

Damir Šljivac, Matej Žnidarec, Goran Knežević, Mario Primorac, Dario Došen:

Renewable Energy Potentials in Croatia, Hungary and European Union

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Laboratory for RES and PV power plant ETFOS 1 10 kW



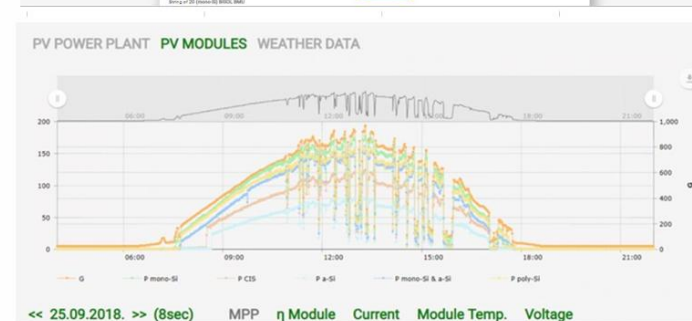
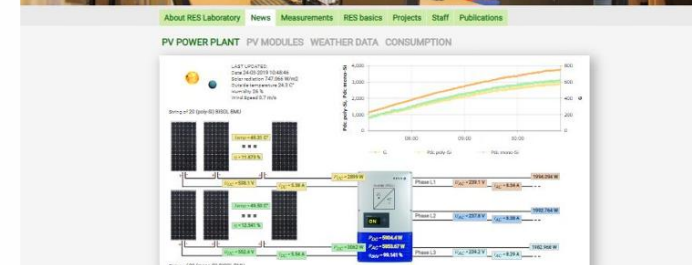
Interreg CRO-HUN REGPHOSYS 2013 - 2014

Establishment of RESLab with 5 types of PV modules on-line measurements

1. Polycrystalline Si **BISOL BMU-250 245 W_p** (20+2 modules)
2. Monocrystalline Si **BISOL BMO-250 250 W_p** (20+2 modules)
3. Thin-film CIS (copper-indium-selenide) **SOLAR FRONTIER SF-150 150 W_p** (2 modules)
4. Thin-film amorphous Si **MASDAR MPV-100S 100 W_p** (2 modules)
5. Heterojunction HTJ mono/thin-film Si **PANASONIC VBHN240SE10 240 W_p** (2 modules)

Laboratory for RES development

- PV power plant 10 kWp
- PV modules: 5 different technologies
- Virtual Lab
- Constant on-line measurements of PV characteristics
- Measurements of Power Quality and Influence on Grid at PCC
- Off-line PV system (picogrid) HIL with batteries and programable load (Interreg CRO-HUN RuRES)
- Development of FERIT building smart microgrid
- DigSilent Grid Integration and PV Sol





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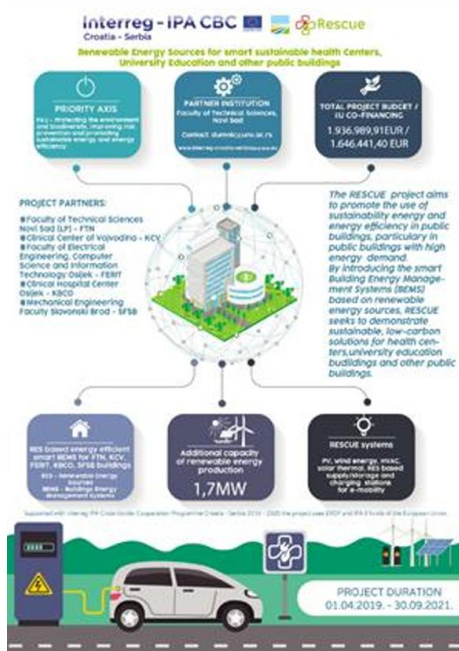


RenewMap

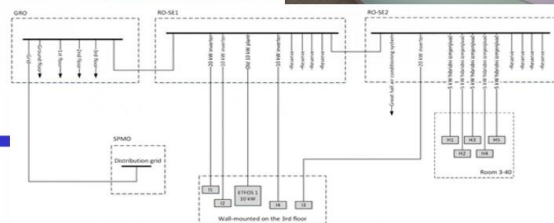
Hungary – Croatia

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RESLab, FERIT MICROGRID 146 kW (Interreg CRO-SRB RESCUE 2019 - 2021)



<http://reslab.ferit.hr/>



FERIT Laboratory for Renewable Energy Sources in RESCUE

<http://reslab.ferit.hr/>

RESEARCH GROUP FOR ADVANCED (SMART) ENERGY TECHNOLOGIES AND SYSTEMS
RESEARCH GROUP FOR ADVANCED INDUSTRIAL SYSTEMS

Current projects and ZICER building construction:

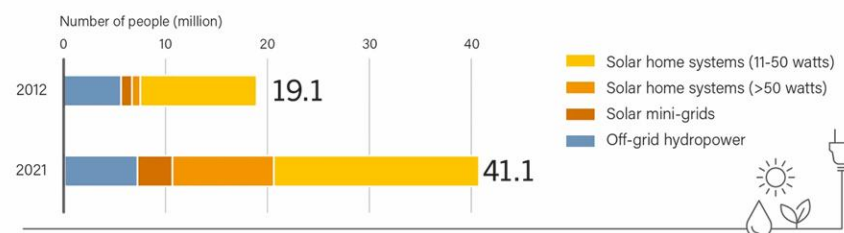
- SynGRID** Creating synergies in Widening countries on the topic of low-voltage grid management, **HORIZON Europe Widera** (2024-2027)
- BALANCE2GRID** development and deployment of hardware and software for energy management system of RES based prosumers, **European Fund for Integrated Territorial Programme** (2024- 2027)
- LivingLAB GreenStudio 1.0** Cooperative Advancement Tehnologies: Research, Innovation and Capacity Enhancement, **Interreg VI-A IPA CBC Croatia Serbia** (2024- 2025)
- FERIT Scientific research Institute (SMART nZEB)** design of smart near zero energy building (microgrid) of FERIT scientific research institute, **European Fund for Regional Development** (2020 -2022), currently in (public tender for) construction



Hungary – Croatia

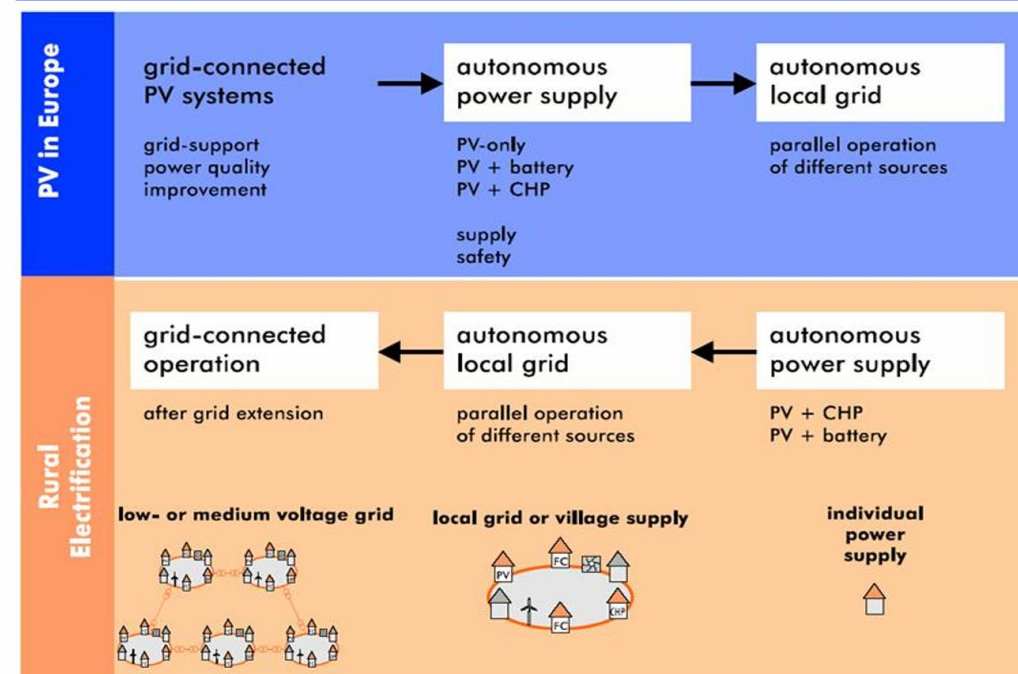
Global trends of RES (PV) usage

- **Energy transition:** RES and particularly PVPP and WPP are now mainstream sources
- Increased usage in developing countries (BRICS, Africa) and need for **modern energy access**:
- New markets for centralized i distributed RES generation in all world regions



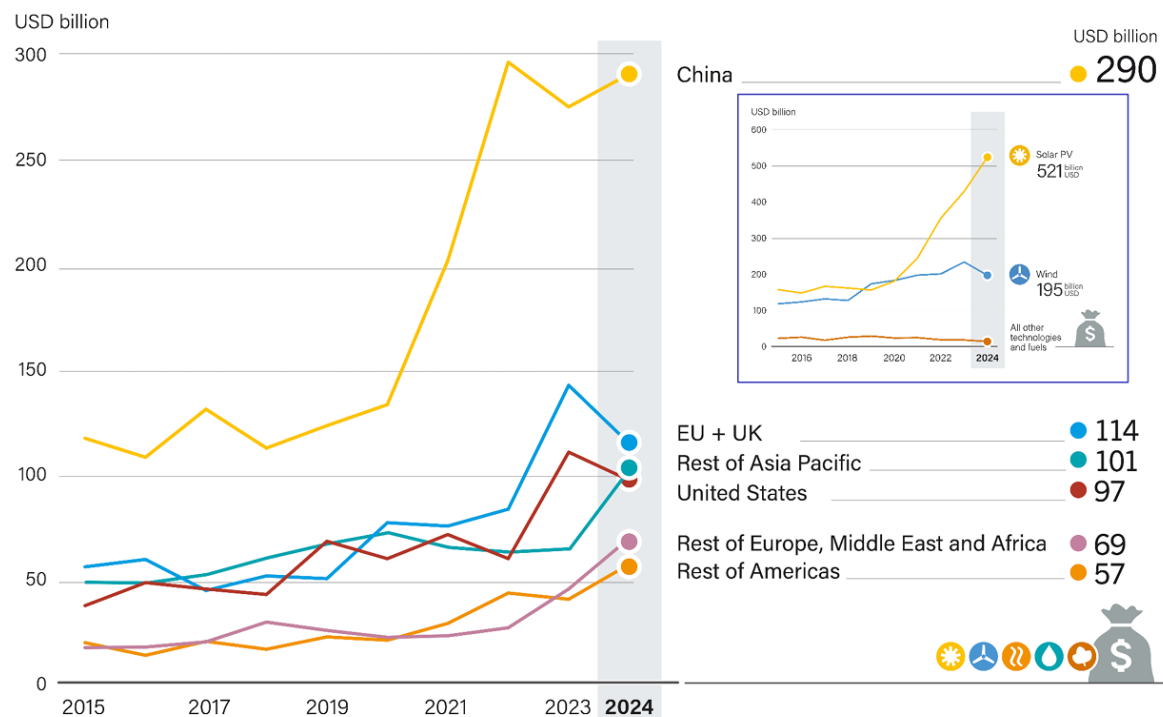
Broj ljudi s pristupom električnoj energiji putem off-grid OIE, 2012./2021.

Comparison of developed and developing countries PV (dis)integration



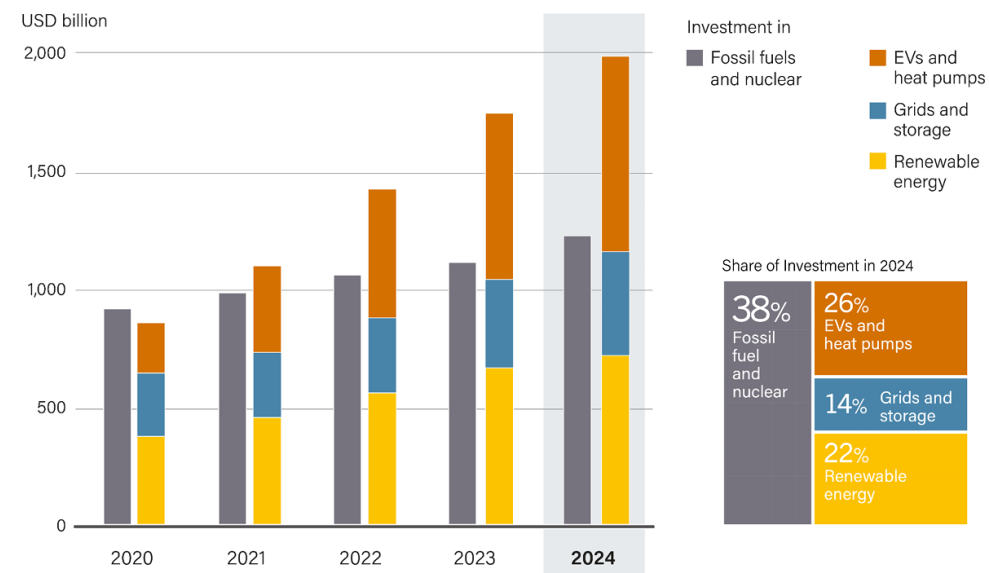
Global RES investments 2015 - 2024

728 billion USD in 2024



Izvor: REN21 Renewables 2025 Global Status Report

Global investments in energy technologies 2015 - 2024



Izvor: REN21 Renewables 2025 Global Status Report



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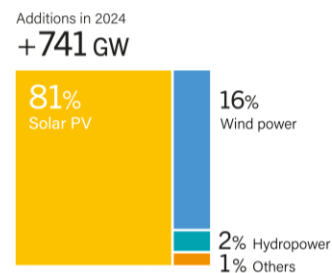
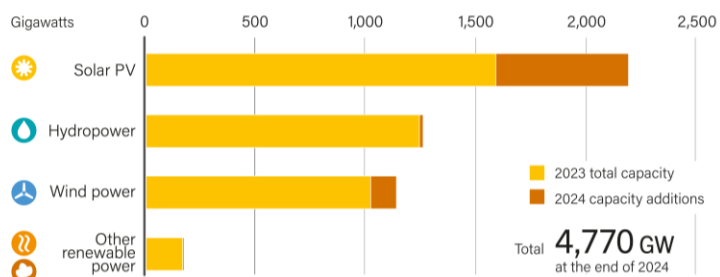
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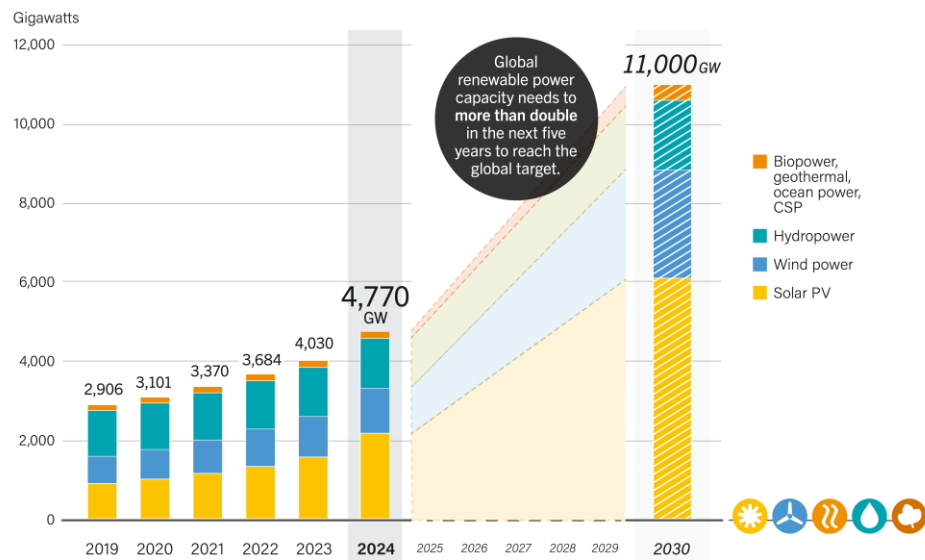
RenewMap

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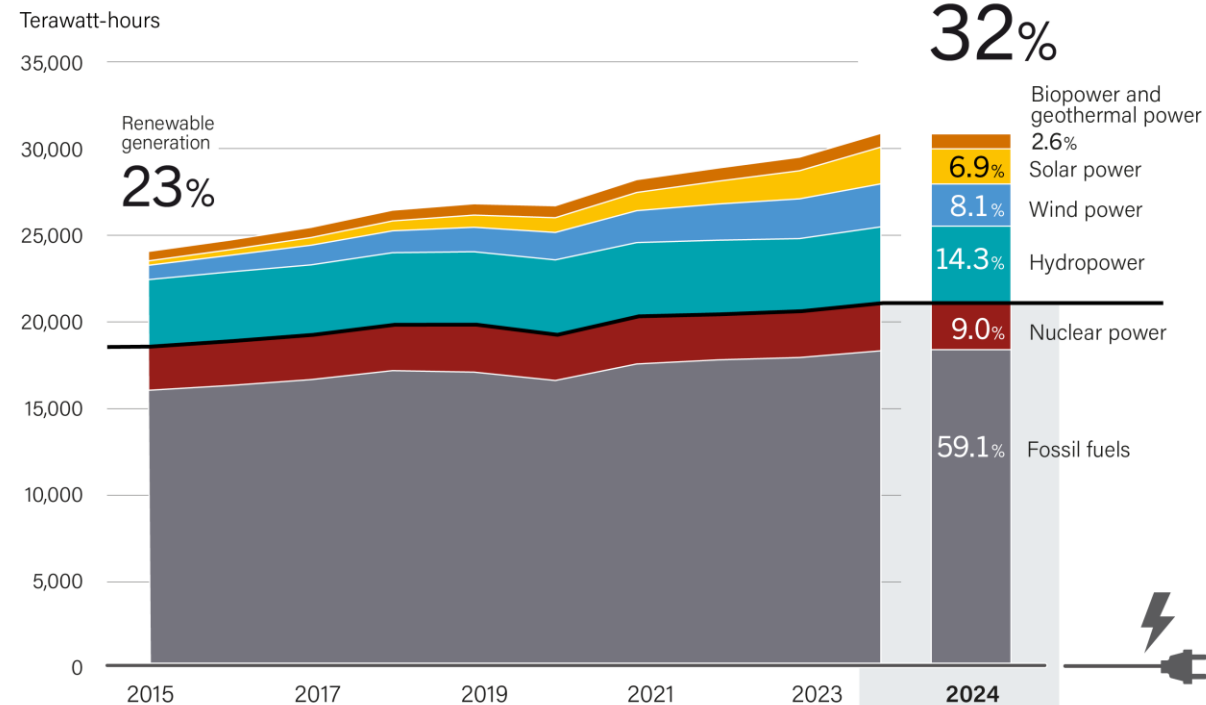
Renewable Power Total Installed Capacity and Additions, by Technology, 2024



Renewable Power Capacity by Technology, 2019-2024, Compared to 2030 Global Tripling Target



Electricity Generation by Energy Source, 2015-2024



REN21 GSR 2025 GLOBAL OVERVIEW



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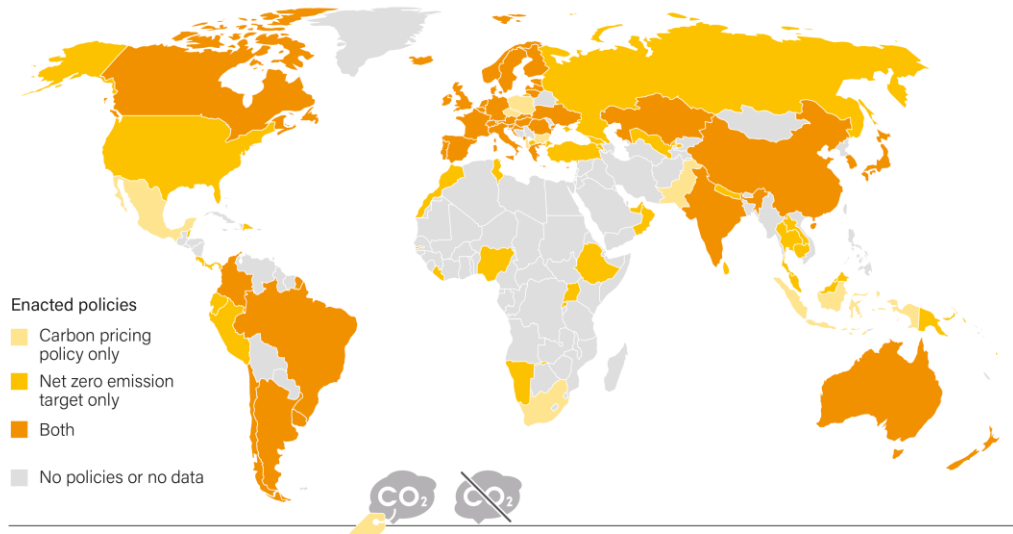
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Renewable Energy Targets, by Country, by Energy Carrier and Share in TREC, as of 2024

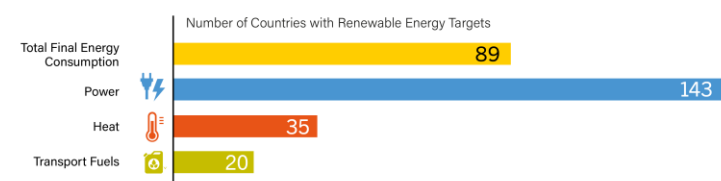
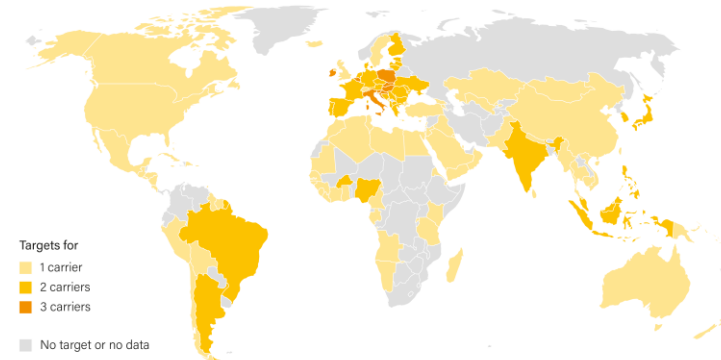


Countries with Climate Change Policies, by Type of Measure, as of 2024



Note: Enacted climate change policies include policies that have been officially passed into legislation or an official policy strategy (including NDCs). They also include net zero emission targets that have already been achieved. Carbon pricing policies include emission trading systems and carbon taxes. Carbon pricing policies of sub-national jurisdictions are not included in this figure. The EU ETS applies in all EU Member States, the European Free Trade Association countries (Iceland, Liechtenstein and Norway) as well as Northern Ireland for electricity generation (under the Protocol of Ireland and Northern Ireland); some countries (Austria, Denmark, Estonia, Finland, France, Germany, Iceland, Ireland, Latvia, Liechtenstein, Luxembourg, the Netherlands, Norway, Poland, Portugal, Spain, Sweden, Slovenia and Hungary) have an additional national scheme in place to complement the EU ETS.

Renewable Energy Targets, by Country and by Energy Carrier, as of 2024



Note: An energy carrier is a transmitter of energy. Energy carriers include electricity, heat and fuels. They occupy intermediate steps in the energy-supply chain between primary sources and end-use applications.

Source: REN21 Policy Database. See endnote 49 for this section.

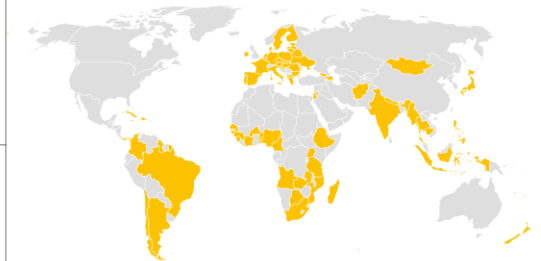
89

countries have
renewable energy
targets



Renewable Energy Target for Total Final Energy Consumption (TFEC), by Country, as of 2024

Target
No target or no data





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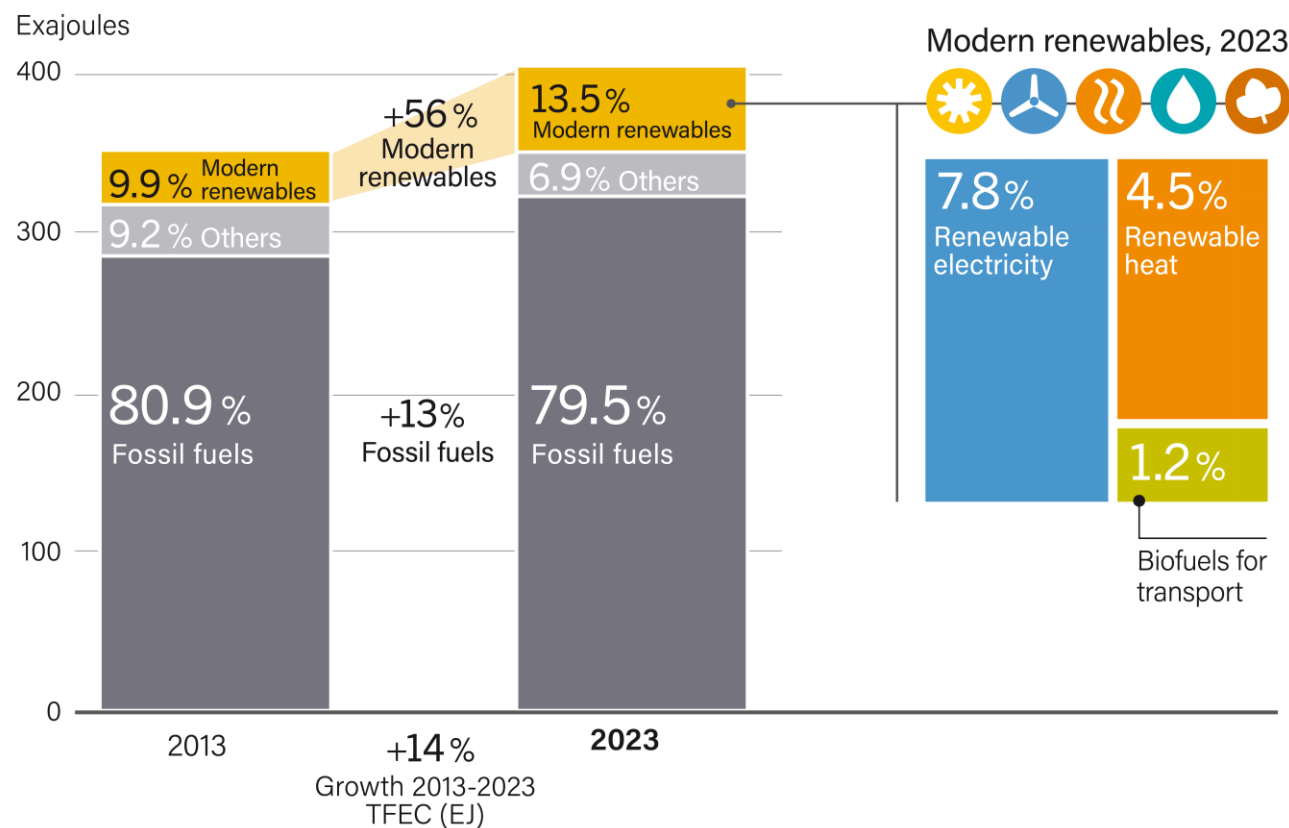
Hungary – Croatia



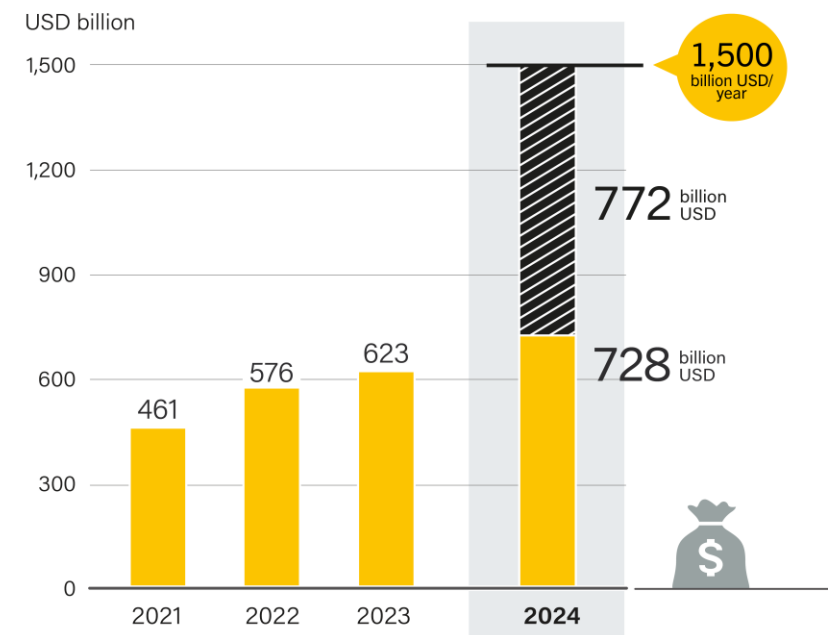
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Total Final Energy Consumption by Source, 2013 and 2023



Investment Gap to Reach the COP 28 Tripling Target by 2030





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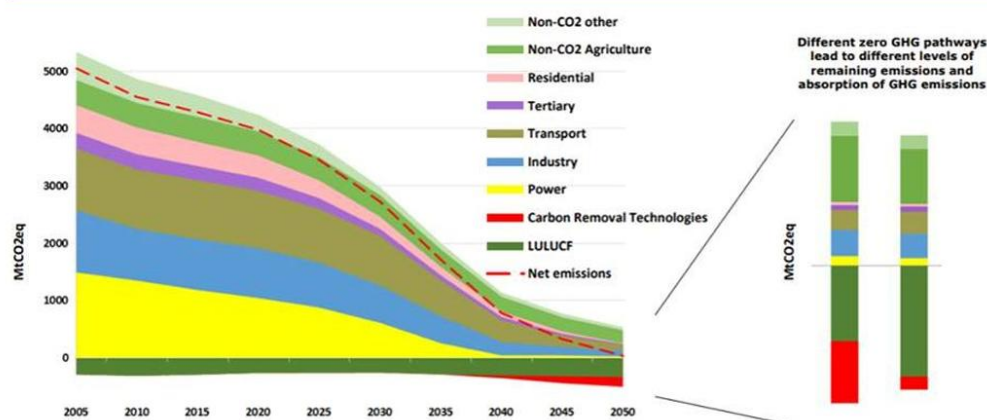


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EU '2050 zero-carbon economy'

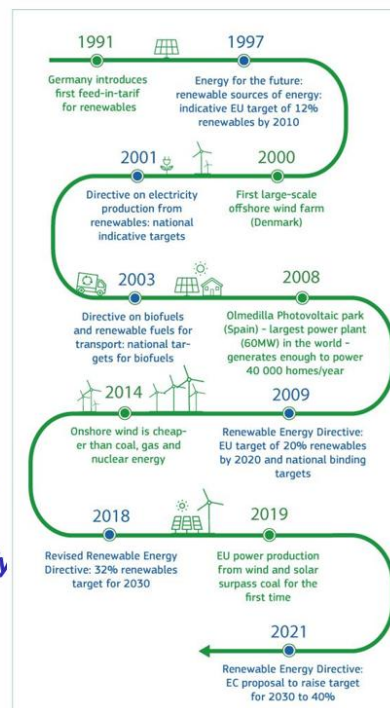


REPowerEU 2022:

- further reducing imports of Russian gas
- boosting industrial decarbonisation
- **rolling out renewables faster**
- investing in energy infrastructure and interconnections
- improving energy efficiency

- **In November 2023, the revised Renewable Energy Directive** introduced targets to almost double the existing share of renewable energy in the EU.

- The objective is to increase the share of renewables in the EU's overall energy consumption, raising the binding target **for 2030 to 42.5%, with the ambition to reach 45%.**



2021 European Green Deal vs 2018. Paris agreement vs 2009. goals

- 55% (2021) vs 45% (2018) vs 40% (2009) less GHG emissions
- 40% (2021) vs 32% (2018) vs 27% (2009) RES share in energy
- 41.5% (2021) vs 32.5% (2018) vs 27% (2009) increased energy efficiency

2050 goal: 100% vs 80% reduction of GHG from reference 1990/1995 in Ky LULUCF, zero-carbon power sector by 2024., smart and microgrids

Source: <http://ec.europa.eu/clima>



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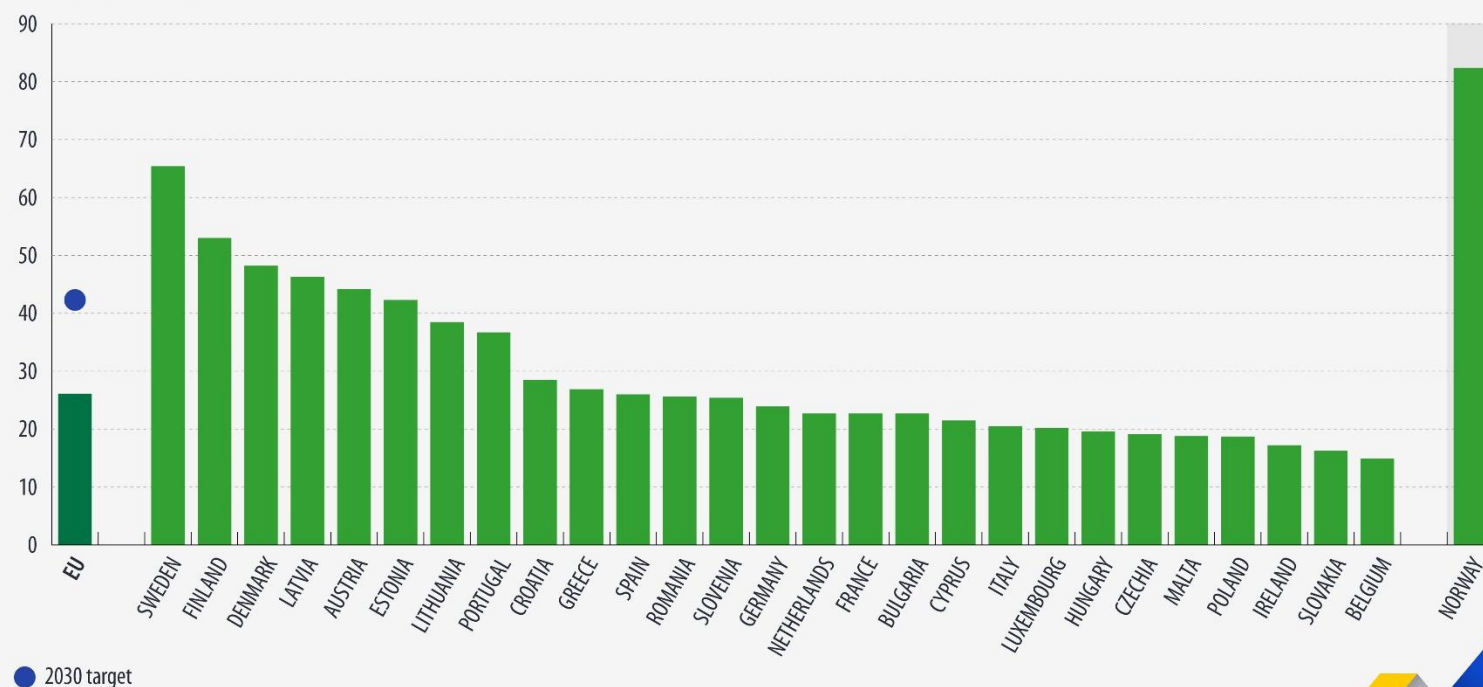
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- According to provisional data, the EU reached a 26.2% share of its gross final energy consumption from renewable sources in 2025, around 1 percentage point (pp) higher than in 2024 and almost 3 times higher than in 2004 (9.6%).
- [EU Directive 2023/2413](#) on the promotion of the use of energy from renewable sources has revised the EU's 2030 renewable energy target from 32% **to 42.5% (with an aim to increase it to 45%)**.
- Therefore, EU countries need to intensify their efforts to collectively comply with the EU target for 2030, which requires increasing the share of renewable energy sources in the EU's gross final energy consumption by more than 16 pp in just 5 years.

Share of energy from renewable sources, 2025

(%, provisional data)



eurostat



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Overall share of energy from renewable sources, 2004-2025

(% of gross final energy consumption)

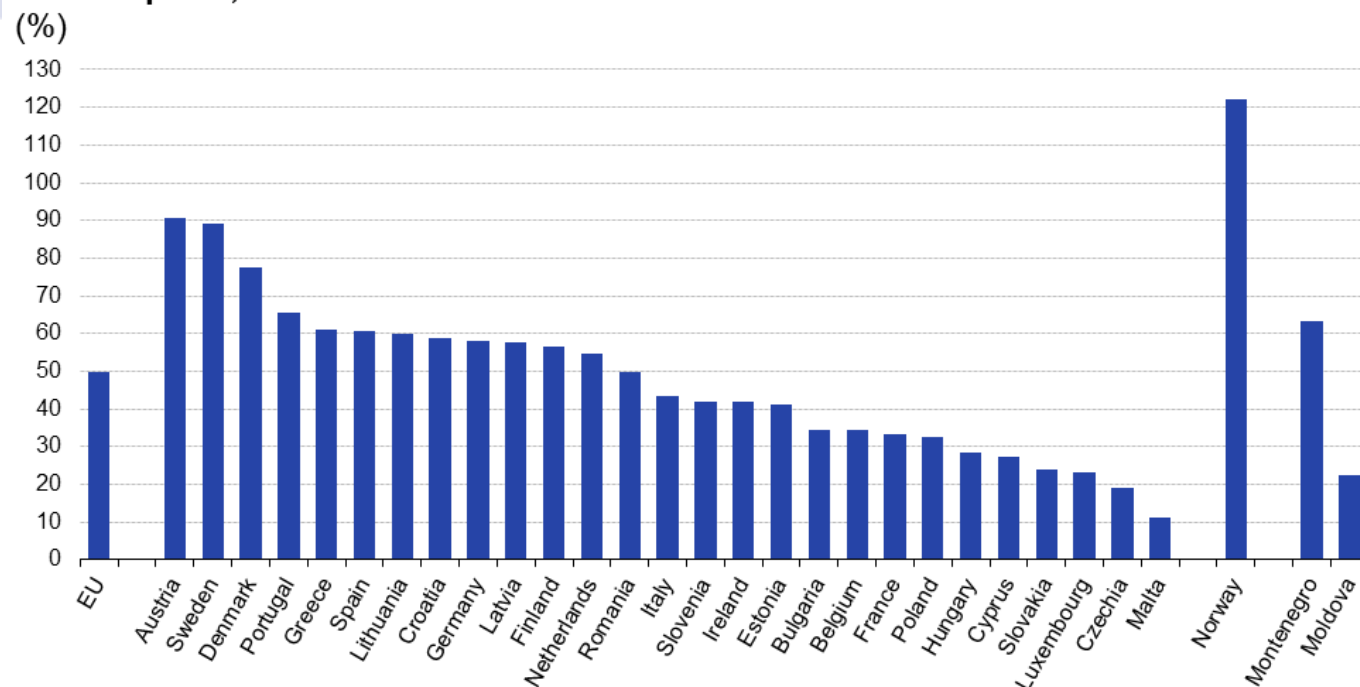
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
EU	9.605	10.182	10.778	11.749	12.552	13.850	14.405	14.547	16.002	16.659	17.416	17.820	17.978	18.411	19.096	19.887	22.038	21.897	23.003	24.578	25.230	26.2
Belgium	1.916	2.325	2.658	3.140	3.611	4.746	6.004	6.302	7.086	7.671	8.038	8.060	8.744	9.136	9.472	9.929	13.000	13.017	13.831	14.673	14.336	14.9
Bulgaria	9.231	9.173	9.415	9.098	10.345	12.005	13.927	14.152	15.837	18.898	18.050	18.261	18.760	18.695	20.581	21.545	23.319	19.394	19.079	23.151	23.210	22.7
Czechia	6.773	7.113	7.362	7.895	8.674	9.977	10.513	10.945	12.814	13.927	15.074	15.070	14.926	14.799	15.139	16.239	17.303	17.614	18.123	18.555	19.210	19.1
Denmark	14.839	15.955	16.332	17.747	18.543	19.948	21.888	23.389	25.465	27.173	29.310	30.469	31.715	34.387	35.159	37.020	31.681	41.495	41.370	43.730	46.759	48.2
Germany	6.207	7.167	8.466	10.039	10.072	10.851	11.667	12.470	13.549	13.757	14.381	14.901	14.885	15.472	16.660	17.266	19.090	19.302	20.829	21.512	22.474	23.9
Estonia	18.420	17.478	16.011	17.139	18.811	23.009	24.575	25.515	25.586	25.356	26.130	28.987	29.232	29.538	29.970	31.730	30.069	37.342	38.542	40.950	38.015	42.3
Ireland	2.378	2.822	3.073	3.497	3.979	5.243	5.755	6.605	7.029	7.521	8.516	9.083	9.189	10.520	10.942	11.979	16.160	12.945	13.017	15.243	16.064	17.2
Greece	7.161	7.277	7.458	8.249	8.183	8.731	10.077	11.153	13.741	15.326	15.683	15.690	15.390	17.300	18.001	19.633	21.749	22.001	22.671	25.269	25.364	26.9
Spain	8.345	8.444	9.156	9.667	10.744	12.958	13.782	13.176	14.239	15.081	15.879	16.221	17.015	17.118	17.023	17.852	21.220	20.550	21.840	24.980	25.420	26.0
France	9.319	9.272	8.936	9.426	11.188	12.215	12.671	10.813	13.239	13.880	14.362	14.803	15.451	15.847	16.384	17.174	19.109	19.391	20.330	22.462	23.229	23.9
Croatia	23.404	23.691	22.668	22.161	21.986	23.596	25.103	25.389	26.757	28.040	27.817	28.969	28.266	27.280	28.047	28.466	31.023	31.285	28.088	28.088	26.708	28.5
Italy	6.316	7.549	8.328	9.807	11.492	12.775	13.023	12.881	15.441	16.741	17.082	17.525	17.415	18.267	17.796	18.181	20.359	18.888	18.826	19.173	19.349	20.5
Cyprus	3.071	3.131	3.263	4.001	5.131	5.920	6.161	6.245	7.111	8.428	9.144	9.903	9.833	10.478	13.873	13.777	16.879	19.069	19.427	20.213	21.900	21.5
Latvia	32.794	32.264	31.141	29.615	29.811	34.317	30.375	33.478	35.709	37.037	38.629	37.538	37.138	39.008	40.019	40.929	42.132	42.112	43.786	43.250	45.535	46.3
Lithuania	17.221	16.768	16.887	16.482	17.824	19.798	19.639	19.943	21.437	22.689	23.592	25.748	25.612	26.038	24.695	25.474	26.773	28.167	29.599	31.926	35.408	38.5
Luxembourg	0.899	1.402	1.469	2.725	2.809	2.929	2.851	2.855	3.112	3.494	4.471	4.987	5.364	6.194	8.942	7.046	11.699	11.713	14.286	14.312	14.742	20.2
Hungary	4.364	6.931	7.433	8.575	8.564	11.673	12.742	13.972	15.530	16.205	14.618	14.495	14.377	13.556	12.548	12.634	13.850	14.134	15.128	17.117	18.329	19.6
Malta	0.102	0.123	0.149	0.177	0.195	0.221	0.979	1.850	2.862	3.760	4.744	5.119	6.208	7.219	7.914	8.230	10.714	12.631	14.040	15.437	17.210	18.8
Netherlands	2.030	2.478	2.778	3.298	3.596	4.266	3.917	4.524	4.659	4.691	5.415	5.714	5.846	6.507	7.394	8.886	13.999	13.117	15.290	17.588	20.180	22.7
Austria	22.553	24.353	26.276	28.144	28.788	31.039	31.205	31.552	32.734	32.665	33.550	33.497	33.370	33.136	33.784	33.755	36.545	34.643	34.057	41.600	42.951	44.2
Poland	6.882	6.867	6.859	6.903	7.686	8.676	9.281	10.337	10.955	11.452	11.605	11.881	11.396	11.059	14.936	15.377	16.102	15.604	16.644	16.651	17.770	18.7
Portugal	19.205	19.523	20.792	21.907	22.929	24.405	24.150	24.603	24.574	25.699	29.508	30.514	30.864	30.611	30.203	30.623	33.982	33.982	34.675	35.154	36.319	36.7
Romania	16.811	17.571	17.096	18.195	20.204	22.157	22.834	21.743	22.825	23.886	24.845	24.785	25.032	24.454	23.875	24.290	24.478	23.871	24.229	25.758	25.378	25.6
Slovenia	18.397	19.809	18.416	19.675	18.646	20.765	21.081	20.937	21.551	23.160	22.459	22.879	21.975	21.658	21.378	21.968	25.000	25.000	25.002	25.066	24.635	25.4
Slovakia	6.391	6.360	6.584	7.766	7.723	9.368	9.099	10.348	10.453	10.133	11.713	12.882	12.029	11.465	11.896	16.894	17.345	17.419	17.482	16.990	18.092	16.3
Finland	29.232	28.814	30.043	29.561	31.071	31.045	32.166	32.532	34.222	36.630	38.633	39.230	38.943	40.857	41.185	42.807	43.939	42.819	47.739	50.784	52.100	53.0
Sweden	38.427	39.982	41.734	43.224	43.922	47.024	46.099	47.632	49.403	50.153	51.151	52.220	52.597	53.390	53.916	55.785	60.124	62.527	66.287	66.393	62.846	65.4
Iceland	58.899	60.270	60.921	71.925	67.981	70.238	70.909	72.298	73.727	73.787	73.043	71.949	75.329	74.104	77.173	78.612	83.725	79.618	78.735	79.443	79.332	-
Norway	58.417	60.069	60.521	60.398	62.003	65.071	61.889	64.638	64.932	66.480	68.406	68.545	69.235	70.036	71.566	74.406	77.358	75.038	76.782	76.729	77.932	82.4
Montenegro	-	35.694	34.842	32.925	32.290	39.371	40.640	40.648	41.513	43.696	44.098	43.073	41.529	39.693	38.801	37.722	43.770	39.891	41.064	40.883	40.822	39.8
Moldova	7.450	6.402	6.960	6.443	6.994	7.924	21.369	22.081	24.328	24.419	26.169	26.173	26.888	27.836	27.476	23.843	25.057	22.202	21.540	22.995	20.769	22.109
North Macedonia	15.702	16.466	16.527	14.976	15.555	17.238	16.451	16.407	18.128	18.509	19.559	19.526	18.044	19.636	18.179	17.485	19.222	19.115	20.009	20.207	21.811	-
Georgia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.292	18.141	19.850	19.452	-
Albania	29.620	31.367	32.070	32.657	32.448	31.437	31.867	31.187	35.152	33.167	31.856	34.913	36.953	35.776	36.572	38.042	45.015	41.390	44.080	46.620	46.880	-
Serbia	12.724	14.257	14.542	14.327	15.888	21.024	19.763	19.118	20.790	21.095	22.864	21.989	21.147	20.287	20.320	21.443	26.297	25.255	24.670	25.428	25.816	-
Bosnia Herzegovina	-	-	-	-	-	-	-	-	-	-	24.873	26.607	25.358	23.241	35.972	37.454	39.835	36.562	39.294	40.011	-	-
Kosovo*	20.541	19.773	19.511	18.812	18.429	18.230	18.230	17.598	18.625	18.823	19.544	18.484	24.472	23.082	24.616	24.215	24.401	22.143	18.773	19.260	-	-

- Sweden highest share among the EU countries, with **65.4%** of its gross final energy consumption coming from renewable sources in 2025. **Solid biomass**, hydro, and wind.
- Finland **53.0%**, relying mainly on **solid biomass**, followed by wind and hydropower.
- Denmark **48.2%**, with solid biomass contributing the most, followed by **wind and biogas**.
- The lowest shares of renewables were recorded in Belgium (14.9%), Slovakia (16.3%), and Ireland (17.2%).
- Hungary **19.6%** (mostly solar electricity and geothermal heat), Croatia **28.5%** (mostly hydro wind and rising solar electricity + biomass and solar heating)

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Renewable Energy Potentials in Croatia, Hungary and European Union

- **In 2025, renewable energy sources made up 49.9% of gross electricity consumption in the EU**, more than 2 pp higher than the previous year (47.5% in 2024). The growth in electricity generated from renewable energy sources during the period 2015 to 2025 largely reflects an expansion in 2 renewable energy sources across the EU, namely **wind power** and **solar power**.
- **Wind power 38.0%, hydropower 26.4%, solar power (23.4%)**, solid biofuels (5.8%) and other renewable sources (6.1%).
- Solar photovoltaic power is the fastest-growing source: in 2008, it accounted for 1%. This means that the growth in electricity from **solar power has been dramatic, rising from just 7.4 terawatt hours (TWh) in 2008 to 304 TWh in 2024**

Share of energy from renewable sources in gross electricity consumption, 2025



Note: Data for 2025 are provisional.

Source: Eurostat (online data code: nrg_ind_ren)



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RenewMap

Hungary – Croatia

Damir Šljivac, Matej Žnidarec, Goran Knežević, Mario Primorac, Dario Došen: Renewable Energy Potentials in Croatia, Hungary and European Union

Share of energy from renewable sources in gross electricity consumption, 2004-2025
(%)

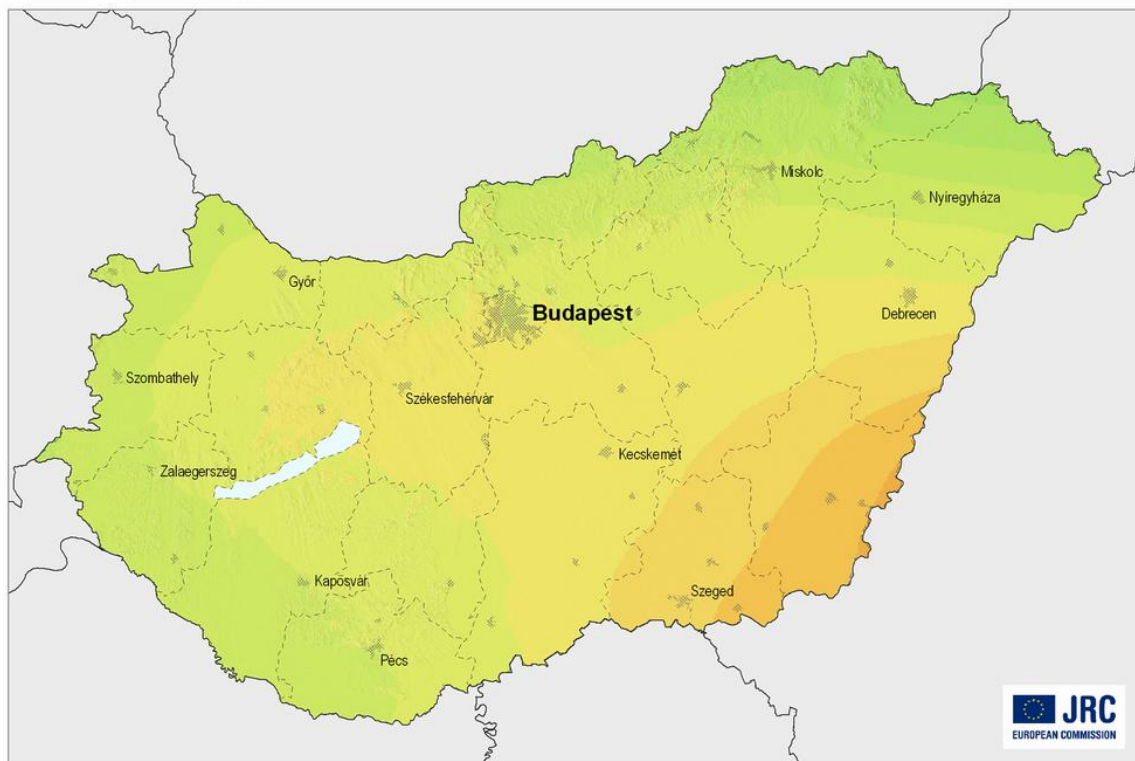
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
EU	15.87	16.40	16.88	17.65	18.53	20.65	21.28	23.30	25.14	26.77	28.60	29.65	30.17	31.10	32.13	34.09	37.41	37.79	41.24	45.40	47.50	49.95
Belgium	1.71	2.39	3.13	3.66	4.62	6.18	7.33	8.99	11.34	12.55	13.41	15.57	15.83	17.21	18.89	20.82	25.12	26.03	29.51	31.37	31.27	34.28
Bulgaria	8.36	8.67	8.73	8.90	9.54	10.91	12.36	12.62	15.82	18.68	18.69	18.98	19.15	19.02	22.36	23.51	23.59	21.41	20.36	29.70	33.87	34.42
Czechia	3.69	3.78	4.10	4.62	5.18	6.38	7.52	10.61	11.67	12.78	13.89	14.07	13.61	13.65	13.71	14.05	14.81	14.47	15.50	16.45	17.93	19.19
Denmark	23.75	24.65	23.97	25.00	25.94	28.26	32.74	35.87	38.72	43.08	48.49	51.29	53.72	59.94	62.39	65.35	65.32	73.19	76.72	78.98	79.66	77.70
Germany	9.44	10.58	11.94	13.73	15.14	17.52	18.24	20.93	23.60	25.28	28.17	30.88	32.27	34.61	37.59	40.60	44.21	43.96	48.04	51.95	54.08	57.88
Estonia	0.55	1.13	1.43	1.43	1.97	5.97	10.29	12.20	15.67	12.95	14.02	16.15	16.19	17.58	19.68	22.00	28.29	29.20	29.11	31.85	37.79	41.06
Ireland	6.03	7.20	8.50	9.53	10.82	14.06	15.64	18.25	19.84	20.96	23.32	25.73	27.07	30.32	33.32	36.46	39.05	37.66	37.39	40.43	41.34	41.72
Greece	7.84	8.21	8.92	9.33	9.65	11.02	12.31	13.81	16.36	21.24	21.92	22.09	22.66	24.46	26.00	31.30	35.86	35.88	42.36	48.23	51.25	60.90
Spain	19.02	19.17	20.03	21.72	23.78	27.88	29.75	31.53	33.44	36.03	37.13	36.97	36.68	36.47	35.24	37.13	42.94	45.99	50.89	56.92	59.68	60.72
France	13.78	13.74	14.06	14.29	14.36	15.09	14.81	16.18	16.55	16.98	18.47	18.82	19.21	19.93	21.13	22.39	24.82	24.82	27.36	30.29	31.34	33.12
Croatia	35.03	35.18	34.82	33.98	33.87	35.88	37.52	37.59	38.76	42.08	45.24	45.41	46.67	46.44	48.14	49.78	53.82	53.47	56.24	57.52	58.04	58.84
Italy	16.09	16.29	15.93	15.95	16.65	18.81	20.09	23.55	27.42	31.30	33.42	33.46	34.01	34.10	33.93	34.97	38.08	36.00	37.10	38.91	40.65	43.54
Cyprus	0.02	0.02	0.03	0.07	0.29	0.59	1.39	3.45	4.93	6.65	7.40	8.45	8.59	8.91	9.36	9.76	12.04	14.84	16.96	20.94	24.09	27.45
Latvia	45.96	43.02	40.41	38.62	38.73	41.94	42.05	44.69	44.88	48.68	51.04	52.21	51.25	54.35	53.50	53.42	53.36	51.40	53.52	54.32	55.51	57.61
Lithuania	3.59	3.83	4.02	4.65	4.91	5.87	7.40	9.02	10.88	13.15	13.71	15.54	16.87	18.25	18.41	18.79	20.17	21.28	26.46	36.47	48.99	59.92
Luxembourg	2.76	3.18	3.17	3.30	3.58	4.11	3.79	4.07	4.66	5.33	5.96	6.20	6.67	8.05	9.11	10.86	13.89	14.22	16.32	18.20	20.50	23.33
Hungary	2.22	4.42	3.45	4.19	5.32	6.96	7.10	6.38	6.06	6.60	7.30	7.34	7.29	7.51	8.31	9.97	11.90	13.66	15.33	19.54	24.06	28.32
Malta	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.45	1.12	1.57	3.33	4.31	5.71	6.84	7.70	7.49	9.49	9.65	10.11	10.73	10.66	11.17
Netherlands	4.45	6.30	6.54	5.96	7.46	9.07	9.60	9.74	10.35	9.91	9.92	11.04	12.55	13.81	15.17	18.23	26.41	33.25	39.65	46.42	50.55	54.73
Austria	61.63	62.90	63.53	65.67	65.88	68.63	66.36	66.78	67.44	68.91	71.06	71.49	72.52	71.63	74.19	75.07	78.20	74.01	73.64	87.90	90.07	90.77
Poland	2.05	2.51	2.86	3.32	4.25	5.71	6.55	8.08	10.61	10.68	12.36	13.40	13.34	13.08	13.03	14.36	16.24	17.17	21.01	25.79	30.37	32.48
Portugal	27.39	27.70	29.31	32.28	34.06	37.56	40.61	45.78	47.51	49.10	52.05	52.62	53.99	54.17	52.19	53.77	58.03	58.43	60.99	63.01	65.80	65.64
Romania	28.43	28.77	28.05	28.11	28.08	30.89	30.38	31.13	33.57	37.52	41.68	43.16	42.71	41.97	41.79	42.62	43.37	42.68	43.73	47.39	47.64	49.87
Slovenia	29.27	28.65	28.23	27.70	29.96	33.76	32.20	31.04	31.64	33.08	33.94	32.72	32.06	32.43	32.31	32.63	35.09	34.98	37.01	41.89	43.08	45.64
Slovakia	15.40	15.73	16.57	16.47	17.01	17.76	17.77	19.30	20.05	20.80	22.87	22.66	22.51	21.34	21.50	22.10	23.07	22.40	22.90	24.20	24.91	24.09
Finland	26.71	26.92	26.42	25.47	26.75	26.82	27.22	28.96	29.11	30.54	31.11	32.21	32.72	35.04	36.54	37.97	39.56	39.58	47.97	52.37	54.31	56.58
Sweden	51.20	50.90	51.78	53.21	53.69	58.25	55.77	59.62	59.78	61.74	63.21	65.73	64.87	65.91	66.23	71.23	74.49	75.76	83.37	87.55	88.14	89.22
Iceland	93.15	94.93	93.50	113.70	90.85	92.86	92.42	93.91	95.42	96.72	97.06	93.11	95.31	93.38	98.50	100.64	102.71	99.54	98.67	99.90	102.44	102.44
Norway	97.97	97.42	100.84	99.05	100.15	105.19	98.25	105.89	104.60	106.92	110.13	106.83	105.64	104.85	106.83	110.45	113.80	113.64	120.01	116.54	115.06	122.00
Montenegro	39.10	37.68	37.62	38.26	46.61	45.74	41.58	42.76	49.07	51.44	49.61	50.96	50.11	52.42	53.65	61.49	60.46	68.51	67.53	66.57	63.14	63.14
Moldova	0.84	0.82	0.79	0.83	0.83	0.96	1.81	1.80	1.69	1.69	1.90	1.98	1.95	2.14	2.63	3.04	3.12	3.58	5.54	9.21	13.69	22.31
North Macedonia	14.51	13.99	14.01	13.67	13.85	15.47	15.85	14.85	16.66	18.21	19.27	21.66	24.14	24.84	24.84	23.78	23.53	22.78	25.87	32.34	40.07	40.07
Georgia	69.98	76.11	74.21	79.63	73.30	70.71	74.62	66.13	72.43	62.67	70.98	79.22	82.10	91.02	92.45	92.99	99.97	94.42	102.97	105.38	105.19	105.19
Serbia	18.49	22.37	23.60	24.81	25.86	28.25	28.18	27.53	28.51	27.97	30.27	28.91	29.15	27.45	28.66	30.11	30.70	29.90	30.14	31.75	32.08	32.08
Bosnia Herzegovina	38.39	38.73	40.83	39.56	41.50	45.48	49.31	46.32	39.29	40.01	40.01	40.01	40.01	40.01	40.01	40.01	40.01	40.01	40.01	40.01	40.01	40.01
Kosovo*	0.47	0.61	0.91	0.97	0.97	1.14	1.36	1.37	1.50	1.63	1.87	1.84	3.97	3.62	4.23	5.15	5.26	5.17	6.68	8.98	8.98	8.98

Hungary – Croatia

Hungary's solar potentials

Global irradiation and solar electricity potential Horizontally mounted photovoltaic modules

Hungary


Yearly sum of global irradiation [kWh/m²]

1100 1150 1200 1250 1300

825 863 900 938 975

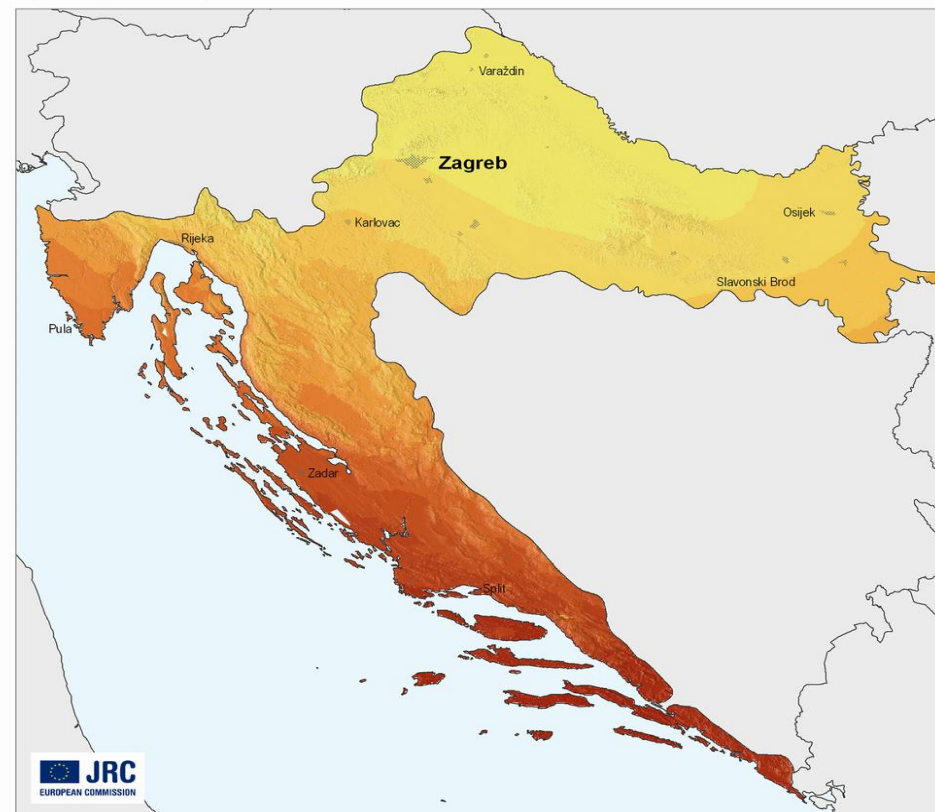
Yearly electricity generated by 1kW_{peak} system with performance ratio 0.75 [kWh/kW_{peak}]

Authors: M. Šuri, T. Cebecauer, T. Huld, E. D. Dunlop
PVGIS © European Communities, 2001-2008
<http://re.jrc.ec.europa.eu/pvgis/>

0 25 50 km

Global irradiation and solar electricity potential Optimally-inclined photovoltaic modules

Croatia


Yearly sum of global irradiation [kWh/m²]

1300 1400 1500 1600 1700 1800 1900

975 1050 1125 1200 1275 1350 1425

Yearly electricity generated by 1kW_{peak} system with performance ratio 0.75 [kWh/kW_{peak}]

Authors: M. Šuri, T. Cebecauer, T. Huld, E. D. Dunlop
PVGIS © European Communities, 2001-2008
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0 25 50 km

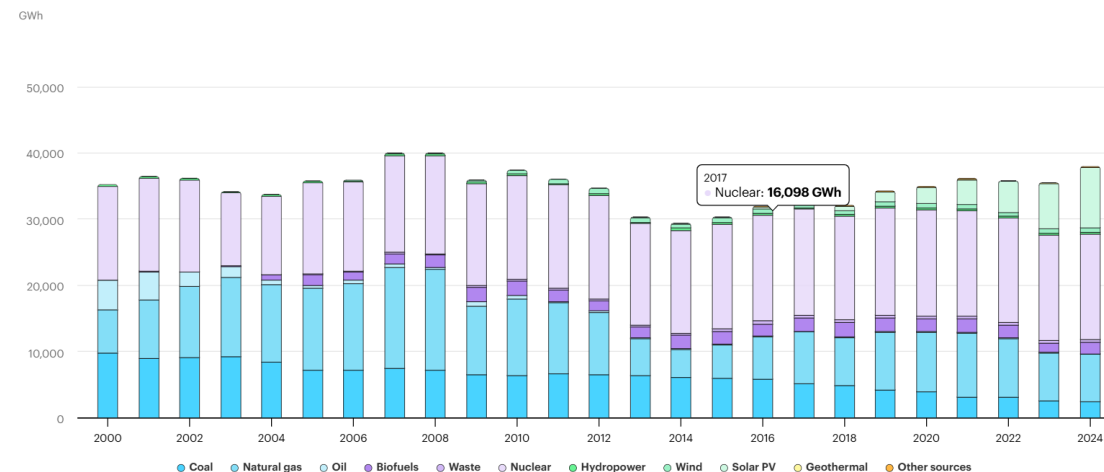
Hungary's RES electricity

- With total installed renewable energy capacity estimated at 10.39 GW, representing a rapid expansion heavily dominated by the solar (PV)~8.5 GW²⁷ aiming for 12 GW by 2030.
- Wind Power~330 MW², stagnant since 2011 due to tight zoning restrictions. New 2026 tenders aim to add 4 GW by 2030.: The government announced tenders to lift long-standing effective restrictions on wind power developments, incorporating state and municipal cooperation.
- Battery Storage (BESS): Capacity has expanded rapidly, reaching nearly 984 MW as of September 2026, positioning Hungary to capitalize on volatile intraday electricity markets.
- Policy and Market Changes Net Metering Phase-out: Annual net metering was replaced by new gross settlement frameworks to comply with EU regulations.
- Support Schemes: Government decrees have adjusted feed-in tariffs and mandatory purchase prices (KÁT system) with capped inflation adjustments.
- Grid Modernization: A €1.5 billion (\$1.37B allocated for grid flexibility) EU-backed program is underway to upgrade infrastructure and integrate nearly 4,800 MW of new renewable energy by 2030.



Ikervár Hydroelectric Plant (1896): Built earlier on the Rába River, it stands as Hungary's first hydroelectric power plant utilizing water energy for electricity.

Electricity generation by source, Hungary, 2000-2024



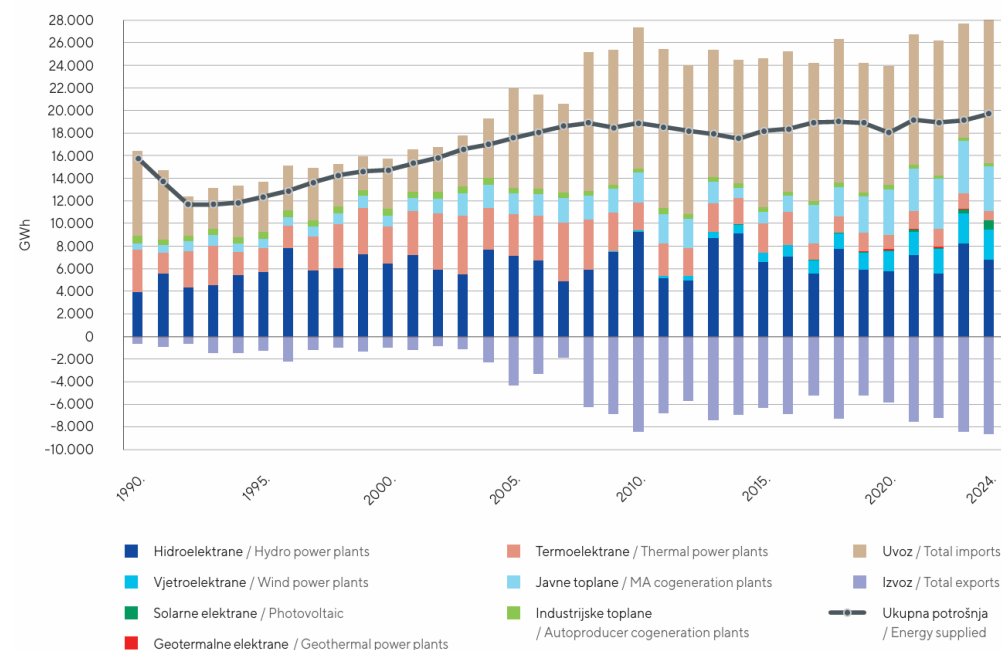
Hungary – Croatia

Croatia RES electricity

- **Croatia boasts one of the greenest grid baselines in the EU due to an immense legacy of hydropower.**
- Croatia satisfies the vast majority of its green domestic electricity needs from **large hydropower plants (~2.3 GW)**, drawing from the highest water resources per capita in the EU, during peak seasons, **renewables can push net generation past 92% of the country's electricity (depending in hydrology).**
- The Onshore Solar Boom: **solar is the fastest-growing sector. Croatia added nearly 1.8 GW by 2026.** This growth is heavily led by commercial and industrial rooftop systems rather than utility-scale fields.
- Wind Power Maturation: Onshore wind is Croatia's second largest renewable pillar (~1.3 GW). Strategic focus is now shifting toward massive offshore wind potentials in the Adriatic Sea, which studies indicate could scale up to 25 GW. 🏰
- Regulatory and Market Framework The "Two-Track" Support Scheme: Administered by the Croatian Energy Market Operator (HROTE), Croatia provides developers with either a guaranteed off-take price (fixed for smaller producers) or a market premium (where large producers sell on the open market and receive a variable premium).
- Battery Storage (BESS) Expansion: Croatia is addressing price volatility and negative electricity hours. The country's first utility-scale battery storage system recently entered trial operation in Šibenik, paving the way for a fully integrated BESS framework.
- Grid Capacity Crises: The rapid integration of distributed solar has stressed the state grid, Transmission System Operator, HOPS, is currently deploying a €124.4 million modernization framework—backed heavily by the EU National Recovery and Resilience Plan—to unlock blocked grid connections for utility projects



Krka Hydroelectric Power Plant (or Jaruga I) Croatia's first AC HPP from 1895. built using advanced machinery manufactured by the famous engineering firm Ganz & Co. from Budapest

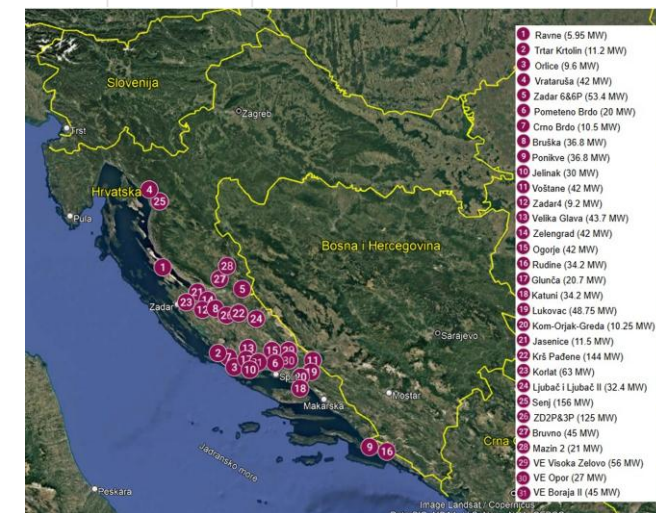
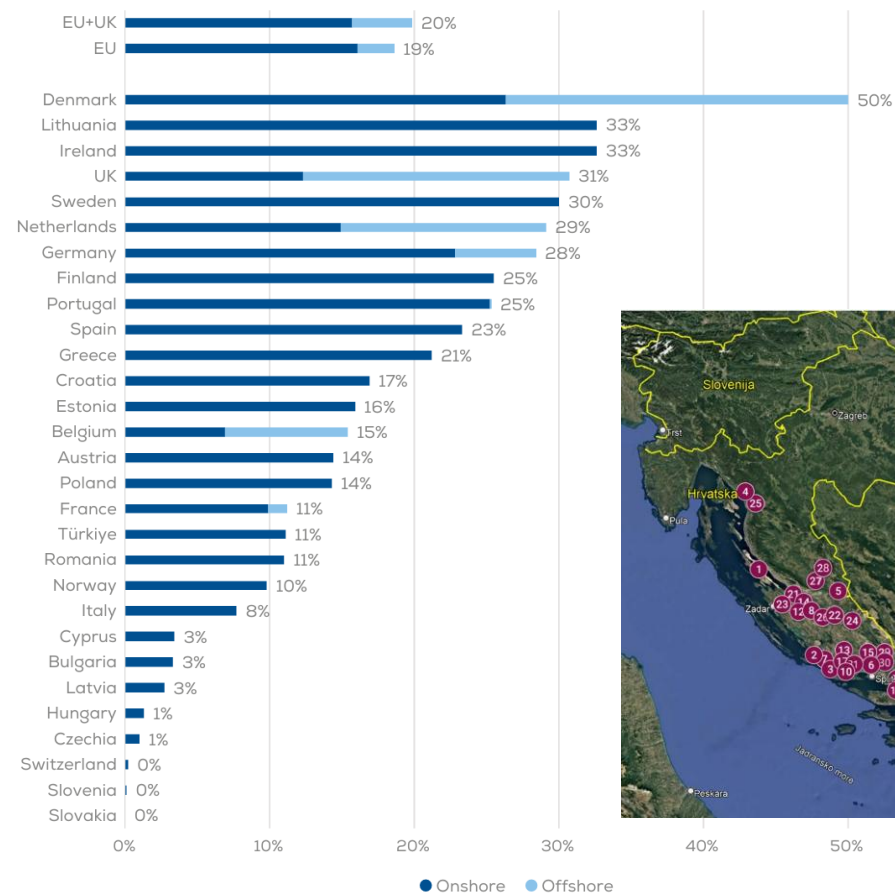


Hungary – Croatia

TABLE 1. New additions, total wind capacity and the share of wind in electricity demand in 2025 ²

EU-27	New installations in 2025 (MW)			Cumulative capacity (MW)			Share of wind in power mix in 2025		
	Onshore	Offshore	Total	Onshore	Offshore	Total	Onshore	Offshore	Total
Austria	285	-	285	4,221	-	4,221	14%	-	14%
Belgium	183	-	183	3,599	2,261	5,860	7%	8%	15%
Bulgaria	-	-	-	711	-	711	3%	-	3%
Croatia	27	-	27	1,264	-	1,264	17%	-	17%
Cyprus	-	-	-	177	-	177	3%	-	3%
Czechia	13	-	13	372	-	372	1%	-	1%
Denmark	35	-	35	4,856	2,652	7,508	26%	24%	50%
Estonia	-	-	-	711	-	711	16%	-	16%
Finland	1,023	-	1,023	9,433	71	9,504	25%	0%	25%
France	1,006	408	1,414	24,463	1,908	26,372	10%	1%	11%
Germany	5,232	503	5,735	68,067	9,624	77,691	23%	6%	28%
Greece	340	-	340	5,694	-	5,694	21%	-	21%
Hungary	-	-	-	333	-	333	1%	-	1%
Ireland	151	-	151	5,094	25	5,119	33%	0%	33%
Italy	579	-	579	13,451	30	13,481	8%	0%	8%
Latvia	-	-	-	137	-	137	3%	-	3%
Lithuania	759	-	759	2,535	-	2,535	33%	-	33%
Luxembourg	13	-	13	227	-	227	-	-	-
Malta	-	-	-	-	-	-	-	-	-
Netherlands	91	-	91	7,054	4,738	11,792	15%	14%	29%
Poland	800	-	800	11,200	-	11,200	14%	-	14%
Portugal	5	-	5	5,965	25	5,990	25%	0%	25%
Romania	330	-	330	3,480	-	3,480	11%	-	11%
Slovakia	-	-	-	4	-	4	0%	-	0%
Slovenia	-	-	-	3	-	3	0%	-	0%
Spain	1,563	-	1,563	33,151	7	33,158	23%	0%	23%
Sweden	1,767	-	1,767	18,323	192	18,515	30%	0%	30%
Total EU-27	14,202	911	15,113	224,525	21,534	246,059	16%	3%	19%

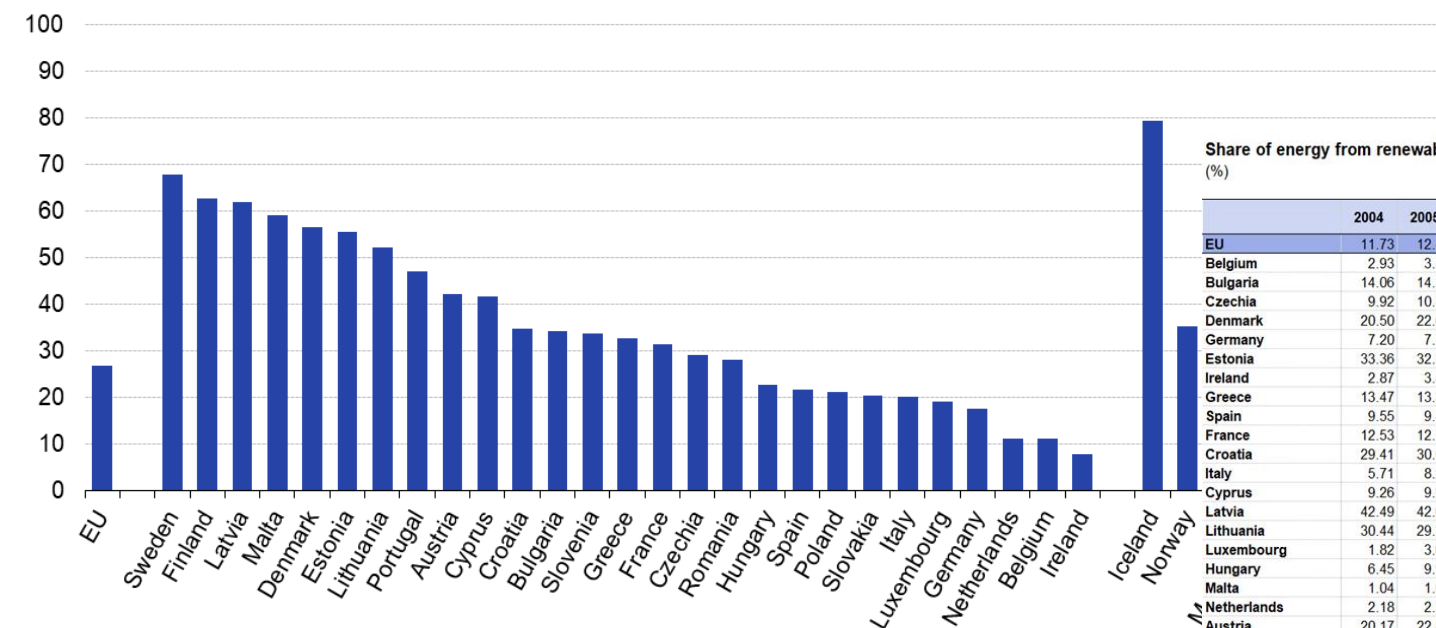
FIGURE 7. Percentage of electricity demand covered by wind in 2025



Source: WindEurope

Hungary – Croatia

Share of energy from renewable sources for heating and cooling, 2024 (%)



Share of energy from renewable sources for heating and cooling, 2004-2025 (%)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
EU	11.73	12.44	13.21	14.82	15.32	16.79	16.99	17.42	18.58	19.04	19.93	20.31	20.40	20.82	21.60	22.43	22.98	23.03	24.77	26.23	26.74	27.40
Belgium	2.93	3.42	3.81	4.71	5.12	6.09	6.71	6.72	7.11	7.64	7.75	7.94	8.25	8.20	8.29	8.32	8.45	9.21	10.43	11.21	11.26	
Bulgaria	14.06	14.26	14.79	13.86	17.26	21.64	24.33	24.77	27.24	29.23	28.52	28.90	29.99	29.85	33.25	35.42	37.18	29.86	31.49	36.06	34.19	
Czechia	9.92	10.84	11.23	12.37	12.92	14.26	14.10	15.39	16.25	17.71	19.53	19.79	19.88	19.73	20.64	22.63	23.53	24.35	25.82	27.67	29.06	
Denmark	20.50	22.61	23.66	26.71	27.96	29.40	30.37	31.89	33.20	34.68	38.01	39.54	41.08	44.06	44.97	47.30	51.07	51.55	51.40	54.50	56.42	
Germany	7.20	7.71	8.41	10.25	10.33	11.15	12.06	12.61	13.42	13.41	13.41	13.43	13.03	13.37	14.22	14.50	14.48	15.53	17.39	16.91	17.68	
Estonia	33.36	32.37	30.84	33.04	36.00	42.03	43.16	44.55	43.22	43.11	44.93	50.03	51.76	52.22	53.67	52.19	58.83	61.35	65.44	66.67	67.81	
Ireland	2.87	3.44	3.59	3.79	3.51	4.18	4.28	4.66	4.85	5.19	6.26	6.18	6.24	6.62	6.38	6.34	6.26	5.42	5.33	7.78	7.91	
Greece	13.47	13.38	13.10	14.68	14.72	17.25	18.66	20.11	24.12	27.42	27.87	26.56	25.42	28.25	30.12	30.05	31.94	31.08	30.62	35.55	32.64	
Spain	9.55	9.41	11.38	11.25	11.62	13.22	12.50	13.47	13.97	13.97	15.56	16.85	15.90	16.21	16.14	17.20	17.97	16.97	19.33	21.90	21.57	
France	12.53	12.36	11.70	12.79	13.28	15.04	16.16	15.26	16.59	17.61	18.05	18.88	20.12	20.60	21.22	22.36	23.37	24.76	26.60	30.18	31.32	
Croatia	29.41	30.00	29.07	29.30	28.82	31.30	32.88	33.82	36.55	37.31	36.22	38.62	37.64	36.63	36.65	36.79	36.93	38.01	37.21	36.17	34.80	
Italy	5.71	8.22	10.09	13.33	15.31	16.43	15.64	13.82	16.98	18.09	18.91	19.25	18.89	20.08	19.28	19.70	19.95	19.35	19.90	20.28	20.22	
Cyprus	9.26	9.97	10.43	13.06	14.47	17.31	18.81	19.98	21.76	22.54	22.19	24.07	24.69	26.42	37.16	35.05	37.12	42.59	41.56	42.75	42.30	
Latvia	42.49	42.68	42.59	42.36	42.94	47.89	40.74	44.71	47.26	49.65	52.15	51.74	51.81	54.58	55.41	57.75	57.09	57.38	61.00	61.40	61.79	
Lithuania	30.44	29.32	29.23	29.09	31.99	33.72	32.53	32.79	34.54	36.87	40.63	46.08	46.56	46.50	46.02	47.37	50.35	48.63	51.54	53.61	52.08	
Luxembourg	1.82	3.61	3.63	4.35	4.57	4.63	4.70	4.74	4.93	5.33	7.07	6.86	7.06	7.45	8.36	8.69	12.61	12.84	14.98	15.39	19.03	
Hungary	6.45	9.94	11.38	13.54	11.97	17.02	18.08	20.04	23.31	23.70	21.28	21.33	21.03	19.90	18.20	18.16	17.72	17.90	20.23	22.27	22.61	
Malta	1.04	1.03	1.36	1.51	1.70	2.01	7.28	12.03	13.40	15.40	15.03	14.64	16.85	19.31	22.83	23.60	23.03	32.61	40.22	53.23	59.21	
Netherlands	2.18	2.38	2.70	2.91	3.02	3.37	3.10	3.69	3.77	4.00	4.93	5.28	5.19	5.75	6.16	7.22	8.05	8.07	9.19	10.36	11.27	
Austria	20.17	22.82	24.49	27.14	27.19	29.63	30.96	31.52	33.08	33.22	33.38	33.23	33.48	33.67	34.18	33.93	34.99	33.13	31.82	40.77	42.17	
Poland	10.21	10.16	10.17	10.46	10.85	11.61	11.81	13.24	13.50	14.27	14.24	14.79	14.92	14.78	21.47	22.00	22.14	20.98	22.10	20.61	21.29	
Portugal	32.49	32.07	34.23	34.95	37.45	37.93	33.81	35.18	33.15	34.63	40.45	40.10	41.61	41.02	40.92	41.66	41.55	42.68	45.54	47.10	46.95	
Romania	17.34	17.93	17.58	19.47	23.17	26.43	27.23	24.31	25.74	26.20	26.74	25.89	26.86	26.58	25.43	25.74	25.33	24.57	26.25	29.13	28.10	
Slovenia	22.82	26.40	24.35	29.31	27.53	28.87	29.54	31.79	33.15	35.12	34.64	36.15	35.56	34.64	32.34	32.13	32.14	35.22	33.99	34.30	33.66	
Slovakia	5.06	5.03	4.45	6.23	6.10	8.18	7.90	9.26	8.80	7.88	8.87	10.79	9.88	9.84	10.60	19.70	19.43	19.52	19.88	18.80	20.43	
Finland	39.50	39.12	41.41	41.43	43.08	42.89	43.97	45.73	48.23	50.77	51.96	52.62	53.70	54.59	54.91	56.88	57.62	52.08	58.29	61.35	62.59	
Sweden	45.93	49.02	52.50	54.47	55.78	59.20	57.07	58.52	60.64	61.71	62.57	63.24	63.41	63.62	63.30	64.39	66.38	68.53	69.81	67.07	67.83	
Iceland	52.34	53.73	57.19	60.91	64.08	64.41	66.19	68.10	68.75	65.89	67.02	69.20	78.25	78.25	79.95	80.90	80.50	79.62	82.03	83.11	79.45	
Norway	25.55	28.84	28.43	29.33	30.92	31.81	33.73	34.67	33.97	32.76	30.91	32.67	32.35	32.67	33.10	33.38	36.13	31.37	33.17	34.07	35.23	
Montenegro		52.91	51.36	49.13	46.01	62.08	76.48	81.29	79.79	68.49	67.62	68.54	69.09	65.68	64.50	62.65	64.78	63.50	64.90	66.59	68.30	
Moldova		20.16	17.42	18.40	17.35	19.02	21.41	34.58	36.34	39.02	40.01	43.63	44.56	45.54	46.10	45.06	40.47	41.17	36.88	38.39	40.66	36.65
North Macedonia		23.31	24.68	24.92	22.49	24.64	29.21	26.50	27.34	29.59	31.76	34.99	34.47	30.92	36.30	32.45	32.07	33.73	40.86	43.79	37.28	37.89
Georgia																			12.37	10.43	10.78	9.33
Albania		33.14	37.76	30.96	33.15	37.06	34.73	31.26	31.43	39.10	37.77	30.98	34.61	32.50	23.97	21.99	24.75	25.12	21.20	22.09	22.92	22.48
Serbia		14.03	15.56	15.76	13.19	16.73	26.50	23.20	21.09	23.20	25.15	28.84	26.93	25.08	24.90	24.29	26.65	35.68	35.40	34.73	35.88	37.23
Bosnia Herzegovina												28.63	32.77	32.33	28.74	52.68	55.87	56.62	53.31	57.65	59.67	
Kosovo*		51.86	49.49	48.93	49.21	47.79	47.76	45.55	44.68	49.34	49.72	51.82	46.73	51.79	50.53	56.74	54.79	55.89	52.10	46.07	45.35	42.81

Source: Eurostat (online data code: nrg_ind_ren)



Interreg

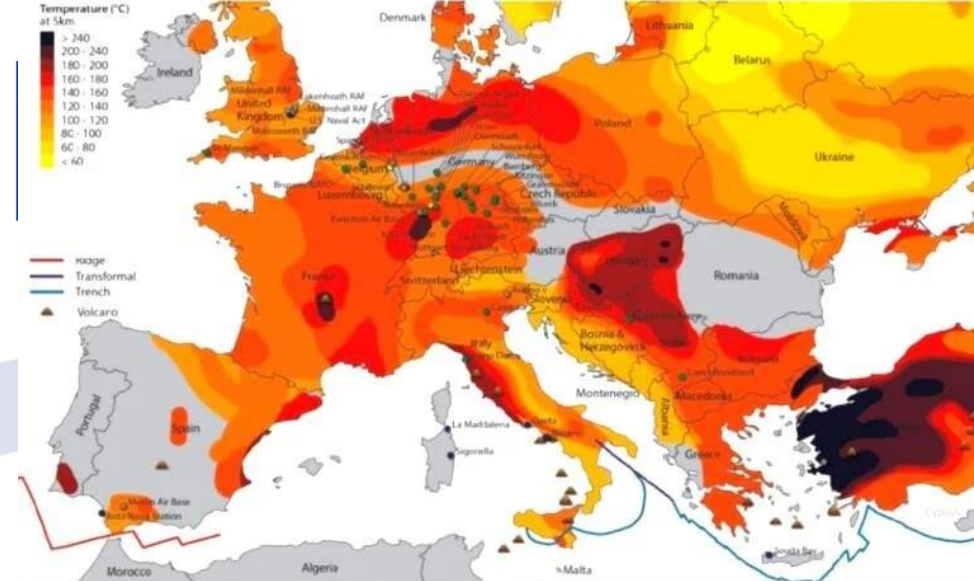


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Hungary – Croatia

Hungary's renewable H&C sector

- **The total available heating capacity in Hungary's district heating systems sits at approximately 7.7 GW.**
- According to Hungary's updated National Energy and Climate Plan (NECP), target is to reach a 32% share of renewable energy sources in the heating and cooling sector by 2030.
- Natural Gas Substitution: up to 25% of natural gas imports.
- Local Planning Requirements: Amended district heating laws mandate all municipalities with a population of over 45,000 inhabitants to draft and implement official heating and cooling plans.
- Energy Performance of Buildings Regulation: For new buildings, the classic fixed RES percentage requirement has been replaced by stricter regulations based on the life-cycle CO₂ emissions of the property.
-  Dominant Technologies and Solutions relying heavily on its unique geographical and local advantages
- **Geothermal Energy: Hungary possesses some of the best geothermal potential in Europe.** Cities like Szeged and Miskolc have implemented massive district heating modernization projects by switching to geothermal sources. It is also heavily used in agriculture (greenhouses).
- **Heat Pumps & ACs:** Increasingly popular in the residential sector, driven by state incentives and subsidies. They play a vital role in meeting nearly zero-energy building (NZEB) requirements.
- **Biomass:** Traditional firewood and modern biomass still comprise a significant portion of renewable heating, both in individual households and municipal district heating networks.



Geothermal Heat and Power: ~905 MWth and only GTPP Tura providing 2.7 MWe

The total built-in direct thermal performance for geothermal energy is roughly **905.58 MW**, distributed across primary sectors:

- **Balneology (Spas & Thermal Baths): 352 MW**
- **Agriculture & Greenhouses: 358 MW.**
- **District Heating Networks:** Around **134 MW** (expanding rapidly via major urban overhauls, such as in Szeged and Budapest's goal to secure up to 200 MW of standalone geothermal capacity).
- **Geothermal Heat Pumps: 42 MW.**
- **Industrial Heat Production: 19 MW**

Biomass heat and power: heavily divided between massive co-generation (CHP) plants and millions of decentralized private wood stoves. **Biomass combined with biogas accounts for 444 MWe**



Interreg

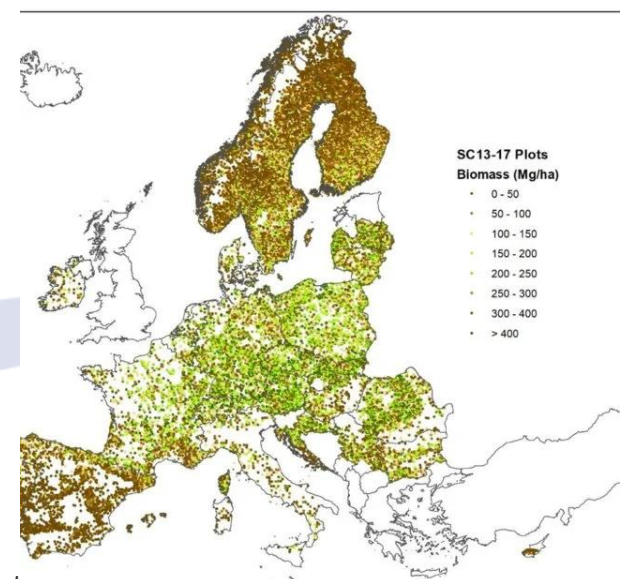


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RenewMap

Hungary – Croatia



Croatia's renewable H&C sector

- H&C is a major share of Croatia's final energy consumption (with space heating alone representing around 70% of residential energy use). The overarching thermal capacity in Croatia's district heating (DH) networks sits at over 1,600 MWth, heavily dominated by the capital city.
- Currently, 80% to 85% of these centralized systems are still powered by fossil natural gas, making them the primary target for renewable fuel-switching initiatives.
- Biomass Heat Power: ~150 MWth and 200 MWe biomass is widely used across Croatia**, heavily decentralized in rural areas via private firewood stoves.
- With highly HEP structured minicipal CHP BE-TO Osijek (3 MWe / 10 MWth), BE-TO Sisak (3 MWe / 10 MWth), Glina (5 MWe), Karlovac, and Brinje. and many private industrial and agricultural biomass and biogas CHP:
- Some like Uni Viridas plant in Babina Greda provides 16 MWth of capacity to local agricultural and wood manufacturing facilities, while the Energy 9 plant adds another 13 MWth.

Geothermal Heat and Power:

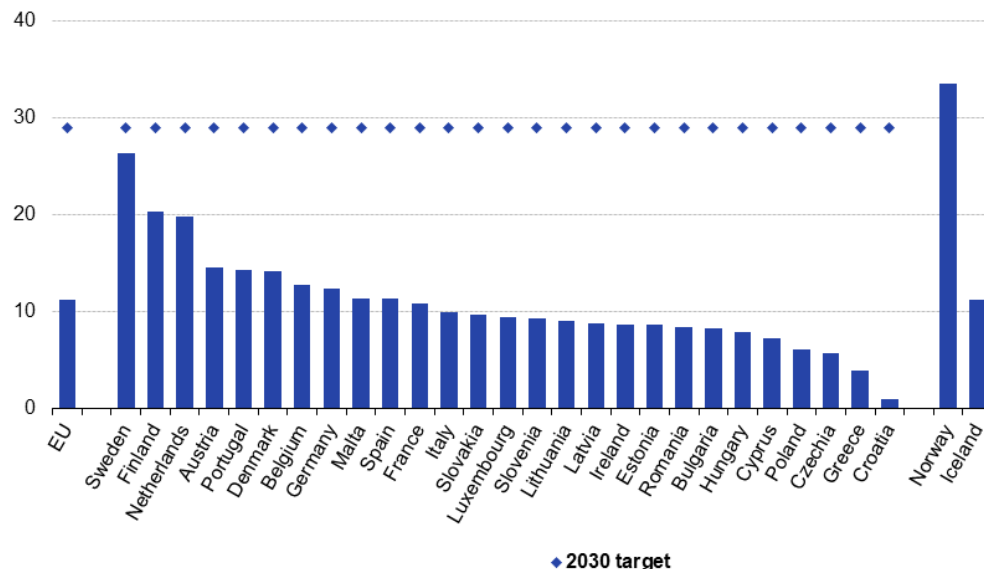
~120 MWth and only 17.5 MWe

- Direct Thermal Use:** 77.3 MWth of installed thermal capacity for balneology (spas, thermal baths, and health resorts), 36.7 MWth in space heating and localized agricultural greenhouse projects.
- Power & Deep Heat Cascades:** The flagship Velika 1 geot— Organic Rankine Cycle (ORC) setup with a 17.5 MWe gross capacity. While primarily built for electricity, its massive thermal infrastructure features an emergency air-cooling heat exchange system of ~70 MWth, underscoring the scale of latent thermal energy available for cascading district heat.
- The Expansion plans and actions: Croatian Hydrocarbon Agency (AZU)** actively verifies new deep-well sites like e.g. Osijek (OsGT-1 well) have logged reservoir temperatures above 100°C, adding an immediate 5 MWth of potential per well directly intended to decarbonize municipal district heatin but also new GTPP.
- Heat Pumps & Seawater Heat Exchangers** expanding, supported by large-scale co-financing initiatives. National Subsidies: The Environmental Protection and Energy Efficiency Fund (FZOEU) runs dedicated multi-million euro calls (such as a €38 million green pool with a €10 million carve-out solely for residential heat pumps), covering 50% to 70% of individual installation costs.
- Seawater & Hydrothermal Potential:** An incredibly unique geographical edge for Croatia is the Adriatic coast. The state heavily incentivizes seawater-source heat pumps for coastal hotels, public facilities, and coastal urban centers. Massive open or closed-loop seawater exchangers allow coastal infrastructure to bypass traditional heating/cooling grids entirely by utilizing the thermal stability of the sea.

Hungary – Croatia

Share of energy from renewable sources in transport, 2024

(%)



Note: North Macedonia has a value of 0.0 and therefore is not visible in the graph. In addition, Moldova (0.1), Albania (0.2), Montenegro (0.3), and Serbia (0.6) all have values below 1 which might make them difficult to see

Source: Eurostat (online data code: nrg_ind_ren)

Share of energy from renewable sources in transport, 2004-2024

(%)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
EU	1.432	1.819	2.472	2.887	4.133	4.891	5.500	4.115	5.767	6.070	6.552	6.753	7.165	7.471	8.265	8.804	10.253	9.051	9.640	10.938	11.204
Belgium	0.642	0.663	0.676	0.671	0.712	2.190	4.800	4.802	4.914	5.088	5.845	3.921	6.029	6.637	6.709	6.817	11.035	10.332	10.472	12.177	12.717
Bulgaria	0.971	0.884	1.049	0.956	0.938	1.092	1.498	0.898	0.650	5.886	5.742	6.492	7.203	7.273	8.076	7.893	9.101	7.612	7.662	8.089	8.197
Czechia	1.203	1.099	1.073	1.048	2.843	4.312	5.220	1.285	6.249	6.445	6.997	6.537	6.496	6.616	6.556	7.841	9.383	6.740	6.240	5.653	5.743
Denmark	0.445	0.443	0.521	0.535	0.540	0.693	1.150	3.609	6.278	6.456	6.556	6.432	6.732	6.935	6.920	7.110	9.701	10.062	9.976	11.134	14.121
Germany	2.136	3.953	6.701	7.532	6.316	5.877	6.413	6.461	7.322	7.299	6.900	6.569	7.013	7.028	7.941	7.630	10.008	8.104	10.070	12.257	12.367
Estonia	0.200	0.235	0.184	0.168	0.185	0.438	0.433	0.445	0.451	0.448	0.418	0.413	0.431	0.417	3.315	6.243	12.165	11.187	8.531	9.065	8.638
Ireland	0.044	0.075	0.102	0.503	1.305	1.962	2.491	3.844	4.044	4.898	5.204	5.942	5.159	7.442	7.186	8.917	10.187	4.646	5.825	7.592	8.656
Greece	0.087	0.059	0.735	1.269	1.062	1.102	1.915	0.600	0.903	0.980	1.326	1.100	1.624	4.001	4.108	4.049	5.341	4.414	4.083	3.942	3.872
Spain	1.035	1.267	0.837	1.375	2.165	3.710	5.018	0.767	0.869	0.950	1.024	1.088	5.167	5.798	6.938	7.610	9.528	9.210	9.680	11.960	11.300
France	0.783	0.784	0.792	0.828	6.245	6.649	6.577	0.987	7.414	7.600	8.249	8.366	8.405	8.765	8.963	9.248	9.207	8.114	8.941	9.944	10.788
Croatia	0.995	1.025	1.005	1.121	1.072	1.291	1.123	1.029	1.049	2.715	2.652	2.361	1.218	1.174	2.582	5.855	6.593	6.985	2.395	0.919	0.936
Italy	1.213	1.048	0.995	0.964	2.616	3.999	4.916	5.060	6.155	5.411	5.020	6.505	7.414	6.484	7.659	9.047	10.736	9.870	10.048	10.250	9.951
Cyprus	0.000	0.000	0.000	0.000	1.921	2.036	1.994	0.000	0.000	1.127	2.680	2.521	2.671	2.561	2.661	3.316	7.401	7.188	7.228	7.285	7.192
Latvia	2.139	2.389	2.165	1.666	1.888	1.888	3.978	4.090	3.995	4.029	4.075	3.639	2.449	2.270	4.729	4.554	6.733	6.436	3.123	1.358	8.780
Lithuania	0.446	0.657	1.905	3.821	4.318	4.481	3.794	3.828	4.973	4.835	4.355	4.582	3.649	4.300	4.333	4.049	5.511	6.467	6.682	7.231	8.983
Luxembourg	0.138	0.159	0.189	2.203	2.173	2.233	2.093	2.360	2.827	4.074	5.550	6.700	5.965	6.478	6.596	7.707	12.581	7.968	8.710	9.118	9.456
Hungary	1.016	1.006	1.217	1.633	5.183	5.887	6.163	6.174	5.998	6.341	7.001	7.169	7.768	7.731	7.746	8.057	11.571	6.165	7.770	7.575	7.918
Malta	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.016	3.216	3.484	4.667	4.679	5.269	6.826	8.019	8.902	10.586	10.516	10.473	10.748	11.351
Netherlands	0.515	0.499	0.850	3.182	2.981	4.570	3.397	5.068	5.217	5.343	6.562	5.597	4.761	5.842	9.483	12.326	12.631	9.279	11.163	13.510	19.746
Austria	4.532	5.070	7.532	8.241	9.560	11.175	10.705	10.077	10.031	9.695	10.983	11.409	10.583	9.703	9.931	10.051	10.283	9.648	10.751	13.576	14.591
Poland	1.581	1.746	1.817	1.746	4.143	5.408	6.640	6.918	6.533	6.666	6.319	5.686	3.974	4.232	5.720	6.200	6.575	5.673	5.791	6.339	6.033
Portugal	0.424	0.450	1.631	2.433	2.515	3.885	5.548	0.695	0.807	0.925	3.667	7.431	7.647	7.914	9.037	9.089	9.701	8.611	8.706	11.162	14.329
Romania	1.819	1.872	1.538	1.641	1.345	1.297	1.366	5.535	4.962	5.445	4.675	5.488	6.169	6.558	6.342	7.846	8.540	8.917	8.924	8.390	8.394
Slovenia	0.850	0.831	1.056	1.473	1.773	2.251	3.118	2.477	3.252	3.769	2.876	2.242	1.601	2.571	5.480	7.983	10.911	10.642	7.828	10.021	9.242
Slovakia	1.500	1.660	3.295	3.994	4.278	5.364	5.292	5.727	5.596	6.212	7.951	8.631	7.765	6.950	6.988	8.308	9.259	8.755	8.931	9.182	9.611
Finland	1.010	0.910	0.956	1.025	2.909	4.556	4.386	1.004	1.049	10.665	24.124	24.567	8.816	18.679	14.772	14.845	14.310	20.298	18.535	20.299	20.271
Sweden	6.288	6.596	7.509	8.421	8.693	9.356	9.627	11.938	13.777	15.315	18.831	21.490	26.560	26.842	29.696	30.309	31.854	28.677	28.841	33.645	26.399
Iceland	0.000	0.000	0.000	0.072	0.107	0.135	0.194	0.872	1.338	2.039	2.256	6.095	6.297	6.999	8.396	9.292	11.959	12.562	13.666	15.700	11.194
Norway	3.095	3.074	3.314	3.742	5.294	5.569	5.391	2.683	3.007	3.190	6.156	7.710	13.763	19.228	20.318	25.668	28.690	25.532	28.874	32.872	33.573
Montenegro	:	0.498	0.505	0.996	0.881	0.697	0.787	0.613	0.736	1.097	1.071	1.188	1.102	0.952	0.860	0.865	0.632	0.278	0.346	0.337	0.289
Serbia	0.452	0.445	0.429	0.665	0.677	1.465	0.672	1.879	2.001	1.682	1.166	1.178	1.232	1.208	1.185	1.137	1.174	0.618	0.602	0.599	0.592
Bosnia Herzegovina	:	:	:	:	:	:	:	:	:	:	0.456	0.530	0.525	0.533	0.439	0.396	0.464	0.244	0.310	0.291	:
Albania	0.099	0.095	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.203	0.347	0.340	0.400	0.460	0.220
North Macedonia	0.203	0.243	0.280	0.282	0.283	0.233	0.198	0.175	0.188	0.182	0.211	0.182	0.140	0.135	0.118	0.136	0.148	0.064	0.054	0.000	0.000
Kosovo*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Moldova	15.870	15.870	15.870	16.400	16.890	17.660	0.131	0.148	0.189	0.214	0.177	0.184	0.236	0.320	0.280	0.174	0.179	0.016	0.017	0.022	0.056
Georgia	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	0.901	1.112	1.076	1.220



Hungary's renewable transport sector

- **Biofuels** remain the mathematical backbone of Hungary's RES-T strategy, governed strictly by the national Fuel Quality Act. **The 25% target by 2030** is legally split into specific blending and sourcing categories:

1. **First-Generation Biofuels:** Capped at a maximum of 3% of final transport energy consumption to mitigate food-versus-fuel environmental sustainability concerns.
 2. **Advanced (Second-Generation) Biofuels & Biogas:** Set to reach at least 4.5% by 2030. This includes utilizing agricultural residues and expanding the collection of waste materials like used cooking oil. RFNBOs (Renewable Fuels of Non-Biological Origin):
 3. **Synthetic fuels and green hydrogen** must account for at least 1% of transport energy by 2030. Hydrogen Strategy: Hungary is actively pushing toward producing 16,000 tonnes of green hydrogen annually via solar-powered electrolysis, specifically earmarked for heavy-duty freight transport.
- **Electromobility and Infrastructure** The remainder of the 2030 target is being driven heavily by the rapid electrification of both private and public transit (purely electric buses receive state subsidies for public fleet integration, around 1,300–1,400 buses) with zero-emission models.

Croatia's renewable transport sector

- According to the official revised NECP submitted to the European Commission, Croatia raised its target for renewable energy in transport **from a previous 13.2% to 24.6% by 2030.**
- **Current Status and Pressure: Croatia has historically recorded low RES-T shares (fluctuating between 1% and 3.9% in previous years, which is among the lowest in the EU).**
- Consequently, accelerated regulatory and infrastructural reforms are underway to **bridge this gap by electromobility state subsidies:**
 1. Subsidies for Residents, Commercial and Taxi Fleets: up to €9,000 per vehicle.
 2. Green Public Transit: procurement of electric buses and matching charging infrastructure.
 3. Green Rail Revolution: implementing projects to roll out **Končar battery-electric trains for non-electrified railway tracks and hybrid train-charging stations**, which feature integrated solar power arrays and Battery Energy Storage Systems (BESS).