

ROADMAP FOR A RENEWABLE ENERGY FUTURE

REmap results by country
Status as of March, 2016



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About IRENA

The International Renewable Energy Agency (IRENA) is an intergovernmental organisation that supports countries in their transition to a sustainable energy future and serves as the principal platform for international co-operation, a centre of excellence, and a repository of policy, technology, resource and financial knowledge on renewable energy. IRENA promotes the widespread adoption and sustainable use of all forms of renewable energy, including bioenergy, geothermal, hydropower, ocean, solar and wind energy, in the pursuit of sustainable development, energy access, energy security and low-carbon economic growth and prosperity.

The full version of the REmap report 2016 edition can be downloaded through www.irena.org/Publications. All REmap related publications and other supporting material are available at www.irena.org/remap

For further information or to provide feedback, please contact the REmap team at remap@irena.org



Note about Data Status

REmap is an ongoing project and country analyses are constantly updated as new information, government plans, and markets developments occur. The information presented in this document is the status of data and REmap findings as of March 2016 and is background information to the 2016 edition of REmap that was released on 17 March, 2016. For more information please email the REmap team at remap@irena.org.

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REmap: ROADMAP FOR A RENEWABLE ENERGY FUTURE

Doubling renewables in the global energy mix by 2030 is not only feasible, but cheaper than not doing so. Economic savings would far exceed the costs. It would create more jobs, boost economic growth and save millions of lives annually through reduced air pollution. It would also, when coupled with greater energy efficiency, put the world on track to keep the rise of temperatures within 2°C, in line with the Paris Agreement.

But to meet that goal, renewable energy deployment must happen six times faster than today.

The second edition of IRENA's global roadmap provides an in-depth perspective on the energy transition in 40 economies, representing 80% of global energy use. It offers concrete technology options and outlines solutions to accelerate renewable energy growth.

The age of renewables is here. But without concerted action, they cannot reach their potential soon enough to meet international climate and development targets. For decision makers in the public and private sectors alike, this roadmap sends an alert – on the opportunities at hand and the costs of not taking them.

These REmap country results are part of IRENA's *REmap: Roadmap for a Renewable Energy Future* report.

Methodology and definitions can be found in the full version of the report in the section *REmap: Country process and analytical approach* and the *Appendix: REmap methodology and data*. Additional information is available on the REmap website at www.irena.org/remap in the *Datasheets and Sources* and *Methodology* sections of the webpage.



Abbreviations:

BF - blast furnace

bln - billion

CO - coke oven

CO₂ - carbon dioxide (CO₂)

CSP - concentrated solar power

DH - district heat

EJ - exajoule

excl. - excluding

GW - gigawatt

Mt - megatonne

N/A - not available/applicable

PJ - petajoule

PV - photovoltaic

RE - renewable energy

TWh - terawatt-hour

UAE - United Arab Emirates

UK – United Kingdom of Great Britain and Northern Ireland

USA - United States of America

USD - United States dollar

yr - year



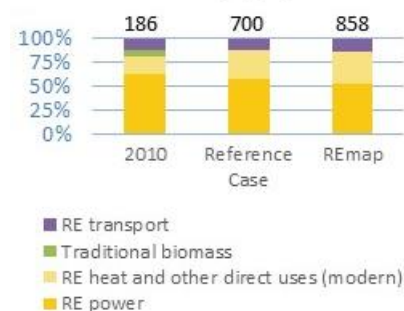
REmap Country Results - Argentina

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	29	60	62
		Renewable capacity	GW	10	36	42
		Hydropower (excl. pumped hydro)	GW	10	23	23
		Wind	GW	0	6	9
		Biofuels (solid, liquid, gaseous)	GW	0	3	4
		Solar PV	GW	0	4	6
		CSP	GW	0	0	0
		Geothermal	GW	0	0	0
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	19	24	21
		Total electricity generation	TWh	125	236	236
		Renewable generation	TWh	36	128	144
		Hydropower	TWh	34	85	85
		Wind	TWh	0	17	26
		Biofuels (solid, liquid, gaseous)	TWh	2	19	22
		Solar PV	TWh	0	7	11
		CSP	TWh	0	0	0
	Geothermal	TWh	0	0	0	
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	89	108	92	
DH	Total district heat generation	PJ	0	0	0	
	Biofuels (solid, liquid, gaseous)	PJ	0	0	0	
	Other renewables	PJ	0	0	0	
	Non-renewable DH	PJ	0	0	0	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	836	2 056	2 067
		Direct uses of renewable energy	PJ	46	215	287
		Solar thermal - Buildings	PJ	0	40	70
		Solar thermal - Industry	PJ	0	10	30
		Geothermal	PJ	0	0	0
		Bioenergy (traditional) - Buildings	PJ	13	0	0
		Bioenergy (modern) - Buildings	PJ	0	57	62
		Bioenergy - Industry	PJ	33	108	125
		Non-renewable - Buildings	PJ	485	1 106	1 081
		Non-renewable - Industry	PJ	286	629	593
	Non-renewable - BF/CO	PJ	19	106	106	
	Transport	Total fuel consumption	PJ	647	1 544	1 534
		Liquid biofuels	PJ	23	79	115
		Conventional biogasoline	PJ	13	29	41
		Advanced biogasoline	PJ	0	0	0
		Biodiesel (conventional and advanced)	PJ	10	50	74
		Biomethane	PJ	0	4	5
Non-renewable fuels		PJ	624	1 461	1 415	
Total final energy consumption (electricity, DH, direct uses) ²		PJ	2 036	4 682	4 684	
RE shares	RE share in electricity generation		29%	54%	61%	
	RE share in district heat generation		0%	0%	0%	
	RE share in Buildings - final energy use, direct uses (modern)		0%	8%	11%	
	RE share in Industry - final energy use, direct uses		10%	16%	21%	
	RE share in Transport fuels		4%	5%	8%	
Share of modern RE in TFEC ³		9%	15%	18%		
Financial indicators	System costs [USD bln/yr in 2030]		N/A	N/A	- 2	
	RE investment needs [USD bln/yr (2010-2030)]		N/A	6	7	
	Investment support for renewables [USD bln/yr in 2030]		N/A	N/A	0.4	
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]		N/A	N/A	1.0	
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]		N/A	N/A	0.7	
	CO ₂ emissions from energy [Mt/yr]		137	263	249	

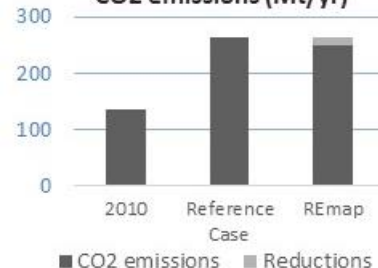
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



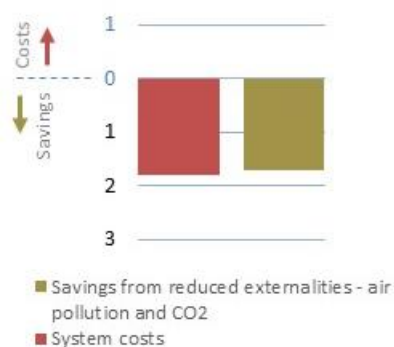
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

- Escenarios Energéticos de Argentina, Plataforma Escenarios Energéticos Argentina 2035 (2015).



REmap Country Results - Australia

		Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	58	71
		Renewable capacity	GW	22	52
		Hydropower (excl. pumped hydro)	GW	7	10
		Wind	GW	5	19
		Biofuels (solid, liquid, gaseous)	GW	0	2
		Solar PV	GW	1	21
		CSP	GW	0	0
		Geothermal	GW	0	1
		Marine, other	GW	0	0
		Non-renewable capacity	GW	45	39
	DH	Total electricity generation	TWh	262	317
		Renewable generation	TWh	38	137
		Hydropower	TWh	17	27
		Wind	TWh	14	54
		Biofuels (solid, liquid, gaseous)	TWh	5	15
		Solar PV	TWh	1	35
		CSP	TWh	0	0
		Geothermal	TWh	0	6
		Marine, other	TWh	0	0
		Non-renewable generation	TWh	225	197
Final energy use - direct uses ¹	Buildings and Industry	Total district heat generation	PJ	0	0
		Biofuels (solid, liquid, gaseous)	PJ	0	0
		Other renewables	PJ	0	0
		Non-renewable DH	PJ	0	0
	Transport	Total direct uses of energy	PJ	1 303	2 218
		Direct uses of renewable energy	PJ	183	379
		Solar thermal - Buildings	PJ	11	30
		Solar thermal - Industry	PJ	0	35
		Geothermal	PJ	0	0
		Bioenergy (traditional) - Buildings	PJ	0	0
		Bioenergy (modern) - Buildings	PJ	54	66
		Bioenergy - Industry	PJ	118	248
		Non-renewable - Buildings	PJ	240	296
		Non-renewable - Industry	PJ	782	1 429
		Non-renewable - BF/CO	PJ	97	89
Financial indicators	RE shares	Total fuel consumption	PJ	1 466	1 928
		Liquid biofuels	PJ	9	53
		Conventional biogasoline	PJ	6	17
		Advanced biogasoline	PJ	0	3
		Biodiesel (conventional and advanced)	PJ	3	33
		Biomethane	PJ	0	0
		Non-renewable fuels	PJ	1 457	1 768
		Total final energy consumption (electricity, DH, direct uses) ²	PJ	3 593	5 236
		RE share in electricity generation		14%	41%
		RE share in district heat generation		0%	0%
	System costs	RE share in Buildings - final energy use, direct uses (modern)		21%	25%
		RE share in Industry - final energy use, direct uses		13%	17%
		RE share in Transport fuels		1%	3%
		Share of modern RE in TFEC ³		8%	17%
		System costs [USD bln/yr in 2030]	N/A	N/A	2
		RE investment needs [USD bln/yr (2010-2030)]	N/A	1	5
		Investment support for renewables [USD bln/yr in 2030]	N/A	N/A	2.5
		Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]	N/A	N/A	14.7
		Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]	N/A	N/A	3.9
		CO ₂ emissions from energy [Mt/yr]		375	429

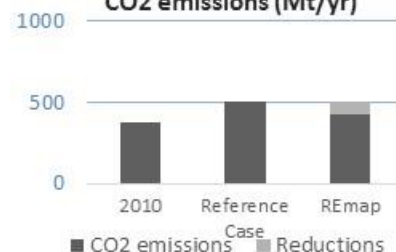
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



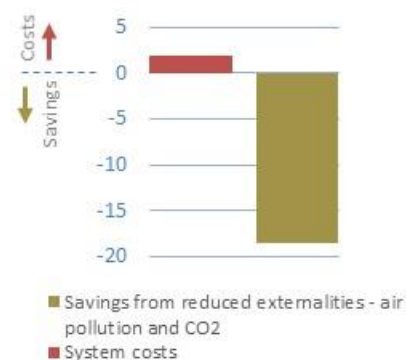
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

- Australian Energy Projections 2014-15 to 2049-50, BREE (2014).
- "Chapter 3: THE OUTLOOK FOR GAS IN THE TRANSPORT FUEL MARKET", Transport Fuels from Australia, CSIRO



REmap Country Results - Belgium

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	18	25	32
		Renewable capacity	GW	4	11	20
		Hydropower (excl. pumped hydro)	GW	1	0	0
		Wind	GW	1	4	6
		Biofuels (solid, liquid, gaseous)	GW	1	2	2
		Solar PV	GW	1	5	11
		CSP	GW	0	0	0
		Geothermal	GW	0	0	0
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	14	14	13
		Total electricity generation	TWh	94	84	85
		Renewable generation	TWh	8	26	41
		Hydropower	TWh	0	0	0
		Wind	TWh	1	11	18
		Biofuels (solid, liquid, gaseous)	TWh	6	10	10
		Solar PV	TWh	1	5	13
		CSP	TWh	0	0	0
	Geothermal	TWh	0	0	0	
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	86	58	44	
DH	Total district heat generation	PJ	36	44	44	
	Biofuels (solid, liquid, gaseous)	PJ	4	6	10	
	Other renewables	PJ	0	0	0	
	Non-renewable DH	PJ	32	38	34	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	750	726	722
		Direct uses of renewable energy	PJ	42	70	82
		Solar thermal - Buildings	PJ	0	12	17
		Solar thermal - Industry	PJ	0	0	2
		Geothermal	PJ	0	0	0
		Bioenergy (traditional) - Buildings	PJ	0	0	0
		Bioenergy (modern) - Buildings	PJ	11	13	13
		Bioenergy - Industry	PJ	31	45	50
		Non-renewable - Buildings	PJ	418	386	377
	Non-renewable - Industry	PJ	247	233	226	
	Non-renewable - BF/CO	PJ	43	37	37	
	Transport	Total fuel consumption	PJ	379	333	324
		Liquid biofuels	PJ	15	33	35
		Conventional biogasoline	PJ	3	6	6
		Advanced biogasoline	PJ	0	0	0
Biodiesel (conventional and advanced)		PJ	12	27	29	
Biomethane		PJ	0	0	0	
Non-renewable fuels	PJ	364	299	289		
Total final energy consumption (electricity, DH, direct uses)			PJ	1 452	1 404	1 396
RE shares	RE share in electricity generation			8%	31%	48%
	RE share in district heat generation			10%	15%	22%
	RE share in Buildings - final energy use, direct uses (modern)			3%	6%	7%
	RE share in Industry - final energy use, direct uses			11%	16%	19%
	RE share in Transport fuels			4%	10%	11%
Share of modern RE in TFEC ³			6%	15%	20%	
Financial indicators	System costs [USD bln/yr in 2030]			N/A	N/A	-0.1
	RE investment needs [USD bln/yr (2010-2030)]			N/A	1	2
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	0.1
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	0.3
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]			N/A	N/A	0.3
	CO2 emissions from energy [Mt/yr]			89	85	78

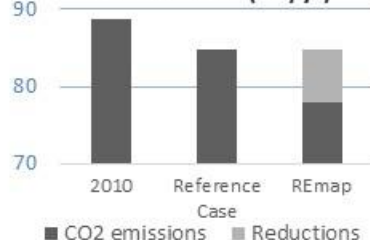
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



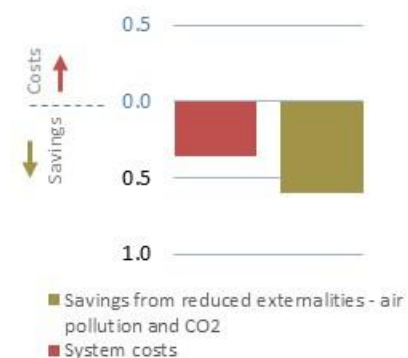
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

- Het Belgische energiesysteem in 2050: Waar naartoe. Federaal Planbureau (2014).
- Potentieel studie hernieuwbare energie 2030 in Vlaanderen, VITO (2014).
- Towards 100% renewable energy in Belgium by 2015, VITO (2013).



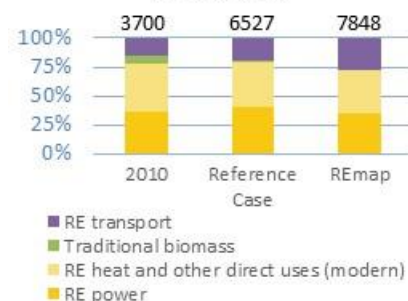
REmap Country Results - Brazil

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	115	249	257
		Renewable capacity	GW	91	203	224
		Hydropower (excl. pumped hydro)	GW	82	131	134
		Wind	GW	1	36	42
		Biofuels (solid, liquid, gaseous)	GW	8	25	25
		Solar PV	GW	0	10	21
		CSP	GW	0	1	2
		Geothermal	GW	0	0	0
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	24	45	33
		Total electricity generation	TWh	515	994	994
		Renewable generation	TWh	437	834	884
		Hydropower	TWh	403	610	622
		Wind	TWh	2	96	116
		Biofuels (solid, liquid, gaseous)	TWh	32	111	112
		Solar PV	TWh	0	14	30
		CSP	TWh	0	2	4
	Geothermal	TWh	0	0	0	
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	78	160	110	
DH	Total district heat generation	PJ	0	0	0	
	Biofuels (solid, liquid, gaseous)	PJ	0	0	0	
	Other renewables	PJ	0	0	0	
	Non-renewable DH	PJ	0	0	0	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	3 442	5 526	5 485
		Direct uses of renewable energy	PJ	1 774	2 611	2 866
		Solar thermal - Buildings	PJ	0	23	94
		Solar thermal - Industry	PJ	0	0	163
		Geothermal	PJ	0	0	10
		Bioenergy (traditional) - Buildings	PJ	225	149	0
		Bioenergy (modern) - Buildings	PJ	108	102	154
		Bioenergy - Industry	PJ	1 441	2 337	2 445
		Non-renewable - Buildings	PJ	316	432	432
		Non-renewable - Industry	PJ	1 352	2 483	2 187
	Non-renewable - BF/CO	PJ	0	0	0	
	Transport	Total fuel consumption	PJ	2 924	6 355	6 344
		Liquid biofuels	PJ	589	1 228	2 187
		Conventional biogasoline	PJ	389	892	1 544
		Advanced biogasoline	PJ	0	6	224
		Biodiesel (conventional and advanced)	PJ	200	330	418
		Biomethane	PJ	0	0	0
Non-renewable fuels		PJ	2 335	5 128	4 157	
Total final energy consumption (electricity, DH, direct uses) ²			PJ	8 294	15 534	15 422
RE shares	RE share in electricity generation			85%	84%	89%
	RE share in district heat generation			0%	0%	0%
	RE share in Buildings - final energy use, direct uses (modern)			17%	18%	37%
	RE share in Industry - final energy use, direct uses			52%	48%	54%
	RE share in Transport fuels			20%	19%	34%
Share of modern RE in TFEC ³				43%	42%	51%
Financial indicators	System costs [USD bln/yr in 2030]			N/A	N/A	- 11
	RE investment needs [USD bln/yr (2010-2030)]			N/A	17	22
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	3.0
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	19.5
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO2) [USD bln/yr in 2030]			N/A	N/A	6.3
	CO2 emissions from energy [Mt/yr]			347	690	564

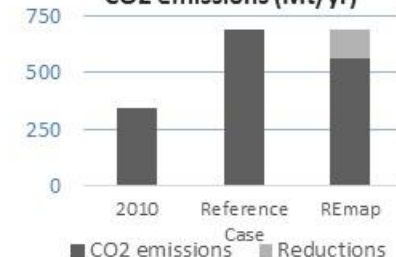
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



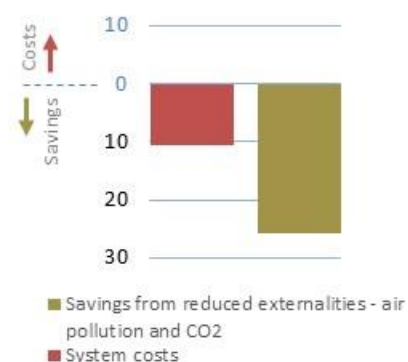
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

- Plano Nacional de Energia 2050, Ministério de Minas e Energia. Empresa de Pesquisa Energética (2014).
- Plano Decenal de Energia 2024, Ministério de Minas e Energia. Empresa de Pesquisa Energética (2015).



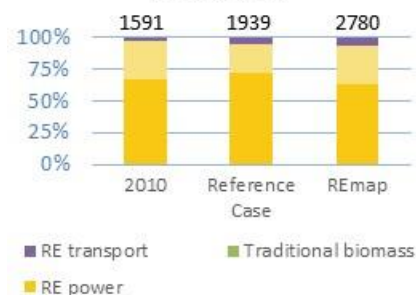
REmap Country Results - Canada

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	129	166	187
		Renewable capacity	GW	81	113	147
		Hydropower (excl. pumped hydro)	GW	75	87	90
		Wind	GW	4	18	31
		Biofuels (solid, liquid, gaseous)	GW	2	4	12
		Solar PV	GW	0	5	13
		CSP	GW	0	0	0
		Geothermal	GW	0	0	1
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	48	53	40
		Total electricity generation	TWh	610	751	785
		Renewable generation	TWh	370	497	615
		Hydropower	TWh	351	432	447
		Wind	TWh	9	33	76
		Biofuels (solid, liquid, gaseous)	TWh	9	16	60
		Solar PV	TWh	1	16	25
		CSP	TWh	0	0	0
		Geothermal	TWh	0	0	7
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	240	254	170	
DH	Total district heat generation	PJ	19	34	34	
	Biofuels (solid, liquid, gaseous)	PJ	2	0	20	
	Other renewables	PJ	0	0	0	
	Non-renewable DH	PJ	17	34	14	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	2 770	5 171	5 114
		Direct uses of renewable energy	PJ	481	447	828
		Solar thermal - Buildings	PJ	0	3	8
		Solar thermal - Industry	PJ	0	0	15
		Geothermal	PJ	0	3	3
		Bioenergy (traditional) - Buildings	PJ	0	0	0
		Bioenergy (modern) - Buildings	PJ	94	145	213
		Bioenergy - Industry	PJ	387	296	589
		Non-renewable - Buildings	PJ	1 204	1 942	1 766
	Non-renewable - Industry	PJ	1 085	2 743	2 481	
	Non-renewable - BF/CO	PJ	0	39	39	
	Transport	Total fuel consumption	PJ	2 449	2 762	2 331
		Liquid biofuels	PJ	52	99	195
		Conventional biogasoline	PJ	42	62	94
		Advanced biogasoline	PJ	0	19	51
		Biodiesel (conventional and advanced)	PJ	9	18	50
		Biomethane	PJ	0	0	0
Non-renewable fuels		PJ	2 398	2 663	2 135	
Total final energy consumption (electricity, DH, direct uses) ²		PJ	7 152	10 371	10 003	
RE shares	RE share in electricity generation		61%	66%	78%	
	RE share in district heat generation		11%	0%	59%	
	RE share in Buildings - final energy use, direct uses (modern)		7%	7%	11%	
	RE share in Industry - final energy use, direct uses		26%	10%	20%	
	RE share in Transport fuels		2%	4%	8%	
Financial indicators	Share of modern RE in TFEC ³		22%	19%	28%	
	System costs [USD bln/yr in 2030]		N/A	N/A	6	
	RE investment needs [USD bln/yr (2010-2030)]		N/A	6	11	
	Investment support for renewables [USD bln/yr in 2030]		N/A	N/A	5.1	
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]		N/A	N/A	14.7	
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO2) [USD bln/yr in 2030]		N/A	N/A	5.2	
	CO2 emissions from energy [Mt/yr]		448	593	489	

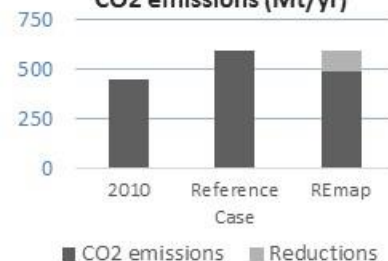
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



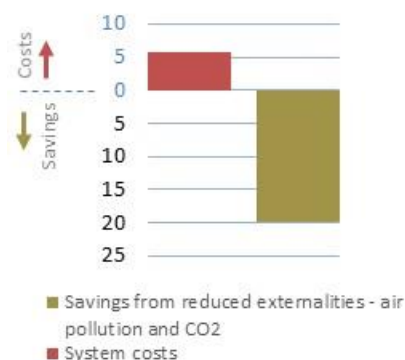
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

- Canada's Energy Future 2016: Energy Supply and Demand Projections to 2040, NEB (2016).
- Report on Energy Supply and Demand in Canada, Government of Canada (2016).



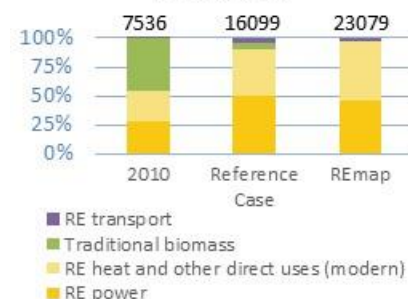
REmap Country Results - China

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	998	2 467	2 731
		Renewable capacity	GW	266	1 066	1 484
		Hydropower (excl. pumped hydro)	GW	213	400	400
		Wind	GW	45	315	562
		Biofuels (solid, liquid, gaseous)	GW	6	38	67
		Solar PV	GW	2	300	422
		CSP	GW	0	12	31
		Geothermal	GW	0	1	1
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	732	1 401	1 248
		Total electricity generation	TWh	4 234	9 315	9 466
		Renewable generation	TWh	802	2 891	3 809
		Hydropower	TWh	722	1 600	1 600
		Wind	TWh	45	648	1 200
		Biofuels (solid, liquid, gaseous)	TWh	33	192	358
		Solar PV	TWh	1	425	595
		CSP	TWh	0	18	46
	Geothermal	TWh	1	9	9	
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	3 433	6 424	5 657	
DH	Total district heat generation	PJ	2 934	3 530	3 530	
	Biofuels (solid, liquid, gaseous)	PJ	34	41	1 401	
	Other renewables	PJ	0	0	0	
	Non-renewable DH	PJ	2 900	3 489	2 129	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	36 167	43 488	41 758
		Direct uses of renewable energy	PJ	5 310	7 236	10 258
		Solar thermal - Buildings	PJ	860	2 674	3 244
		Solar thermal - Industry	PJ	0	84	1 219
		Geothermal	PJ	150	301	446
		Bioenergy (traditional) - Buildings	PJ	3 400	891	0
		Bioenergy (modern) - Buildings	PJ	793	2 407	3 632
		Bioenergy - Industry	PJ	107	879	1 717
		Non-renewable - Buildings	PJ	5 883	6 083	3 593
		Non-renewable - Industry	PJ	19 743	24 135	21 872
	Non-renewable - BF/CO	PJ	5 231	6 035	6 035	
	Transport	Total fuel consumption	PJ	7 226	17 372	16 409
		Liquid biofuels	PJ	51	751	751
		Conventional biogasoline	PJ	32	516	516
		Advanced biogasoline	PJ	0	2	2
		Biodiesel (conventional and advanced)	PJ	18	233	233
		Biomethane	PJ	0	0	0
Non-renewable fuels		PJ	7 175	16 622	15 658	
Total final energy consumption (electricity, DH, direct uses) ²			PJ	57 156	90 172	88 213
RE shares	RE share in electricity generation			19%	31%	40%
	RE share in district heat generation			1%	1%	40%
	RE share in Buildings - final energy use, direct uses (modern)			16%	44%	67%
	RE share in Industry - final energy use, direct uses			1%	4%	12%
	RE share in Transport fuels			1%	4%	5%
Share of modern RE in TFEC ³			7%	17%	26%	
Financial indicators	System costs [USD bln/yr in 2030]			N/A	N/A	46
	RE investment needs [USD bln/yr (2010-2030)]			N/A	105	160
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	56.4
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	116.1
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]			N/A	N/A	74.4
	CO2 emissions from energy [Mt/yr]			6 394	9 499	8 010

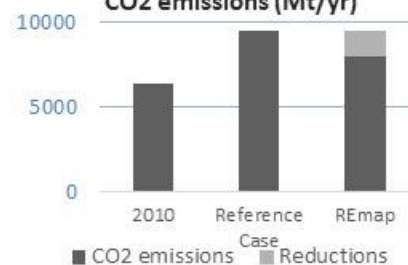
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



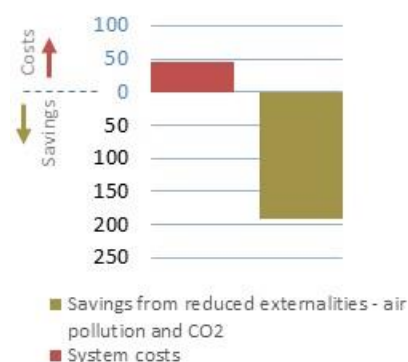
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

- World Energy Outlook 2012 & 2015, IEA (2012; 2015).



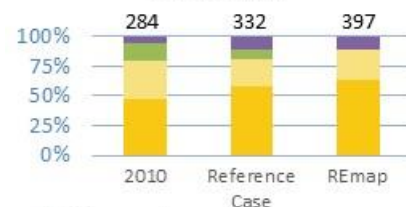
REmap Country Results - Colombia

		Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	13	22
		Renewable capacity	GW	9	22
		Hydropower (excl. pumped hydro)	GW	9	17
		Wind	GW	0	1
		Biofuels (solid, liquid, gaseous)	GW	0	1
		Solar PV	GW	0	2
		CSP	GW	0	0
		Geothermal	GW	0	0
		Marine, other	GW	0	0
		Non-renewable capacity	GW	3	4
		Total electricity generation	TWh	56	98
		Renewable generation	TWh	41	80
		Hydropower	TWh	40	66
		Wind	TWh	0	1
		Biofuels (solid, liquid, gaseous)	TWh	1	3
		Solar PV	TWh	0	4
		CSP	TWh	0	0
		Geothermal	TWh	0	2
		Marine, other	TWh	0	0
		Non-renewable generation	TWh	15	23
Final energy use - direct uses ¹	DH	Total district heat generation	PJ	0	0
		Biofuels (solid, liquid, gaseous)	PJ	0	0
		Other renewables	PJ	0	0
		Non-renewable DH	PJ	0	0
	Buildings and Industry	Total direct uses of energy	PJ	438	530
		Direct uses of renewable energy	PJ	133	101
		Solar thermal - Buildings	PJ	0	0
		Solar thermal - Industry	PJ	0	4
		Geothermal	PJ	0	0
		Bioenergy (traditional) - Buildings	PJ	39	28
		Bioenergy (modern) - Buildings	PJ	39	28
		Bioenergy - Industry	PJ	55	48
		Non-renewable - Buildings	PJ	92	136
		Non-renewable - Industry	PJ	200	271
		Non-renewable - BF/CO	PJ	13	18
	Transport	Total fuel consumption	PJ	364	719
		Liquid biofuels	PJ	17	35
		Conventional biogasoline	PJ	14	27
		Advanced biogasoline	PJ	0	0
		Biodiesel (conventional and advanced)	PJ	3	9
		Biomethane	PJ	0	0
		Non-renewable fuels	PJ	347	685
		Non-renewable - BF/CO	PJ	13	18
Financial indicators	RE shares	Total final energy consumption (electricity, DH, direct uses)²	PJ	984	1 551
		RE share in electricity generation		74%	78%
		RE share in district heat generation		0%	0%
		RE share in Buildings - final energy use, direct uses (modern)		23%	21%
		RE share in Industry - final energy use, direct uses		21%	20%
		RE share in Transport fuels		5%	7%
		Share of modern RE in TFEC ³		25%	27%
	System costs	System costs [USD bln/yr in 2030]		N/A	1
		RE investment needs [USD bln/yr (2010-2030)]		N/A	2
		Investment support for renewables [USD bln/yr in 2030]		N/A	1.3
		Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]		N/A	1.6
		Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]		N/A	0.7
		CO ₂ emissions from energy [Mt/yr]		54	84
		CO ₂ emissions from energy [Mt/yr]		98	84

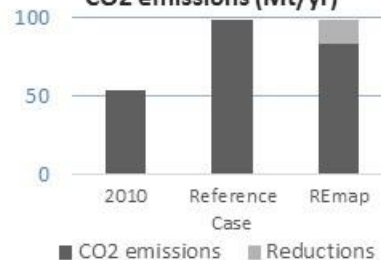
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



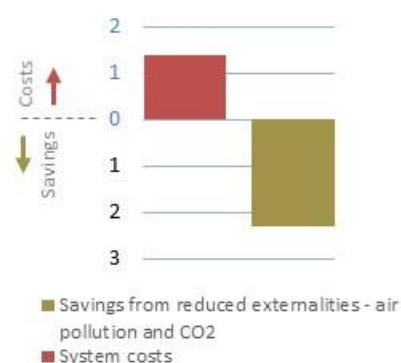
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

- Plan de Expansión de Referencia Generación – Transmisión 2014-2028, UPME (2013).
- Integración de las energías renovables no convencionales en Colombia, UPME (2015).



REmap Country Results - Cyprus

			Unit	2010	Reference Case 2030	REmap 2030	
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	1.7	2.0	2.7	
		Renewable capacity	GW	0.2	0.9	1.7	
		Hydropower (excl. pumped hydro)	GW	0.0	0.0	0.0	
		Wind	GW	0.1	0.3	0.3	
		Biofuels (solid, liquid, gaseous)	GW	0.0	0.0	0.0	
		Solar PV	GW	0.0	0.6	1.3	
		CSP	GW	0.0	0.1	0.1	
		Geothermal	GW	0.0	0.0	0.0	
		Marine, other	GW	0.0	0.0	0.0	
		Non-renewable capacity	GW	1.5	1.1	0.9	
		Total electricity generation	TWh	4.9	6.1	6.6	
		Renewable generation	TWh	0.1	1.6	3.0	
		Hydropower	TWh	0.0	0.0	0.0	
		Wind	TWh	0.0	0.4	0.5	
		Biofuels (solid, liquid, gaseous)	TWh	0.0	0.1	0.1	
		Solar PV	TWh	0.0	0.9	2.2	
		CSP	TWh	0.0	0.2	0.2	
		Geothermal	TWh	0.0	0.0	0.0	
		Marine, other	TWh	0.0	0.0	0.0	
	Non-renewable generation	TWh	4.8	4.5	3.7		
	DH	Total district heat generation	PJ	0.0	0.0	0.0	
		Biofuels (solid, liquid, gaseous)	PJ	0.0	0.0	0.0	
		Other renewables	PJ	0.0	0.0	0.0	
		Non-renewable DH	PJ	0.0	0.0	0.0	
	Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	19.6	16.5	16.3
			Direct uses of renewable energy	PJ	3.3	5.8	6.4
Solar thermal - Buildings			PJ	2.6	3.6	4.0	
Solar thermal - Industry			PJ	0.0	0.1	0.2	
Geothermal			PJ	0.0	0.1	0.1	
Bioenergy (traditional) - Buildings			PJ	0.0	0.0	0.0	
Bioenergy (modern) - Buildings			PJ	0.3	1.0	1.0	
Bioenergy - Industry			PJ	0.5	1.1	1.1	
Non-renewable - Buildings			PJ	7.0	6.6	6.2	
Non-renewable - Industry			PJ	9.3	4.0	3.7	
Non-renewable - BF/CO		PJ	0.0	0.0	0.0		
Transport		Total fuel consumption	PJ	43.7	51.3	46.0	
		Liquid biofuels	PJ	0.6	5.2	5.2	
		Conventional biogasoline	PJ	0.2	1.7	1.7	
		Advanced biogasoline	PJ	0.0	0.5	0.5	
		Biodiesel (conventional and advanced)	PJ	0.5	3.0	3.0	
		Biomethane	PJ	0.0	0.0	0.0	
	Non-renewable fuels	PJ	43.1	46.1	40.9		
Total final energy consumption (electricity, DH, direct uses) ²			PJ	81	88	85	
RE shares	RE share in electricity generation			1%	26%	45%	
	RE share in district heat generation			0%	0%	0%	
	RE share in Buildings - final energy use, direct uses (modern)			29%	42%	45%	
	RE share in Industry - final energy use, direct uses			5%	22%	26%	
	RE share in Transport fuels			1%	10%	11%	
Financial indicators	Share of modern RE in TFEC ³			5%	19%	26%	
	System costs [USD bln/yr in 2030]			N/A	N/A	0.05	
	RE investment needs [USD bln/yr (2010-2030)]			N/A	0.00	0.00	
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	0.04	
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	0.10	
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO2) [USD bln/yr in 2030]			N/A	N/A	0.04	
	CO ₂ emissions from energy [Mt/yr]			9	6	5	

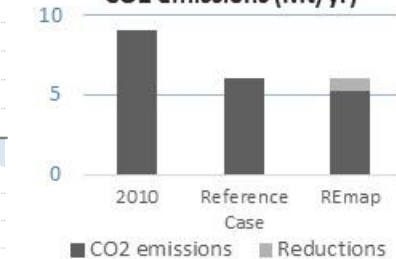
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



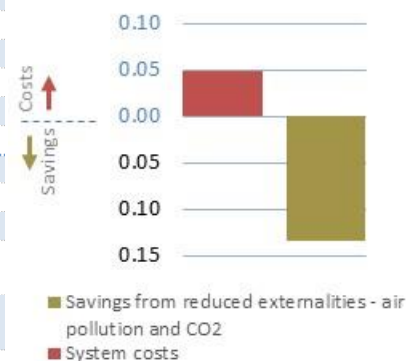
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

- Renewable Energy Roadmap for the Republic of Cyprus, IRENA (2015).
- National Renewable Energy Action Plan (NREAP), Republic of Cyprus submitted to EC (2013).



REmap Country Results - Denmark

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	14	19	22
		Renewable capacity	GW	5	14	17
		Hydropower (excl. pumped hydro)	GW	0	0	0
		Wind	GW	4	9	11
		Biofuels (solid, liquid, gaseous)	GW	1	2	3
		Solar PV	GW	0	3	3
		CSP	GW	0	0	0
		Geothermal	GW	0	0	0
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	9	6	5
		Total electricity generation	TWh	39	39	49
		Renewable generation	TWh	13	29	43
		Hydropower	TWh	0	0	0
		Wind	TWh	8	20	30
		Biofuels (solid, liquid, gaseous)	TWh	5	7	11
		Solar PV	TWh	0	2	2
		CSP	TWh	0	0	0
		Geothermal	TWh	0	0	0
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	26	10	7	
DH	Total district heat generation	PJ	145	125	115	
	Biofuels (solid, liquid, gaseous)	PJ	60	63	101	
	Other renewables	PJ	0	1	11	
	Non-renewable DH	PJ	85	61	3	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	193	168	119
		Direct uses of renewable energy	PJ	54	82	94
		Solar thermal - Buildings	PJ	1	1	1
		Solar thermal - Industry	PJ	0	0	0
		Geothermal	PJ	0	0	3
		Bioenergy (traditional) - Buildings	PJ	0	0	0
		Bioenergy (modern) - Buildings	PJ	40	53	53
		Bioenergy - Industry	PJ	13	29	38
		Non-renewable - Buildings	PJ	59	33	11
		Non-renewable - Industry	PJ	80	53	14
	Non-renewable - BF/CO	PJ	0	0	0	
	Transport	Total fuel consumption	PJ	207	243	216
		Liquid biofuels	PJ	1	19	34
		Conventional biogasoline	PJ	1	19	19
		Advanced biogasoline	PJ	0	0	10
		Biodiesel (conventional and advanced)	PJ	0	0	6
Biomethane		PJ	0	0	0	
Non-renewable fuels	PJ	206	224	182		
Total final energy consumption (electricity, DH, direct uses) ²			PJ	647	664	614
RE shares	RE share in electricity generation			34%	74%	86%
	RE share in district heat generation			42%	51%	97%
	RE share in Buildings - final energy use, direct uses (modern)			41%	62%	83%
	RE share in Industry - final energy use, direct uses			14%	35%	73%
	RE share in Transport fuels			1%	8%	16%
Financial indicators	Share of modern RE in TFEC ³			22%	38%	60%
	System costs [USD bln/yr in 2030]			N/A	N/A	-0.4
	RE investment needs [USD bln/yr (2010-2030)]			N/A	1	2
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	1.0
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	2.2
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO2) [USD bln/yr in 2030]			N/A	N/A	0.7
	CO2 emissions from energy [Mt/yr]			46	33	18

References for further consultation:

- National Renewable Energy Action Plan (NREAP), Denmark submitted to EC (2013).
- Danish Energy Outlook, Energi Styrelsen (2011).
- Accelerating Green Energy Towards 2020, Danish Energy Agreement (2012).

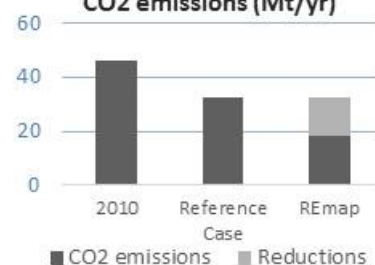
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



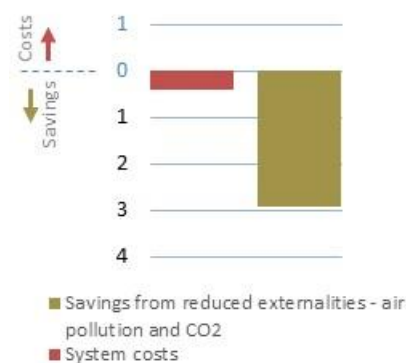
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



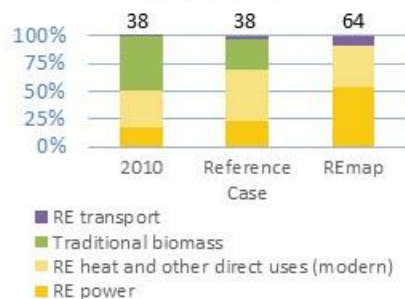
REmap Country Results – Dominican Republic

				Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	5	7	9	
		Renewable capacity	GW	1	1	5	
		Hydropower (excl. pumped hydro)	GW	1	1	1	
		Wind	GW	0	0	3	
		Biofuels (solid, liquid, gaseous)	GW	0	0	0	
		Solar PV	GW	0	0	1	
		CSP	GW	0	0	0	
		Geothermal	GW	0	0	0	
		Marine, other	GW	0	0	0	
		Non-renewable capacity	GW	4	6	4	
		Total electricity generation	TWh	14	30	30	
		Renewable generation	TWh	2	3	11	
		Hydropower	TWh	2	2	2	
		Wind	TWh	0	1	5	
		Biofuels (solid, liquid, gaseous)	TWh	0	0	2	
		Solar PV	TWh	0	0	2	
		CSP	TWh	0	0	0	
		Geothermal	TWh	0	0	0	
	Marine, other	TWh	0	0	0		
	Non-renewable generation	TWh	12	27	19		
DH	Total district heat generation	PJ	0	0	0		
	Biofuels (solid, liquid, gaseous)	PJ	0	0	0		
	Other renewables	PJ	0	0	0		
	Non-renewable DH	PJ	0	0	0		
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	76	93	85	
		Direct uses of renewable energy	PJ	31	28	24	
		Solar thermal - Buildings	PJ	0	1	1	
		Solar thermal - Industry	PJ	0	0	1	
		Geothermal	PJ	0	0	0	
		Bioenergy (traditional) - Buildings	PJ	18	10	0	
		Bioenergy (modern) - Buildings	PJ	3	3	7	
		Bioenergy - Industry	PJ	9	13	15	
		Non-renewable - Buildings	PJ	25	36	35	
		Non-renewable - Industry	PJ	20	29	26	
	Non-renewable - BF/CO	PJ	0	0	0		
	Transport	Total fuel consumption	PJ	96	135	132	
		Liquid biofuels	PJ	0	1	5	
		Conventional biogasoline	PJ	0	1	1	
		Advanced biogasoline	PJ	0	0	0	
		Biodiesel (conventional and advanced)	PJ	0	0	4	
Biomethane		PJ	0	0	0		
Non-renewable fuels	PJ	95	134	126			
Total final energy consumption (electricity, DH, direct uses) ²			PJ	221	322	311	
RE shares	RE share in electricity generation			13%	9%	37%	
	RE share in district heat generation			0%	0%	0%	
	RE share in Buildings - final energy use, direct uses (modern)			7%	9%	19%	
	RE share in Industry - final energy use, direct uses			32%	30%	38%	
	RE share in Transport fuels			0%	1%	4%	
Share of modern RE in TFEC ³			9%	8%	21%		
Financial indicators	System costs [USD bln/yr in 2030]			N/A	N/A	- 1	
	RE investment needs [USD bln/yr (2010-2030)]			N/A	0.1	0.4	
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	0.03	
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	1.8	
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]			N/A	N/A	0.4	
	CO ₂ emissions from energy [Mt/yr]			20	36	29	

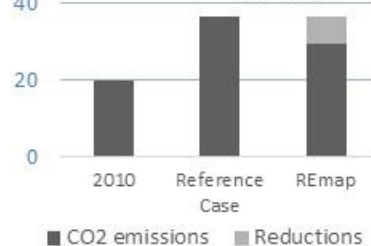
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



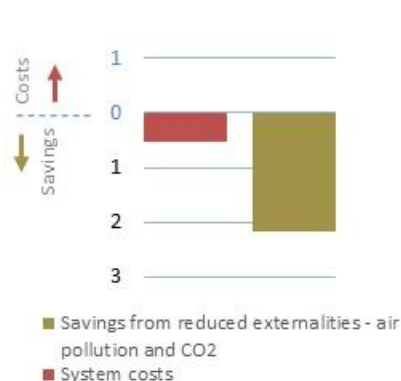
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

- Prospectiva demanda de la República Dominicana CNE (forthcomig).
- Harnessing the Dominican Republic's Sustainable Energy Resources, WorldWatch Institute (2015).



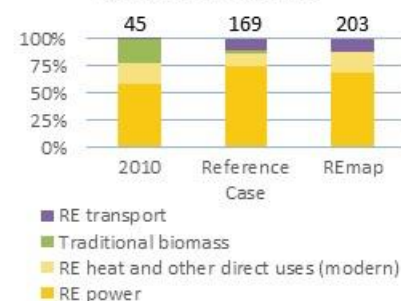
REmap Country Results – Ecuador

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	5	14	14
		Renewable capacity	GW	2	10	11
		Hydropower (excl. pumped hydro)	GW	2	9	9
		Wind	GW	0	0	1
		Biofuels (solid, liquid, gaseous)	GW	0	0	0
		Solar PV	GW	0	0	1
		CSP	GW	0	0	0
		Geothermal	GW	0	0	0
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	3	4	3
		Total electricity generation	TWh	20	60	60
		Renewable generation	TWh	9	43	48
		Hydropower	TWh	9	42	44
		Wind	TWh	0	1	2
		Biofuels (solid, liquid, gaseous)	TWh	0	0	1
		Solar PV	TWh	0	1	1
		CSP	TWh	0	0	0
	Geothermal	TWh	0	0	1	
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	11	17	12	
DH	Total district heat generation	PJ	0	0	0	
	Biofuels (solid, liquid, gaseous)	PJ	0	0	0	
	Other renewables	PJ	0	0	0	
	Non-renewable DH	PJ	0	0	0	
Final energy use - direct uses ^{1 1}	Buildings and Industry	Total direct uses of energy	PJ	113	158	153
		Direct uses of renewable energy	PJ	19	26	39
		Solar thermal - Buildings	PJ	0	0	1
		Solar thermal - Industry	PJ	0	0	5
		Geothermal	PJ	0	0	0
		Bioenergy (traditional) - Buildings	PJ	10	7	0
		Bioenergy (modern) - Buildings	PJ	0	7	9
		Bioenergy - Industry	PJ	9	12	24
		Non-renewable - Buildings	PJ	43	60	59
	Non-renewable - Industry	PJ	51	72	55	
	Non-renewable - BF/CO	PJ	0	0	0	
	Transport	Total fuel consumption	PJ	209	309	298
		Liquid biofuels	PJ	0	17	24
		Conventional biogasoline	PJ	0	17	21
		Advanced biogasoline	PJ	0	0	0
		Biodiesel (conventional and advanced)	PJ	0	0	2
		Biomethane	PJ	0	0	0
Non-renewable fuels		PJ	209	292	275	
Total final energy consumption (electricity, DH, direct uses) ²			PJ	383	647	632
RE shares	RE share in electricity generation			45%	72%	80%
	RE share in district heat generation			0%	0%	0%
	RE share in Buildings - final energy use, direct uses (modern)			0%	9%	15%
	RE share in Industry - final energy use, direct uses			15%	15%	34%
	RE share in Transport fuels			0%	5%	8%
Share of modern RE in TFEC ³			9%	25%	32%	
Financial indicators	System costs [USD bln/yr in 2030]			N/A	N/A	- 1
	RE investment needs [USD bln/yr (2010-2030)]			N/A	1	1
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	0.0
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	0.8
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]			N/A	N/A	0.3
	CO ₂ emissions from energy [Mt/vr]			31	45	39

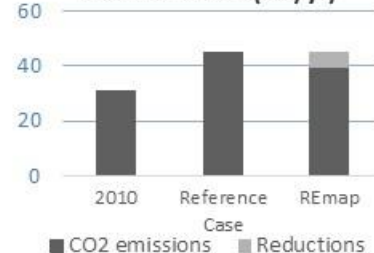
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



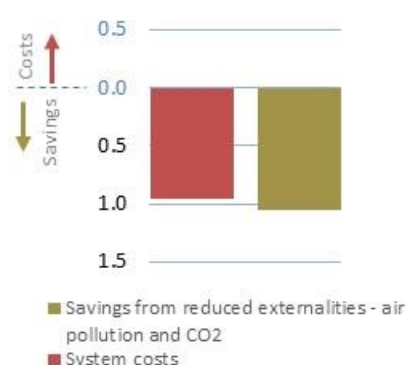
Final RE consumption by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

- Plan Nacional para el buen vivir 2013-2017, Tomo I, Consejo Nacional de Planificación (2013).
- Plan Maestro de Electrificación (PME) 2013-2022, CONELEC (2013).
- Evaluación Rápida y Análisis de Brechas del Sector Energético, Roberto Gomelsky (2013).



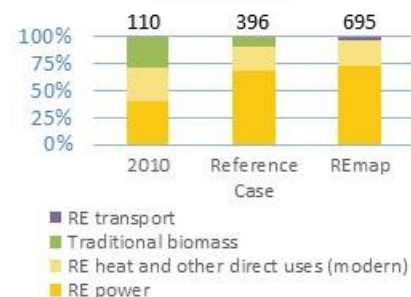
REmap Country Results – Egypt

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	25	56	78
		Renewable capacity	GW	3	25	59
		Hydropower (excl. pumped hydro)	GW	3	2	2
		Wind	GW	1	20	21
		Biofuels (solid, liquid, gaseous)	GW	0	0	1
		Solar PV	GW	0	1	21
		CSP	GW	0	3	14
		Geothermal	GW	0	0	0
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	21	31	19
		Total electricity generation	TWh	147	285	289
		Renewable generation	TWh	15	86	158
		Hydropower	TWh	13	9	9
		Wind	TWh	1	69	71
		Biofuels (solid, liquid, gaseous)	TWh	0	0	3
		Solar PV	TWh	0	1	37
		CSP	TWh	0	7	38
		Geothermal	TWh	0	0	0
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	132	199	131	
DH	Total district heat generation	PJ	0	0	0	
	Biofuels (solid, liquid, gaseous)	PJ	0	0	0	
	Other renewables	PJ	0	0	0	
	Non-renewable DH	PJ	0	0	0	
Final energy use - direct uses ^{1 1}	Buildings and Industry	Total direct uses of energy	PJ	777	1 061	981
		Direct uses of renewable energy	PJ	65	126	166
		Solar thermal - Buildings	PJ	0	4	9
		Solar thermal - Industry	PJ	0	0	20
		Geothermal	PJ	0	0	0
		Bioenergy (traditional) - Buildings	PJ	32	38	1
		Bioenergy (modern) - Buildings	PJ	0	0	10
		Bioenergy - Industry	PJ	33	84	127
		Non-renewable - Buildings	PJ	246	377	343
		Non-renewable - Industry	PJ	456	544	457
	Non-renewable - BF/CO	PJ	10	15	15	
	Transport	Total fuel consumption	PJ	623	921	896
		Liquid biofuels	PJ	0	0	25
		Conventional biogasoline	PJ	0	0	0
		Advanced biogasoline	PJ	0	0	25
		Biodiesel (conventional and advanced)	PJ	0	0	0
Biomethane		PJ	0	0	0	
Non-renewable fuels	PJ	623	921	871		
Total final energy consumption (electricity, DH, direct uses) ²			PJ	1 947	2 882	2 797
RE shares	RE share in electricity generation			10%	30%	55%
	RE share in district heat generation			0%	0%	0%
	RE share in Buildings - final energy use, direct uses (modern)			0%	1%	5%
	RE share in Industry - final energy use, direct uses			7%	13%	24%
	RE share in Transport fuels			0%	0%	3%
Financial indicators	Share of modern RE in TFEC ³			4%	12%	25%
	System costs [USD bln/yr in 2030]			N/A	N/A	2
	RE investment needs [USD bln/yr (2010-2030)]			N/A	3	8
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	4.0
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	1.9
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]			N/A	N/A	2.7
CO ₂ emissions from energy [Mt/yr]			159	240	187	

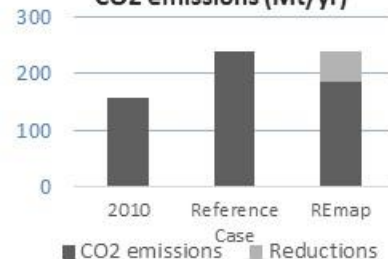
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



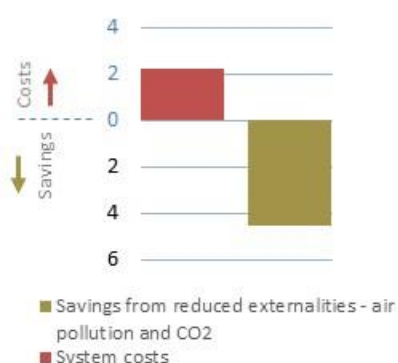
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

- Lahmeyer International; Fraunhofer ISI; Fraunhofer ISE (2013). Sub-task Reports 5.1, 5.6, 5.7, 6.1.
- L'Observatoire Méditerranéen de L'Energie (2011). 'Mediterranean Energy Perspectives'. OME, Nanterre.



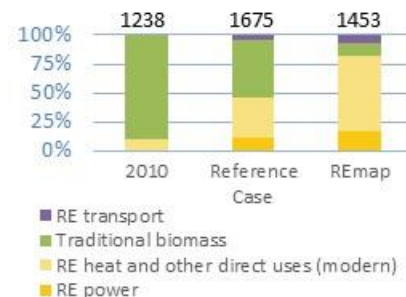
REmap Country Results – Ethiopia

		Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	2	31
		Renewable capacity	GW	28	30
		Hydropower (excl. pumped hydro)	GW	17	17
		Wind	GW	0	1
		Biofuels (solid, liquid, gaseous)	GW	0	2
		Solar PV	GW	0	9
		CSP	GW	0	0
		Geothermal	GW	0	1
		Marine, other	GW	0	0
		Non-renewable capacity	GW	4	3
	DH	Total electricity generation	TWh	5	105
		Renewable generation	TWh	95	108
		Hydropower	TWh	73	73
		Wind	TWh	0	4
		Biofuels (solid, liquid, gaseous)	TWh	0	12
		Solar PV	TWh	0	12
		CSP	TWh	0	0
		Geothermal	TWh	0	6
		Marine, other	TWh	0	0
		Non-renewable generation	TWh	10	9
Final energy use - direct uses ¹	Buildings and Industry	Total district heat generation	PJ	0	0
		Biofuels (solid, liquid, gaseous)	PJ	0	0
		Other renewables	PJ	0	0
		Non-renewable DH	PJ	0	0
	Transport	Total direct uses of energy	PJ	1 253	1 724
		Direct uses of renewable energy	PJ	1 224	1 102
		Solar thermal - Buildings	PJ	0	0
		Solar thermal - Industry	PJ	0	0
		Geothermal	PJ	0	0
		Bioenergy (traditional) - Buildings	PJ	1 116	833
		Bioenergy (modern) - Buildings	PJ	108	597
		Bioenergy - Industry	PJ	0	57
		Non-renewable - Buildings	PJ	12	17
		Non-renewable - Industry	PJ	17	224
		Non-renewable - BF/CO	PJ	0	0
	Transport	Total fuel consumption	PJ	37	458
		Liquid biofuels	PJ	0	60
		Conventional biogasoline	PJ	0	64
		Advanced biogasoline	PJ	0	3
		Biodiesel (conventional and advanced)	PJ	0	31
		Biomethane	PJ	0	0
		Non-renewable fuels	PJ	37	398
					148
RE shares	Total final energy consumption (electricity, DH, direct uses) ²		PJ	1 304	2 386
	RE share in electricity generation			99%	91%
	RE share in district heat generation			0%	0%
	RE share in Buildings - final energy use, direct uses (modern)			9%	41%
	RE share in Industry - final energy use, direct uses			0%	20%
	RE share in Transport fuels			0%	13%
	Share of modern RE in TFC ³			9%	35%
	Share of modern RE in TFC ³			9%	70%
	System costs [USD bln/yr in 2030]			N/A	1
	RE investment needs [USD bln/yr (2010-2030)]			N/A	4
	Investment support for renewables [USD bln/yr in 2030]			N/A	3.3
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	3.5
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]			N/A	1.2
	CO ₂ emissions from energy [Mt/yr]			5	65
	CO ₂ emissions from energy [Mt/yr]			5	41
Financial indicators	System costs [USD bln/yr in 2030]			N/A	1
	RE investment needs [USD bln/yr (2010-2030)]			N/A	4
	Investment support for renewables [USD bln/yr in 2030]			N/A	3.3
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	3.5
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]			N/A	1.2

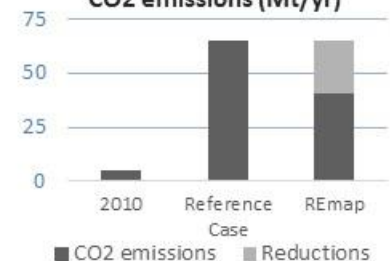
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



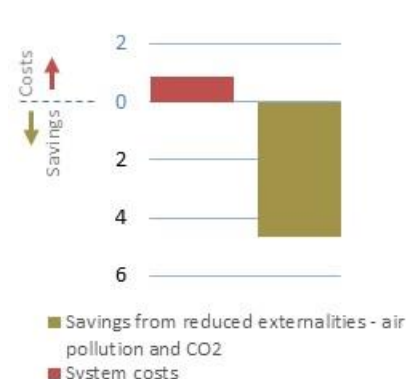
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

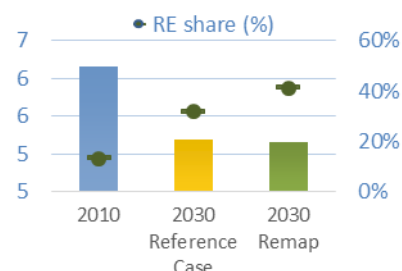
- Ethiopian Climate Resilient Green Economy Strategy (CRGE), Ministry of Environment and Forest (MEF), 2015.



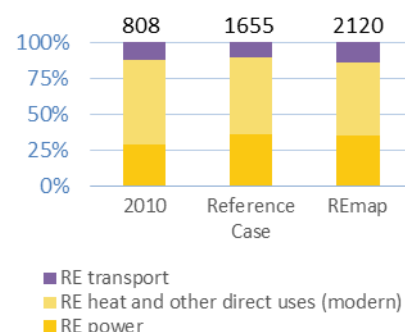
REmap Country Results – France

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	119	147	167
		Renewable capacity	GW	33	94	121
		Hydropower (excl. pumped hydro)	GW	25	25	26
		Wind	GW	6	35	46
		Biofuels (solid, liquid, gaseous)	GW	1	3	5
		Solar PV	GW	1	32	44
		CSP	GW	0	0	0
		Geothermal	GW	0	0	0
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	86	53	46
		Total electricity generation	TWh	569	529	532
		Renewable generation	TWh	85	224	284
		Hydropower	TWh	69	72	74
		Wind	TWh	10	91	121
		Biofuels (solid, liquid, gaseous)	TWh	5	20	30
		Solar PV	TWh	1	41	57
		CSP	TWh	0	0	0
	Geothermal	TWh	0	1	0	
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	484	305	249	
DH	Total district heat generation	PJ	153	248	293	
	Biofuels (solid, liquid, gaseous)	PJ	23	49	94	
	Other renewables	PJ	0	6	6	
	Non-renewable DH	PJ	131	193	193	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	2 631	1 668	1 569
		Direct uses of renewable energy	PJ	451	749	823
		Solar thermal - Buildings	PJ	2	39	69
		Solar thermal - Industry	PJ	0	0	14
		Geothermal	PJ	4	21	21
		Bioenergy (traditional) - Buildings	PJ	0	0	0
		Bioenergy (modern) - Buildings	PJ	363	309	339
		Bioenergy - Industry	PJ	82	380	380
		Non-renewable - Buildings	PJ	1 347	284	127
		Non-renewable - Industry	PJ	723	523	508
	Non-renewable - BF/CO	PJ	111	111	111	
	Transport	Total fuel consumption	PJ	1 808	1 444	1 445
		Liquid biofuels	PJ	101	165	300
		Conventional biogasoline	PJ	17	25	44
		Advanced biogasoline	PJ	0	15	45
		Biodiesel (conventional and advanced)	PJ	85	125	211
		Biomethane	PJ	0	0	0
Non-renewable fuels		PJ	1 707	1 279	1 145	
Total final energy consumption (electricity, DH, direct uses) ²			PJ	6 164	5 188	5 150
RE shares	RE share in electricity generation			15%	42%	53%
	RE share in district heat generation			15%	22%	34%
	RE share in Buildings - final energy use, direct uses (modern)			22%	57%	77%
	RE share in Industry - final energy use, direct uses			10%	42%	44%
	RE share in Transport fuels			6%	11%	21%
Share of modern RE in TFEC ³			13%	32%	41%	
Financial indicators	System costs [USD bln/yr in 2030]			N/A	N/A	2
	RE investment needs [USD bln/yr (2010-2030)]			N/A	11	14
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	1.4
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	2.4
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]			N/A	N/A	1.4
	CO ₂ emissions from energy [Mt/yr]			316	191	162

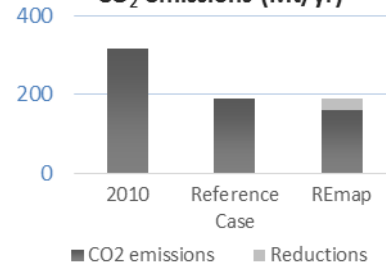
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



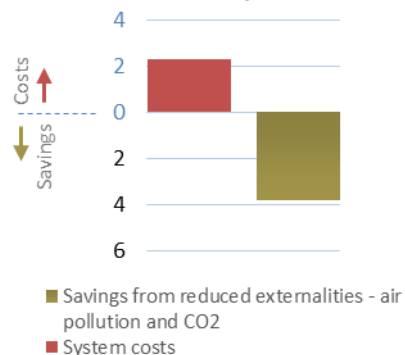
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln/yr in 2030)



References for further consultation:

- France Energy Transition Law, 2015.
- Vers un mix électrique 100% renouvelable en 2050, ADEME (2015).
- Roadmap for smart grid and electricity systems integrating renewable energy sources, ADEME (2013).



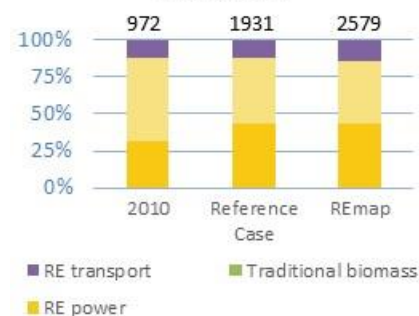
REmap Country Results – Germany

		Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	161	222
		Renewable capacity	GW	63	146
		Hydropower (excl. pumped hydro)	GW	5	5
		Wind	GW	27	88
		Biofuels (solid, liquid, gaseous)	GW	11	20
		Solar PV	GW	20	75
		CSP	GW	0	0
		Geothermal	GW	0	1
		Marine, other	GW	0	0
		Non-renewable capacity	GW	98	66
		Total electricity generation	TWh	629	599
		Renewable generation	TWh	103	286
		Hydropower	TWh	21	19
		Wind	TWh	38	143
		Biofuels (solid, liquid, gaseous)	TWh	33	67
		Solar PV	TWh	12	56
		CSP	TWh	0	0
		Geothermal	TWh	0	1
		Marine, other	TWh	0	0
		Non-renewable generation	TWh	525	313
Final energy use – direct uses ¹	DH	Total district heat generation	PJ	555	578
		Biofuels (solid, liquid, gaseous)	PJ	52	191
		Other renewables	PJ	0	84
		Non-renewable DH	PJ	504	320
	Buildings and Industry	Total direct uses of energy	PJ	4 694	3 275
		Direct uses of renewable energy	PJ	495	741
		Solar thermal - Buildings	PJ	18	106
		Solar thermal - Industry	PJ	0	25
		Geothermal	PJ	19	86
		Bioenergy (traditional) - Buildings	PJ	0	0
		Bioenergy (modern) - Buildings	PJ	318	375
		Bioenergy - Industry	PJ	140	174
		Non-renewable - Buildings	PJ	2 435	1 207
	Transport	Non-renewable - Industry	PJ	1 510	1 242
		Non-renewable - BF/CO	PJ	254	85
		Total fuel consumption	PJ	2 500	2 137
		Liquid biofuels	PJ	121	228
		Conventional biogasoline	PJ	33	49
		Advanced biogasoline	PJ	0	46
		Biodiesel (conventional and advanced)	PJ	88	133
		Biomethane	PJ	0	5
		Non-renewable fuels	PJ	2 379	1 909
		Total final energy consumption (electricity, DH, direct uses) ²	PJ	9 565	7 539
RE shares	RE shares	RE share in electricity generation		16%	48%
		RE share in district heat generation		9%	33%
		RE share in Buildings - final energy use, direct uses (modern)		13%	32%
		RE share in Industry - final energy use, direct uses		8%	12%
		RE share in Transport fuels		5%	11%
		Share of modern RE in TFEC ³		10%	26%
	Financial indicators	System costs [USD bln/yr in 2030]		N/A	3
		RE investment needs [USD bln/yr (2010-2030)]		N/A	15
		Investment support for renewables [USD bln/yr in 2030]		N/A	2.9
		Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]		N/A	6.0
		Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]		N/A	4.8
		CO ₂ emissions from energy [Mt/yr]		746	518

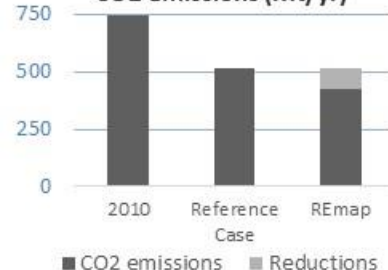
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



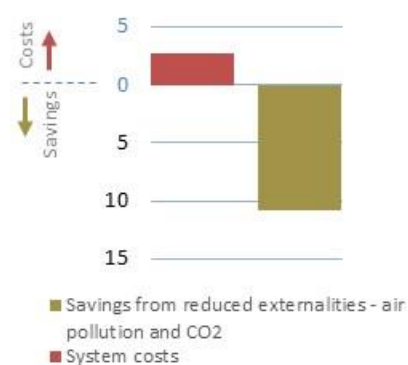
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

- REmap: Renewable Energy Prospects, Germany, IRENA (2015).
- Projektionsbericht 2015, BMU (2015).
- Entwicklung der Energiemärkte – Energiereferenzprognose, BMWi (2014).



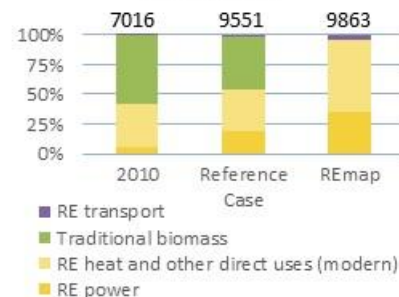
REmap Country Results – India

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	174	663	854
		Renewable capacity	GW	56	252	521
		Hydropower (excl. pumped hydro)	GW	37	48	77
		Wind	GW	14	146	194
		Biofuels (solid, liquid, gaseous)	GW	3	11	28
		Solar PV	GW	1	48	209
		CSP	GW	0	0	11
		Geothermal	GW	0	0	2
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	118	411	333
		Total electricity generation	TWh	946	3 428	3 490
		Renewable generation	TWh	136	592	1 186
		Hydropower	TWh	104	131	230
		Wind	TWh	21	345	458
		Biofuels (solid, liquid, gaseous)	TWh	10	35	108
		Solar PV	TWh	1	82	346
		CSP	TWh	0	0	28
		Geothermal	TWh	0	0	16
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	810	2 835	2 304	
DH	Total district heat generation	PJ	0	0	0	
	Biofuels (solid, liquid, gaseous)	PJ	0	0	0	
	Other renewables	PJ	0	0	0	
	Non-renewable DH	PJ	0	0	0	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	13 055	27 567	25 256
		Direct uses of renewable energy	PJ	6 639	7 638	5 966
		Solar thermal - Buildings	PJ	6	71	510
		Solar thermal - Industry	PJ	0	1	151
		Geothermal	PJ	9	9	19
		Bioenergy (traditional) - Buildings	PJ	4 063	4 259	0
		Bioenergy (modern) - Buildings	PJ	1 364	1 485	2 967
		Bioenergy - Industry	PJ	1 196	1 813	2 319
		Non-renewable - Buildings	PJ	1 023	4 740	4 740
		Non-renewable - Industry	PJ	5 116	14 553	13 914
	Non-renewable - BF/CO	PJ	278	636	636	
	Transport	Total fuel consumption	PJ	2 214	5 718	3 351
		Liquid biofuels	PJ	8	109	468
		Conventional biogasoline	PJ	7	42	108
		Advanced biogasoline	PJ	0	1	37
		Biodiesel (conventional and advanced)	PJ	2	66	323
Biomethane		PJ	0	0	0	
Non-renewable fuels	PJ	2 205	5 609	2 883		
Total final energy consumption (electricity, DH, direct uses) ²			PJ	18 222	44 055	38 695
RE shares	RE share in electricity generation			14%	17%	34%
	RE share in district heat generation			0%	0%	0%
	RE share in Buildings - final energy use, direct uses (modern)			21%	15%	42%
	RE share in Industry - final energy use, direct uses			19%	11%	15%
	RE share in Transport fuels			0%	2%	14%
Share of modern RE in TFEC ³			16%	12%	25%	
Financial indicators	System costs [USD bln/yr in 2030]			N/A	N/A	17
	RE investment needs [USD bln/yr (2010-2030)]			N/A	25	51
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	22.2
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	103.2
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO2) [USD bln/yr in 2030]			N/A	N/A	39.3
	CO2 emissions from energy [Mt/yr]			1 560	4 570	3 783

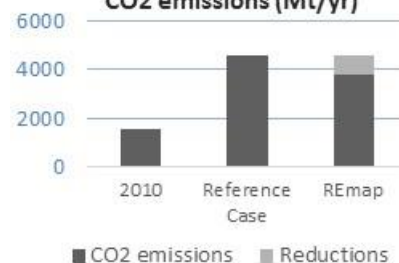
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



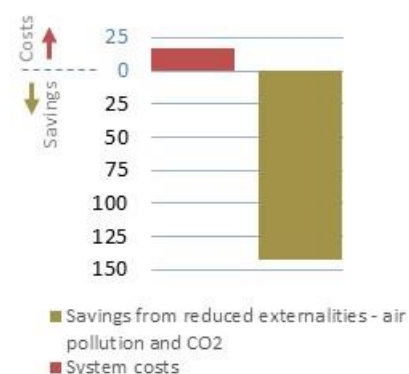
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

- Low Carbon Strategies for Inclusive Growth, Planning Commission of Government of India (2014).
- Report on India's Renewable Electricity Roadmap to 2030, NITI Aayog, Government of India (2015).
- Twelfth Five Year Plan (2012-2017), Planning Commission of Government of India (2013).



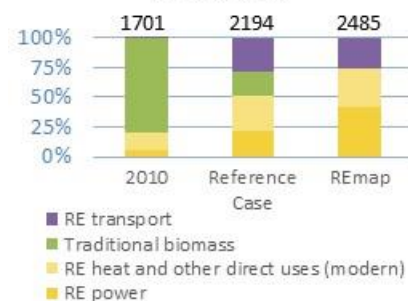
REmap Country Results – Indonesia

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	36	196	239
		Renewable capacity	GW	7	60	129
		Hydropower (excl. pumped hydro)	GW	4	16	25
		Wind	GW	0	2	11
		Biofuels (solid, liquid, gaseous)	GW	2	29	29
		Solar PV	GW	0	4	47
		CSP	GW	0	0	0
		Geothermal	GW	1	9	14
		Marine, other	GW	0	0	3
		Non-renewable capacity	GW	29	136	110
		Total electricity generation	TWh	170	590	593
		Renewable generation	TWh	27	147	328
		Hydropower	TWh	18	37	76
		Wind	TWh	0	2	31
		Biofuels (solid, liquid, gaseous)	TWh	0	61	61
		Solar PV	TWh	0	2	62
		CSP	TWh	0	0	0
		Geothermal	TWh	9	45	84
	Marine, other	TWh	0	0	13	
	Non-renewable generation	TWh	143	443	266	
DH	Total district heat generation	PJ	0	0	0	
	Biofuels (solid, liquid, gaseous)	PJ	0	0	0	
	Other renewables	PJ	0	0	0	
	Non-renewable DH	PJ	0	0	0	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	3 568	5 524	5 173
		Direct uses of renewable energy	PJ	1 608	1 110	791
		Solar thermal - Buildings	PJ	0	0	0
		Solar thermal - Industry	PJ	0	0	20
		Geothermal	PJ	0	0	10
		Bioenergy (traditional) - Buildings	PJ	1 352	461	0
		Bioenergy (modern) - Buildings	PJ	0	70	182
		Bioenergy - Industry	PJ	255	579	579
		Non-renewable - Buildings	PJ	317	654	654
		Non-renewable - Industry	PJ	1 644	3 760	3 727
	Non-renewable - BF/CO	PJ	0	0	0	
	Transport	Total fuel consumption	PJ	1 492	3 601	3 577
		Liquid biofuels	PJ	8	617	651
		Conventional biogasoline	PJ	1	417	433
		Advanced biogasoline	PJ	0	0	0
		Biodiesel (conventional and advanced)	PJ	7	200	218
Biomethane		PJ	0	0	0	
Non-renewable fuels	PJ	1 483	2 985	2 925		
Total final energy consumption (electricity, DH, direct uses) ²			PJ	5 590	11 289	10 923
RE shares	RE share in electricity generation			16%	25%	55%
	RE share in district heat generation			0%	0%	0%
	RE share in Buildings - final energy use, direct uses (modern)			0%	6%	22%
	RE share in Industry - final energy use, direct uses			13%	13%	14%
	RE share in Transport fuels			1%	17%	18%
	Share of modern RE in TFEC ³			6%	16%	23%
Financial indicators	System costs [USD bln/yr in 2030]			N/A	N/A	4
	RE investment needs [USD bln/yr (2010-2030)]			N/A	5	13
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	4.2
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	6.9
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]			N/A	N/A	10.5
	CO ₂ emissions from energy [Mt/yr]			391	971	761

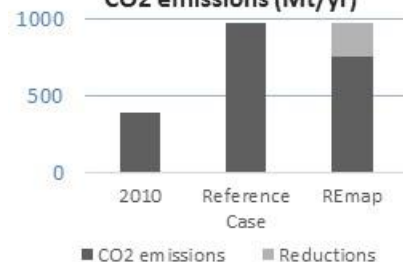
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



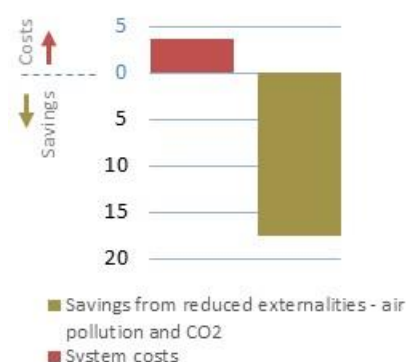
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

- Outlook Energi Indonesia, MEMR (2014).
- Outlook Energi Indonesia, BPPT (2015).
- Peer Review on Low Carbon Energy Policies in Indonesia (2013).



REmap Country Results – Iran (power sector)

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	67	98	108
		Renewable capacity	GW	10	29	42
		Hydropower (excl. pumped hydro)	GW	10	21	21
		Wind	GW	0	6	12
		Biofuels (solid, liquid, gaseous)	GW	0	1	2
		Solar PV	GW	0	1	8
		CSP	GW	0	0	0
		Geothermal	GW	0	0	0
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	57	69	66
		Total electricity generation	TWh	245	425	425
		Renewable generation	TWh	13	63	93
		Hydropower	TWh	12	37	37
		Wind	TWh	0	16	30
		Biofuels (solid, liquid, gaseous)	TWh	0	7	12
		Solar PV	TWh	0	2	14
		CSP	TWh	0	0	0
		Geothermal	TWh	0	0	0
		Marine, other	TWh	0	0	0
		Non-renewable generation	TWh	233	362	331
RE share in electricity generation			5%	15%	22%	

References for further consultation:

- Data provided by Iran Renewable Energy Organisation, based on output of the “MAED” and “MESSAGE” models.



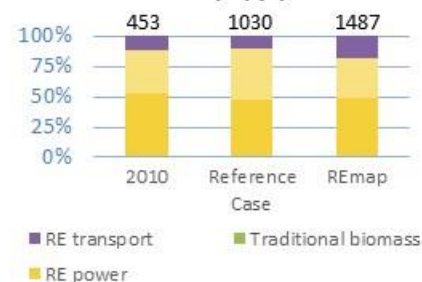
REmap Country Results – Italy

		Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	110	123
		Renewable capacity	GW	26	64
		Hydropower (excl. pumped hydro)	GW	14	14
		Wind	GW	6	19
		Biofuels (solid, liquid, gaseous)	GW	2	5
		Solar PV	GW	3	25
		CSP	GW	0	1
		Geothermal	GW	1	1
		Marine, other	GW	0	0
		Non-renewable capacity	GW	84	59
	DH	Total electricity generation	TWh	302	352
		Renewable generation	TWh	67	135
		Hydropower	TWh	41	39
		Wind	TWh	9	29
		Biofuels (solid, liquid, gaseous)	TWh	9	22
		Solar PV	TWh	2	37
		CSP	TWh	0	2
		Geothermal	TWh	5	7
		Marine, other	TWh	0	0
		Non-renewable generation	TWh	235	217
Final energy use - direct uses ¹	Buildings and Industry	Total district heat generation	PJ	205	126
		Biofuels (solid, liquid, gaseous)	PJ	15	24
		Other renewables	PJ	1	1
		Non-renewable DH	PJ	189	101
	Transport	Total direct uses of energy	PJ	2 166	2 142
		Direct uses of renewable energy	PJ	149	405
		Solar thermal - Buildings	PJ	5	44
		Solar thermal - Industry	PJ	0	0
		Geothermal	PJ	3	18
		Bioenergy (traditional) - Buildings	PJ	0	0
		Bioenergy (modern) - Buildings	PJ	131	304
		Bioenergy - Industry	PJ	9	39
		Non-renewable - Buildings	PJ	1 317	1 000
		Non-renewable - Industry	PJ	700	736
		Non-renewable - BF/CO	PJ	0	0
Financial indicators	RE shares	Total fuel consumption	PJ	1 703	1 677
		Liquid biofuels	PJ	55	105
		Conventional biogasoline	PJ	0	14
		Advanced biogasoline	PJ	0	25
		Biodiesel (conventional and advanced)	PJ	54	65
		Biomethane	PJ	0	0
		Non-renewable fuels	PJ	1 648	1 572
		Total final energy consumption (electricity, DH, direct uses) ²	PJ	5 200	5 317
		RE share in electricity generation		22%	38%
		RE share in district heat generation		8%	19%
	System costs	RE share in Buildings - final energy use, direct uses (modern)		10%	27%
		RE share in Industry - final energy use, direct uses		1%	5%
		RE share in Transport fuels		3%	6%
		Share of modern RE in TFEC ³		9%	20%
		System costs [USD bln/yr in 2030]	N/A	N/A	- 2
		RE investment needs [USD bln/yr (2010-2030)]	N/A	5	9
		Investment support for renewables [USD bln/yr in 2030]	N/A	N/A	1.8
		Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]	N/A	N/A	10.0
		Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]	N/A	N/A	2.9
		CO ₂ emissions from energy [Mt/yr]		383	277

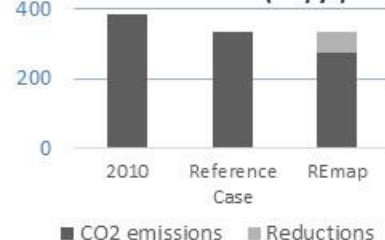
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



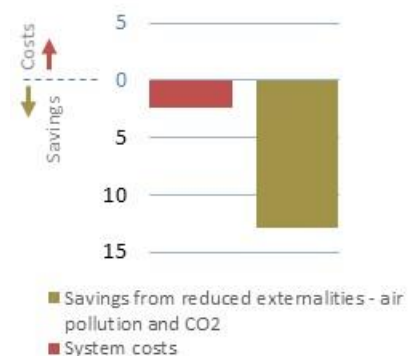
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

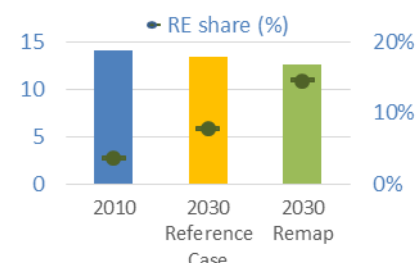
- Italy's National Energy Strategy, Italian Ministry for Economic Development (2010).
- Rapporto Energia E Ambiente, Scenari E Strategie, ENEA (2013).
- Italian National Renewable Energy Action Plan, Italian Ministry for Economic Development (2010).



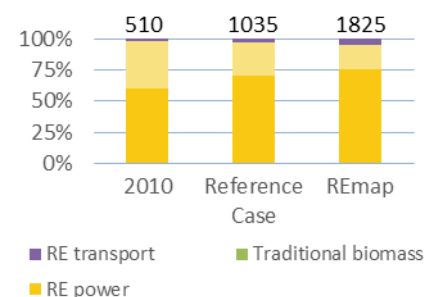
REmap Country Results – Japan

				Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	262	266	388	
		Renewable capacity	GW	31	105	250	
		Hydropower (excl. pumped hydro)	GW	21	23	23	
		Wind	GW	2	10	37	
		Biofuels (solid, liquid, gaseous)	GW	3	7	7	
		Solar PV	GW	4	64	179	
		CSP	GW	0	0	0	
		Geothermal	GW	1	2	2	
		Marine, other	GW	0	0	2	
		Non-renewable capacity	GW	231	161	139	
	Total electricity generation	TWh	1 159	1 057	1 158		
	Renewable generation	TWh	99	236	439		
	Hydropower	TWh	76	88	90		
	Wind	TWh	4	18	74		
	Biofuels (solid, liquid, gaseous)	TWh	12	44	49		
	Solar PV	TWh	4	75	212		
	CSP	TWh	0	0	0		
	Geothermal	TWh	3	11	11		
	Marine, other	TWh	0	0	4		
	Non-renewable generation	TWh	1 060	821	719		
DH	Total district heat generation	PJ	21	20	20		
	Biofuels (solid, liquid, gaseous)	PJ	4	4	4		
	Other renewables	PJ	0	0	0		
	Non-renewable DH	PJ	17	16	16		
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	7 153	7 162	6 072	
		Direct uses of renewable energy	PJ	190	275	364	
		Solar thermal - Buildings	PJ	18	21	52	
		Solar thermal - Industry	PJ	0	0	50	
		Geothermal	PJ	0	0	0	
		Bioenergy (traditional) - Buildings	PJ	0	0	0	
		Bioenergy (modern) - Buildings	PJ	0	0	0	
		Bioenergy - Industry	PJ	172	254	261	
		Non-renewable - Buildings	PJ	2 596	2 475	1 384	
		Non-renewable - Industry	PJ	3 566	3 611	3 523	
	Non-renewable - BF/CO	PJ	801	801	801		
	Transport	Total fuel consumption	PJ	3 363	2 927	2 818	
		Liquid biofuels	PJ	8	27	76	
		Conventional biogasoline	PJ	8	27	76	
Advanced biogasoline		PJ	0	0	0		
Biodiesel (conventional and advanced)		PJ	0	0	0		
Biomethane		PJ	0	0	1		
Non-renewable fuels	PJ	3 355	2 900	2 741			
Total final energy consumption (electricity, DH, direct uses) ²			PJ	14 132	13 381	12 549	
RE shares	RE share in electricity generation			9%	22%	38%	
	RE share in district heat generation			20%	21%	21%	
	RE share in Buildings - final energy use, direct uses (modern)			1%	1%	4%	
	RE share in Industry - final energy use, direct uses			5%	7%	8%	
	RE share in Transport fuels			0%	1%	3%	
	Share of modern RE in TFEC ³			4%	8%	15%	
Financial indicators	System costs [USD bln/yr in 2030]			N/A	N/A	1	
	RE investment needs [USD bln/yr (2010-2030)]			N/A	21	36	
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	8.6	
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	6.9	
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO2) [USD bln/yr in 2030]			N/A	N/A	6.5	
	CO2 emissions from energy [Mt/yr]			1 192	1 053	923	

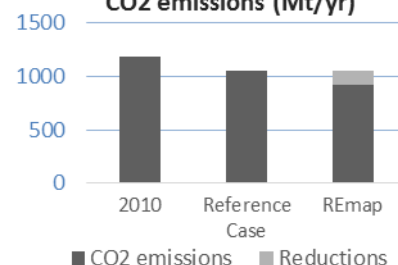
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



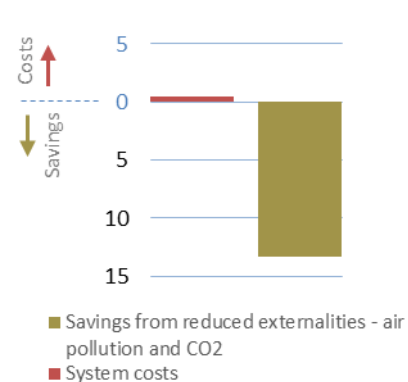
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



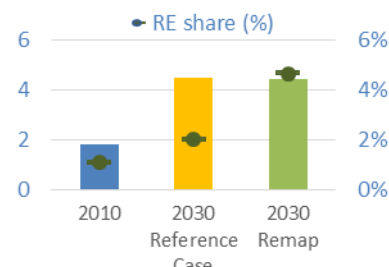
References for further consultation:

- Long-term energy supply and demand outlook, METI (2015).
- Data Book on heat Pump & Thermal Storage System 2013, Heat Pump & Thermal Storage Technology Center of Japan (2013).
- FY 2013 Energy Supply and Demand Report, METI (2015).

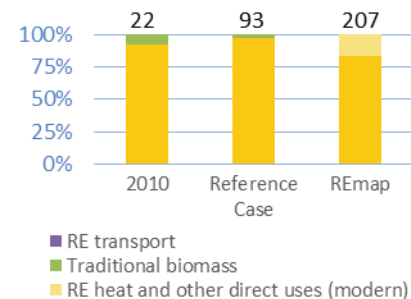
REmap Country Results – Kazakhstan

		Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	20	34
		Renewable capacity	GW	9	19
		Hydropower (excl. pumped hydro)	GW	4	4
		Wind	GW	5	11
		Biofuels (solid, liquid, gaseous)	GW	0	1
		Solar PV	GW	1	4
		CSP	GW	0	0
		Geothermal	GW	0	0
		Marine, other	GW	0	0
		Non-renewable capacity	GW	25	22
	DH	Total electricity generation	TWh	83	145
		Renewable generation	TWh	29	56
		Hydropower	TWh	15	15
		Wind	TWh	14	32
		Biofuels (solid, liquid, gaseous)	TWh	0	3
		Solar PV	TWh	1	7
		CSP	TWh	0	0
		Geothermal	TWh	0	0
		Marine, other	TWh	0	0
		Non-renewable generation	TWh	116	90
Final energy use – direct uses ¹	Buildings and Industry	Total district heat generation	PJ	402	1 120
		Biofuels (solid, liquid, gaseous)	PJ	0	39
		Other renewables	PJ	0	7
		Non-renewable DH	PJ	402	1 081
	Transport	Total direct uses of energy	PJ	1 145	3 082
		Direct uses of renewable energy	PJ	2	5
		Solar thermal - Buildings	PJ	0	0
		Solar thermal - Industry	PJ	0	0
		Geothermal	PJ	0	4
		Bioenergy (traditional) - Buildings	PJ	2	0
		Bioenergy (modern) - Buildings	PJ	0	1
		Bioenergy - Industry	PJ	0	0
		Non-renewable - Buildings	PJ	220	951
		Non-renewable - Industry	PJ	833	1 915
		Total fuel consumption	PJ	184	173
		Liquid biofuels	PJ	0	0
		Conventional biogasoline	PJ	0	0
		Advanced biogasoline	PJ	0	0
		Biodiesel (conventional and advanced)	PJ	0	0
		Biomethane	PJ	0	0
		Non-renewable fuels	PJ	184	168
		Total final energy consumption (electricity, DH, direct uses) ²	PJ	1 829	4 456
		RE share in electricity generation	10%	20%	38%
		RE share in district heat generation	0%	0%	4%
RE shares		RE share in Buildings - final energy use, direct uses (modern)	0%	0%	0%
		RE share in Industry - final energy use, direct uses	0%	0%	0%
		RE share in Transport fuels	0%	0%	0%
		Share of modern RE in TFEC ³	1%	2%	5%
Financial indicators		System costs [USD bln/yr in 2030]	N/A	N/A	1
		RE investment needs [USD bln/yr (2010-2030)]	N/A	1	2
		Investment support for renewables [USD bln/yr in 2030]	N/A	N/A	1.0
		Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]	N/A	N/A	8.4
		Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]	N/A	N/A	0.9
		CO ₂ emissions from energy [Mt/yr]	179	777	759

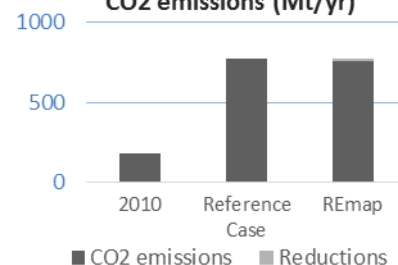
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



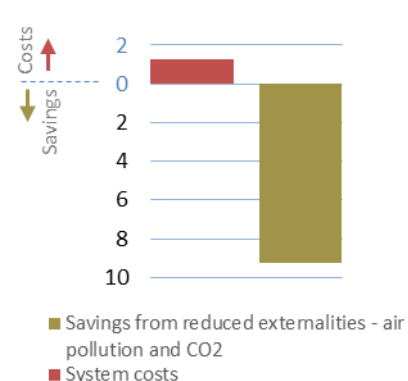
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

- Concept for transition of the Republic of Kazakhstan to Green Economy, Republic of Kazakhstan (2013).
- Kerimray, A. *et al.* (2015), "TIMES Kazakhstan: from a national to a regional analysis and modelling", 1 June 2015, ETSAP Workshop. Abu Dhabi.

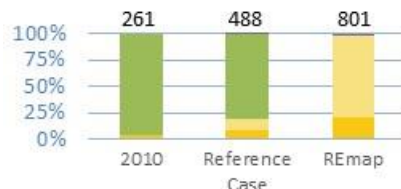
REmap Country Results – Kenya

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	2	3	4
		Renewable capacity	GW	1	2	3
		Hydropower (excl. pumped hydro)	GW	1	1	1
		Wind	GW	0	0	1
		Biofuels (solid, liquid, gaseous)	GW	0	0	0
		Solar PV	GW	0	0	0
		CSP	GW	0	0	0
		Geothermal	GW	0	1	1
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	1	1	1
		Total electricity generation	TWh	8	20	20
		Renewable generation	TWh	5	11	15
		Hydropower	TWh	3	3	3
		Wind	TWh	0	2	2
		Biofuels (solid, liquid, gaseous)	TWh	0	0	0
		Solar PV	TWh	0	0	1
		CSP	TWh	0	0	0
		Geothermal	TWh	1	7	9
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	2	8	5	
DH	Total district heat generation	PJ	0	0	0	
	Biofuels (solid, liquid, gaseous)	PJ	0	0	0	
	Other renewables	PJ	0	0	0	
	Non-renewable DH	PJ	0	0	0	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	441	548	279
		Direct uses of renewable energy	PJ	393	445	186
		Solar thermal - Buildings	PJ	0	2	3
		Solar thermal - Industry	PJ	0	0	1
		Geothermal	PJ	0	0	0
		Bioenergy (traditional) - Buildings	PJ	393	391	0
		Bioenergy (modern) - Buildings	PJ	0	51	171
		Bioenergy - Industry	PJ	0	0	12
		Non-renewable - Buildings	PJ	14	44	44
		Non-renewable - Industry	PJ	35	60	49
	Non-renewable - BF/CO	PJ	0	0	0	
	Transport	Total fuel consumption	PJ	71	136	136
		Liquid biofuels	PJ	0	1	3
		Conventional biogasoline	PJ	0	1	1
		Advanced biogasoline	PJ	0	0	3
		Biodiesel (conventional and advanced)	PJ	0	0	0
Biomethane		PJ	0	0	0	
Non-renewable fuels	PJ	71	135	133		
Total final energy consumption (electricity, DH, direct uses) ²			PJ	535	755	485
RE shares	RE share in electricity generation			70%	57%	74%
	RE share in district heat generation			0%	0%	0%
	RE share in Buildings - final energy use, direct uses (modern)			0%	11%	80%
	RE share in Industry - final energy use, direct uses			0%	0%	21%
	RE share in Transport fuels			0%	0%	2%
Financial indicators	Share of modern RE in TFEC ³			3%	12%	50%
	System costs [USD bln/yr in 2030]			N/A	N/A	0
	RE investment needs [USD bln/yr (2010-2030)]			N/A	1	1
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	0.4
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	1.3
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]			N/A	N/A	0.1
CO ₂ emissions from energy [Mt/yr]			11	21	19	

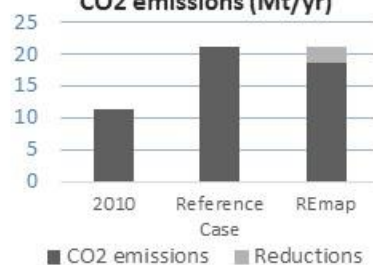
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



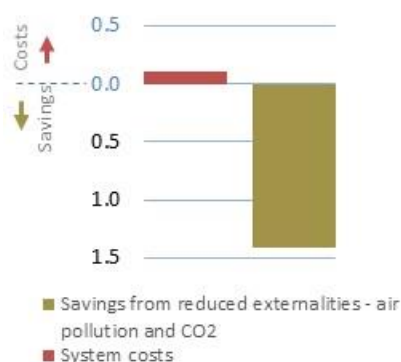
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

- Kenya Vision 2030, Government of Kenya, (2007).
- Updated Least Cost Power Development Plan – Study Period: 2011-2031, Energy Regulatory Commission (2011).
- National Energy Policy (Draft), Ministry of Energy and Petroleum (2011).



REmap Country Results – Kuwait (power sector)

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	14.7	43.6	45.5
		Renewable capacity	GW	0.0	8.1	14.3
		Hydropower (excl. pumped hydro)	GW	0.0	0.0	0.0
		Wind	GW	0.0	3.7	3.8
		Biofuels (solid, liquid, gaseous)	GW	0.0	0.0	0.0
		Solar PV	GW	0.0	3.3	4.1
		CSP	GW	0.0	1.1	6.4
		Geothermal	GW	0.0	0.0	0.0
		Marine, other	GW	0.0	0.0	0.0
		Non-renewable capacity	GW	14.7	35.5	31.3
		Total electricity generation	TWh	57.0	146.1	146.1
		Renewable generation	TWh	0.0	15.9	29.2
		Hydropower	TWh	0.0	0.0	0.0
		Wind	TWh	0.0	7.5	7.6
		Biofuels (solid, liquid, gaseous)	TWh	0.0	0.0	0.0
		Solar PV	TWh	0.0	5.2	6.2
		CSP	TWh	0.0	3.2	15.4
		Geothermal	TWh	0.0	0.0	0.0
		Marine, other	TWh	0.0	0.0	0.0
		Non-renewable generation	TWh	57.0	130.2	116.9
RE share in electricity generation				0%	11%	20%

References for further consultation:

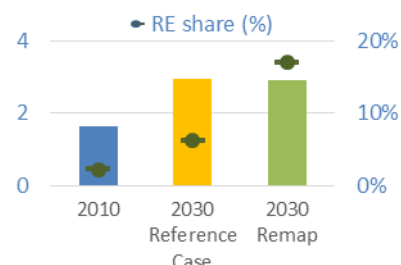
- Clean Energy Options, Modeling of Possible Deployment Scenarios, KISR (2015).



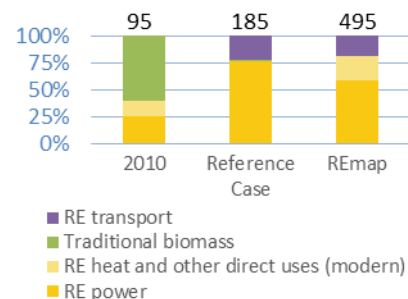
REmap Country Results – Malaysia

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	27	60	69
		Renewable capacity	GW	3	14	29
		Hydropower (excl. pumped hydro)	GW	2	11	13
		Wind	GW	0	0	1
		Biofuels (solid, liquid, gaseous)	GW	1	2	6
		Solar PV	GW	0	0	9
		CSP	GW	0	0	0
		Geothermal	GW	0	0	0
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	24	46	40
		Total electricity generation	TWh	125	181	187
		Renewable generation	TWh	8	45	93
		Hydropower	TWh	6	34	41
		Wind	TWh	0	0	2
		Biofuels (solid, liquid, gaseous)	TWh	2	11	33
		Solar PV	TWh	0	1	15
		CSP	TWh	0	0	0
	Geothermal	TWh	0	0	1	
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	117	135	94	
DH	Total district heat generation	PJ	0	0	0	
	Biofuels (solid, liquid, gaseous)	PJ	0	0	0	
	Other renewables	PJ	0	0	0	
	Non-renewable DH	PJ	0	0	0	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	527	740	742
		Direct uses of renewable energy	PJ	71	2	115
		Solar thermal - Buildings	PJ	0	0	9
		Solar thermal - Industry	PJ	0	0	20
		Geothermal	PJ	0	0	0
		Bioenergy (traditional) - Buildings	PJ	57	1	0
		Bioenergy (modern) - Buildings	PJ	14	0	1
		Bioenergy - Industry	PJ	0	0	85
		Non-renewable - Buildings	PJ	83	52	43
		Non-renewable - Industry	PJ	373	686	584
	Non-renewable - BF/CO	PJ	0	0	0	
	Transport	Total fuel consumption	PJ	704	1 579	1 533
		Liquid biofuels	PJ	0	42	91
		Conventional biogasoline	PJ	0	30	30
		Advanced biogasoline	PJ	0	0	0
		Biodiesel (conventional and advanced)	PJ	0	12	61
		Biomethane	PJ	0	0	0
Non-renewable fuels		PJ	704	1 538	1 443	
Total final energy consumption (electricity, DH, direct uses) ²		PJ	1 651	2 933	2 911	
RE shares	RE share in electricity generation			6%	25%	50%
	RE share in district heat generation			0%	0%	0%
	RE share in Buildings - final energy use, direct uses (modern)			9%	1%	18%
	RE share in Industry - final energy use, direct uses			0%	0%	15%
	RE share in Transport fuels			0%	3%	6%
	Share of modern RE in TFEC ³			2%	6%	17%
Financial indicators	System costs [USD bln/yr in 2030]			N/A	N/A	2
	RE investment needs [USD bln/yr (2010-2030)]			N/A	2	3
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	2.5
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	4.7
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]			N/A	N/A	2.8
	CO ₂ emissions from energy [Mt/vr]			179	263	206

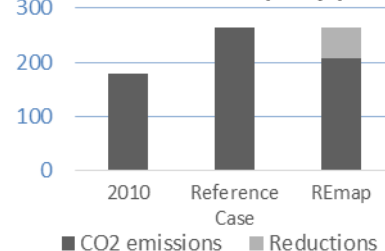
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



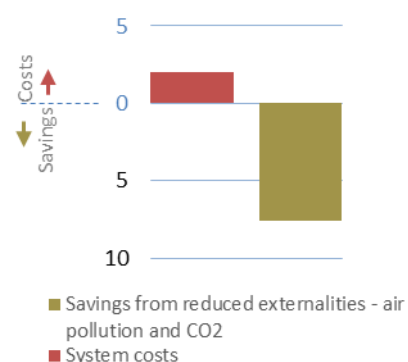
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

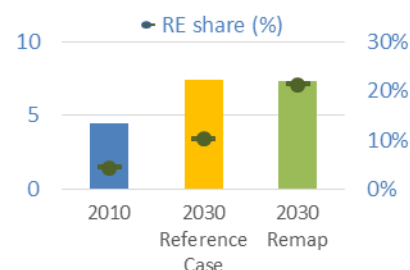
- 4th ASEAN Energy Outlook (AE04), ASEAN Centre for Energy (ACE) (2016).
- MALAYSIA COUNTRY PROFILES: ENERGY DATA AND POLICY, ACE (2015).
- Study on Asia potential of biofuel market, ERIA (2013).
- Technology roadmap, Solar Heating and Cooling, IEA (2012).



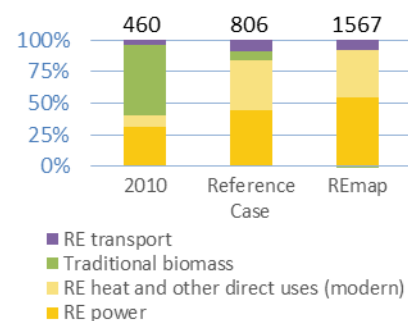
REmap Country Results – Mexico

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	53	118	155
		Renewable capacity	GW	13	38	102
		Hydropower (excl. pumped hydro)	GW	12	19	24
		Wind	GW	0	11	29
		Biofuels (solid, liquid, gaseous)	GW	0	1	3
		Solar PV	GW	0	6	40
		CSP	GW	0	0	2
		Geothermal	GW	1	1	4
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	40	80	53
		Total electricity generation	TWh	259	602	603
		Renewable generation	TWh	48	116	280
		Hydropower	TWh	37	52	72
		Wind	TWh	1	38	92
		Biofuels (solid, liquid, gaseous)	TWh	3	4	15
		Solar PV	TWh	0	13	66
		CSP	TWh	0	0	4
	Geothermal	TWh	7	9	32	
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	211	486	324	
DH	Total district heat generation	PJ	0	0	0	
	Biofuels (solid, liquid, gaseous)	PJ	0	0	0	
	Other renewables	PJ	0	0	0	
	Non-renewable DH	PJ	0	0	0	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	1 491	2 133	2 109
		Direct uses of renewable energy	PJ	302	375	583
		Solar thermal - Buildings	PJ	5	70	80
		Solar thermal - Industry	PJ	0	13	59
		Geothermal	PJ	0	0	14
		Bioenergy (traditional) - Buildings	PJ	259	51	0
		Bioenergy (modern) - Buildings	PJ	0	216	230
		Bioenergy - Industry	PJ	38	25	200
		Non-renewable - Buildings	PJ	402	590	583
		Non-renewable - Industry	PJ	788	1 168	943
	Non-renewable - BF/CO	PJ	0	0	0	
	Transport	Total fuel consumption	PJ	2 134	3 266	3 258
		Liquid biofuels	PJ	17	75	128
		Conventional biogasoline	PJ	17	53	70
		Advanced biogasoline	PJ	0	0	17
		Biodiesel (conventional and advanced)	PJ	0	22	42
		Biomethane	PJ	0	0	0
Non-renewable fuels		PJ	2 118	3 190	3 129	
Total final energy consumption (electricity, DH, direct uses) ²		PJ	4 503	7 383	7 354	
RE shares	RE share in electricity generation		18%	19%	46%	
	RE share in district heat generation		0%	0%	0%	
	RE share in Buildings - final energy use, direct uses (modern)		1%	31%	35%	
	RE share in Industry - final energy use, direct uses		5%	3%	22%	
	RE share in Transport fuels		1%	2%	4%	
	Share of modern RE in TFEC ³		4%	10%	21%	
Financial indicators	System costs [USD bln/yr in 2030]		N/A	N/A	- 2	
	RE investment needs [USD bln/yr (2010-2030)]		N/A	3	10	
	Investment support for renewables [USD bln/yr in 2030]		N/A	N/A	2.2	
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]		N/A	N/A	2.4	
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]		N/A	N/A	5.2	
	CO ₂ emissions from energy [Mt/yr]		369	619	515	

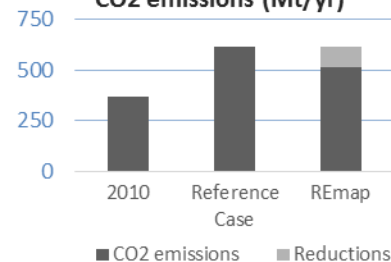
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



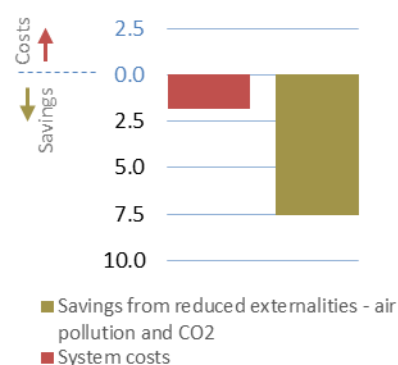
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

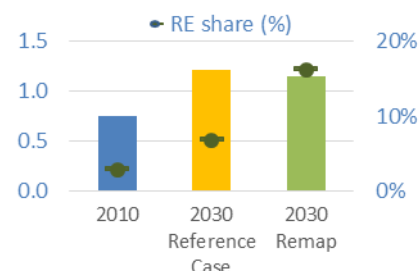
- Energy Demand and Supply Outlook 5th Edition, APEC (2014).
- Prospectiva de Energías Renovables 2012-2026 by the Mexican Energy Secretariat (SENER).



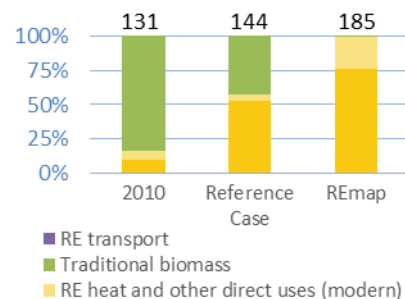
REmap Country Results – Morocco

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	6.4	24.8	29.8
		Renewable capacity	GW	2.1	14.4	21.5
		Hydropower (excl. pumped hydro)	GW	1.8	3.3	3.4
		Wind	GW	0.3	5.2	10.1
		Biofuels (solid, liquid, gaseous)	GW	0.0	0.0	0.5
		Solar PV	GW	0.0	2.7	4.4
		CSP	GW	0.0	3.1	3.1
		Geothermal	GW	0.0	0.0	0.0
		Marine, other	GW	0.0	0.0	0.0
		Non-renewable capacity	GW	4.3	10.4	8.3
		Total electricity generation	TWh	25.0	78.8	87.4
		Renewable generation	TWh	4.1	26.5	48.5
		Hydropower	TWh	3.5	4.0	4.1
		Wind	TWh	0.7	11.0	27.0
		Biofuels (solid, liquid, gaseous)	TWh	0.0	0.0	2.8
		Solar PV	TWh	0.0	4.5	7.6
		CSP	TWh	0.0	7.0	7.0
	Geothermal	TWh	0.0	0.0	0.0	
	Marine, other	TWh	0.0	0.0	0.0	
	Non-renewable generation	TWh	20.9	52.3	38.9	
DH	Total district heat generation	PJ	0.0	0.0	0.0	
	Biofuels (solid, liquid, gaseous)	PJ	0.0	0.0	0.0	
	Other renewables	PJ	0.0	0.0	0.0	
	Non-renewable DH	PJ	0.0	0.0	0.0	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	307.1	594.3	527.6
		Direct uses of renewable energy	PJ	117.5	68.0	45.0
		Solar thermal - Buildings	PJ	0.0	0.0	7.0
		Solar thermal - Industry	PJ	0.0	0.0	10.0
		Geothermal	PJ	0.0	0.0	0.0
		Bioenergy (traditional) - Buildings	PJ	108.9	60.8	0.8
		Bioenergy (modern) - Buildings	PJ	5.4	4.2	24.2
		Bioenergy - Industry	PJ	3.1	3.1	3.1
		Non-renewable - Buildings	PJ	66.5	293.3	260.8
		Non-renewable - Industry	PJ	123.1	233.0	221.9
	Non-renewable - BF/CO	PJ	0.0	0.0	0.0	
	Transport	Total fuel consumption	PJ	277.2	305.5	270.0
		Liquid biofuels	PJ	0.0	0.0	0.0
		Conventional biogasoline	PJ	0.0	0.0	0.0
		Advanced biogasoline	PJ	0.0	0.0	0.0
		Biodiesel (conventional and advanced)	PJ	0.0	0.0	0.0
		Biomethane	PJ	0.0	0.0	0.0
Non-renewable fuels		PJ	277	305	270	
Total final energy consumption (electricity, DH, direct uses) ²			PJ	753	1 214	1 139
RE shares	RE share in electricity generation			16%	34%	55%
	RE share in district heat generation			0%	0%	0%
	RE share in Buildings - final energy use, direct uses (modern)			3%	1%	11%
	RE share in Industry - final energy use, direct uses			2%	1%	6%
	RE share in Transport fuels			0%	0%	0%
Share of modern RE in TFEC ³			3%	7%	16%	
Financial indicators	System costs [USD bln/yr in 2030]			N/A	N/A	-0.2
	RE investment needs [USD bln/yr (2010-2030)]			N/A	1	2
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	0.4
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	3.1
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO2) [USD bln/yr in 2030]			N/A	N/A	1.0
	CO2 emissions from energy [Mt/yr]			56	97	76

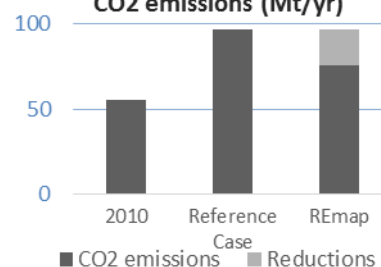
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



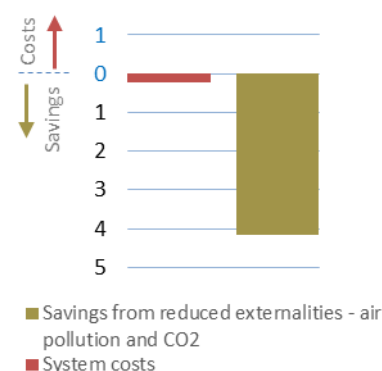
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

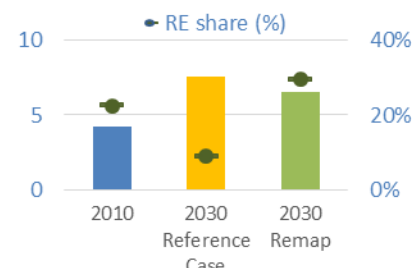
- Etude Prospective de la Demande D'Energie a L'Horizon 2030, Ministry of Energy, Mines, Water and Environment (2013).
- Energie 2030: Quelles options pour le Maroc, Planning Commission.
- Intended Nationally Determined Contribution (INDC), Government of Morocco (2015).



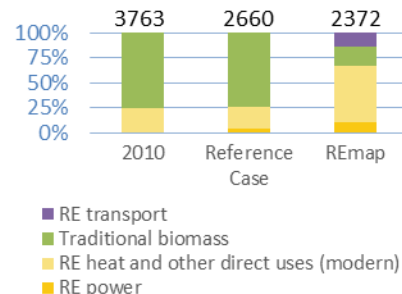
REmap Country Results – Nigeria

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	6	29	40
		Renewable capacity	GW	2	11	28
		Hydropower (excl. pumped hydro)	GW	2	8	10
		Wind	GW	0	0	1
		Biofuels (solid, liquid, gaseous)	GW	0	0	0
		Solar PV	GW	0	4	16
		CSP	GW	0	0	2
		Geothermal	GW	0	0	0
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	4	18	12
		Total electricity generation	TWh	21	141	141
		Renewable generation	TWh	6	39	74
		Hydropower	TWh	5	33	43
		Wind	TWh	0	0	3
		Biofuels (solid, liquid, gaseous)	TWh	0	0	0
		Solar PV	TWh	1	6	24
		CSP	TWh	0	0	3
	Geothermal	TWh	0	0	0	
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	15	103	68	
DH	Total district heat generation	PJ	0	0	0	
	Biofuels (solid, liquid, gaseous)	PJ	0	0	0	
	Other renewables	PJ	0	0	0	
	Non-renewable DH	PJ	0	0	0	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	3 821	5 097	4 130
		Direct uses of renewable energy	PJ	3 746	2 531	1 800
		Solar thermal - Buildings	PJ	0	159	170
		Solar thermal - Industry	PJ	0	64	343
		Geothermal	PJ	0	0	0
		Bioenergy (traditional) - Buildings	PJ	2 813	1 978	450
		Bioenergy (modern) - Buildings	PJ	554	331	830
		Bioenergy - Industry	PJ	379	0	6
		Non-renewable - Buildings	PJ	26	546	609
		Non-renewable - Industry	PJ	50	2 020	1 721
	Non-renewable - BF/CO	PJ	0	0	0	
	Transport	Total fuel consumption	PJ	341	1 941	1 946
		Liquid biofuels	PJ	0	0	327
		Conventional biogasoline	PJ	0	0	194
		Advanced biogasoline	PJ	0	0	0
		Biodiesel (conventional and advanced)	PJ	0	0	132
Biomethane		PJ	0	0	0	
Non-renewable fuels	PJ	341	1 941	1 619		
Total final energy consumption (electricity, DH, direct uses) ²			PJ	4 228	7 509	6 546
RE shares	RE share in electricity generation			27%	27%	52%
	RE share in district heat generation			19%	19%	19%
	RE share in Buildings - final energy use, direct uses (modern)			16%	16%	49%
	RE share in Industry - final energy use, direct uses			88%	3%	17%
	RE share in Transport fuels			0%	0%	17%
Share of modern RE in TFEC ³			22%	9%	29%	
Financial indicators	System costs [USD bln/yr in 2030]			N/A	N/A	- 3
	RE investment needs [USD bln/yr (2010-2030)]			N/A	3	6
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	0.1
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	6.4
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO2) [USD bln/yr in 2030]			N/A	N/A	2.5
	CO2 emissions from energy [Mt/yr]			40	361	312

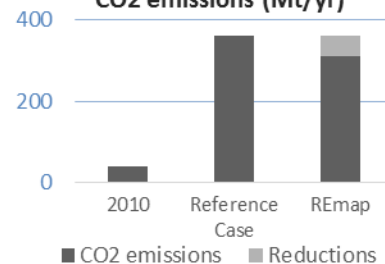
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



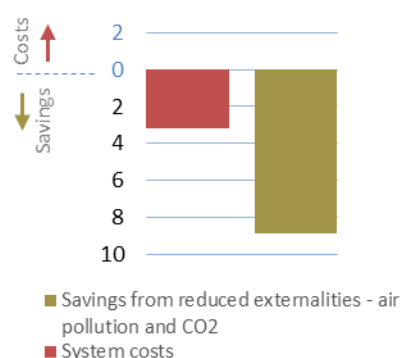
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

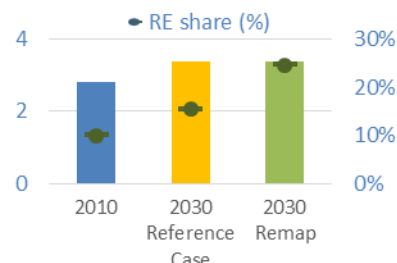
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- Sustainable Energy for All Action Agenda, ICREEE (2015).
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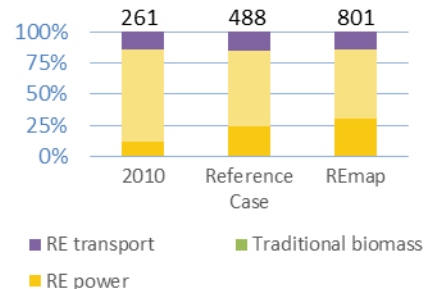
REmap Country Results – Poland

			Unit	2010	Reference Case 2030	REmap 2030	
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	36	54	63	
		Renewable capacity	GW	5	16	31	
		Hydropower (excl. pumped hydro)	GW	2	1	2	
		Wind	GW	2	8	17	
		Biofuels (solid, liquid, gaseous)	GW	0	5	8	
		Solar PV	GW	0	3	5	
		CSP	GW	0	0	0	
		Geothermal	GW	0	0	0	
		Marine, other	GW	0	0	0	
		Non-renewable capacity	GW	31	38	32	
		Total electricity generation	TWh	157	216	217	
		Renewable generation	TWh	11	42	84	
		Hydropower	TWh	3	3	5	
		Wind	TWh	2	18	43	
		Biofuels (solid, liquid, gaseous)	TWh	6	18	32	
		Solar PV	TWh	0	2	4	
		CSP	TWh	0	0	1	
		Geothermal	TWh	0	0	0	
	Marine, other	TWh	0	0	0		
	Non-renewable generation	TWh	146	175	133		
	DH	Total district heat generation	PJ	344	513	471	
		Biofuels (solid, liquid, gaseous)	PJ	13	41	93	
		Other renewables	PJ	0	14	17	
		Non-renewable DH	PJ	331	458	361	
	Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	1 238	1 276	1 269
			Direct uses of renewable energy	PJ	184	253	356
Solar thermal - Buildings			PJ	0	26	45	
Solar thermal - Industry			PJ	0	0	10	
Geothermal			PJ	1	0	0	
Bioenergy (traditional) - Buildings			PJ	0	0	0	
Bioenergy (modern) - Buildings			PJ	122	155	170	
Bioenergy - Industry			PJ	61	72	130	
Non-renewable - Buildings			PJ	627	428	375	
Non-renewable - Industry			PJ	342	491	434	
Non-renewable - BF/CO		PJ	85	104	104		
Transport		Total fuel consumption	PJ	698	907	907	
		Liquid biofuels	PJ	37	71	103	
		Conventional biogasoline	PJ	12	11	14	
		Advanced biogasoline	PJ	0	15	20	
		Biodiesel (conventional and advanced)	PJ	25	45	70	
		Biomethane	PJ	0	0	6	
		Non-renewable fuels	PJ	661	835	799	
	Total final energy consumption (electricity, DH, direct uses) ²	PJ	2 808	3 375	3 367		
RE shares	RE share in electricity generation		7%	19%	39%		
	RE share in district heat generation		4%	11%	23%		
	RE share in Buildings - final energy use, direct uses (modern)		16%	30%	37%		
	RE share in Industry - final energy use, direct uses		15%	13%	24%		
	RE share in Transport fuels		5%	8%	12%		
	Share of modern RE in TFEC ³		10%	15%	25%		
Financial indicators	System costs [USD bln/yr in 2030]		N/A	N/A	4		
	RE investment needs [USD bln/yr (2010-2030)]		N/A	2	4		
	Investment support for renewables [USD bln/yr in 2030]		N/A	N/A	2.9		
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]		N/A	N/A	4.1		
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]		N/A	N/A	2.7		
	CO ₂ emissions from energy [Mt/yr]		284	301	248		

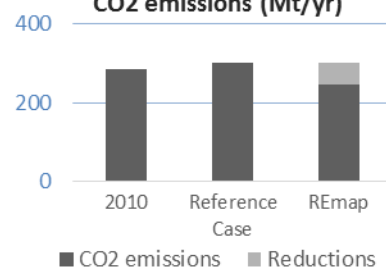
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



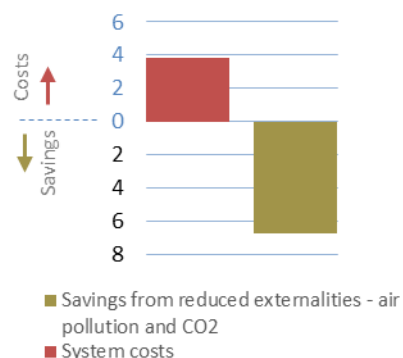
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

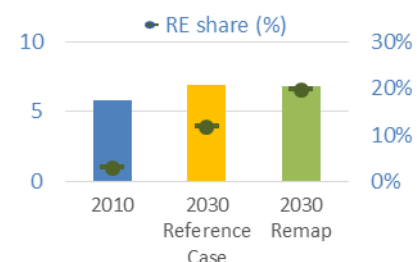
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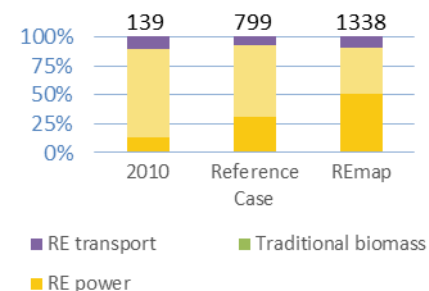
REmap Country Results – Republic of Korea

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	73	138	181
		Renewable capacity	GW	7	41	101
		Hydropower (excl. pumped hydro)	GW	6	7	7
		Wind	GW	0	13	27
		Biofuels (solid, liquid, gaseous)	GW	0	5	5
		Solar PV	GW	1	17	61
		CSP	GW	0	0	0
		Geothermal	GW	0	0	0
		Marine, other	GW	0	0	1
		Non-renewable capacity	GW	67	97	79
		Total electricity generation	TWh	480	738	748
		Renewable generation	TWh	6	76	207
		Hydropower	TWh	4	5	5
		Wind	TWh	1	27	89
		Biofuels (solid, liquid, gaseous)	TWh	1	23	23
		Solar PV	TWh	1	20	82
		CSP	TWh	0	0	0
	Geothermal	TWh	0	0	3	
	Marine, other	TWh	0	2	6	
	Non-renewable generation	TWh	475	662	541	
DH	Total district heat generation	PJ	172	305	305	
	Biofuels (solid, liquid, gaseous)	PJ	20	22	22	
	Other renewables	PJ	0	20	20	
	Non-renewable DH	PJ	152	263	263	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	2 526	2 889	2 809
		Direct uses of renewable energy	PJ	97	477	517
		Solar thermal - Buildings	PJ	1	57	57
		Solar thermal - Industry	PJ	0	19	38
		Geothermal	PJ	2	85	107
		Bioenergy (traditional) - Buildings	PJ	0	0	0
		Bioenergy (modern) - Buildings	PJ	3	11	11
		Bioenergy - Industry	PJ	91	306	306
		Non-renewable - Buildings	PJ	831	912	843
		Non-renewable - Industry	PJ	1 136	1 037	987
	Non-renewable - BF/CO	PJ	462	462	462	
	Transport	Total fuel consumption	PJ	1 539	1 436	1 409
		Liquid biofuels	PJ	15	59	132
		Conventional biogasoline	PJ	1	0	13
		Advanced biogasoline	PJ	0	0	0
		Biodiesel (conventional and advanced)	PJ	14	59	119
Biomethane		PJ	0	0	0	
Non-renewable fuels	PJ	1 524	1 378	1 277		
Total final energy consumption (electricity, DH, direct uses) ²			PJ	5 787	6 910	6 839
RE shares	RE share in electricity generation			1%	10%	28%
	RE share in district heat generation			11%	14%	14%
	RE share in Buildings - final energy use, direct uses (modern)			1%	13%	13%
	RE share in Industry - final energy use, direct uses			7%	25%	28%
	RE share in Transport fuels			1%	4%	9%
Share of modern RE in TFEC ³			3%	12%	20%	
Financial indicators	System costs [USD bln/yr in 2030]			N/A	N/A	0
	RE investment needs [USD bln/yr (2010-2030)]			N/A	6	14
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	2.3
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	4.9
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]			N/A	N/A	5.7
	CO ₂ emissions from energy [Mt/yr]			504	493	378

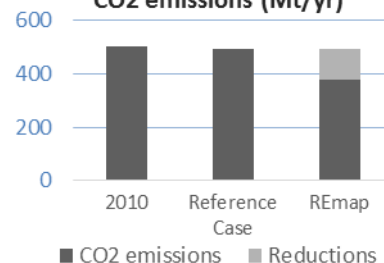
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



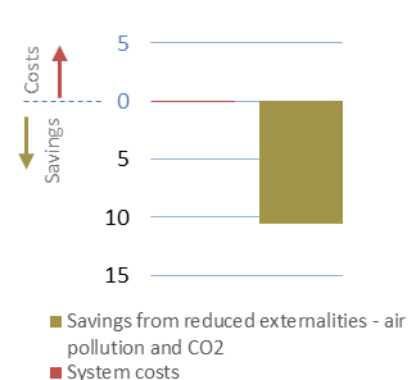
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



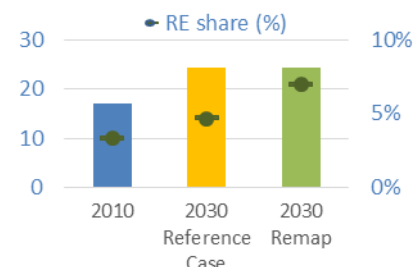
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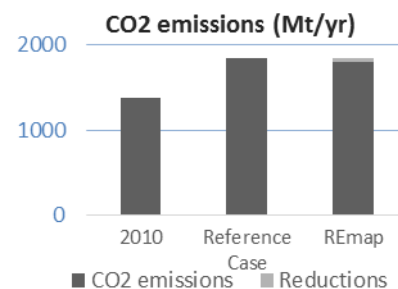
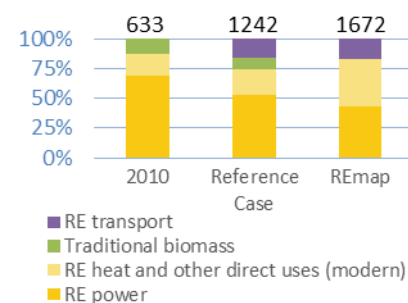
REmap Country Results – Russian Federation

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	231	285	294
		Renewable capacity	GW	47	66	76
		Hydropower (excl. pumped hydro)	GW	47	58	58
		Wind	GW	0	4	5
		Biofuels (solid, liquid, gaseous)	GW	0	2	7
		Solar PV	GW	0	2	5
		CSP	GW	0	0	0
		Geothermal	GW	0	0	1
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	183	220	218
		Total electricity generation	TWh	1 036	1 352	1 379
		Renewable generation	TWh	170	243	276
		Hydropower	TWh	166	227	227
		Wind	TWh	0	8	11
		Biofuels (solid, liquid, gaseous)	TWh	3	6	28
		Solar PV	TWh	0	2	5
		CSP	TWh	0	0	0
	Geothermal	TWh	1	1	6	
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	866	1 109	1 103	
DH	Total district heat generation	PJ	5 674	7 305	7 305	
	Biofuels (solid, liquid, gaseous)	PJ	120	162	395	
	Other renewables	PJ	0	0	0	
	Non-renewable DH	PJ	5 554	7 143	6 910	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	5 426	8 807	8 782
		Direct uses of renewable energy	PJ	91	248	318
		Solar thermal - Buildings	PJ	0	0	0
		Solar thermal - Industry	PJ	0	0	0
		Geothermal	PJ	0	0	0
		Bioenergy (traditional) - Buildings	PJ	76	120	0
		Bioenergy (modern) - Buildings	PJ	0	0	190
		Bioenergy - Industry	PJ	15	128	128
		Non-renewable - Buildings	PJ	2 255	3 034	2 939
		Non-renewable - Industry	PJ	2 233	3 386	3 386
	Non-renewable - BF/CO	PJ	846	2 138	2 138	
	Transport	Total fuel consumption	PJ	3 733	5 401	5 400
		Liquid biofuels	PJ	0	200	288
		Conventional biogasoline	PJ	0	200	200
		Advanced biogasoline	PJ	0	0	0
		Biodiesel (conventional and advanced)	PJ	0	0	88
		Biomethane	PJ	0	0	0
Non-renewable fuels		PJ	3 733	5 201	5 112	
Total final energy consumption (electricity, DH, direct uses) ²			PJ	16 932	24 336	24 311
RE shares	RE share in electricity generation			16%	18%	20%
	RE share in district heat generation			2%	2%	5%
	RE share in Buildings - final energy use, direct uses (modern)			0%	0%	6%
	RE share in Industry - final energy use, direct uses			1%	4%	4%
	RE share in Transport fuels			0%	4%	5%
Share of modern RE in TFEC ³			3%	5%	7%	
Financial indicators	System costs [USD bln/yr in 2030]			N/A	N/A	- 1
	RE investment needs [USD bln/yr (2010-2030)]			N/A	13	14
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	2.2
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	1.5
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]			N/A	N/A	1.7
	CO ₂ emissions from energy [Mt/yr]			1 384	1 843	1 810

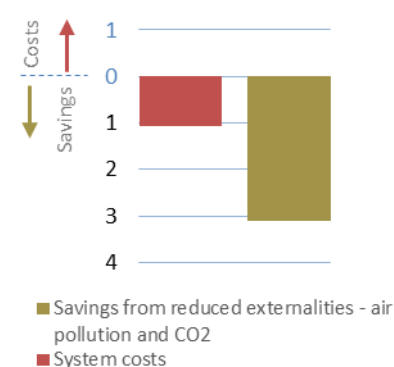
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



Final RE use by sector (%) and total (PJ/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

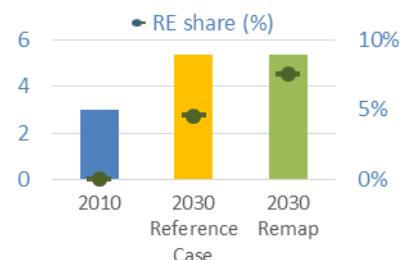
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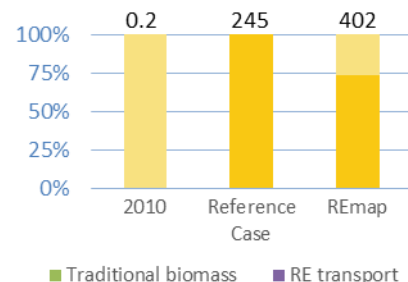
REmap Country Results – Saudi Arabia

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	55	137	140
		Renewable capacity	GW	0	27	37
		Hydropower (excl. pumped hydro)	GW	0	0	0
		Wind	GW	0	5	5
		Biofuels (solid, liquid, gaseous)	GW	0	2	2
		Solar PV	GW	0	8	16
		CSP	GW	0	13	14
		Geothermal	GW	0	1	1
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	55	110	104
		Total electricity generation	TWh	240	601	601
		Renewable generation	TWh	0	85	106
		Hydropower	TWh	0	0	0
		Wind	TWh	0	15	16
		Biofuels (solid, liquid, gaseous)	TWh	0	11	12
		Solar PV	TWh	0	14	28
		CSP	TWh	0	42	46
		Geothermal	TWh	0	4	4
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	240	516	495	
DH	Total district heat generation	PJ	0	0	0	
	Biofuels (solid, liquid, gaseous)	PJ	0	0	0	
	Other renewables	PJ	0	0	0	
	Non-renewable DH	PJ	0	0	0	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	824	1 020	1 073
		Direct uses of renewable energy	PJ	0	0	107
		Solar thermal - Buildings	PJ	0	0	59
		Solar thermal - Industry	PJ	0	0	38
		Geothermal	PJ	0	0	10
		Bioenergy (traditional) - Buildings	PJ	0	0	0
		Bioenergy (modern) - Buildings	PJ	0	0	0
		Bioenergy - Industry	PJ	0	0	0
		Non-renewable - Buildings	PJ	63	69	69
		Non-renewable - Industry	PJ	761	951	897
	Non-renewable - BF/CO	PJ	0	0	0	
	Transport	Total fuel consumption	PJ	1 476	2 629	2 594
		Liquid biofuels	PJ	0	0	0
		Conventional biogasoline	PJ	0	0	0
		Advanced biogasoline	PJ	0	0	0
		Biodiesel (conventional and advanced)	PJ	0	0	0
Biomethane		PJ	0	0	0	
Non-renewable fuels	PJ	1 476	2 629	2 594		
Total final energy consumption (electricity, DH, direct uses) ²			PJ	2 990	5 376	5 332
RE shares	RE share in electricity generation			0%	14%	18%
	RE share in district heat generation			0%	0%	0%
	RE share in Buildings - final energy use, direct uses (modern)			0%	0%	46%
	RE share in Industry - final energy use, direct uses			0%	0%	5%
	RE share in Transport fuels			0%	0%	0%
Share of modern RE in TFEC ³			0%	5%	8%	
Financial indicators	System costs [USD bln/yr in 2030]			N/A	N/A	- 8
	RE investment needs [USD bln/yr (2010-2030)]			N/A	4	6
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	0.3
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	4.3
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO2) [USD bln/yr in 2030]			N/A	N/A	1.1
	CO2 emissions from energy [Mt/yr]			360	488	465

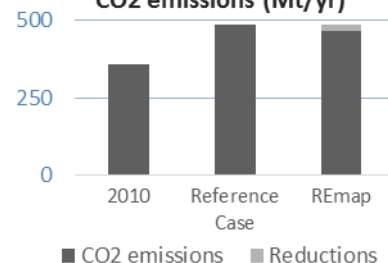
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



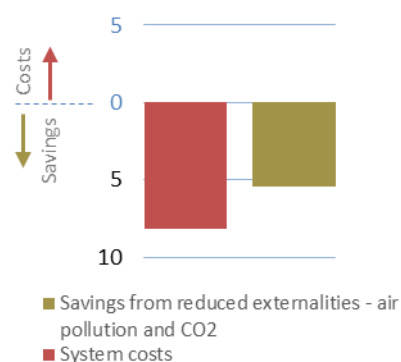
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

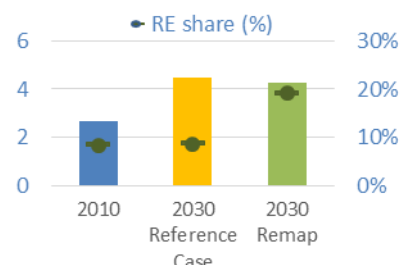
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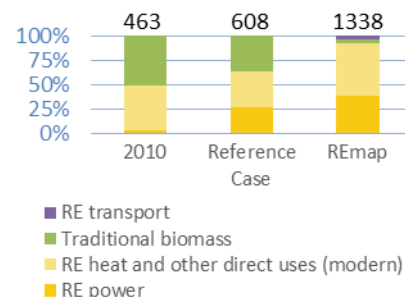
REmap Country Results – South Africa

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	37	75	92
		Renewable capacity	GW	1	19	43
		Hydropower (excl. pumped hydro)	GW	1	1	1
		Wind	GW	0	4	8
		Biofuels (solid, liquid, gaseous)	GW	0	1	3
		Solar PV	GW	0	10	25
		CSP	GW	0	3	5
		Geothermal	GW	0	0	0
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	36	57	50
		Total electricity generation	TWh	259	438	440
		Renewable generation	TWh	4	48	98
		Hydropower	TWh	4	4	4
		Wind	TWh	0	11	22
		Biofuels (solid, liquid, gaseous)	TWh	0	5	16
		Solar PV	TWh	0	17	39
		CSP	TWh	0	11	18
	Geothermal	TWh	0	0	0	
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	255	390	341	
DH	Total district heat generation	PJ	0	0	0	
	Biofuels (solid, liquid, gaseous)	PJ	0	0	0	
	Other renewables	PJ	0	0	0	
	Non-renewable DH	PJ	0	0	0	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	1 189	1 427	1 277
		Direct uses of renewable energy	PJ	451	445	487
		Solar thermal - Buildings	PJ	3	4	75
		Solar thermal - Industry	PJ	0	0	26
		Geothermal (Buildings and Industry)	PJ	0	0	0
		Bioenergy (traditional) - Buildings	PJ	237	219	33
		Bioenergy (modern) - Buildings	PJ	133	123	170
		Bioenergy - Industry	PJ	78	99	184
		Non-renewable - Buildings	PJ	175	153	70
		Non-renewable - Industry	PJ	587	829	720
	Non-renewable - BF/CO	PJ	- 24	0	0	
	Transport	Total fuel consumption	PJ	740	1 524	1 497
		Liquid biofuels	PJ	0	0	31
		Conventional biogasoline	PJ	0	0	16
		Advanced biogasoline	PJ	0	0	0
		Biodiesel (conventional and advanced)	PJ	0	0	15
		Biomethane	PJ	0	0	0
Non-renewable fuels		PJ	740	1 524	1 466	
Total finale energy consumption (electricity, DH, direct uses) ²			PJ	2 682	4 490	4 239
RE shares	RE share in electricity generation			2%	11%	22%
	RE share in district heat generation			N/A	N/A	N/A
	RE share in Buildings - final energy use, direct uses (modern)			25%	25%	70%
	RE share in Industry - final energy use, direct uses			12%	11%	23%
	RE share in Transport fuels			0%	0%	2%
Share of modern RE in TFEC ³			8%	9%	19%	
Financial indicators	System costs [USD bln/yr in 2030]			N/A	N/A	0
	RE investment needs [USD bln/yr (2010-2030)]			N/A	2	5
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	3.5
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	16.6
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]			N/A	N/A	3.1
	CO ₂ emissions from energy [Mt/vr]			361	509	447

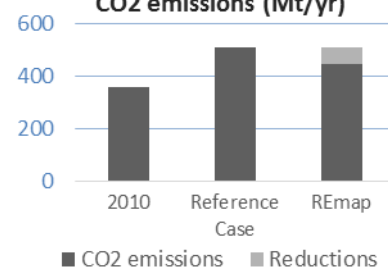
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



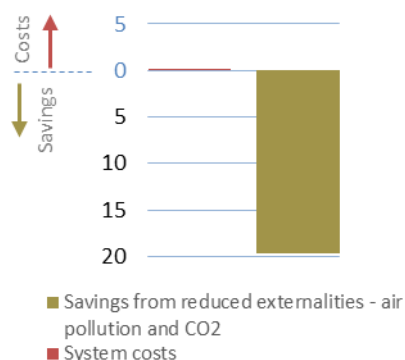
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

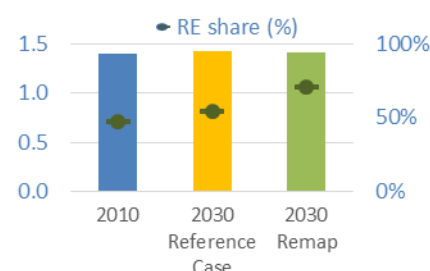
- Draft 2012 on Integrated Energy Planning (2012).
- IRP 2010-2030, update report, DOE (2013).



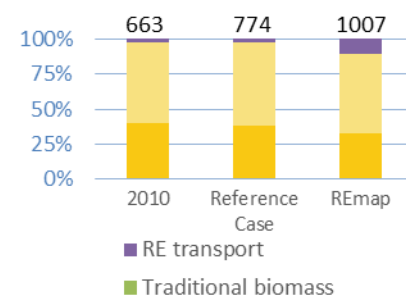
REmap Country Results – Sweden

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	28	42	44
		Renewable capacity	GW	18	29	33
		Hydropower (excl. pumped hydro)	GW	16	17	20
		Wind	GW	2	7	7
		Biofuels (solid, liquid, gaseous)	GW	0	5	6
		Solar PV	GW	0	0	0
		CSP	GW	0	0	0
		Geothermal	GW	0	0	0
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	9	13	11
		Total electricity generation	TWh	148	194	198
		Renewable generation	TWh	83	120	136
		Hydropower	TWh	66	69	82
		Wind	TWh	4	12	12
		Biofuels (solid, liquid, gaseous)	TWh	13	39	42
		Solar PV	TWh	0	0	0
		CSP	TWh	0	0	0
	Geothermal	TWh	0	0	0	
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	65	74	62	
DH	Total district heat generation	PJ	204	170	194	
	Biofuels (solid, liquid, gaseous)	PJ	150	157	186	
	Other renewables	PJ	0	1	1	
	Non-renewable DH	PJ	54	12	8	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	398	482	453
		Direct uses of renewable energy	PJ	225	304	382
		Solar thermal - Buildings	PJ	0	0	0
		Solar thermal - Industry	PJ	0	0	0
		Geothermal	PJ	0	0	0
		Bioenergy (traditional) - Buildings	PJ	0	0	0
		Bioenergy (modern) - Buildings	PJ	31	55	55
		Bioenergy - Industry	PJ	194	248	326
		Non-renewable - Buildings	PJ	36	37	8
		Non-renewable - Industry	PJ	97	141	63
	Non-renewable - BF/CO	PJ	40	0	0	
	Transport	Total fuel consumption	PJ	319	297	297
		Liquid biofuels	PJ	17	10	99
		Conventional biogasoline	PJ	3	2	2
		Advanced biogasoline	PJ	0	3	25
		Biodiesel (conventional and advanced)	PJ	14	5	72
Biomethane		PJ	0	5	8	
Non-renewable fuels	PJ	302	282	190		
Total final energy consumption (electricity, DH, direct uses) ²			PJ	1 400	1 423	1 417
RE shares	RE share in electricity generation			56%	62%	69%
	RE share in district heat generation			74%	93%	96%
	RE share in Buildings - final energy use, direct uses (modern)			46%	60%	87%
	RE share in Industry - final energy use, direct uses			67%	64%	84%
	RE share in Transport fuels			5%	5%	37%
Share of modern RE in TFEC ³				47%	54%	70%
Financial indicators	System costs [USD bln/yr in 2030]			N/A	N/A	- 1
	RE investment needs [USD bln/yr (2010-2030)]			N/A	2	3
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	0.4
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	0.3
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]			N/A	N/A	0.8
	CO ₂ emissions from energy [Mt/vr]			41	38	22

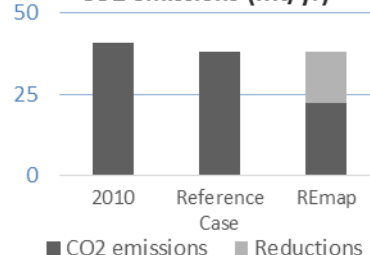
TFC (EJ/yr) (left) and share of modern RE in TFC (%) (right)



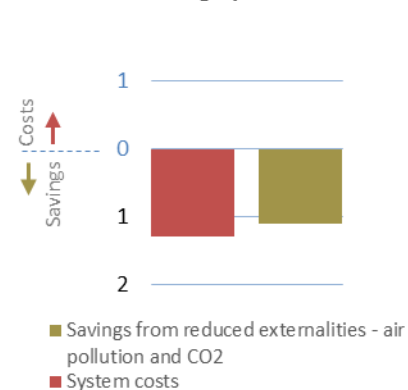
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

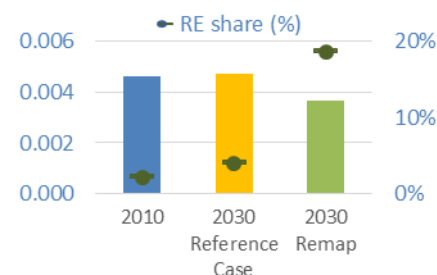
- Energy in Sweden 2015, Swedish Energy Agency (2015).
- The Advanced Energy [r]evolution, Greenpeace International, European Renewable Energy Council (2011).
- National Renewable Energy Action Plan (NREAP), Sweden submitted to EC (2012).



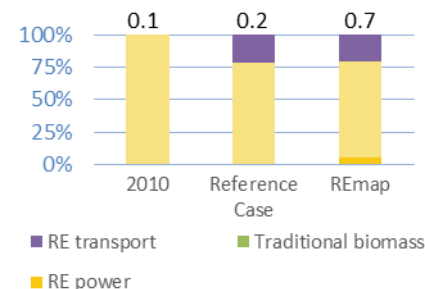
REmap Country Results – Tonga

		Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	0.01	0.03
		Renewable capacity	GW	0.00	0.12
		Hydropower (excl. pumped hydro)	GW	0.00	0.00
		Wind	GW	0.00	0.00
		Biofuels (solid, liquid, gaseous)	GW	0.00	0.00
		Solar PV	GW	0.00	0.12
		CSP	GW	0.00	0.00
		Geothermal	GW	0.00	0.00
		Marine, other	GW	0.00	0.00
		Non-renewable capacity	GW	0.01	-0.03
	DH	Total electricity generation	TWh	0.06	0.12
		Renewable generation	TWh	0.00	0.14
		Hydropower	TWh	0.00	0.00
		Wind	TWh	0.00	0.00
		Biofuels (solid, liquid, gaseous)	TWh	0.00	0.00
		Solar PV	TWh	0.00	0.14
		CSP	TWh	0.00	0.00
		Geothermal	TWh	0.00	0.00
		Marine, other	TWh	0.00	0.00
		Non-renewable generation	TWh	0.06	0.22
Final energy use – direct uses ¹	Buildings and Industry	Total district heat generation	PJ	0.00	0.00
		Biofuels (solid, liquid, gaseous)	PJ	0.00	0.00
		Other renewables	PJ	0.00	0.00
		Non-renewable DH	PJ	0.00	0.00
	Transport	Total direct uses of energy	PJ	2.60	2.65
		Direct uses of renewable energy	PJ	0.10	0.50
		Solar thermal - Buildings	PJ	0.00	0.25
		Solar thermal - Industry	PJ	0.00	0.10
		Geothermal	PJ	0.00	0.00
		Bioenergy (traditional) - Buildings	PJ	0.00	0.00
		Bioenergy (modern) - Buildings	PJ	0.05	0.07
		Bioenergy - Industry	PJ	0.05	0.08
		Non-renewable - Buildings	PJ	1.50	1.21
		Non-renewable - Industry	PJ	1.00	0.88
		Non-renewable - BF/CO	PJ	0.00	0.00
	Transport	Total fuel consumption	PJ	2.00	2.04
		Liquid biofuels	PJ	0.00	0.14
		Conventional biogasoline	PJ	0.00	0.04
		Advanced biogasoline	PJ	0.00	0.00
		Biodiesel (conventional and advanced)	PJ	0.00	0.10
		Biomethane	PJ	0.00	0.00
		Non-renewable fuels	PJ	2.00	0.83
		Total final energy consumption (electricity, DH, direct uses) ²	PJ	4.60	4.69
		RE share in electricity generation	3%	7%	39%
		RE share in district heat generation	0%	0%	0%
		RE share in Buildings - final energy use, direct uses (modern)	3%	4%	21%
		RE share in Industry - final energy use, direct uses	5%	8%	17%
		RE share in Transport fuels	0%	2%	14%
		Share of modern RE in TFEC ³	2%	4%	19%
Financial indicators	System costs	System costs [USD bln/yr in 2030]	N/A	N/A	0
		RE investment needs [USD bln/yr (2010-2030)]	N/A	0	0
		Investment support for renewables [USD bln/yr in 2030]	N/A	N/A	0.0
		Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]	N/A	N/A	0.0
		Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]	N/A	N/A	0.0
		CO ₂ emissions from energy [Mt/yr]	0	0	0

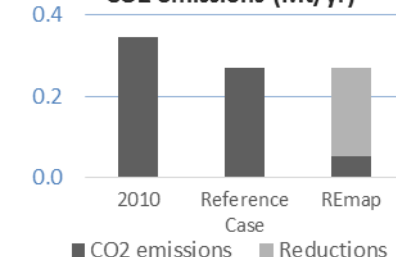
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



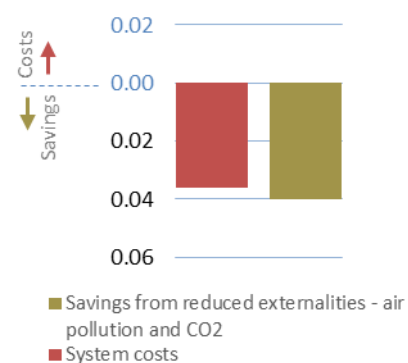
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

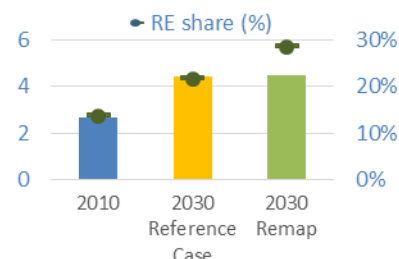
- Pacific Lighthouses, Tonga, IRENA (2013).
- Tonga Energy Road Map 2010-2020, Kingdom of Tonga (2010).



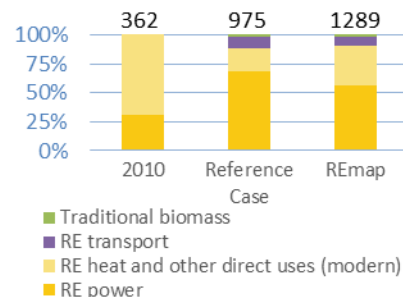
REmap Country Results – Turkey

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	45	144	146
		Renewable capacity	GW	16	89	95
		Hydropower (excl. pumped hydro)	GW	15	44	44
		Wind	GW	1	33	33
		Biofuels (solid, liquid, gaseous)	GW	0	1	4
		Solar PV	GW	0	9	11
		CSP	GW	0	0	0
		Geothermal	GW	0	1	3
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	29	55	51
		Total electricity generation	TWh	187	543	544
		Renewable generation	TWh	38	229	251
		Hydropower	TWh	36	119	119
		Wind	TWh	1	82	82
		Biofuels (solid, liquid, gaseous)	TWh	0	7	18
		Solar PV	TWh	0	14	18
		CSP	TWh	0	0	0
	Geothermal	TWh	0	8	13	
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	149	313	293	
DH	Total district heat generation	PJ	0	0	0	
	Biofuels (solid, liquid, gaseous)	PJ	0	0	0	
	Other renewables	PJ	0	0	0	
	Non-renewable DH	PJ	0	0	0	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	1 456	1 598	1 630
		Direct uses of renewable energy	PJ	252	210	461
		Solar thermal - Buildings	PJ	13	37	54
		Solar thermal - Industry	PJ	5	0	23
		Geothermal	PJ	40	24	102
		Bioenergy (traditional) - Buildings	PJ	0	16	16
		Bioenergy (modern) - Buildings	PJ	192	124	244
		Bioenergy - Industry	PJ	2	8	23
		Non-renewable - Buildings	PJ	620	712	548
		Non-renewable - Industry	PJ	488	573	518
	Non-renewable - BF/CO	PJ	96	103	103	
	Transport	Total fuel consumption	PJ	623	1 220	1 205
		Liquid biofuels	PJ	0	100	100
		Conventional biogasoline	PJ	0	9	9
		Advanced biogasoline	PJ	0	0	0
		Biodiesel (conventional and advanced)	PJ	0	91	91
		Biomethane	PJ	0	0	0
Non-renewable fuels		PJ	623	1 120	1 105	
Total final energy consumption (electricity, DH, direct uses) ²		PJ	2 663	4 441	4 463	
RE shares	RE share in electricity generation		20%	42%	46%	
	RE share in district heat generation		0%	0%	0%	
	RE share in Buildings - final energy use, direct uses (modern)		28%	20%	41%	
	RE share in Industry - final energy use, direct uses		2%	1%	11%	
	RE share in Transport fuels		0%	8%	8%	
Financial indicators	Share of modern RE in TFEC ³		14%	22%	29%	
	System costs [USD bln/yr in 2030]		N/A	N/A	0	
	RE investment needs [USD bln/yr (2010-2030)]		N/A	10	12	
	Investment support for renewables [USD bln/yr in 2030]		N/A	N/A	1.4	
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]		N/A	N/A	4.3	
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO2) [USD bln/yr in 2030]		N/A	N/A	1.3	
CO2 emissions from energy [Mt/yr]		235	316	290		

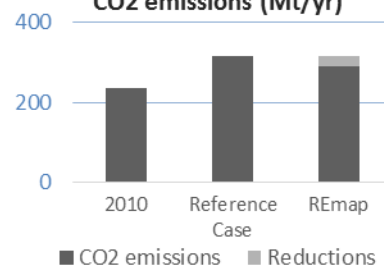
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



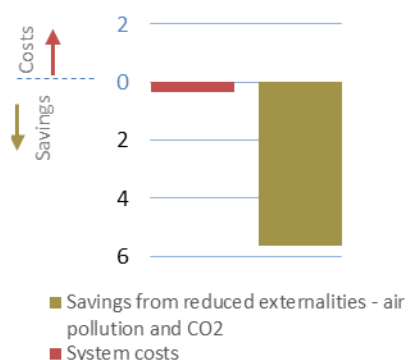
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

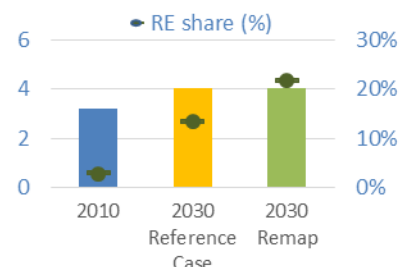
- National Renewable Energy Action Plan for Turkey, Ministry of Energy and Natural Resources (2014).



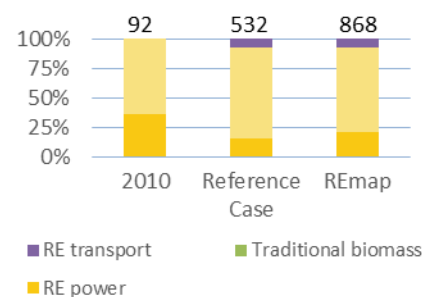
REmap Country Results – Ukraine

				Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	54	80	85	
		Renewable capacity	GW	6	11	27	
		Hydropower (excl. pumped hydro)	GW	5	6	6	
		Wind	GW	0	0	9	
		Biofuels (solid, liquid, gaseous)	GW	0	3	4	
		Solar PV	GW	0	3	8	
		CSP	GW	0	0	0	
		Geothermal	GW	0	0	0	
		Marine, other	GW	0	0	0	
		Non-renewable capacity	GW	48	69	58	
		Total electricity generation	TWh	189	284	284	
		Renewable generation	TWh	13	32	71	
		Hydropower	TWh	13	15	15	
		Wind	TWh	0	8	35	
		Biofuels (solid, liquid, gaseous)	TWh	0	7	13	
		Solar PV	TWh	0	3	8	
		CSP	TWh	0	0	0	
		Geothermal	TWh	0	0	0	
	Marine, other	TWh	0	0	0		
	Non-renewable generation	TWh	175	252	213		
	DH	Total district heat generation	PJ	619	678	678	
		Biofuels (solid, liquid, gaseous)	PJ	11	116	137	
		Other renewables	PJ	0	0	0	
Non-renewable DH		PJ	607	562	541		
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	1 687	2 085	2 099	
		Direct uses of renewable energy	PJ	48	312	502	
		Solar thermal - Buildings	PJ	0	15	36	
		Solar thermal - Industry	PJ	0	0	5	
		Geothermal	PJ	0	4	10	
		Bioenergy (traditional) - Buildings	PJ	0	0	0	
		Bioenergy (modern) - Buildings	PJ	47	126	186	
		Bioenergy - Industry	PJ	2	167	264	
		Non-renewable - Buildings	PJ	636	689	611	
		Non-renewable - Industry	PJ	628	679	581	
	Non-renewable - BF/CO	PJ	375	406	406		
	Transport	Total fuel consumption	PJ	455	557	557	
		Liquid biofuels	PJ	0	37	63	
		Conventional biogasoline	PJ	0	25	30	
		Advanced biogasoline	PJ	0	0	5	
		Biodiesel (conventional and advanced)	PJ	0	12	27	
		Biomethane	PJ	0	0	0	
		Non-renewable fuels	PJ	455	520	495	
Total final energy consumption (electricity, DH, direct uses) ²		PJ	3 207	4 039	4 053		
RE shares	RE share in electricity generation			7%	11%	25%	
	RE share in district heat generation			2%	17%	20%	
	RE share in Buildings - final energy use, direct uses (modern)			7%	17%	27%	
	RE share in Industry - final energy use, direct uses			0%	20%	32%	
	RE share in Transport fuels			0%	7%	11%	
Financial indicators	Share of modern RE in TFEC ³			3%	13%	22%	
	System costs [USD bln/yr in 2030]			N/A	N/A	0	
	RE investment needs [USD bln/yr (2010-2030)]			N/A	2	4	
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	0.7	
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	1.6	
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]			N/A	N/A	2.6	
	CO ₂ emissions from energy [Mt/yr]			236	284	231	

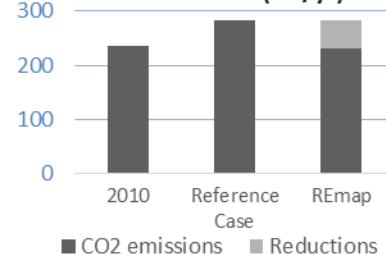
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



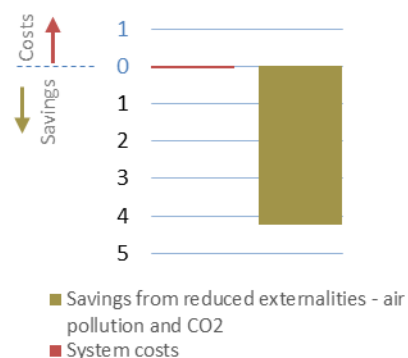
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

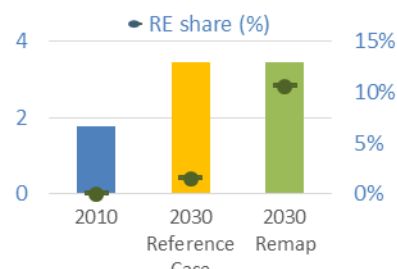
- National Renewable Energy Action Plan (NREAP) through 2020 DRAFT, State Agency on Energy Efficiency and Energy Saving of Ukraine (2012).



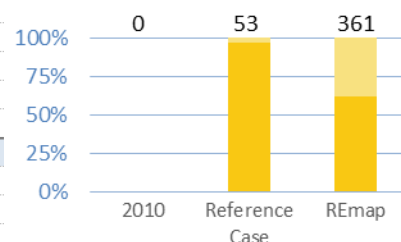
REmap Country Results – United Arab Emirates

				Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	23	56	75	
		Renewable capacity	GW	0	8	34	
		Hydropower (excl. pumped hydro)	GW	0	0	0	
		Wind	GW	0	0	1	
		Biofuels (solid, liquid, gaseous)	GW	0	0	0	
		Solar PV	GW	0	6	29	
		CSP	GW	0	1	3	
		Geothermal	GW	0	0	0	
		Marine, other	GW	0	0	0	
		Non-renewable capacity	GW	23	48	42	
		Total electricity generation	TWh	98	233	242	
		Renewable generation	TWh	0	15	66	
		Hydropower	TWh	0	0	0	
		Wind	TWh	0	0	1	
		Biofuels (solid, liquid, gaseous)	TWh	0	1	3	
		Solar PV	TWh	0	10	49	
		CSP	TWh	0	3	12	
		Geothermal	TWh	0	0	0	
	Marine, other	TWh	0	0	0		
	Non-renewable generation	TWh	98	218	176		
DH	Total district heat generation	PJ	0	0	0		
	Biofuels (solid, liquid, gaseous)	PJ	0	0	0		
	Other renewables	PJ	0	0	0		
	Non-renewable DH	PJ	0	0	0		
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	1 149	1 876	1 915	
		Direct uses of renewable energy	PJ	0	2	138	
		Solar thermal - Buildings	PJ	0	2	56	
		Solar thermal - Industry	PJ	0	0	66	
		Geothermal	PJ	0	0	16	
		Bioenergy (traditional) - Buildings	PJ	0	0	0	
		Bioenergy (modern) - Buildings	PJ	0	0	0	
		Bioenergy - Industry	PJ	0	0	0	
		Non-renewable - Buildings	PJ	9	15	3	
		Non-renewable - Industry	PJ	1 140	1 860	1 773	
	Non-renewable - BF/CO	PJ	0	0	0		
	Transport	Total fuel consumption	PJ	362	744	687	
		Liquid biofuels	PJ	0	0	0	
		Conventional biogasoline	PJ	0	0	0	
		Advanced biogasoline	PJ	0	0	0	
		Biodiesel (conventional and advanced)	PJ	0	0	0	
		Biomethane	PJ	0	0	0	
Non-renewable fuels		PJ	362	744	687		
Total final energy consumption (electricity, DH, direct uses) ²			PJ	1 753	3 443	3 420	
RE shares	RE share in electricity generation			0%	6%	27%	
	RE share in district heat generation			0%	0%	0%	
	RE share in Buildings - final energy use, direct uses (modern)			0%	11%	94%	
	RE share in Industry - final energy use, direct uses			0%	0%	4%	
	RE share in Transport fuels			0%	0%	0%	
	Share of modern RE in TFEC ³			0%	2%	11%	
Financial indicators	System costs [USD bln/yr in 2030]			N/A	N/A	- 1	
	RE investment needs [USD bln/yr (2010-2030)]			N/A	1	4	
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	1.8	
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	2.3	
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO2) [USD bln/yr in 2030]			N/A	N/A	1.6	
	CO ₂ emissions from energy [Mt/yr]			153	271	240	

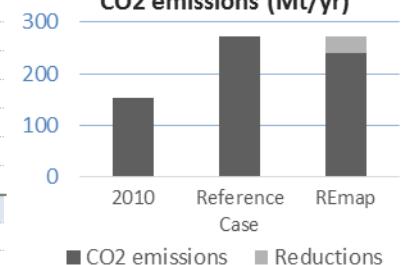
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



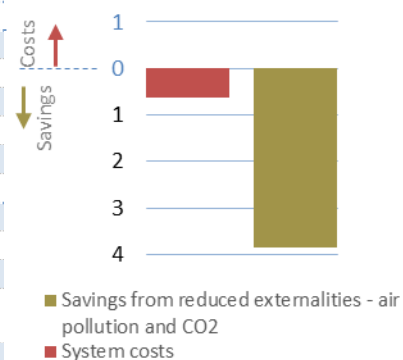
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

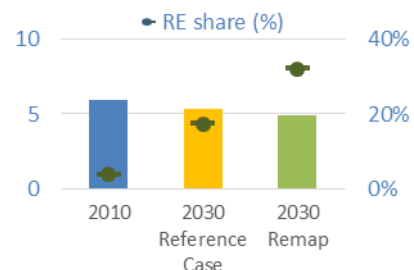
- REmap: Renewable Energy Prospects, United Arab Emirates, IRENA (2015).
- UAE State of Energy Report 2015, Ministry of Energy (2015).
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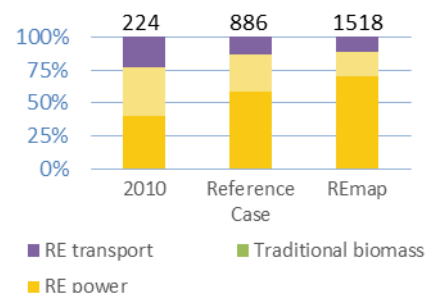
REmap Country Results – United Kingdom

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	91	109	141
		Renewable capacity	GW	9	50	98
		Hydropower (excl. pumped hydro)	GW	2	2	4
		Wind	GW	5	27	60
		Biofuels (solid, liquid, gaseous)	GW	2	6	6
		Solar PV	GW	0	16	24
		CSP	GW	0	0	0
		Geothermal	GW	0	0	3
		Marine, other	GW	0	0	1
		Non-renewable capacity	GW	82	58	43
		Total electricity generation	TWh	366	346	397
		Renewable generation	TWh	28	142	298
		Hydropower	TWh	5	6	14
		Wind	TWh	11	82	195
		Biofuels (solid, liquid, gaseous)	TWh	12	39	39
		Solar PV	TWh	0	15	25
		CSP	TWh	0	0	0
	Geothermal	TWh	0	0	19	
	Marine, other	TWh	0	0	4	
	Non-renewable generation	TWh	338	203	99	
DH	Total district heat generation	PJ	231	165	165	
	Biofuels (solid, liquid, gaseous)	PJ	8	25	48	
	Other renewables	PJ	0	0	0	
	Non-renewable DH	PJ	224	140	117	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	2 976	2 418	1 881
		Direct uses of renewable energy	PJ	82	246	281
		Solar thermal - Buildings	PJ	0	0	23
		Solar thermal - Industry	PJ	0	0	3
		Geothermal	PJ	0	0	0
		Bioenergy (traditional) - Buildings	PJ	0	0	0
		Bioenergy (modern) - Buildings	PJ	61	133	133
		Bioenergy - Industry	PJ	20	114	122
		Non-renewable - Buildings	PJ	2 059	1 593	1 034
		Non-renewable - Industry	PJ	726	480	467
	Non-renewable - BF/CO	PJ	110	99	99	
	Transport	Total fuel consumption	PJ	1 753	1 605	1 514
		Liquid biofuels	PJ	52	119	165
		Conventional biogasoline	PJ	17	90	100
		Advanced biogasoline	PJ	0	1	36
		Biodiesel (conventional and advanced)	PJ	34	29	29
		Biomethane	PJ	0	0	0
Non-renewable fuels		PJ	1 701	1 485	1 349	
Total final energy consumption (electricity, DH, direct uses) ²			PJ	5 936	5 330	4 871
RE shares	RE share in electricity generation			8%	41%	75%
	RE share in district heat generation			3%	15%	29%
	RE share in Buildings - final energy use, direct uses (modern)			3%	8%	13%
	RE share in Industry - final energy use, direct uses			3%	19%	21%
	RE share in Transport fuels			3%	7%	11%
Financial indicators	Share of modern RE in TFE ³			4%	17%	32%
	System costs [USD bln/yr in 2030]			N/A	N/A	- 3
	RE investment needs [USD bln/yr (2010-2030)]			N/A	7	16
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	1.6
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	2.0
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]			N/A	N/A	3.2
	CO ₂ emissions from energy [Mt/yr]			516	300	237

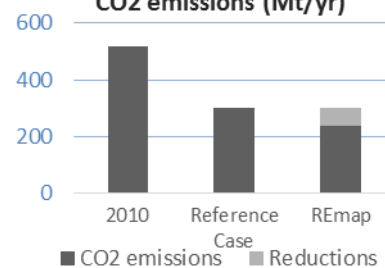
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



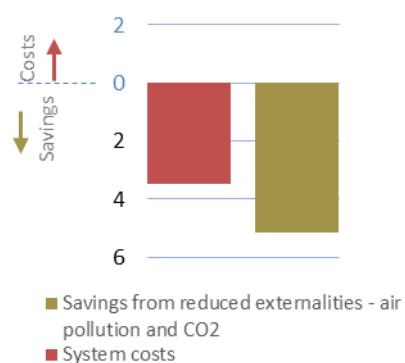
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

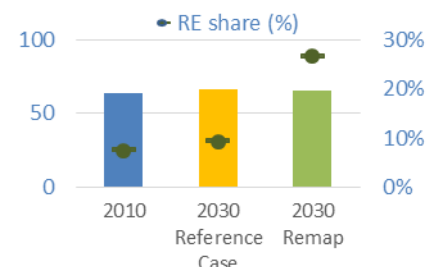
- 2015 energy and emissions projections: projections of greenhouse gas emissions and energy demand from 2015 to 2035, DECC (2015).
- Delivering UK Energy Investment, DECC (2014).
- UK Renewable Energy Roadmap Update 2013, DECC (2013).



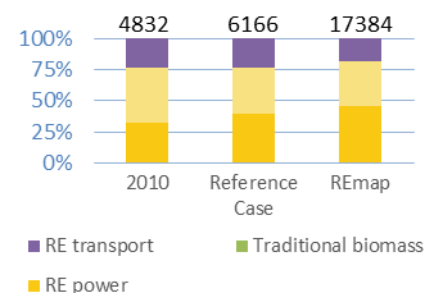
REmap Country Results – United States

				Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	983	1 106	1 435	
		Renewable capacity	GW	133	227	792	
		Hydropower (excl. pumped hydro)	GW	78	80	115	
		Wind	GW	39	87	343	
		Biofuels (solid, liquid, gaseous)	GW	10	13	66	
		Solar PV	GW	2	37	237	
		CSP	GW	1	2	6	
		Geothermal	GW	2	7	25	
		Marine, other	GW	0	0	0	
		Non-renewable capacity	GW	850	880	643	
		Total electricity generation	TWh	4 129	4 679	4 887	
		Renewable generation	TWh	470	756	2 450	
		Hydropower	TWh	260	295	429	
		Wind	TWh	96	245	1 099	
		Biofuels (solid, liquid, gaseous)	TWh	95	94	348	
		Solar PV	TWh	4	68	368	
		CSP	TWh	1	3	16	
	Geothermal	TWh	15	52	189		
	Marine, other	TWh	0	0	0		
	Non-renewable generation	TWh	3 659	3 923	2 437		
DH	Total district heat generation	PJ	455	516	516		
	Biofuels (solid, liquid, gaseous)	PJ	91	154	154		
	Other renewables	PJ	0	0	0		
	Non-renewable DH	PJ	363	363	363		
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	23 098	24 802	23 763	
		Direct uses of renewable energy	PJ	2 114	2 228	6 065	
		Solar thermal - Buildings	PJ	96	113	692	
		Solar thermal - Industry	PJ	0	0	241	
		Geothermal	PJ	11	29	59	
		Bioenergy (traditional) - Buildings	PJ	0	0	0	
		Bioenergy (modern) - Buildings	PJ	550	501	704	
		Bioenergy - Industry	PJ	1 456	1 585	4 370	
		Non-renewable - Buildings	PJ	9 556	8 789	6 644	
		Non-renewable - Industry	PJ	11 090	13 481	10 750	
	Non-renewable - BF/CO	PJ	339	304	304		
	Transport	Total fuel consumption	PJ	27 264	26 196	25 462	
		Liquid biofuels	PJ	1 125	1 422	2 965	
		Conventional biogasoline	PJ	1 060	1 227	1 465	
		Advanced biogasoline	PJ	0	44	1 350	
		Biodiesel (conventional and advanced)	PJ	65	150	150	
		Biomethane	PJ	0	0	261	
Non-renewable fuels		PJ	26 139	24 775	22 236		
Total final energy consumption (electricity, DH, direct uses) ²			PJ	64 150	66 370	65 462	
RE shares	RE share in electricity generation			11%	16%	50%	
	RE share in district heat generation			20%	30%	30%	
	RE share in Buildings - final energy use, direct uses (modern)			6%	7%	18%	
	RE share in Industry - final energy use, direct uses			12%	11%	30%	
	RE share in Transport fuels			4%	5%	12%	
Share of modern RE in TFEC ³			8%	9%	27%		
Financial indicators	System costs [USD bln/yr in 2030]			N/A	N/A	20	
	RE investment needs [USD bln/yr (2010-2030)]			N/A	13	96	
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	41.5	
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	73.3	
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]			N/A	N/A	86.3	
	CO ₂ emissions from energy [Mt/yr]			5 662	5 532	3 805	

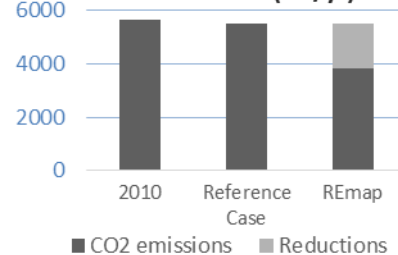
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



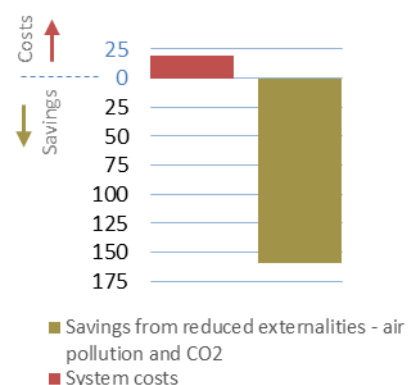
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

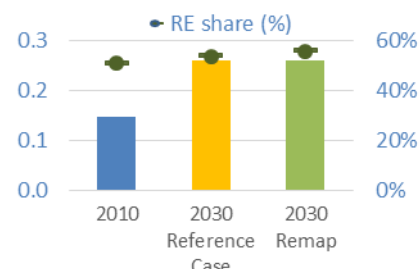
- Annual Energy Outlook 2015, US Energy Information Agency (2015).
- Clean Power Plan, US Environmental Protection Agency (2015).
- Transportation Energy Futures, National Renewable Energy Laboratory (2014).
- Renewable Electricity Futures Study, National Renewable Energy Laboratory (2012).



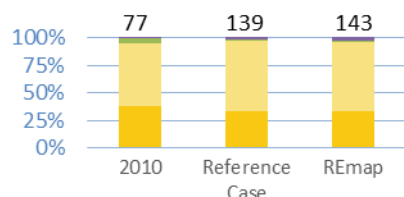
REmap Country Results – Uruguay

			Unit	2010	Reference Case 2030	REmap 2030
Energy generation and capacity	Power sector	Total installed power generation capacity	GW	3	5	5
		Renewable capacity	GW	2	4	4
		Hydropower (excl. pumped hydro)	GW	2	2	2
		Wind	GW	0	2	2
		Biofuels (solid, liquid, gaseous)	GW	0	1	1
		Solar PV	GW	0	0	0
		CSP	GW	0	0	0
		Geothermal	GW	0	0	0
		Marine, other	GW	0	0	0
		Non-renewable capacity	GW	1	1	1
		Total electricity generation	TWh	11	16	16
		Renewable generation	TWh	10	15	15
		Hydropower	TWh	8	10	10
		Wind	TWh	0	3	3
		Biofuels (solid, liquid, gaseous)	TWh	1	2	2
		Solar PV	TWh	0	1	1
		CSP	TWh	0	0	0
		Geothermal	TWh	0	0	0
	Marine, other	TWh	0	0	0	
	Non-renewable generation	TWh	1	1	1	
DH	Total district heat generation	PJ	0	0	0	
	Biofuels (solid, liquid, gaseous)	PJ	0	0	0	
	Other renewables	PJ	0	0	0	
	Non-renewable DH	PJ	0	0	0	
Final energy use - direct uses ¹	Buildings and Industry	Total direct uses of energy	PJ	64	116	116
		Direct uses of renewable energy	PJ	48	90	92
		Solar thermal - Buildings	PJ	0	1	1
		Solar thermal - Industry	PJ	0	0	2
		Geothermal	PJ	0	0	0
		Bioenergy (traditional) - Buildings	PJ	4	2	2
		Bioenergy (modern) - Buildings	PJ	10	11	11
		Bioenergy - Industry	PJ	35	76	76
		Non-renewable - Buildings	PJ	9	13	12
		Non-renewable - Industry	PJ	7	13	11
	Non-renewable - BF/CO	PJ	0	0	0	
	Transport	Total fuel consumption	PJ	43	82	81
		Liquid biofuels	PJ	0	2	4
		Conventional biogasoline	PJ	0	1	2
		Advanced biogasoline	PJ	0	0	0
		Biodiesel (conventional and advanced)	PJ	0	1	2
		Biomethane	PJ	0	0	0
Non-renewable fuels	PJ	43	80	77		
Total final energy consumption (electricity, DH, direct uses) ²			PJ	148	260	259
RE shares	RE share in electricity generation			89%	94%	94%
	RE share in district heat generation			0%	0%	0%
	RE share in Buildings - final energy use, direct uses (modern)			44%	46%	47%
	RE share in Industry - final energy use, direct uses			83%	85%	87%
	RE share in Transport fuels			1%	2%	5%
Financial indicators	Share of modern RE in TFEC ³			51%	54%	56%
	System costs [USD bln/yr in 2030]			N/A	N/A	0.02
	RE investment needs [USD bln/yr (2010-2030)]			N/A	0.3	0.3
	Investment support for renewables [USD bln/yr in 2030]			N/A	N/A	0.05
	Savings from reduced externalities - air pollution (average) [USD bln/yr in 2030]			N/A	N/A	0.1
	Savings from reduced externalities - CO ₂ (USD 50/tonne CO ₂) [USD bln/yr in 2030]			N/A	N/A	0.02
CO2 emissions from energy [Mt/yr]			5	10	9	

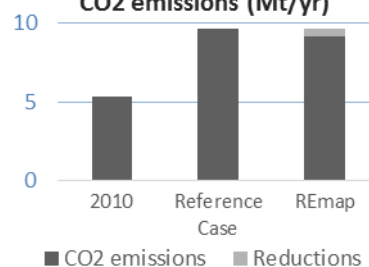
TFEC (EJ/yr) (left) and share of modern RE in TFEC (%) (right)



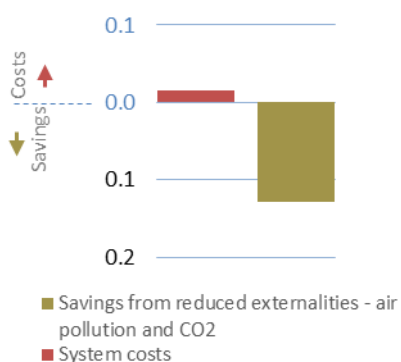
Final RE use by sector (%) and total (PJ/yr)



CO₂ emissions (Mt/yr)



Costs and savings (USD bln in 2030)



References for further consultation:

- Estudio de Demanda 2012-2035, MIEM (2014).



NOTES:

¹ Final energy use/consumption from direct uses excludes electricity and district heat consumption.

² Total final energy consumption (TFEC) is the energy delivered to consumers, whether as electricity, heat or fuels that can be used directly as a source of energy. This consumption is usually sub-divided into that used in: transport; industry; residential, commercial and public buildings; and agriculture; and it excludes non-energy uses of fuels.

³ Modern renewable energy (RE) excludes traditional uses of bioenergy (in countries that use traditional bioenergy); the share of modern RE in TFEC is equal to total modern RE consumption in end-use sectors (including consumption of renewable electricity and district heat and direct uses of renewables), divided by TFEC:

$$\text{Share of modern RE in TFEC} = \frac{\text{Total modern RE use}}{\text{TFEC}}$$





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