

How are Baseline Results presented



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Format of results

- The Baseline scenarios will be provided in excel format to each CP
- Excel file contains information on:
 - Framework conditions: economic, fuel prices, etc.
 - Policy indicators: RES indicators, GHG emissions
 - Energy system projections: energy consumption by fuel type and sector
 - Energy system indicators: import dependence, CHP indicators, utilisation rates, carbon intensity

EU27noUK:Reference scenario(REF2020_v1)

Detailed Analytical Results
Primes Ver. 6 Energy Model

E3-Modelling

15/10/2020

Cover Overview Summary indicator industry domestic transport transport_detail power generation pg-detail pg-costs pg-indicators Explanation +

- Overview
- Summary
- Indicators
- By sector:
 - Industry
 - Domestic: services, agriculture, residential
 - Transport
 - Transport detail
 - Power generation
 - Pg-Detail
 - Pg-costs
 - Pg-indicators
- Explanations

EU27noUK:Reference scenario(REF2020_v1)									OVERVIEW
	1990	2015	2020	2025	2030	2035	2040	2045	2050
Macroeconomic drivers									
GDP (in M€15)		12,594,976	12,652,614	14,454,104	15,277,715	16,167,859	17,192,755	18,412,613	19,762,069
Population (Million)		443.7	447.2	448.6	449.2	449.7	449.4	448.1	445.4
International Fuel prices (in €15 per boe)									
Oil	35.2	47.2	33.5	52.8	72.2	81.5	87.8	95.2	106.3
Gas (NCV)	23.7	38.7	19.7	27.9	36.2	39.7	46.6	50.5	51.2
Coal	13.0	11.6	8.9	12.3	15.6	16.9	18.0	18.9	19.7
Key Policy variables									
Carbon price ETS sectors (€15/ t of CO2)	0	7.5	25.0	26.5	30.0	50.0	80.0	120.0	150.0
Average renew ables value (€15/ MWh)	0	0.0	26.2	40.8	98.6	2.6	0.7	0.3	0.2
Average energy efficiency value (€15/ toe)	0	0.0	95.7	224.7	890.0	315.0	190.8	144.7	134.8
Key Policy indicators									
Overall RES share		17.8	21.6	25.2	33.3	35.5	38.6	42.2	43.8
RES-H&C share		19.6	22.7	25.2	32.7	34.0	35.9	36.8	37.5
RES-E share		30.9	34.3	45.9	58.7	60.5	64.4	70.6	72.2
RES-T share		6.2	10.3	10.4	20.8	28.7	39.4	51.7	57.9

- Overview:
 - Results in 5 years time steps to 2050
 - All key indicators to understand policy indicators

ktoe	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'40	'40-'50
	Annual % Change												
Production (incl.recovery of products)	650634	607407	581627	597631	561520	550384	576573	578109	0.2	-1.2	-0.2	-0.8	0.5
Solids	139089	107592	93513	77461	53313	21554	16780	16331	-2.4	-3.5	-3.2	-12.0	-2.7
Oil	29607	23911	24792	21464	16192	13983	12096	10161	-2.2	-4.2	-1.1	-4.2	-3.1
Natural gas	72424	63067	52099	48054	47430	44904	45773	45596	-0.3	-5.3	-2.7	-0.7	0.2
Nuclear	204548	189476	155759	133721	120288	126564	122206	112831	-0.1	-1.5	-3.4	-0.5	-1.1
Renew able energy sources	204966	223361	255465	316931	324297	343379	379718	393189	5.3	2.9	3.6	0.8	1.4
Hydro	29272	32072	31364	31685	31848	31849	32566	32628	0.6	0.0	-0.1	0.1	0.2
Biomass & Waste	135144	137794	142188	163000	157366	160052	164073	167267	6.1	1.8	1.7	-0.2	0.4
Wind	23304	32159	50103	74712	82988	91363	104476	111194	20.6	10.4	8.8	2.0	2.0
Solar and others	10773	14371	23701	37111	40695	46047	53875	56107	24.1	14.6	10.0	2.2	2.0
Geothermal	6473	6964	8109	10421	11400	14068	24728	25993	1.9	2.4	4.1	3.0	6.3
Net Imports	827864	718697	771081	672873	646926	614129	574080	564686	0.3	-2.2	-0.7	-0.9	-0.8
Solids	91526	52629	48582	33263	24725	15308	12343	11103	1.3	-5.8	-4.5	-7.5	-3.2
Oil	512614	409300	454821	412387	380211	355857	338232	328425	-0.5	-2.9	0.1	-1.5	-0.8
- Crude oil and Feedstocks	535311	390444	432376	387855	353369	324071	301961	286172	-0.5	-2.9	-0.1	-1.8	-1.2
- Oil products	-22697	18856	22445	24532	26842	31786	36271	42253	-0.3	-2.1	2.7	2.6	2.9
Natural gas	220711	253522	259532	222476	237569	238249	220981	225277	1.9	0.3	-1.3	0.7	-0.6
Electricity	-645	-691	877	-1495	-820	283	-351	-1027	-5.0	0.0	0.0	0.0	0.0
Renew able energy forms	3658	3937	7269	6243	5240	4432	2875	908	28.0	-0.2	4.7	-3.4	-14.7
Gross Inland Consumption	#####	#####	#####	#####	#####	#####	#####	#####	0.3	-1.8	-0.6	-0.9	-0.2
Solids	234459	160222	142095	110723	78038	36862	29124	27434	-1.2	-4.4	-3.6	-10.4	-2.9
Oil	492067	402793	436148	390141	352793	326062	306121	293619	-0.7	-2.9	-0.3	-1.8	-1.0
Natural gas	296278	316504	310994	268469	280937	276988	258362	260777	1.6	-1.3	-1.6	0.3	-0.6
Nuclear	204548	189476	155759	133721	120288	126564	122206	112831	-0.1	-1.5	-3.4	-0.5	-1.1
Electricity	-645	-691	877	-1495	-820	283	-351	-1027	-5.0	0.0	0.0	0.0	0.0
Renew able energy forms	208655	227265	262676	323117	329462	347625	382220	393395	5.5	2.8	3.6	0.7	1.2
as %in Gross Inland Consumption													
Solids	16.3	12.4	10.9	9.0	6.7	3.3	2.7	2.5					
Oil	34.3	31.1	33.3	31.9	30.4	29.3	27.9	27.0					
Natural gas	20.6	24.4	23.8	21.9	24.2	24.9	23.5	24.0					
Nuclear	14.3	14.6	11.9	10.9	10.4	11.4	11.1	10.4					
Renew able energy forms	14.5	17.5	20.1	26.4	28.4	31.2	34.8	36.2					
Gross Electricity Generation in GWh_e	#####	#####	#####	#####	#####	#####	#####	#####	1.2	-0.4	0.9	0.6	0.7
Nuclear	784894	727058	597680	513116	461572	485653	468932	432958	-0.1	-1.6	-3.4	-0.5	-1.1
Hydro & wind	712803	884745	#####	#####	#####	#####	#####	#####	3.7	5.2	6.3	1.6	1.7
Thermal (incl. biomass)	#####	#####	#####	946375	963152	881270	782184	823817	1.1	-2.5	-2.4	-0.7	-0.7
Fuel Inputs for Thermal Power Generation	319982	260652	233365	202559	191310	164508	157008	163181	0.8	-3.1	-2.5	-2.1	-0.1
Solids	168709	111074	91566	69272	44068	9650	4430	3236	-1.1	-4.4	-4.6	-17.9	-10.4
Oil (including refinery gas)	17100	5474	2900	1975	1941	1460	941	645	-6.7	-12.1	-9.7	-3.0	-7.8
Gas	80978	94412	90092	73358	92372	94184	77387	80681	4.6	-2.4	-2.5	2.5	-1.5
Biomass & Waste	47573	44046	43161	51131	46105	50947	55511	58906	11.0	1.6	1.5	0.0	1.5
Geothermal heat	5622	5646	5646	6824	6824	8266	18740	19713	1.6	1.6	1.9	1.9	9.1
Hydrogen - Methanol	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0

- Summary:

- Results in 5 years time steps to 2050
- Annual percentage changes
- All key indicators to understand Energy system development

	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'40	'40-'50
	Annual % Change												
Net Installed Power Capacity (in MW_e)	857529	890779	#####	#####	#####	#####	#####	#####	2.4	1.5	3.1	0.3	1.1
<u>Nuclear energy</u>	113438	108001	99211	93931	78029	69179	65770	57464	-0.4	-1.3	-1.4	-3.0	-1.8
<u>Renewable energy</u>	340317	417867	580705	814642	879201	958361	#####	#####	6.2	6.1	6.9	1.6	1.7
Hydro (pumping excluded)	125139	126657	127999	129101	129483	130319	131970	132350	0.6	0.4	0.2	0.1	0.2
Lakes	85989	86479	87014	87293	87418	87610	88042	88328	0.7	0.1	0.1	0.0	0.1
Run of river	39151	40178	40985	41808	42065	42710	43927	44021	0.4	1.1	0.4	0.2	0.3
Wind power	127164	168568	244757	356266	389445	424481	485893	507679	20.6	7.7	7.8	1.8	1.8
Wind on-shore	121280	155415	214082	292465	320600	347800	394408	412431	20.4	7.0	6.5	1.7	1.7
Wind off-shore	5884	13153	30675	63801	68844	76681	91485	95247	41.7	23.3	17.1	1.9	2.2
Solar	87773	122403	207709	329035	360033	403320	474650	492712	67.0	15.2	10.4	2.1	2.0
Other renewables (tidal etc.)	240	240	240	240	240	240	240	536	0.0	0.0	0.0	0.0	8.4
<u>Thermal power</u>	403774	364910	335356	296447	247189	211623	194589	192131	1.7	-1.3	-2.1	-3.3	-1.0
Solids fired	150207	128838	97786	65416	41470	24910	18497	12211	-0.8	-1.8	-6.6	-9.2	-6.9
Oil fired	43601	24130	16640	13003	8174	4947	3062	1634	-2.0	-8.7	-6.0	-9.2	-10.5
Gas fired	183539	174611	181878	176800	157483	140010	129409	140514	6.3	-0.4	0.1	-2.3	0.0
Natural gas	177794	169704	176896	172613	153699	137130	127073	138266	6.5	-0.3	0.2	-2.3	0.1
Derived gasses	5745	4907	4982	4188	3785	2880	2336	2248	1.6	-3.3	-1.6	-3.7	-2.4
Biomass-waste fired	25604	36486	38206	40174	39009	40462	40142	34120	6.0	7.1	1.0	0.1	-1.7
Hydrogen plants	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Geothermal heat	823	845	845	1053	1053	1294	3479	3651	2.4	1.0	2.2	2.1	10.9
Net Power Capacity Investment ⁽¹⁾ (in MW_e - for five years per year)	154876	128345	235359	302826	105963	165083	257786	204146	0.0	-0.7	9.0	-5.9	2.1
<u>Nuclear energy</u>	1445	6983	32308	38681	8432	12185	17549	11850	0.0	24.2	18.7	-10.9	-0.3
<u>Renewable energy</u>	114949	80198	171463	235710	64559	108985	217871	167548	0.0	0.9	11.4	-7.4	4.4
Hydro (pumping excluded)	8980	2205	1395	1102	382	836	1650	416	0.0	-6.7	-6.7	-2.7	-6.7
Lakes	5710	1118	535	278	126	192	432	286	0.0	-8.6	-13.0	-3.7	4.1
Run of river	3270	1087	860	824	257	644	1218	130	0.0	-4.1	-2.7	-2.4	-14.8
Wind power	47121	43259	84760	113282	33179	62000	117429	91419	0.0	0.4	10.1	-5.8	4.0
Wind on-shore	42571	35990	67239	80156	28136	53535	101920	83107	0.0	-1.1	8.3	-4.0	4.5
Wind off-shore	4551	7269	17521	33127	5043	8465	15510	8313	0.0	20.8	16.4	-12.8	-0.2
Solar	58848	34734	85307	121326	30998	46149	98792	75417	0.0	2.4	13.3	-9.2	5.0
Other renewables (tidal etc.)	0	0	0	0	0	0	0	296	0.0	0.0	0.0	0.0	0.0
<u>Thermal power</u>	38482	41164	31588	28435	32972	43912	22366	24748	0.0	-4.2	-3.6	4.4	-5.6
Solids fired	13562	15149	6722	3253	6117	1346	228	352	0.0	15.3	-14.3	-8.4	-12.5
Oil fired	1654	1287	186	104	662	351	313	86	0.0	-4.4	-22.2	12.9	-13.2
Gas fired	17098	11974	22326	22015	25137	37454	15471	18170	0.0	-13.7	6.3	5.5	-7.0
Natural gas	16855	11877	21057	21398	24960	37246	15364	17303	0.0	-13.7	6.1	5.7	-7.4
Derived gasses	243	97	1269	618	177	209	107	866	0.0	-17.1	20.4	-10.3	15.3
Biomass-waste fired	6107	12731	2353	2854	1056	3916	4086	5892	0.0	9.6	-13.9	3.2	4.2
Hydrogen plants	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Geothermal heat	60	22	0	208	0	845	2268	248	0.0	-11.7	25.2	15.0	-11.5
Net Electricity generation by plant type (in GWh)^(b)	#####	#####	#####	#####	#####	#####	#####	#####	1.2	-0.4	1.0	0.7	0.7
<u>Nuclear energy</u>	747442	691934	568786	488056	438803	461211	444532	409995	0.0	-1.6	-3.4	-0.6	-1.2
<u>Renewable energy</u>	708042	879478	#####	#####	#####	#####	#####	#####	3.7	5.2	6.3	1.6	1.7
Hydro (pumping excluded)	335607	367658	359492	363275	365163	365227	373555	374261	0.6	0.0	-0.1	0.1	0.2
Lakes	182217	198653	190513	190702	190889	188317	189840	190231	0.7	-0.3	-0.4	-0.1	0.1
Run of river	153390	169005	168979	172573	174273	176909	183715	184030	0.4	0.4	0.2	0.2	0.4
Wind power	270975	373946	582593	868749	964973	#####	#####	#####	20.5	10.5	8.8	2.0	2.0
Wind on-shore	249772	325981	473787	668130	741337	808728	914483	981236	20.1	9.4	7.4	1.9	2.0
Wind off-shore	21203	47965	108806	200620	223635	253634	300349	311717	0.0	24.7	15.4	2.4	2.1
Solar	100998	137412	238917	385367	420001	474457	560184	581916	69.7	19.5	10.9	2.1	2.1
Other renewables (tidal etc.)	463	463	463	463	463	463	463	1408	-0.6	-0.3	0.0	0.0	11.8
<u>Thermal power</u>	#####	#####	#####	887583	915400	848741	753030	793077	1.2	-2.6	-2.4	-0.4	-0.7
Solids fired	677515	433845	359915	279797	179800	47287	28244	19003	-1.1	-4.2	-4.3	-16.3	-8.7
Oil fired	48915	22143	11431	7271	7635	6275	4139	2837	-6.0	-13.3	-10.5	-1.5	-7.6
Gas fired	420120	526794	511826	419729	569612	639156	548812	582692	5.6	-1.1	-2.2	4.3	-0.9
Natural gas	408794	516783	502232	411822	562298	632987	543691	577465	6.0	-0.7	-2.2	4.4	-0.9
Derived gasses	11327	10011	9594	7907	7314	6169	5121	5227	0.7	-10.9	-2.3	-2.5	-1.6
Biomass-waste fired	109262	140859	142823	172850	150418	146410	150044	165623	11.4	2.2	2.1	-1.6	1.2
Hydrogen plants	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Geothermal heat	6538	6565	6565	7935	7935	9612	21791	22922	1.5	2.3	1.9	1.9	9.1

- PG-Detail:
 - Installed capacity
 - Capacity investment
 - Net electricity generation by plant type
 - Net steam generation by plant type
 - Net electric efficiency
 - Storage
- Electricity and steam demand