

APPENDIX

The national-level energy ladder and its carbon implications

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Table S1. *Instrumental variable results, 2010*

Dependent variable: Share of total primary energy use

	(1)	(2)	(3)	(4)	(5)	(6)	(7) (8)	(9)	
	Biomass	Hydro	Oil	Coal	Natural gas	Nuclear	Geo-thermal	Waste	Wind
Log GDP per capita	-0.164*** (0.020)	0.005 (0.007)	0.031 (0.019)	-0.013 (0.018)	0.090*** (0.022)	0.040*** (0.012)	0.002 (0.003)	0.005*** (0.001)	0.002*** (0.001)
Log population	0.012 (0.016)	-0.024** (0.010)	-0.040** (0.017)	0.024 (0.019)	0.007 (0.023)	0.015*** (0.005)	0.003 (0.004)	0.001 (0.001)	-0.000 (0.000)
Log land	-0.023* (0.013)	0.018** (0.008)	0.002 (0.018)	-0.010 (0.011)	0.019 (0.022)	-0.001 (0.005)	-0.003 (0.004)	-0.000 (0.000)	0.000 (0.000)
Transition economy dummy	-0.150*** (0.033)	0.046* (0.028)	-0.181*** (0.034)	0.117*** (0.045)	0.141** (0.055)	0.044** (0.017)	-0.010* (0.005)	-0.001 (0.001)	-0.002** (0.001)
Forest area (squared kilometers per capita)	3.492*** (1.000)	-1.407** (0.680)	-2.717** (1.165)	0.343 (0.919)	-0.905 (1.289)	1.069*** (0.324)	-0.004 (0.326)	0.058* (0.032)	-0.019 (0.021)
Water resources ('000 cubic meters per capita)	-0.001 (0.001)	0.002*** (0.001)	0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001*** (0.000)	-0.000 (0.000)	-0.000** (0.000)	-0.000 (0.000)
Oil reserves (ttoe per capita)	0.001 (0.012)	-0.016* (0.009)	0.012 (0.024)	-0.011 (0.010)	0.043 (0.034)	-0.019** (0.009)	-0.004 (0.003)	-0.003** (0.001)	-0.002** (0.001)
Coal reserves (ttoe per capita)	-0.044 (0.056)	-0.054 (0.037)	-0.027 (0.055)	0.349*** (0.105)	-0.146* (0.080)	-0.072*** (0.024)	-0.001 (0.005)	-0.007*** (0.002)	-0.002* (0.001)
Natural gas reserves (ttoe per capita)	0.008*** (0.002)	-0.000 (0.001)	-0.022*** (0.004)	0.001 (0.001)	0.015** (0.006)	-0.001 (0.001)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Volcanoes per capita (*1,000,000)	0.004 (0.006)	-0.011*** (0.004)	-0.012* (0.007)	0.003 (0.005)	0.002 (0.007)	0.006*** (0.002)	0.007*** (0.002)	0.000** (0.000)	0.000 (0.000)
Second-stage R^2	0.64	0.14	0.28	0.27	0.31	0.19	0.68	0.12	0.12

Instrument: 1950 log GDP per capita

F statistic on excluded instrument in instrumental variables regressions: 95.75

Stock–Yogo 5% significance level critical value (10% maximal IV size): 16.38

Partial R^2 on excluded instrument in instrumental variables regressions: 0.41Countries: 132^a

Notes: ***, **, and * indicate statistical significance at the 1, 5, and 10% levels. Robust standard errors are in parentheses. Coefficients on constants not reported. The bold diagonal is the set of own-resource coefficients. The dependent variables range from 0 to 1.

^a Hong Kong and Taiwan are excluded due to missing resource data.

Table S2. Panel results using the between estimator

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Biomass	Hydro	Oil	Coal	Natural gas	Nuclear	Geo-thermal	Waste	Wind
<i>Specification 1: Linear estimates</i>									
Log GDP per capita	-0.183*** (0.014)	-0.004 (0.007)	0.073*** (0.015)	0.030** (0.013)	0.063*** (0.015)	0.014*** (0.004)	0.004 (0.003)	0.001*** (0.000)	0.000*** (0.000)
R^2 (between)	0.55	0.00	0.14	0.04	0.12	0.08	0.01	0.14	0.06
<i>Specification 2: Quadratic estimates</i>									
Log GDP per capita	-0.993*** (0.175)	0.060 (0.089)	0.921*** (0.189)	0.215 (0.170)	-0.183 (0.193)	0.012 (0.054)	-0.011 (0.043)	-0.005* (0.003)	-0.000 (0.001)
Log GDP per capita, squared	0.048*** (0.010)	-0.004 (0.005)	-0.050*** (0.011)	-0.011 (0.010)	0.014 (0.011)	0.000 (0.003)	0.001 (0.003)	0.000** (0.000)	0.000 (0.000)
R^2 (between)	0.61	0.01	0.26	0.05	0.13	0.08	0.01	0.17	0.06
GDP per capita level at turning point (2005 I\$) ^a	34,020	-	10,300	-	-	-	-	1,225	-
Type of relationship ^b	U	No sig. relation	Inverse-U	Increasing	Increasing	Increasing	No sig. relation	Increasing	Increasing
Observations: 4,949									
Years: 1960-2010									
Countries: 134									

Notes: ***, **, and * indicate statistical significance at the 1, 5, and 10% levels respectively. Standard errors are in parentheses. Coefficients on constants not reported. The dependent variables range from 0 to 1.

^a Only shown if the quadratic term is significant at the 10% level.

^b Relationships are only classed as non-linear if the quadratic term is statistically significant at the 10% level and GDP per capita at the estimated turning point exceeds I\$2,000. Sig.= significant.