.26

Estimation outcome for female

	(1) Necessity	(2) Income	(3) Knowledge	(4) Full
Gasoline generator	1.78 (0.23)			1.35 (0.59)
Electricity off	4.51*** (0.02)			3.76** (0.07)
Car		1.78 (0.22)		1.46 (0.42)
Household size		1.18* (0.14)		1.20* (0.14)
logIQ			1.54 (0.76)	0.75 (0.83)
Education			1.22 (0.61)	1.07 (0.86)
Household head			0.47* (0.11)	0.44** (0.07)
Age			1.06*** (0.01)	1.04** (0.09)
Kashkadaryo	1.09 (0.85)	0.78 (0.57)	1.34 (0.55)	1.57 (0.40)
Khorazm	1.62 (0.25)	1.50 (0.35)	3.28*** (0.04)	2.66** (0.07)
N	60	60	56	54
pseudo R²	0.15	0.11	0.16	0.26

Estimation outcome for male

	(1) Necessity	(2) Income	(3) Knowledge	(4) Full
Gasoline generator	1.35** (0.06)			1.18 (0.35)
Electricity off	0.78 (0.24)			0.84 (0.42)
Car		1.29** (0.09)		1.21** (0.08)
Household size		1.07** (0.08)		1.06 (0.16)
logIQ			0.55 (0.28)	0.53 (0.26)
Education			1.05 (0.78)	1.09 (0.63)
Household head			1.07 (0.79)	1.05 (0.87)
Age			1.02*** (0.00)	1.02*** (0.02)
Kashkadaryo	0.66*** (0.03)	0.65*** (0.02)	0.60*** (0.01)	0.61*** (0.02)
Khorazm	0.92 (0.65)	0.91 (0.61)	0.84 (0.36)	0.91 (0.62)
N	310	308	294	284
pseudo R ²	0.03	0.03	0.05	0.06

Estimation outcome for male

	(1) Necessity	(2) Income	(3) Knowledge	(4) Full
Gasoline generator	1.35** (0.06)			1.18 (0.35)
Electricity off	0.78 (0.24)			0.84 (0.42)
Car		1.29** (0.09)		1.21** (0.08)
Household size		1.07** (0.08)		1.06 (0.16)
logIQ			0.55 (0.28)	0.53 (0.26)
Education			1.05 (0.78)	1.09 (0.63)
Household head			1.07 (0.79)	1.05 (0.87)
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Kashkadaryo	0.66*** (0.03)	0.65*** (0.02)	0.60*** (0.01)	0.61*** (0.02)
Khorazm	0.92 (0.65)	0.91 (0.61)	0.84 (0.36)	0.91 (0.62)
N	310	308	294	284
pseudo R ²	0.03	0.03	0.05	0.06

Conclusion

- Most of the households are male headed and female participates really low in decision making processes.
- Most problematic households are in rural region while their decision makers are relatively poor which decreases probability of adopting this energy sources
- Policy makers should take into account gender role in the household
- To faster the public acceptance of the RE sources government should introduce financial stimulating programs

Limitations

- Not normally distributed due to randomly selected household head
- Knowledge on RE is not calculated properly

Thank you for your attention