

Session 2B

Technology and Business features

Global annual power plant market - the past 40 years and a projection of the next 40 years

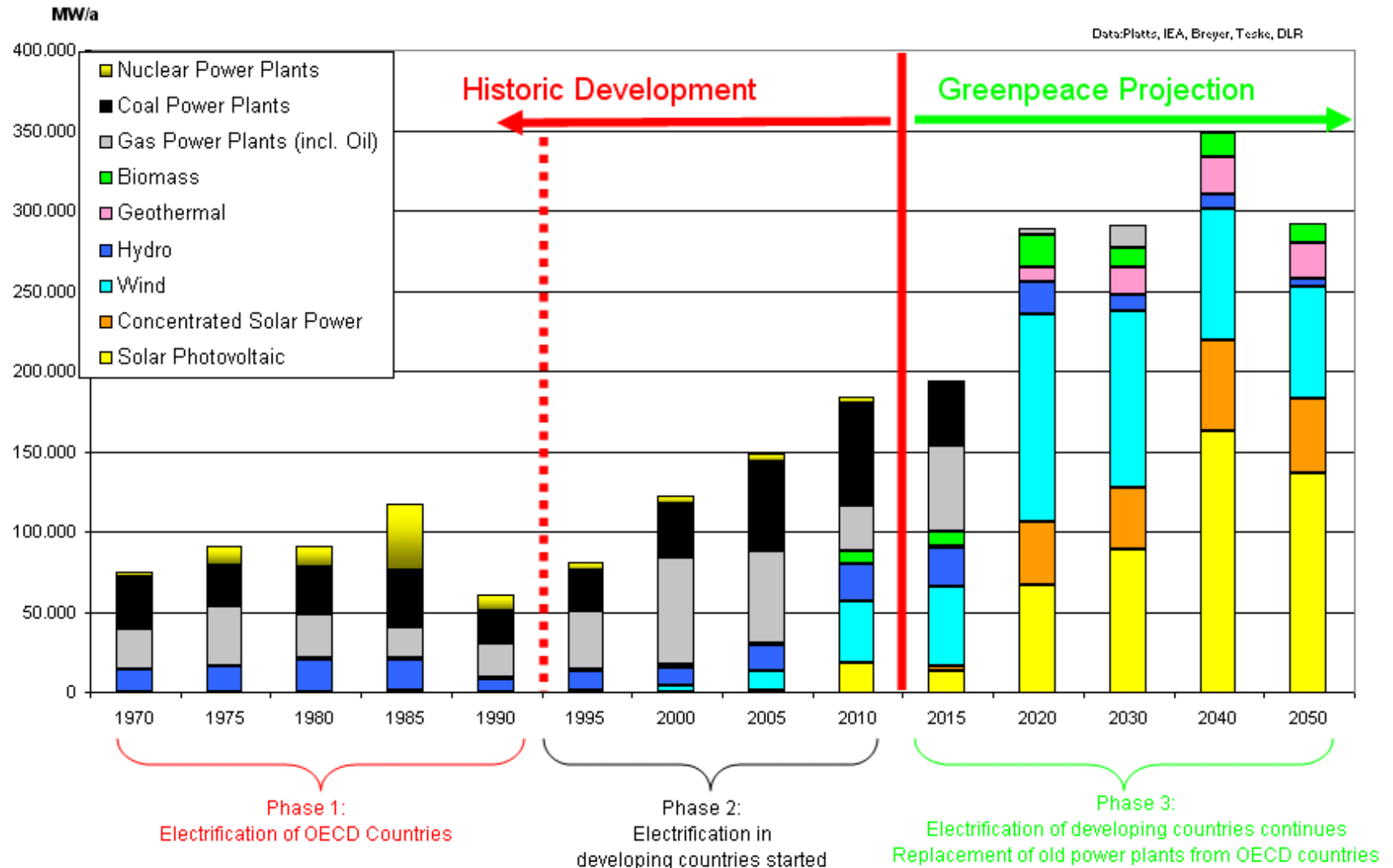


figure 1.5: japan - development of electricity generation structure under three scenarios

(REFERENCE, ENERGY [R]EVOLUTION AND ADVANCED ENERGY [R]EVOLUTION) ["EFFICIENCY" = REDUCTION COMPARED TO THE REFERENCE SCENARIO]

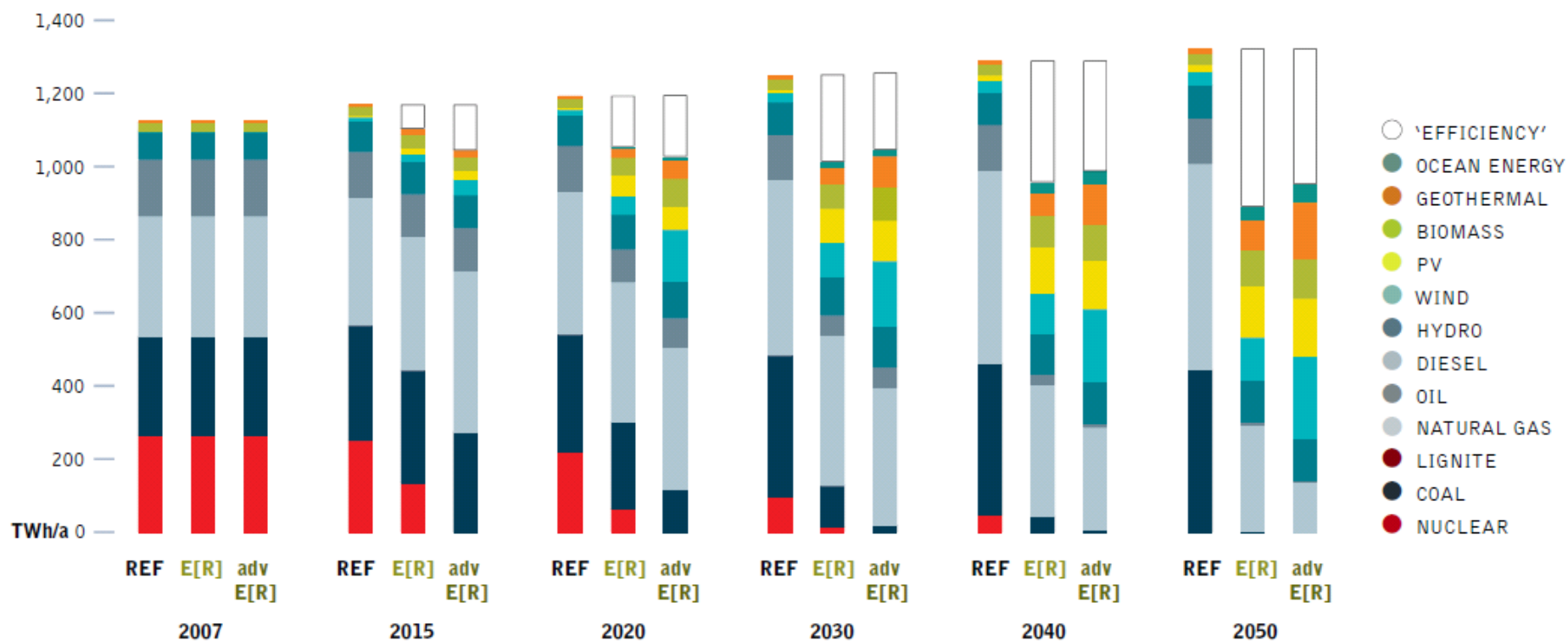


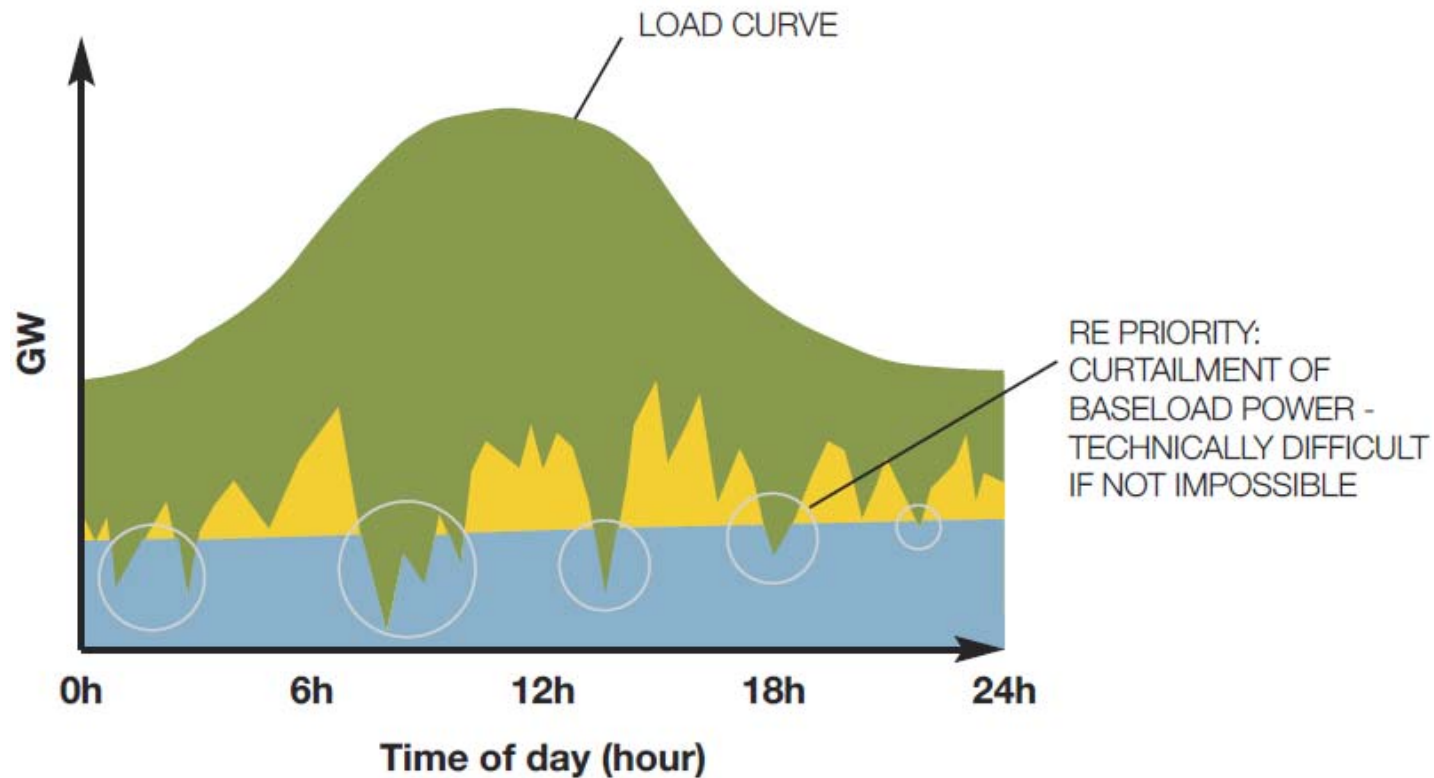
table 0.1: japan - overview energy [r]evolution immediate nuclear energy phase out

NUCLEAR PHASE-OUT 2012: REPLACEMENT STRATEGY										
	UNIT	2012	2013	2014	2015	2016	2017	2018	2019	2020
NUCLEAR GENERATION REPLACEMENT	TWh/a	135	135	135	135	121.0	106.9	92.66	78.3	63.8
Increased power generation from gas power plants via higher capacity factors	TWh	98.0	90.8	83.7	76.3	64.1	53.1	42.3	31.7	17.3
Required capacity factor for gas power plants	h/a	7,565	7,335	7,115	6,900	6,780	6,675	6,570	6,465	6,290
Annual demand reduction 1.7% per year (Instead of 1% per year)	TWh/a	30	30	30	30	30	30	30	30	30
Wind electricity to replace nuclear	TWh/a	5.8	11.7	17.7	23.5	21.8	18.8	15.3	11.4	12.0
PV electricity to replace nuclear	TWh/a	1.2	2.5	3.8	5.0	5.0	5.1	5.1	5.1	4.5
Total additional Wind + PV generation	TWh/a	7.0	14.2	21.5	28.6	26.8	23.9	20.4	16.5	16.4
NUCLEAR CAPACITY REPLACEMENT	GW	19.3	19.3	19.3	19.3	17.2	15.1	13.1	11.0	8.9
Annual wind market	GW	5.0	5.0	5.0	5.0	6.1	6.1	6.1	6.1	6.1
Total wind capacity	GW	8.3	13.3	18.3	23.3	29.4	35.6	41.7	47.9	56.0
Annual PV market	GW	5.0	5.0	5.0	5.0	6.7	6.7	6.7	6.8	6.8
Total PV capacity	GW	8.9	13.9	18.9	23.9	30.6	37.3	44.1	50.8	57.0
Total additional Wind + PV capacity	GW	10.0	10.0	10.0	10.0	12.9	12.9	12.9	12.9	12.9
Annual CO ₂ emissions	million T CO ₂ /a	1,267	1,261	1,254	1,247	1,171	1,095	1,018	942	866
CO ₂ emissions compared to 1990 levels	%	111%	110%	110%	109%	102%	96%	89%	82%	76%

Reality Check: Need Infrastructure

Electricity Grid

- Technology Choices: „Base-load“ versus „Flexible Generation“
- Decentralized Generation versus Centralized Generation



smart-grid vision for the energy [r]evolution

