Analysing Clean Energy & Sustainable Development

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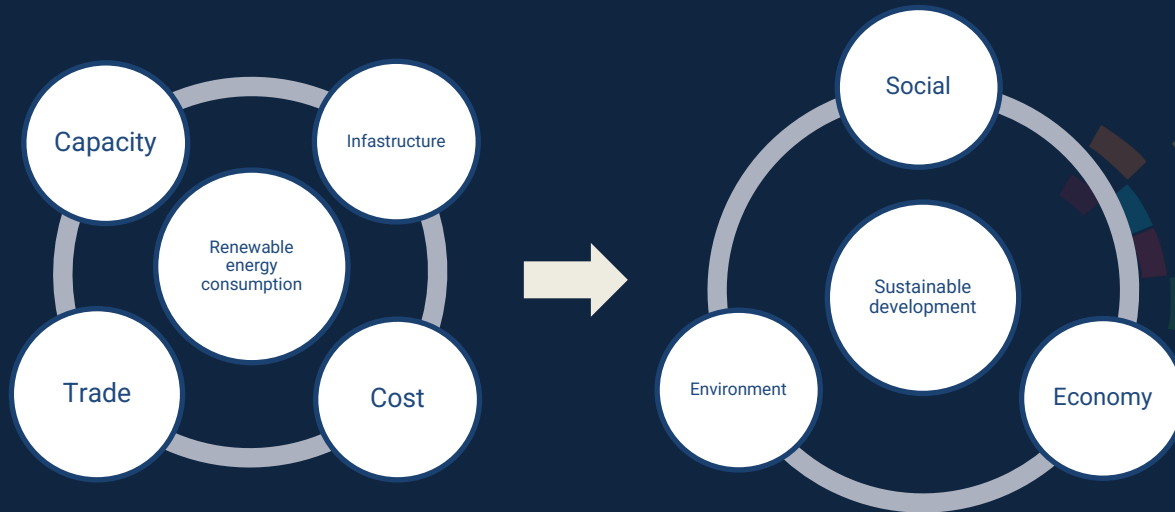Subregional Office for North and Central Asia
UN ESCAP

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Rationale for analysing clean energy & sustainable development

- Interlinkages between Goal 7 targets and other sustainable development goals and targets

- Sustainable & clean energy can be a potential driver for achievement of the 2030 Agenda

- Better determine the explanatory effect of clean energy on sustainable development indicators

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Conceptual Framework & Methodology

Capacity

Infastructure

Renewable
energy
consumption

Trade

Cost

Social

Sustainable
development

Environment

Economy

2-step approach using renewable energy
consumption as an instrumental variable

Conceptual Framework & Methodology

i. $RE_{it} = x_0 + x_1\,capacity_{it} + x_2\,infrastructure_{it} + x_3\,cost_{it} + x_4\,trade_{it} + \mu_{it} + \varepsilon_{it}$

ii. $SDG_{it} = x_0 + x_1\,\widehat{RE}_{it} + \mu_{it} + \varepsilon_{it}$

RE_{it} = renewable energy consumption

$capacity_{it}$ = installed renewable energy capacity

$infrastructure_{it}$ = number of renewable energy plants

$cost_{it}$ = levelized cost of energy

$trade_{it}$ = intraregional energy trade

$\widehat{RE}_{it}$ = fitted values of renewable energy consumption

SDG_{it} = sustainable development indicator

μ_{it} = covariates

ε_{it} = error term

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Determinants of sustainable & clean energy

	Pooled OLS	Fixed Effects	Random Effects
	Dependent Variable: Renewable Energy Consumption (PJ)		
RE_{t-1}	0.449*** (0.054)	0.123** (0.057)	0.338*** (0.045)
Capacity	0.005* (0.002)	0.005*** (0.002)	0.005** (0.002)
Infrastructure	-0.015 (0.019)	0.0001 (0.035)	-0.016 (0.035)
Cost	-5.949 (46.342)	-18.929 (36.139)	11.120 (39.210)
Trade	0.00003 (0.001)	0.0002** (0.0001)	0.0002* (0.0001)
GDP	-0.0002 (0.0005)	0.001* (0.0004)	0.0001 (0.0004)
Exchange rate	0.001 (0.003)	-0.011 (0.039)	-0.0004 (0.004)
Hydro	0.002*** (0.0002)	0.002*** (0.0002)	0.003*** (0.0002)
Fossil fuel	-0.00004 (0.00005)	-0.0003*** (0.00005)	-0.0001*** (0.00004)
Constant	7.573 (6.558)		-1.363 (7.706)
Covariates	Yes	Yes	Yes
R^2	0.999	0.742	0.964
Adj. R^2	0.998	0.685	0.959
Number of observations	95	95	95

Determinants of sustainable & clean energy

Summarizing results of analyzing determinants for clean energy

	Relationship	Significance
Capacity	Positive	Significant
Infrastructure	Positive	Insignificant
Cost	Negative	Insignificant
Trade	Positive	Significant

Keeping in mind that this analysis is
based on historical data

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Relationship between clean energy & sustainable development

Summarizing results of analyzing relationship between clean energy & sustainable development

	Relationship	Significance
Poverty	Negative	Significant
Electricity access	Positive	Significant
Gross domestic product	Positive	Significant
CO2 emissions	Negative	Significant

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Findings & Conclusion

- Results suggest that renewable energy consumption can facilitate social development, economic growth and environmental quality improvement.

- High significance of constants in second stage indicate significance of uncaptured variables.

- Complement the findings from network analysis to highlight synergies & trade-offs of renewable energy.

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