



Escuela de Ingeniería Técnica Industrial
Industria Ingeniaritza Teknikoko Eskola
EIBAR

Av. Otaola 29 Eibar



eman ta zabal zazu



Universidad
del País Vasco Euskal Herriko
Unibertsitatea



EIBARKO INGENIARITZA ESKOLAKO GARAPEN IRAUNKORRARI BURUZKO I. JARDUNALDIAK I JORNADAS SOBRE DESARROLLO SOSTENIBLE EN LA ESCUELA DE INGENIERÍA DE EIBAR

Cuando: 4 y 5 de Junio de 2009

Donde: Escuela de Ingeniería de Eibar

Noiz: 2009ko ekainaren 4an eta 5ean

Non: Eibarko Ingeniaritza Eskola

Más información

<http://www.euiti-eibar.ehu.es>

Informazio gehiago





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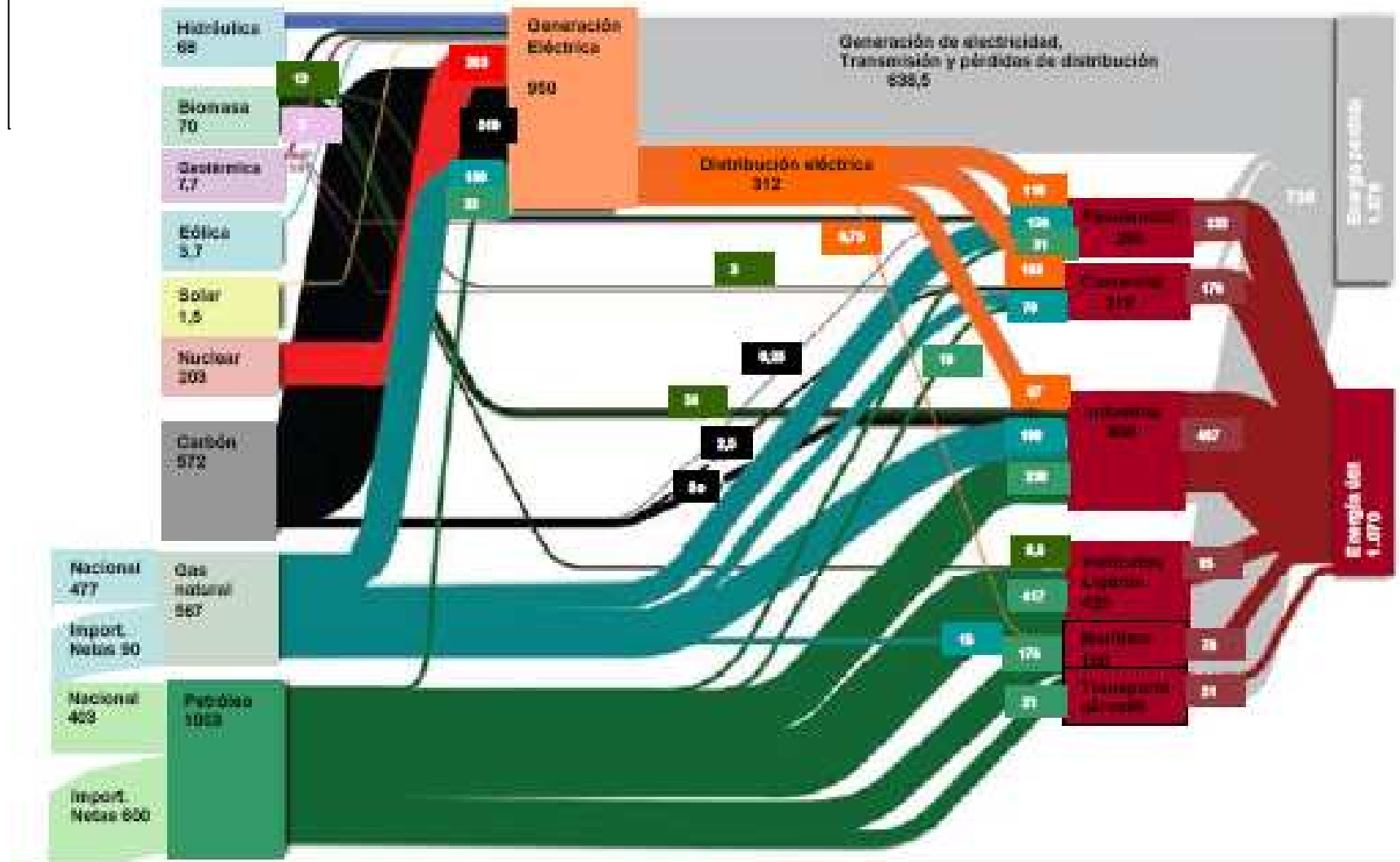
ELEMENTOS PARA UNA ALTERNATIVA ENERGÉTICA BASADA EN LA EFICIENCIA Y EN LAS ENERGÍAS RENOVABLES

PONENTE: Roberto Bermejo

EFICIENCIA

- PNUD:
 - 2/3 de la energía primaria se pierde en la conversión en energía final
 - Potencial de ahorro rentable para países industrializados: 25-35%
- Potencial de ahorro según el PE: 23%
- Informe oficial de GB: 30%
- Países menos desarrollados: 3-5 veces menos eficientes

FLUJO ENERGÉTICO DE LOS EE. UU. EN 2005 (en MTpe)

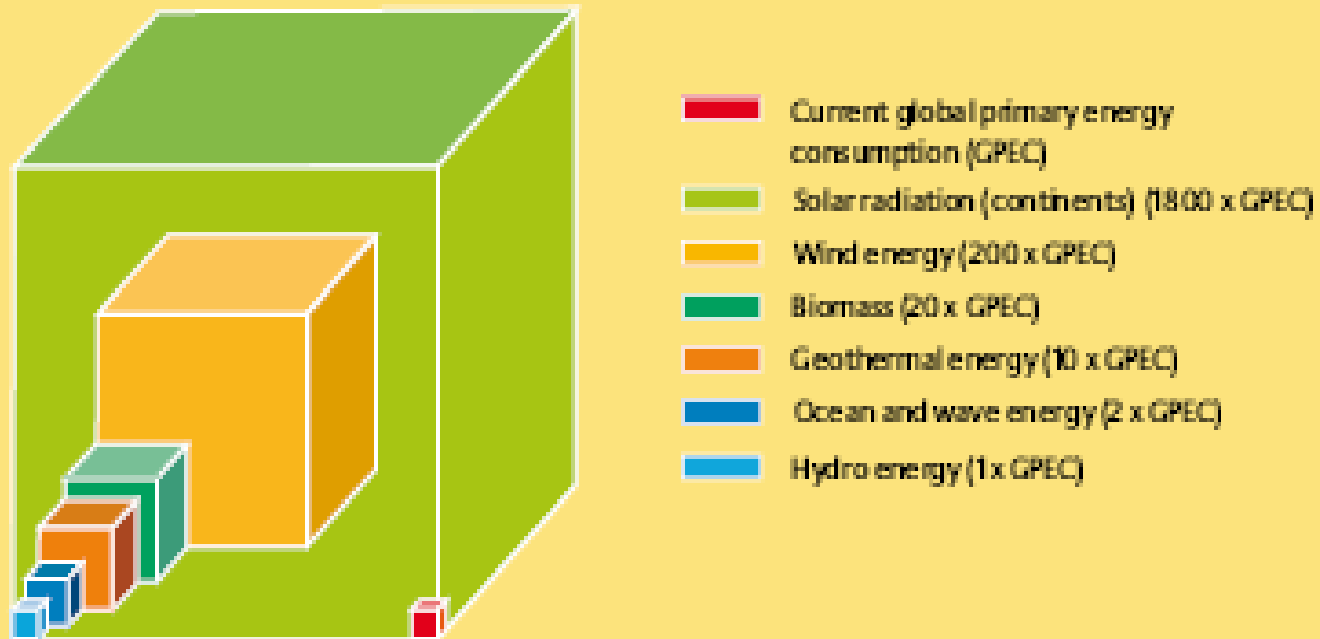


FUENTES PRINCIPALES

- Biomasa
- Solar termal
- Electricidad
 - Eólica
 - Fotovoltaica
 - Solar termal
 - Otras: biomasa, olas, energía maremotriz, geotérmica, etc.

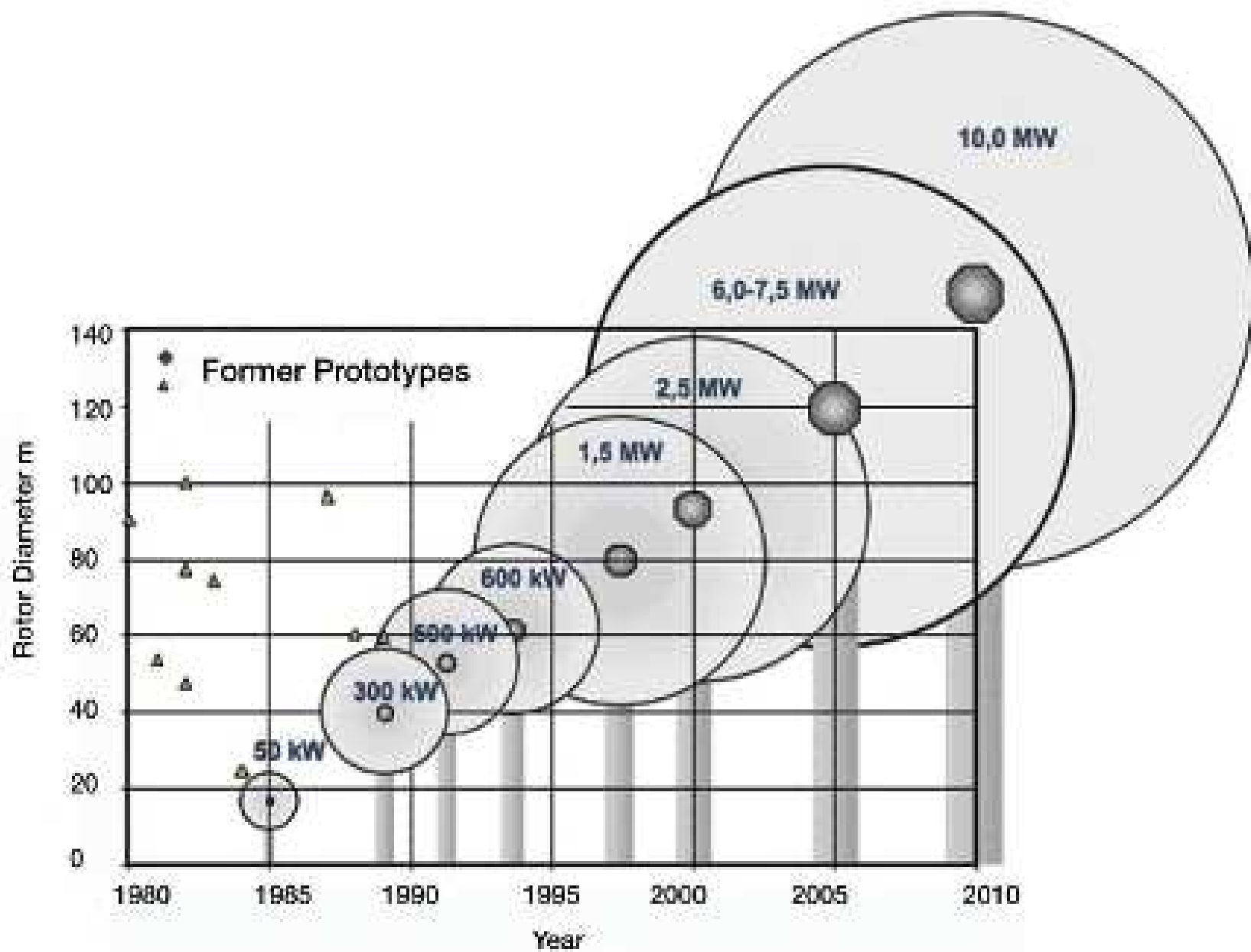
POTENCIAL FÍSICO DE LAS ENERGÍAS RENOVABLES

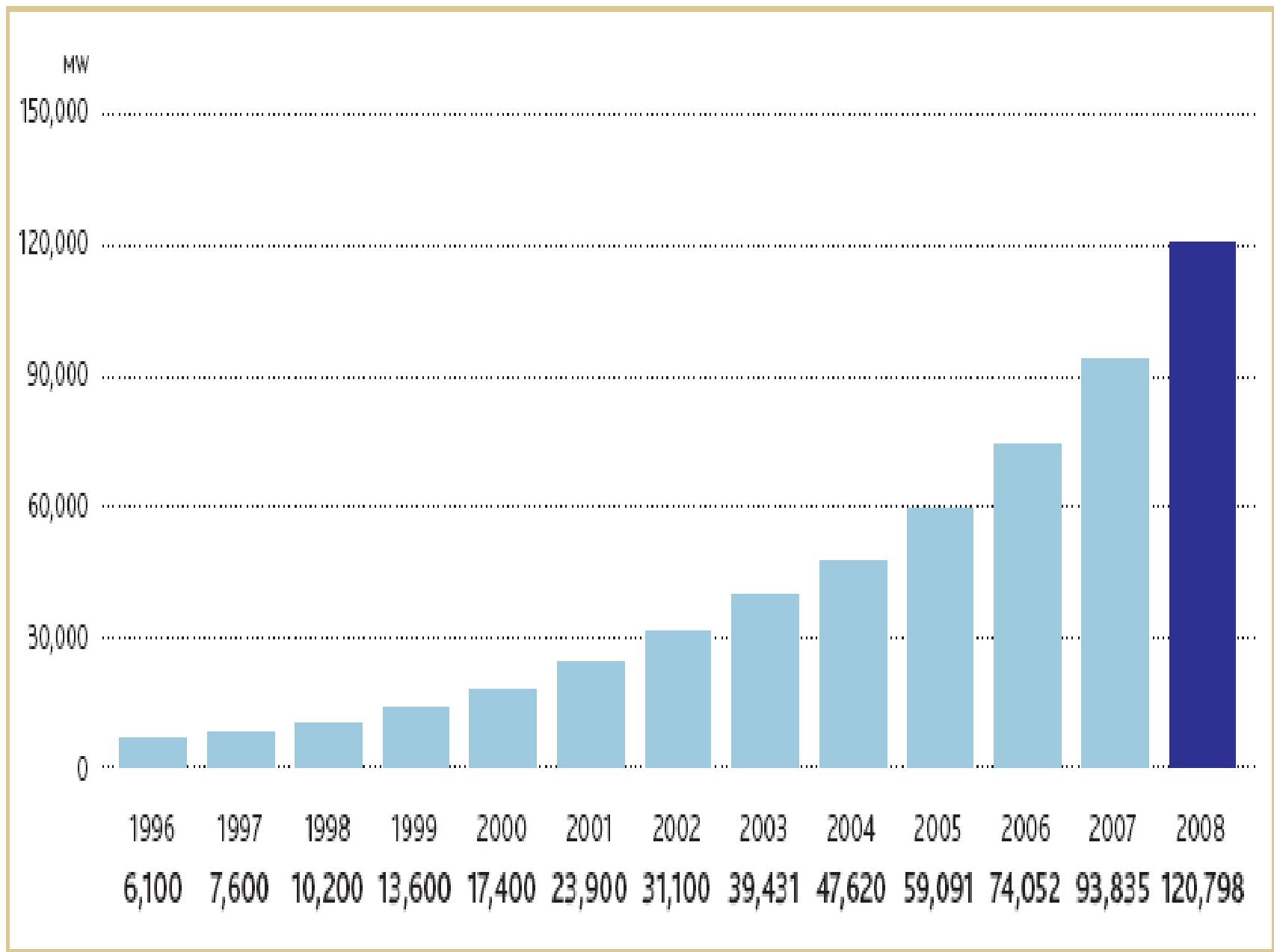
The physical potential of renewable energies

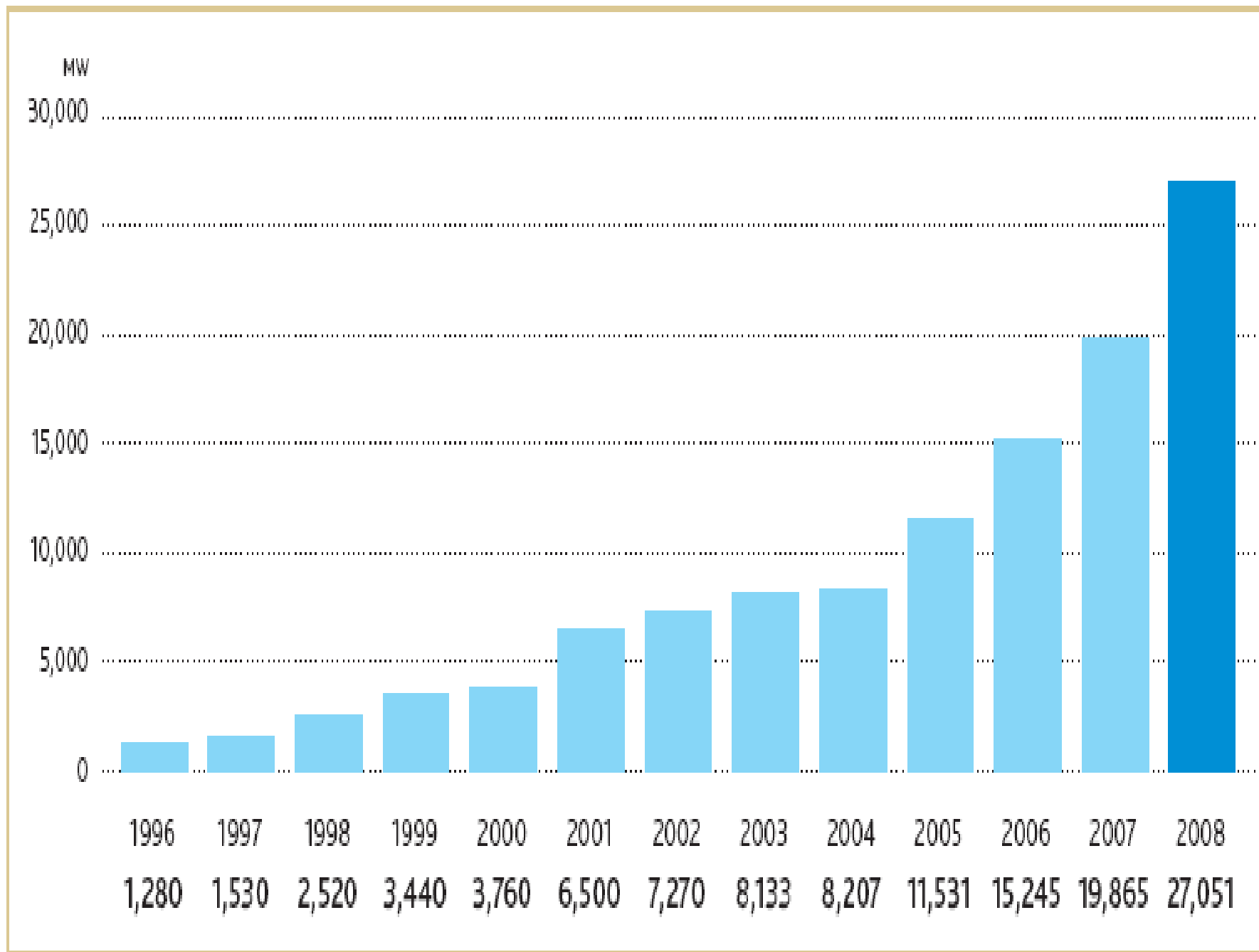


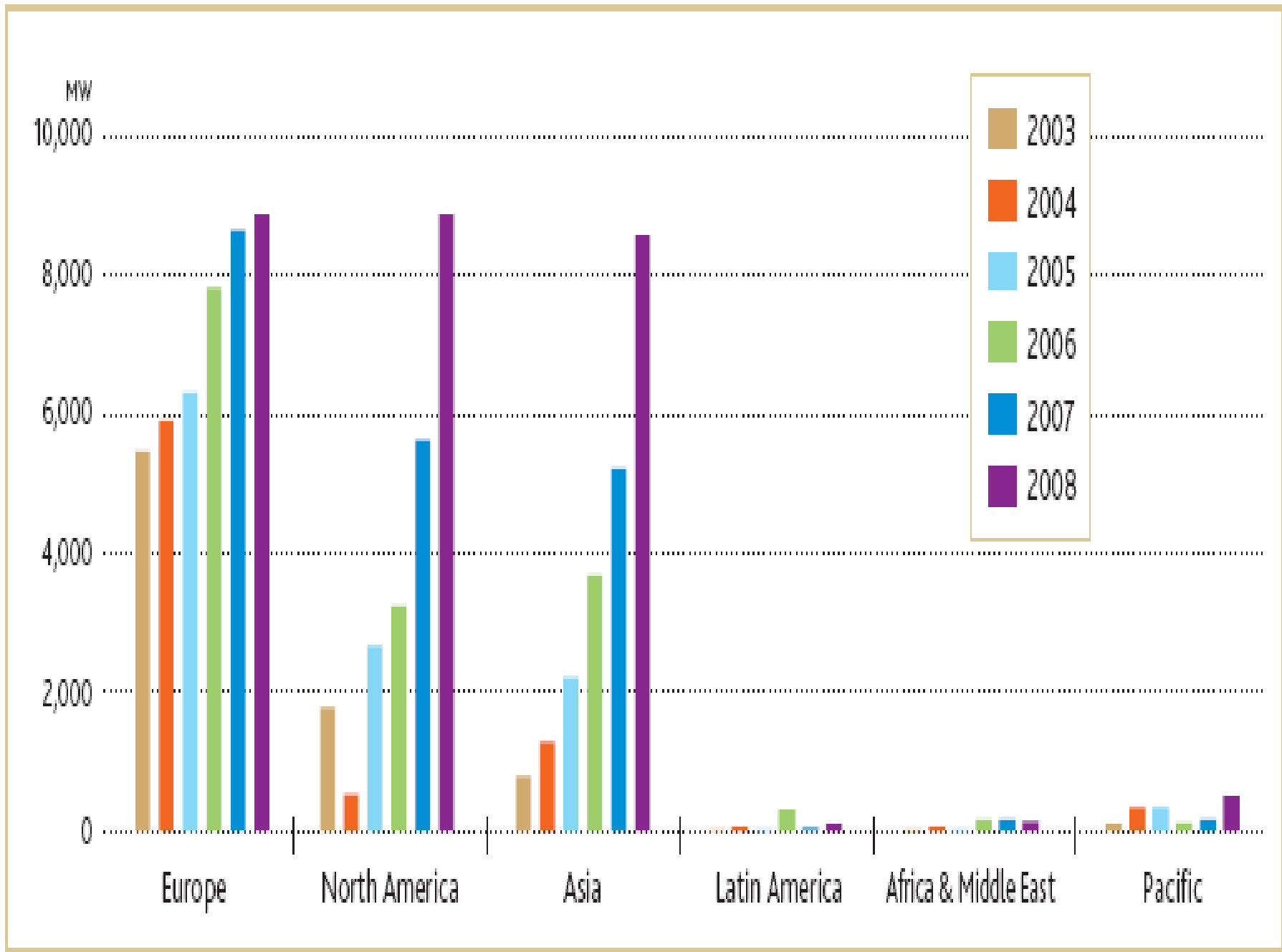
DIRECTIVA 20/20/20

	Share of energy from renewable sources in final consumption of energy, 2005	Target for share of energy from renewable sources in final consumption of energy, 2020
Belgium	2.2%	13%
Bulgaria	9.4%	16%
The Czech Republic	6.1%	13%
Denmark	17.0%	30%
Germany	5.8%	18%
Estonia	18.0%	25%
Ireland	3.1%	16%
Greece	6.9%	18%
Spain	8.7%	20%
France	10.3%	23%
Italy	5.2%	17%
Cyprus	2.9%	13%
Latvia	34.9%	42%
Lithuania	15.0%	23%
Luxembourg	0.9%	11%
Hungary	4.3%	13%
Malta	0.0%	10%
The Netherlands	2.4%	14%
Austria	23.3%	34%
Poland	7.2%	15%
Portugal	20.5%	31%
Romania	17.8%	24%
Slovenia	16.0%	25%
The Slovak Republic	6.7%	14%
Finland	28.5%	38%
Sweden	39.8%	49%
United Kingdom	1.3%	15%

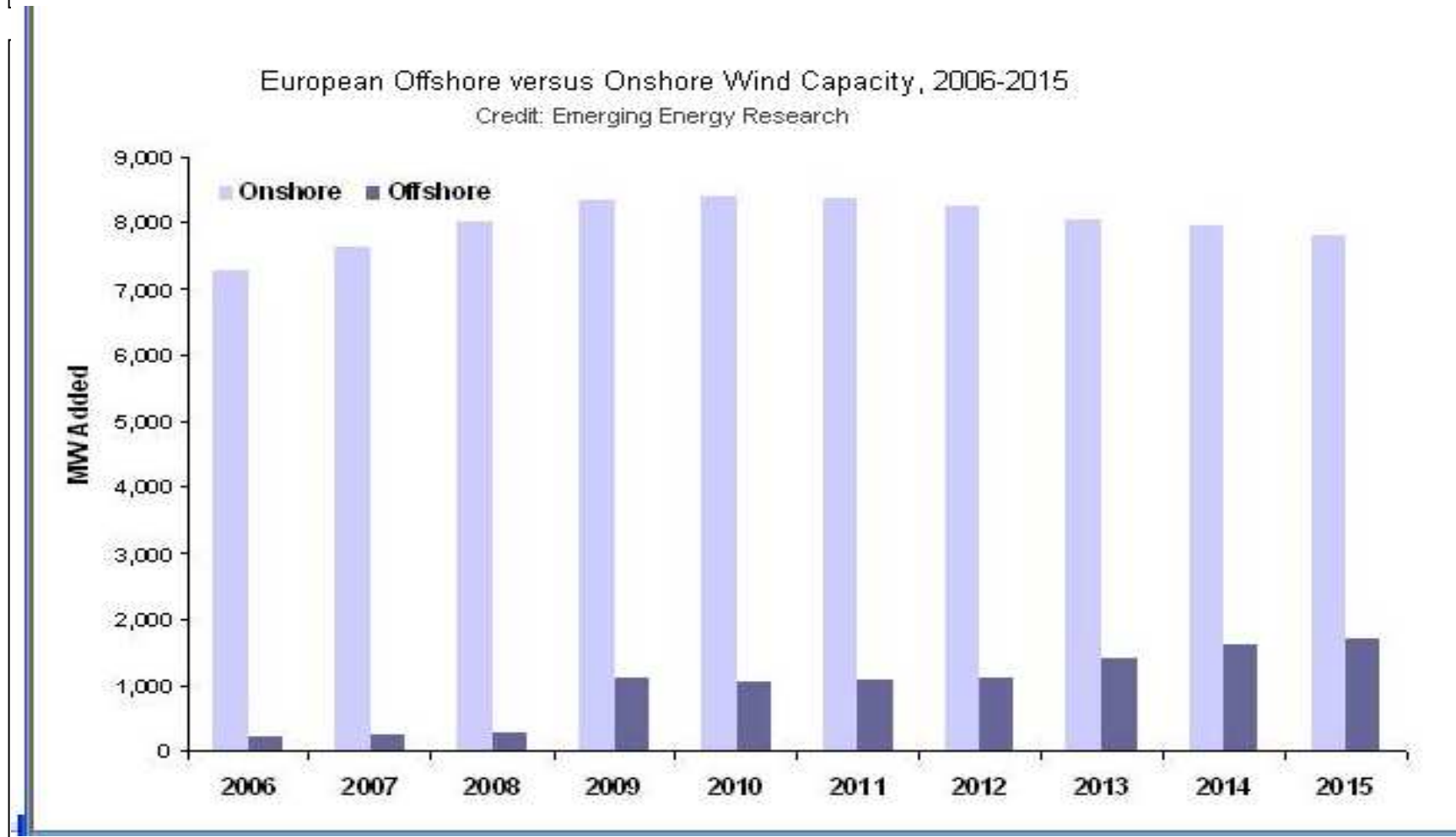






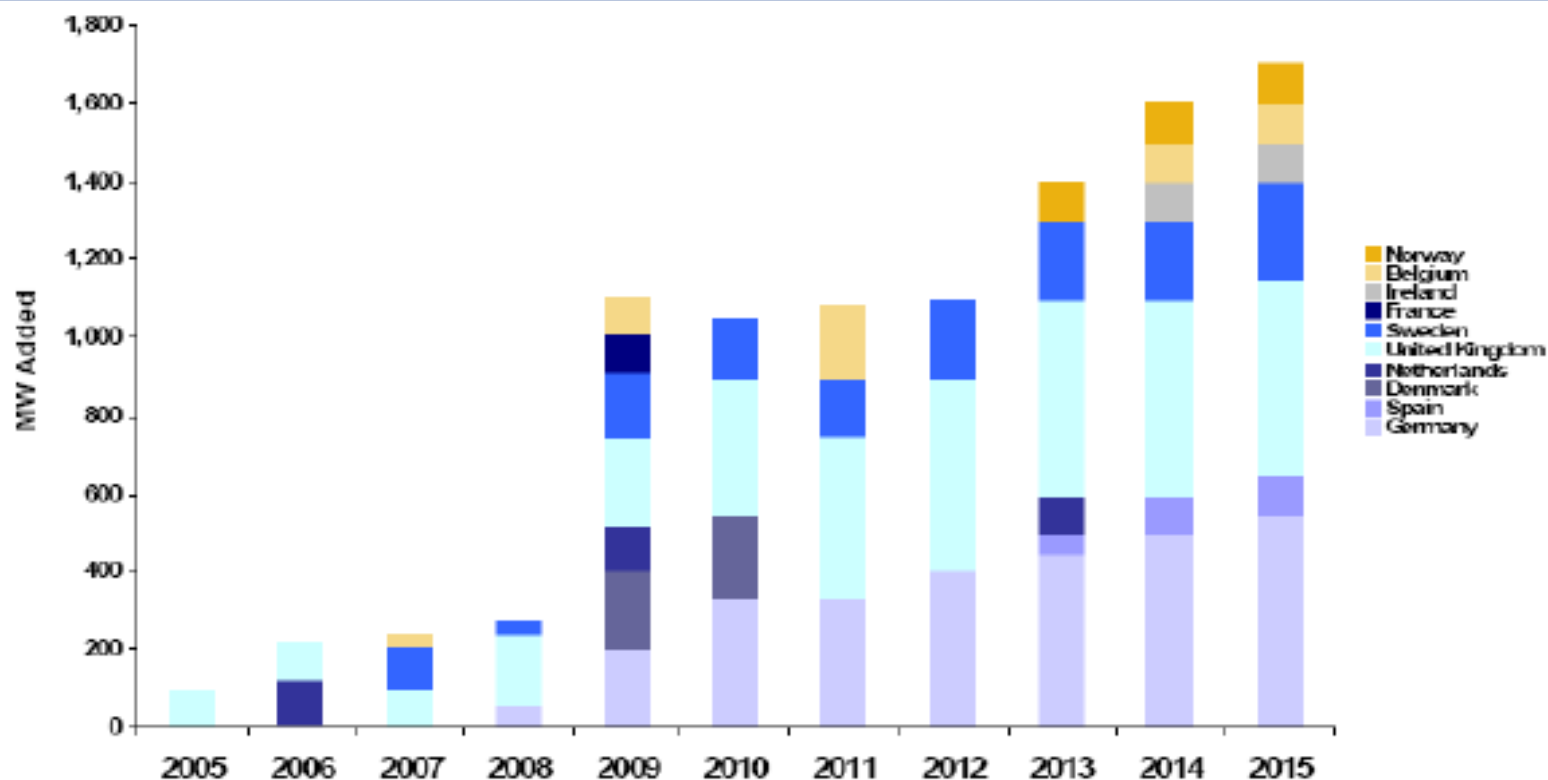


CAPACIDAD EÓLICA EN TIERRA Y MAR



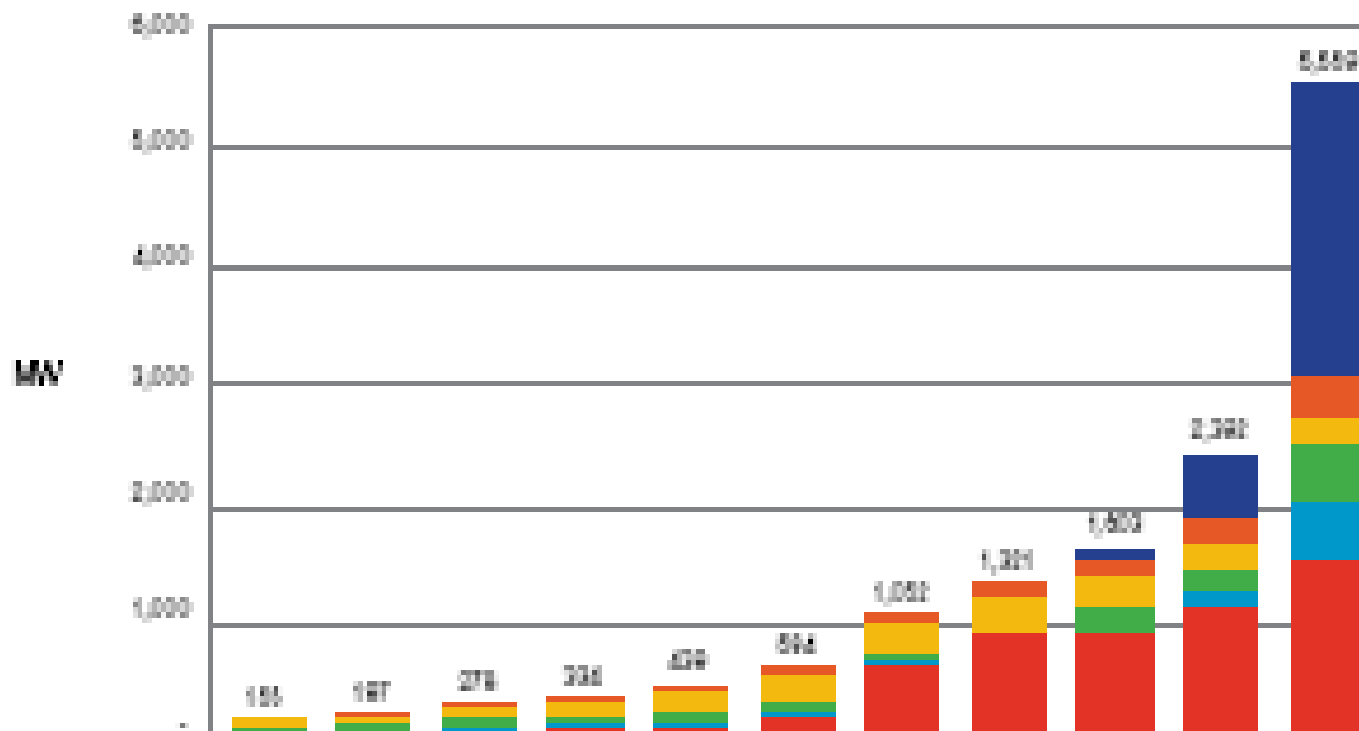
POTENCIA EÓLICA MARINA AÑADIDA EN EUROPA 2005-2015

Graph. 16: European Offshore Wind Capacity Added, 2005-2015

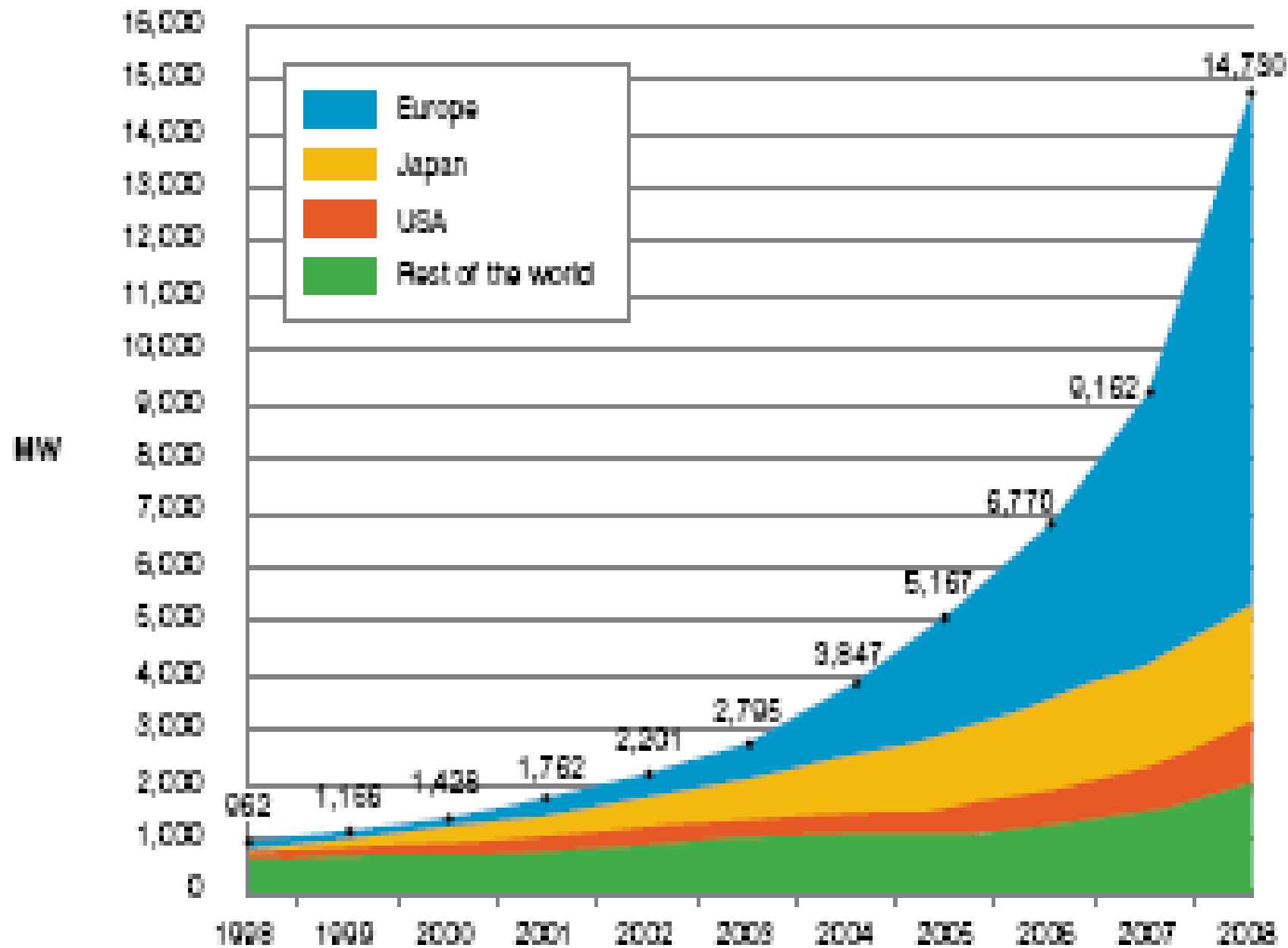


Source(s): Emerging Energy Research

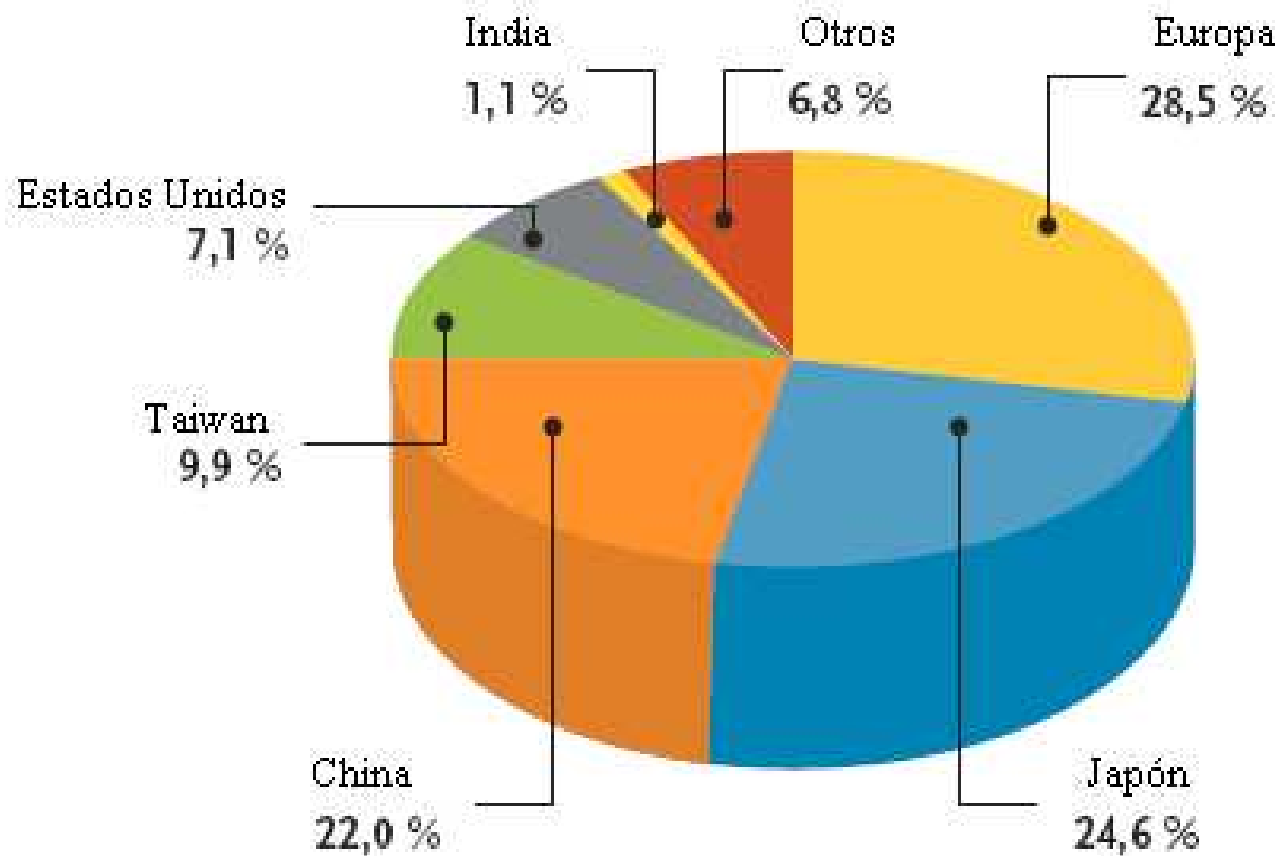
	Annual capacity (MW)			Cumulative capacity (MW)			Employment		
	Onshore	Offshore	Total	Onshore	Offshore	Total	Onshore	Offshore	Total
2007	8,344	210	8,554	55,500	1,100	56,535	147,736	6,370	154,106
2010	6,873	1,331	8,205	76,500	3,500	80,000	129,271	41,396	170,667
2015	8,086	2,300	10,386	112,500	12,000	124,500	151,047	61,401	212,448
2020	9,949	6,805	16,754	145,000	35,000	180,000	176,199	152,491	328,690
2025	10,519	8,504	19,023	164,800	74,500	239,300	177,194	191,744	368,938
2030	9,882	9,590	19,472	180,000	120,000	300,000	161,606	215,637	377,244



MW	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2009
Spain	0	1	-	2	8	10	8	26	66	660	2,511
USA	-	17	22	29	44	59	60	114	145	207	342
Japan	69	72	112	135	145	223	272	293	267	210	210
Rest of the world	68	84	64	75	104	66	53	12	106	207	495
Rest of Europe	8	11	10	18	16	50	30	30	27	108	432
Germany	10	12	40	79	90	150	600	650	650	1,100	1,500
TOTAL	155	197	278	334	439	694	1,052	1,321	1,800	2,362	5,559



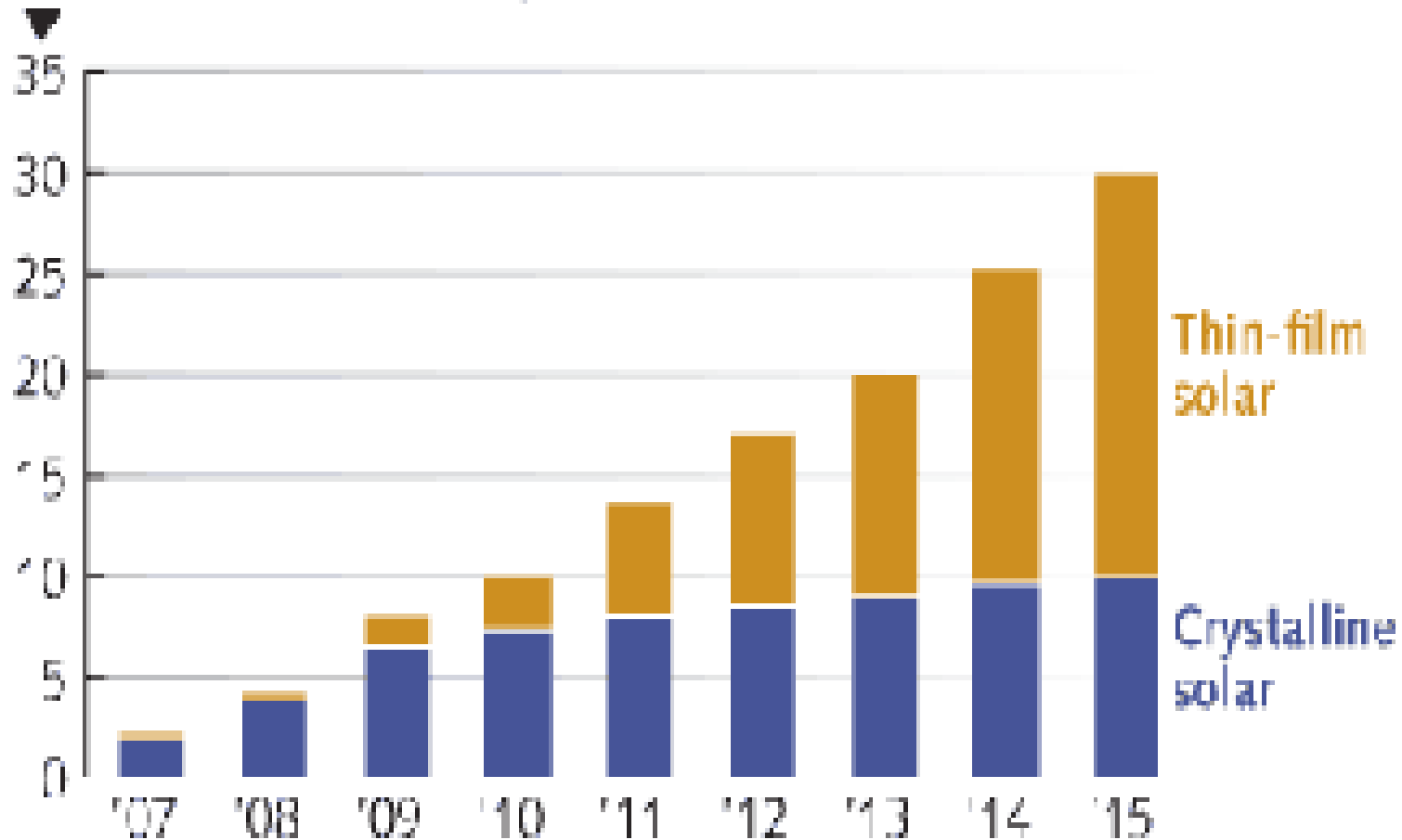
PRODUCCIÓN DE PLACAS FOTOVOLTAICAS

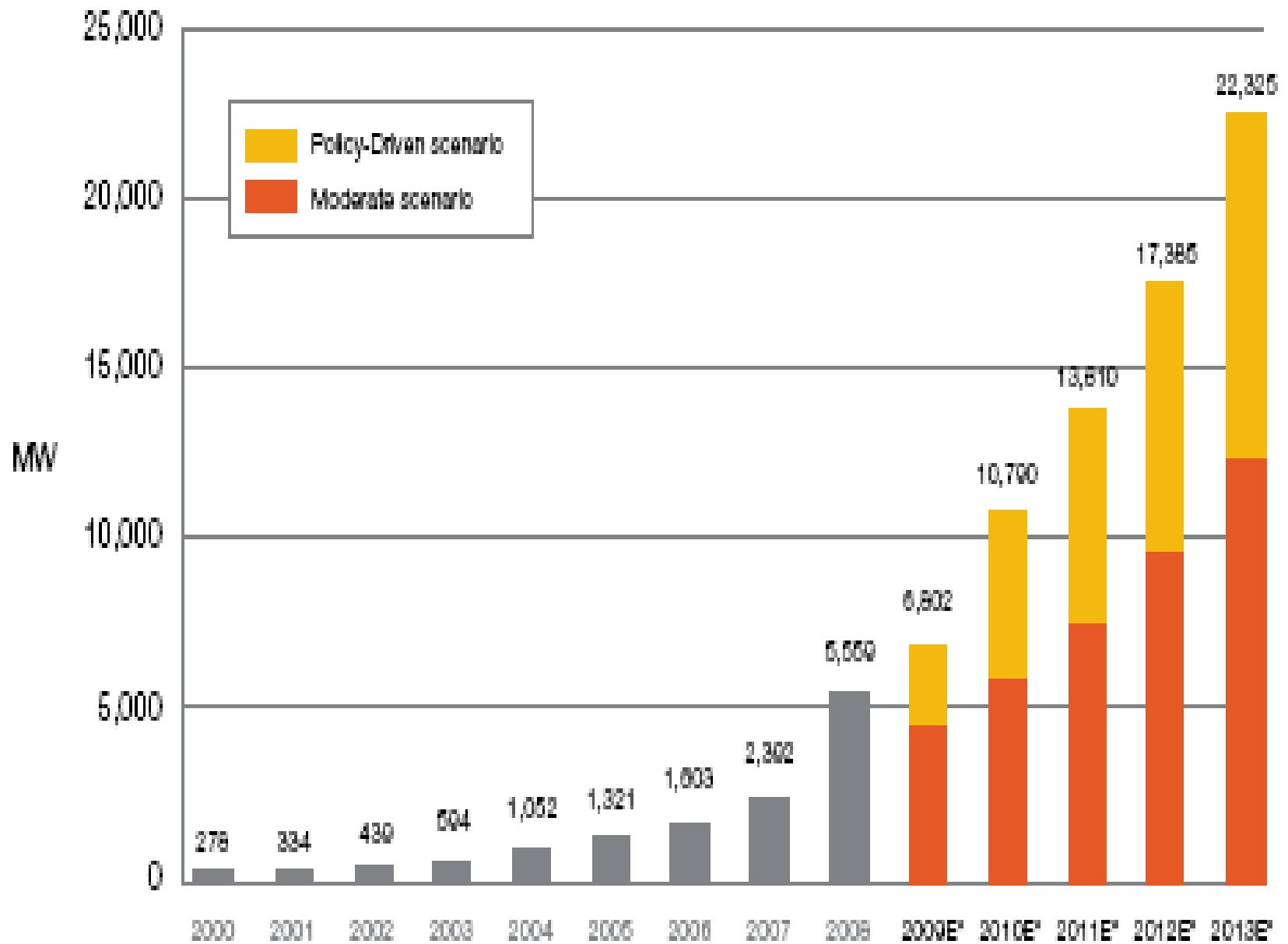


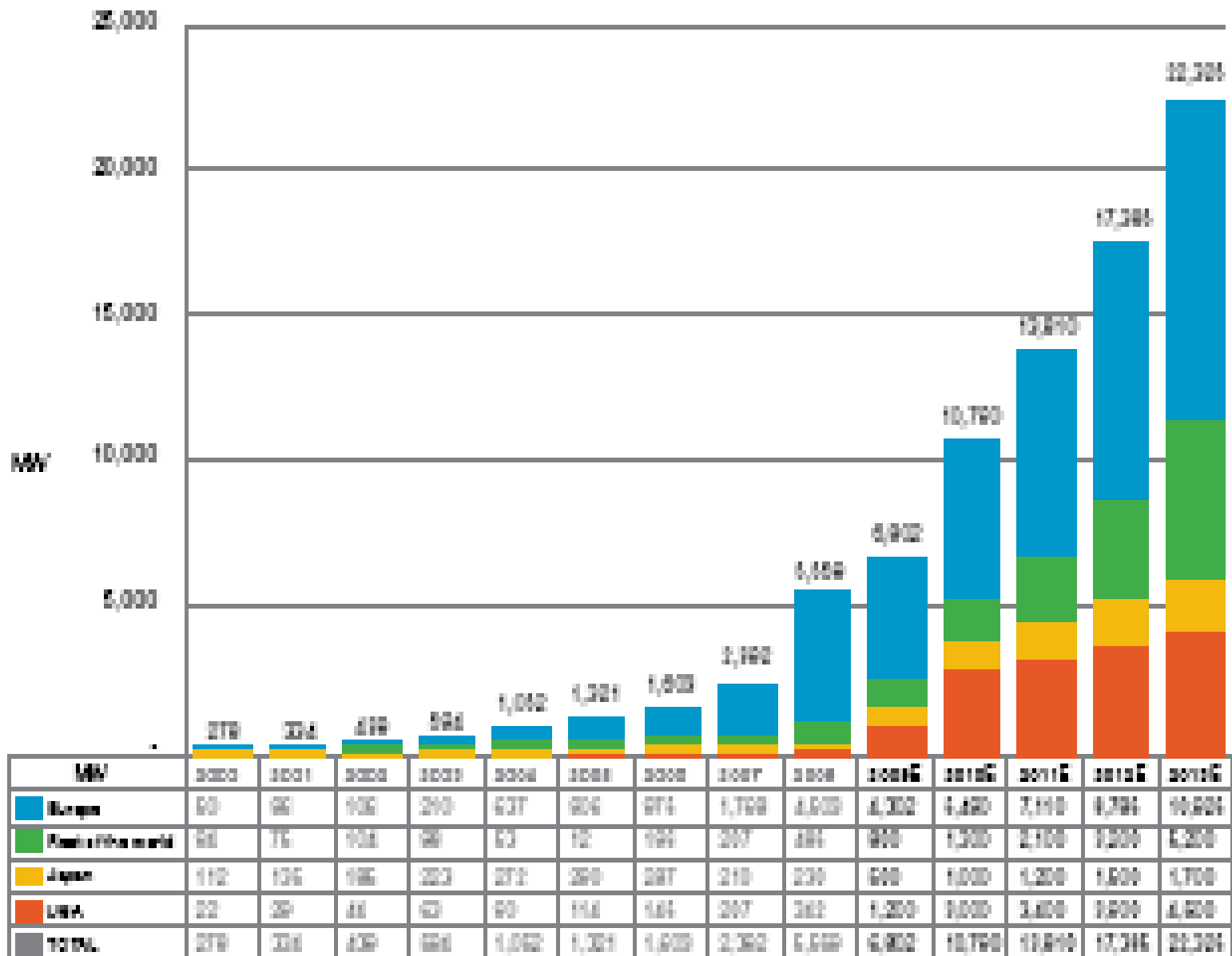
Entreprises Companies	Pays Country	Technologie des cellules Cell technology	Production		Production capacity	
			2007	2008	2007	2008
Q-Cells	Germany	Crystalline/Thin film	389	574	760	800
First Solar	USA	Thin film	206	502,6	735	>1 000
Suntech Power	China	Crystalline/Thin film	327	497,5	1 000	1 000
Sharp	Japan	Crystalline/Thin film	363	473	710	710
JA Solar	China	Crystalline	102	300	500-600	600
Kyocera	Japan	Crystalline	207	290	300	650
Yingli Green Energy	China	Crystalline	150	281,5	400	600
Motech	Taiwan	Crystalline	196	272	580	580
SunPower	USA, Philippines	Crystalline	150	236,9	414	414
Sanyo	Japan	Crystalline/Thin film	165	215	340	500

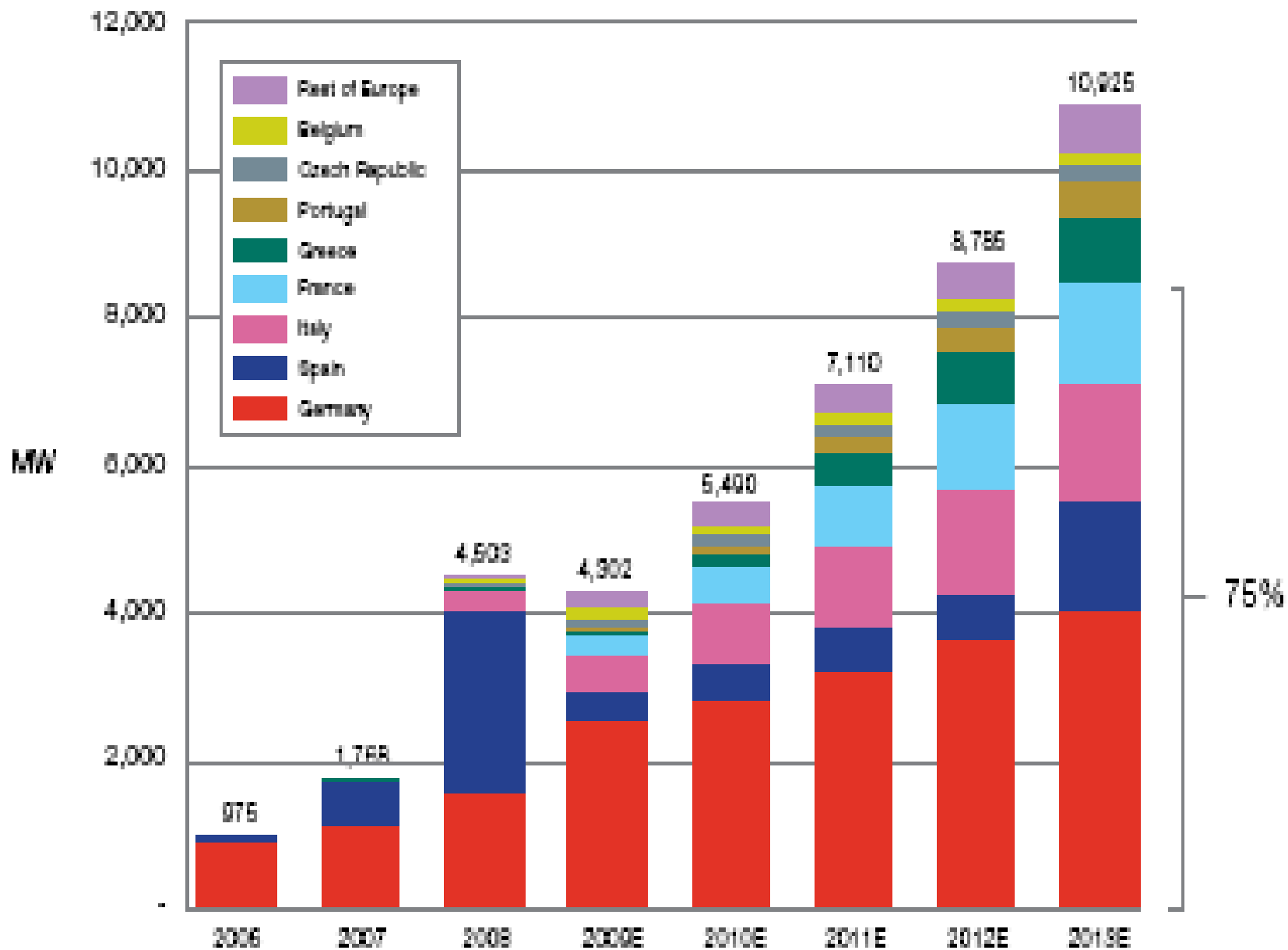
ESTIMACIÓN SOBRE LA EVOLUCIÓN DE LAS PLACAS CRISTALINAS Y DE CAPA FINA

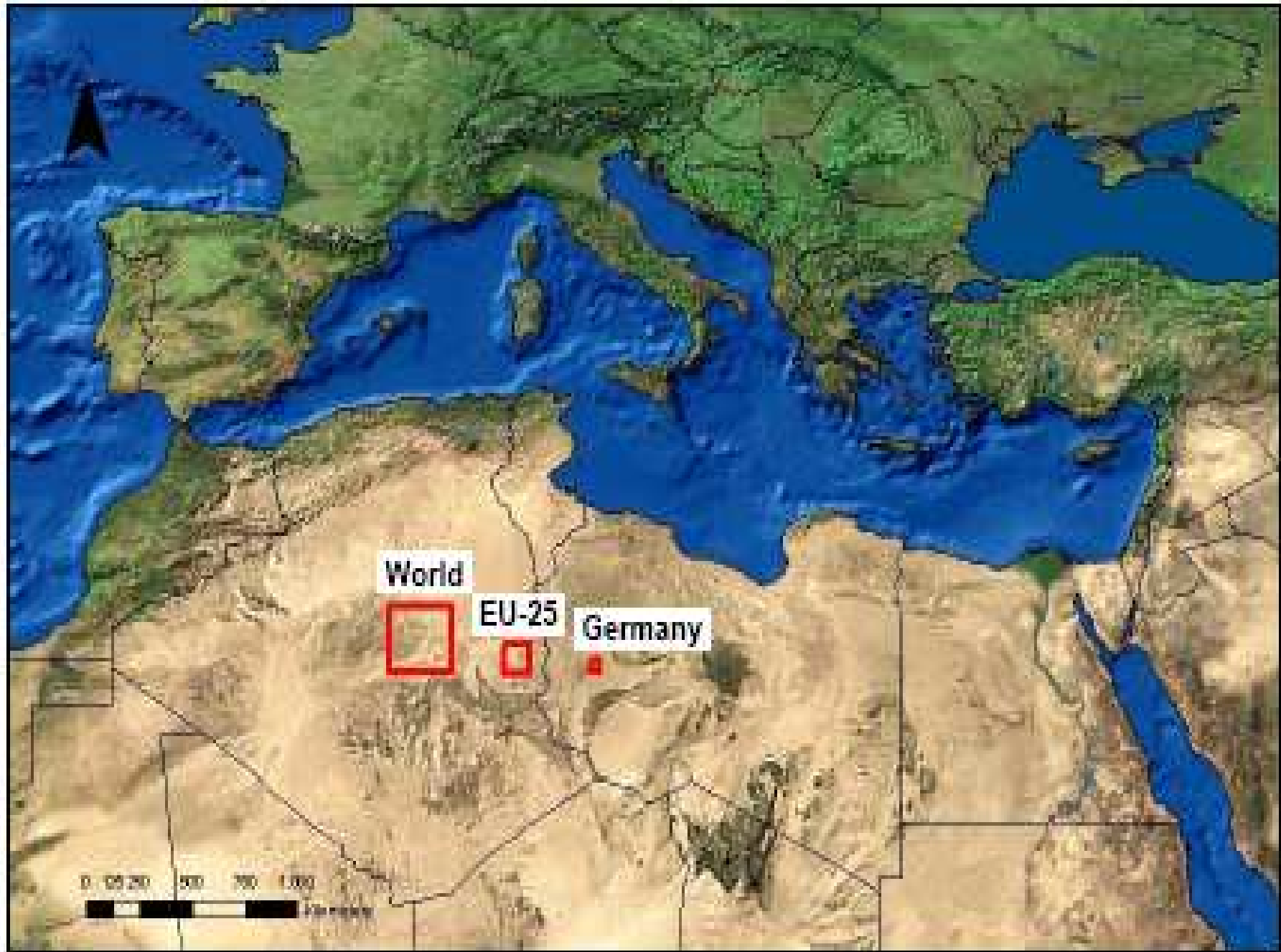
Global solar cell demand (GW)





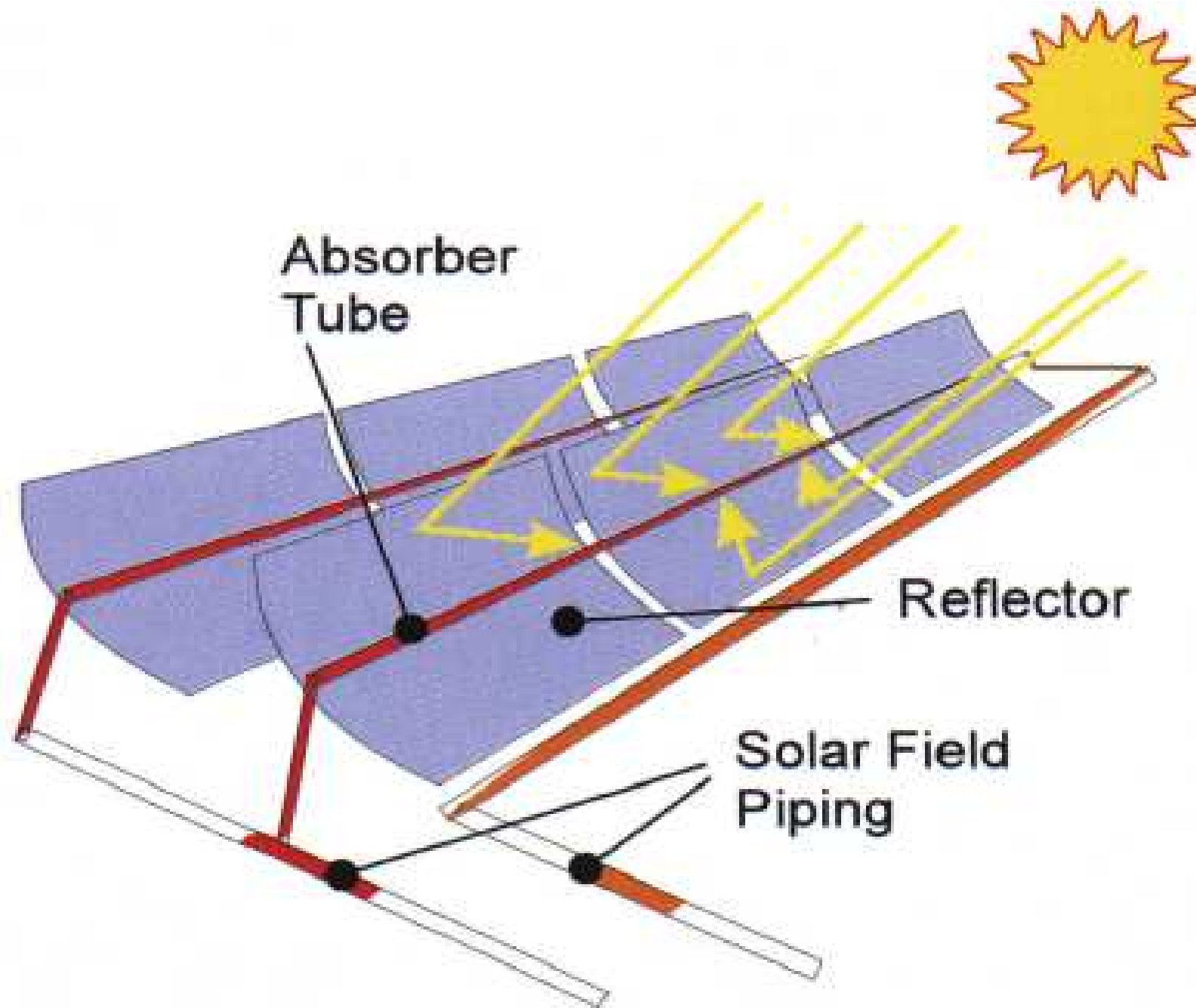


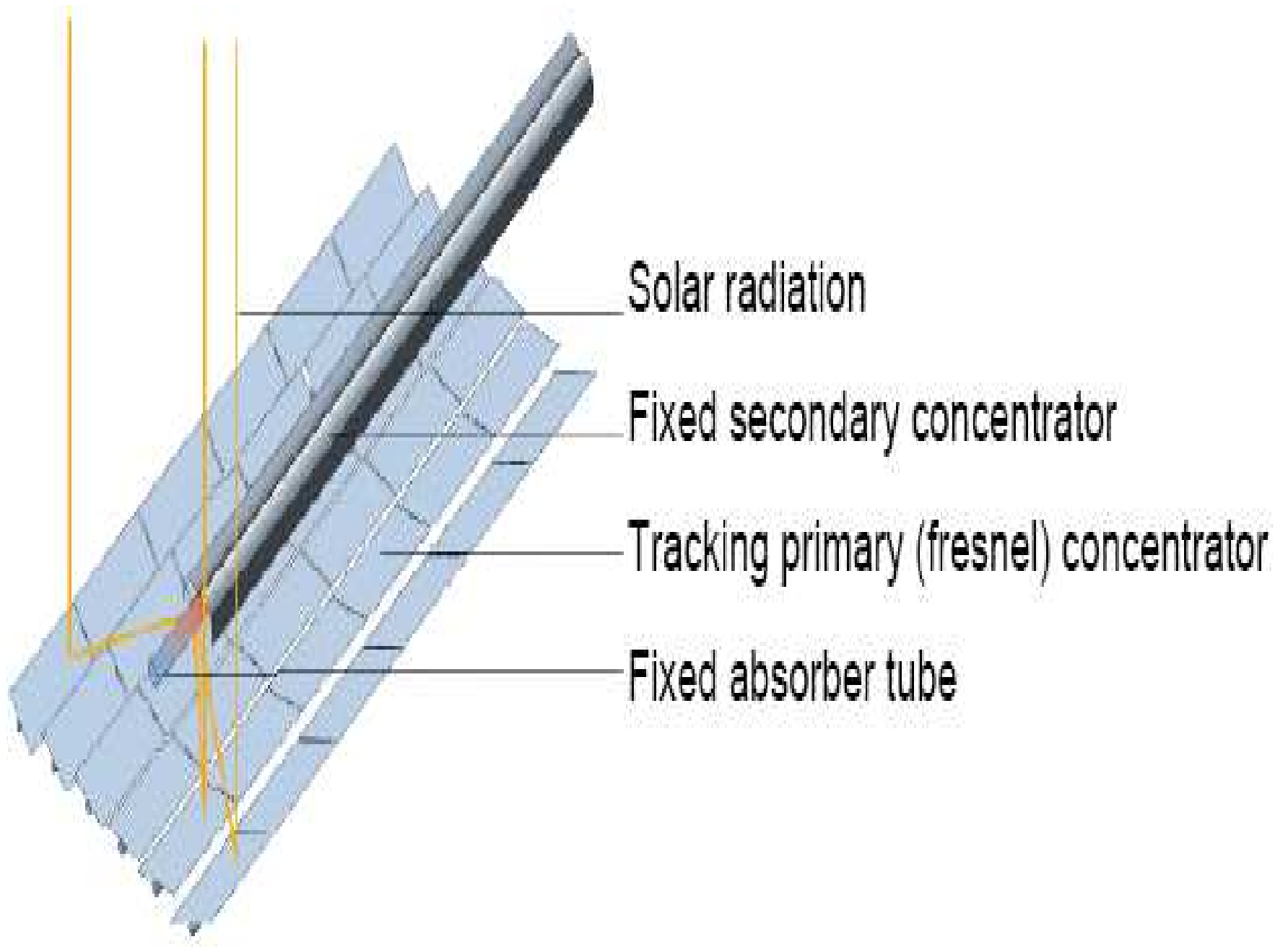




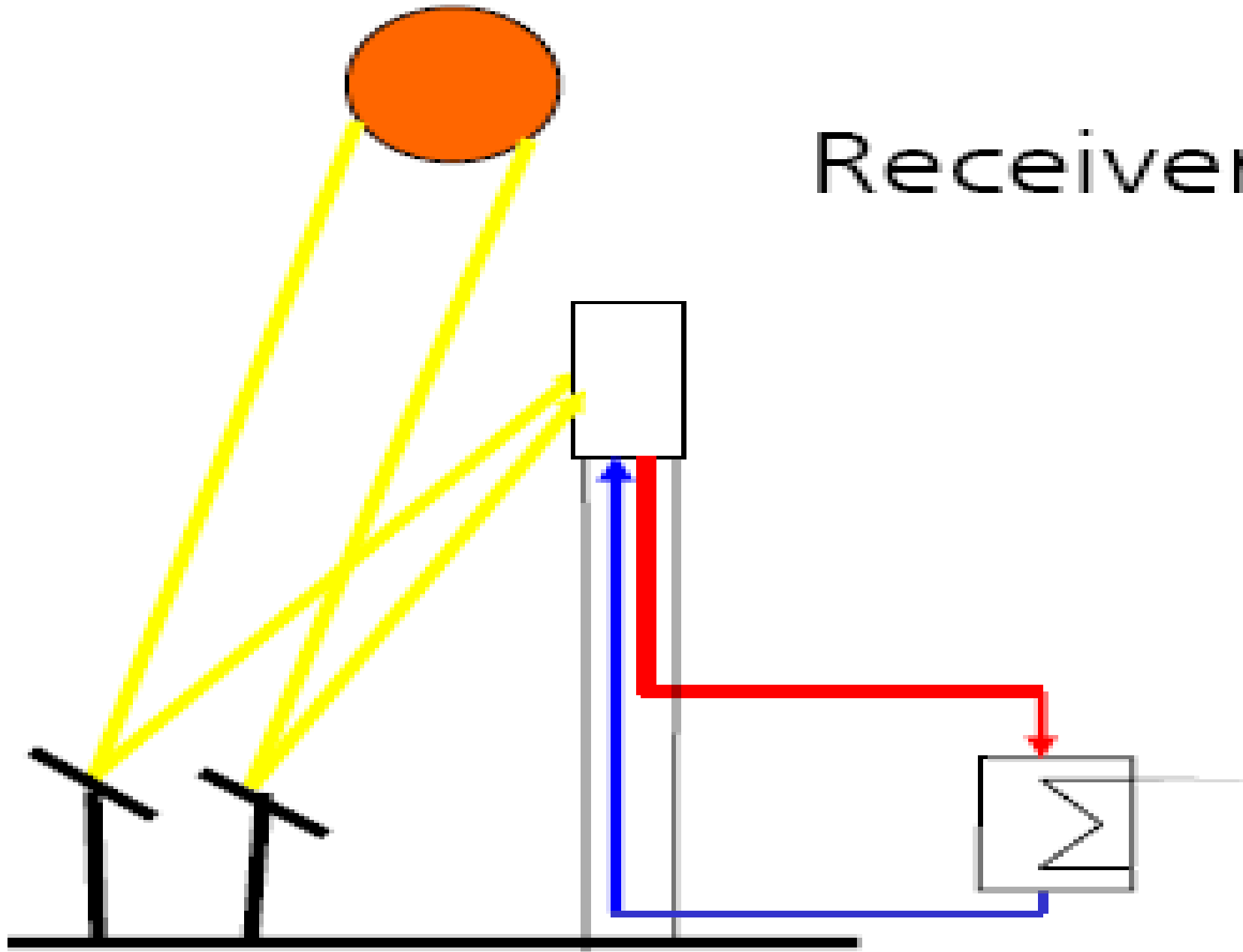
Technical and economical potential of solar thermal power plants in the Mediterranean

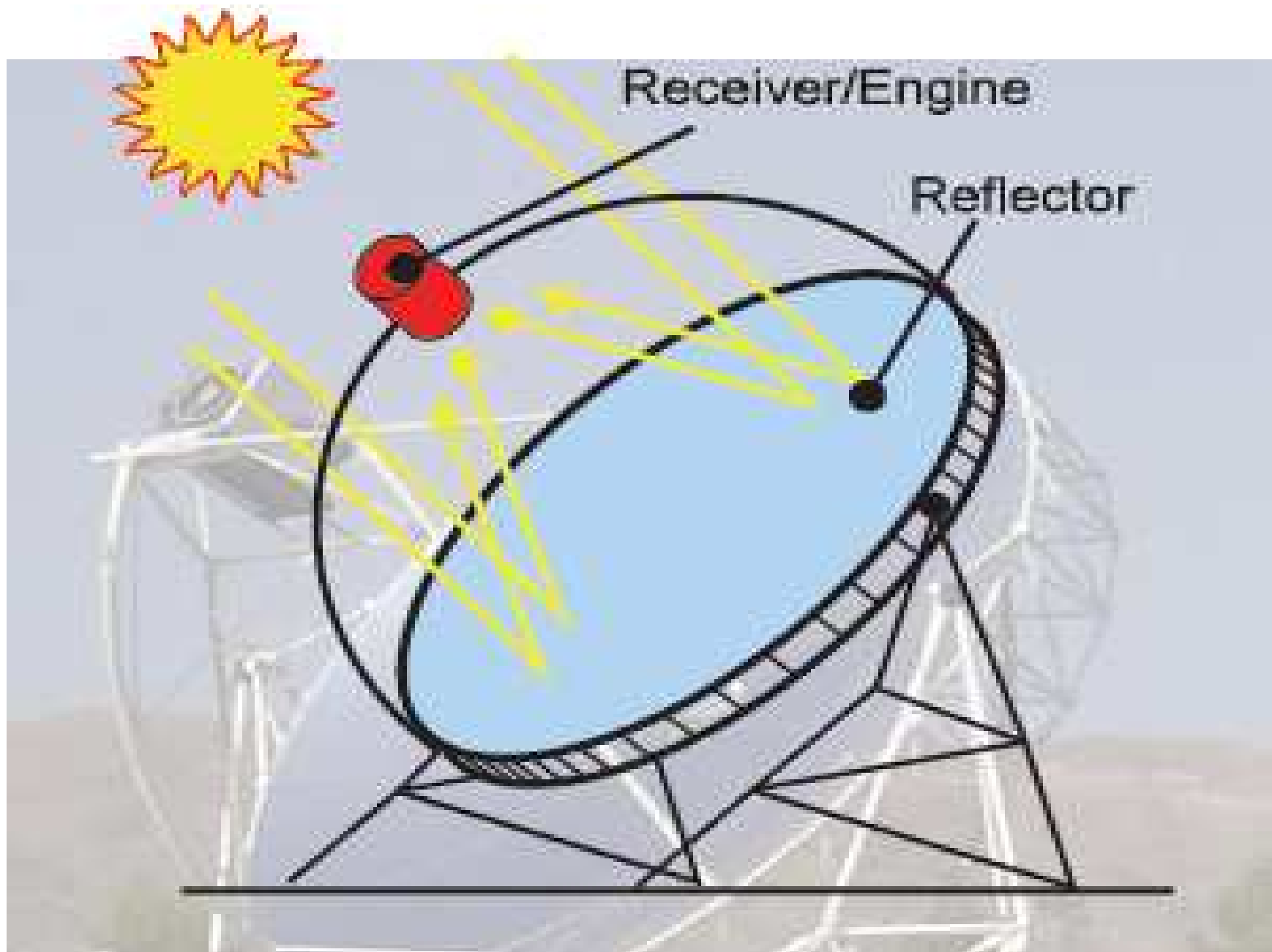
	Economic Potential	Used until 2050	Direct Normal Irradiance*
	TWh/y	TWh/y	kWh/m ² /y
Bahrain	33	4	2050
Cyprus	20	1	2200
Iran	20000	349	2200
Iraq	28647	190	2000
Israel	318	29	2400
Jordan	6429	40	2700
Kuwait	1525	13	2100
Lebanon	14	12	2000
Oman	19404	22	2200
Qatar	792	3	2000
Saudi Arabia	124560	135	2500
Syria	10210	117	2200
UAE	1988	10	2200
Yemen	5100	142	2200
Algeria	168972	165	2700
Egypt	73656	395	2800
Libya	139477	22	2700
Morocco	20146	150	2600
Tunisia	9244	43	2400
Greece	4	4	2000
Italy	7	5	2000
Malta	2	0	2000
Portugal	142	6	2200
Spain	1278	25	2250
Turkey	131	125	2000
Total	632099	2005	2000 – 2800



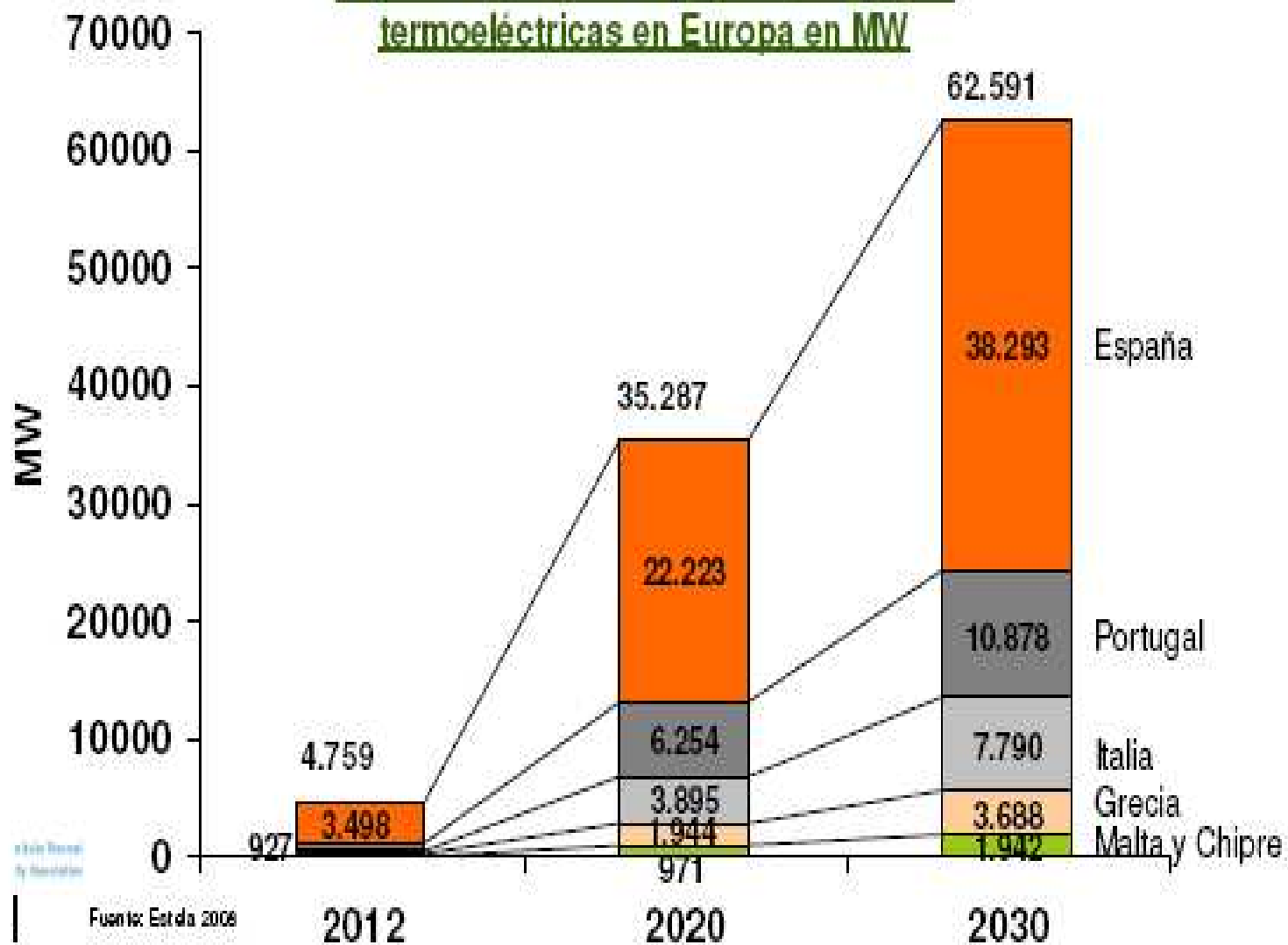


Receiver





Capacidad instalada de plantas solares termoelectricas en Europa en MW

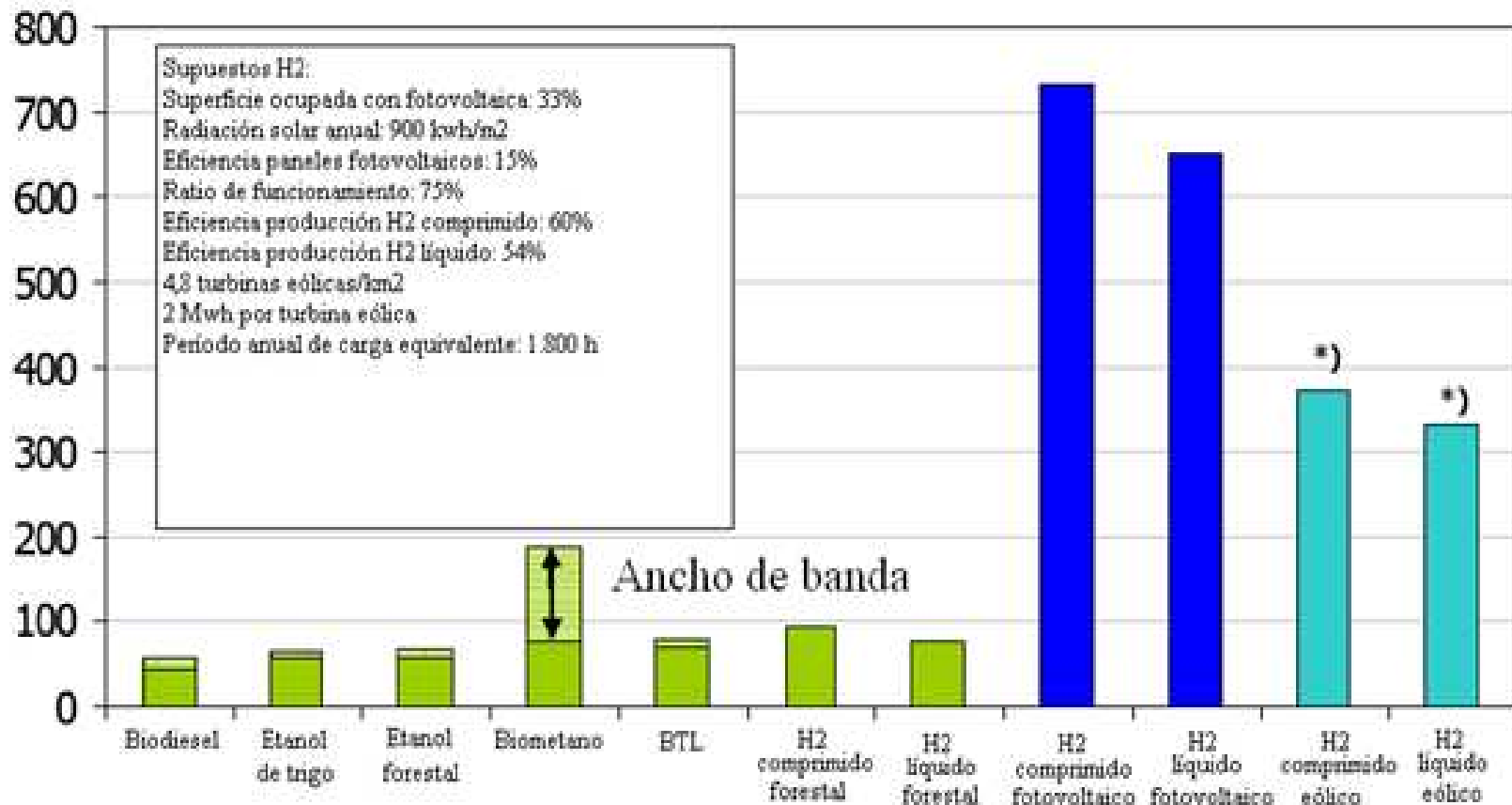


BIOCOMBUSTIBLES

- Objetivo de la UE: 5,75 %, en 2010
- Orígenes:
 - Bioetanol: cereales, caña de azúcar, remolacha azucarera, aceite de palma....
 - Biodiesel: soja, colza, girasol, aceite de palma...
- Problemas:
 - Éticos
 - Tierra disponible
 - Balance energético

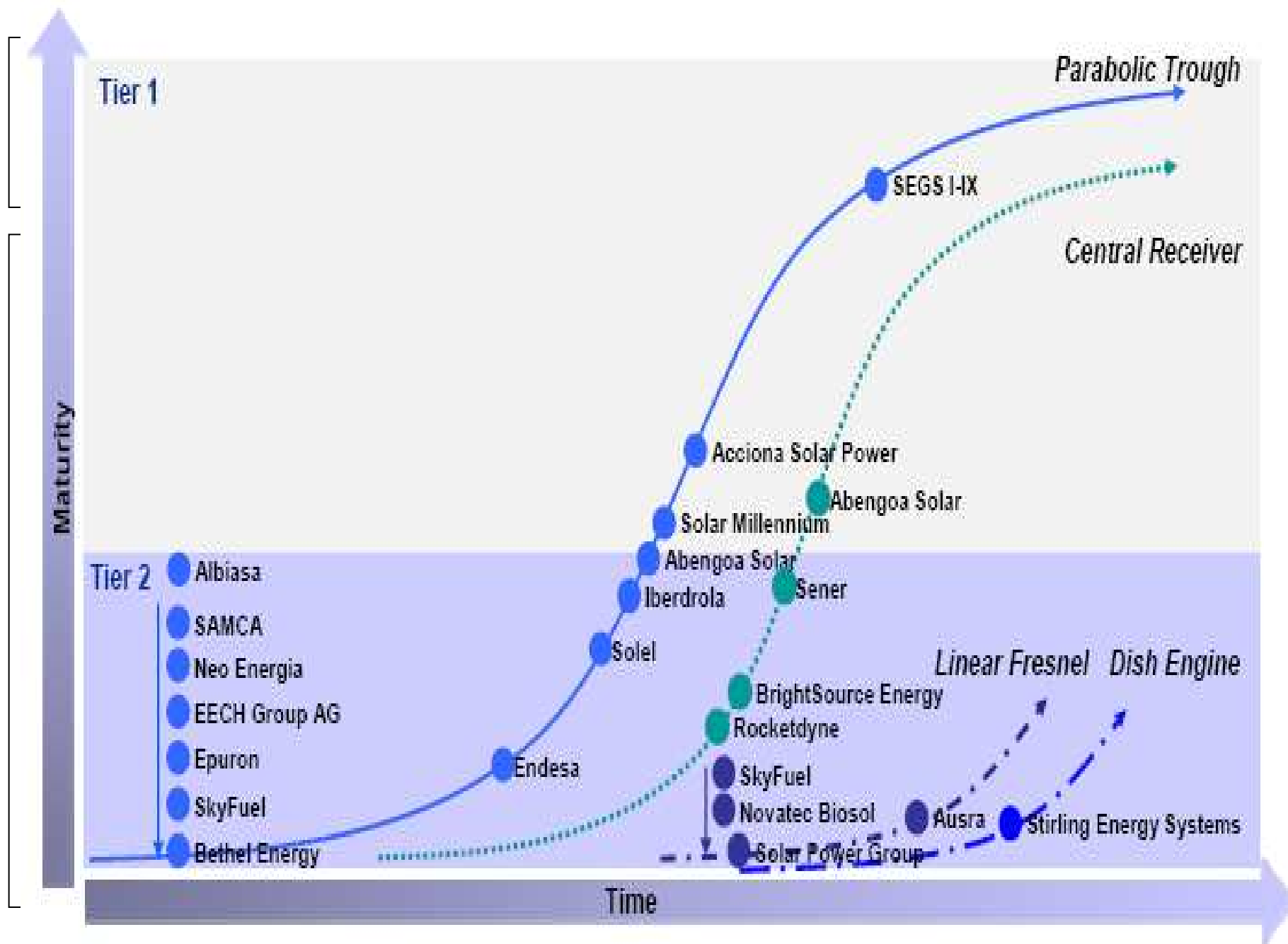
PRODUCCIÓN DE ENERGÍA POR HECT

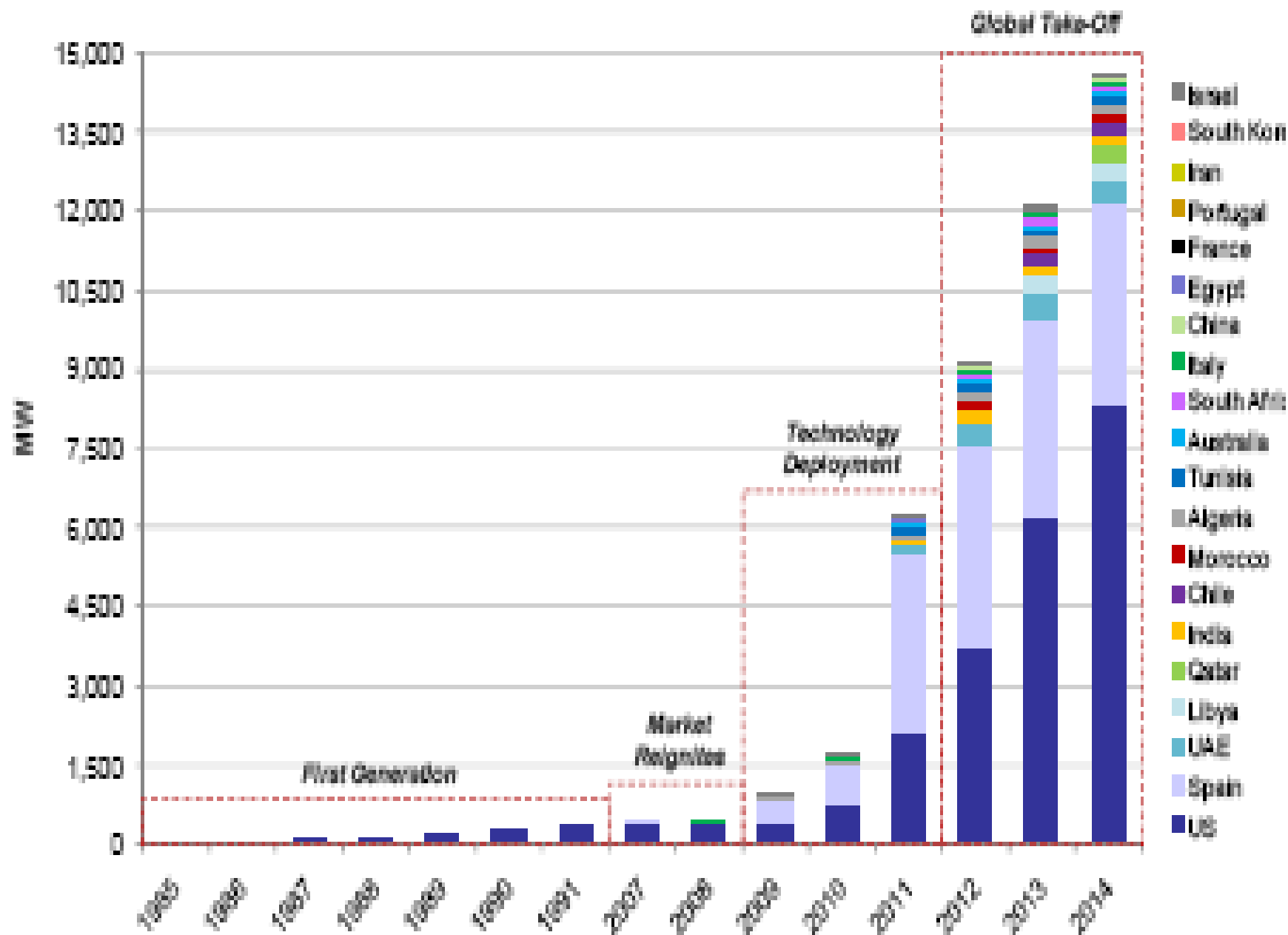
Rendimiento (GJ/hectárea y año)



BINOMIO H2/CC

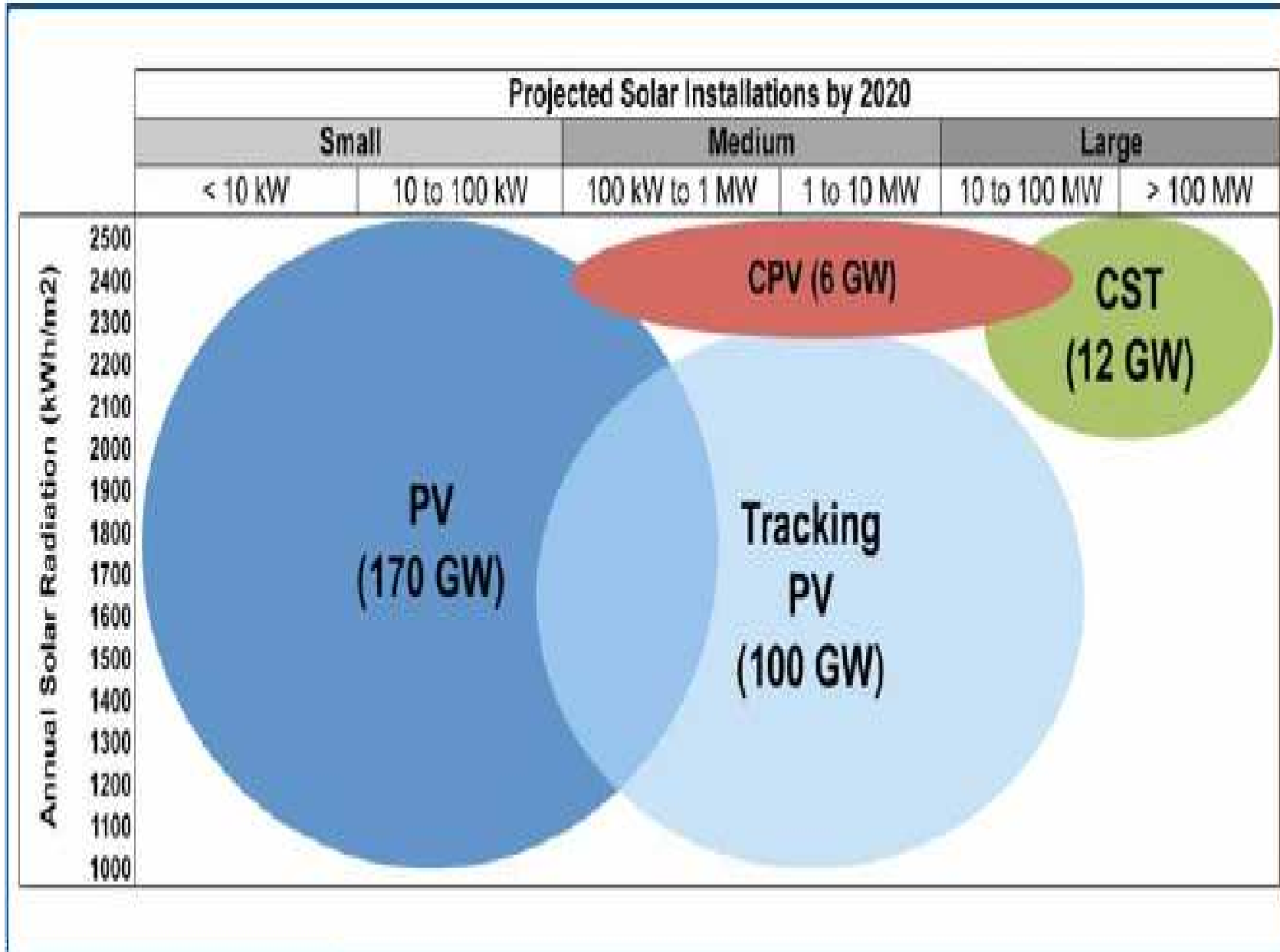
- Nueva trayectoria tecnológica impulsada por el mercado y acelerada por el techo
- Ventajas:
 - Seguridad energética
 - Fuerte incremento de la eficiencia
 - Mejora ambiental en las ciudades (ruido, contaminación)
 - Estabilizador de las energías renovables



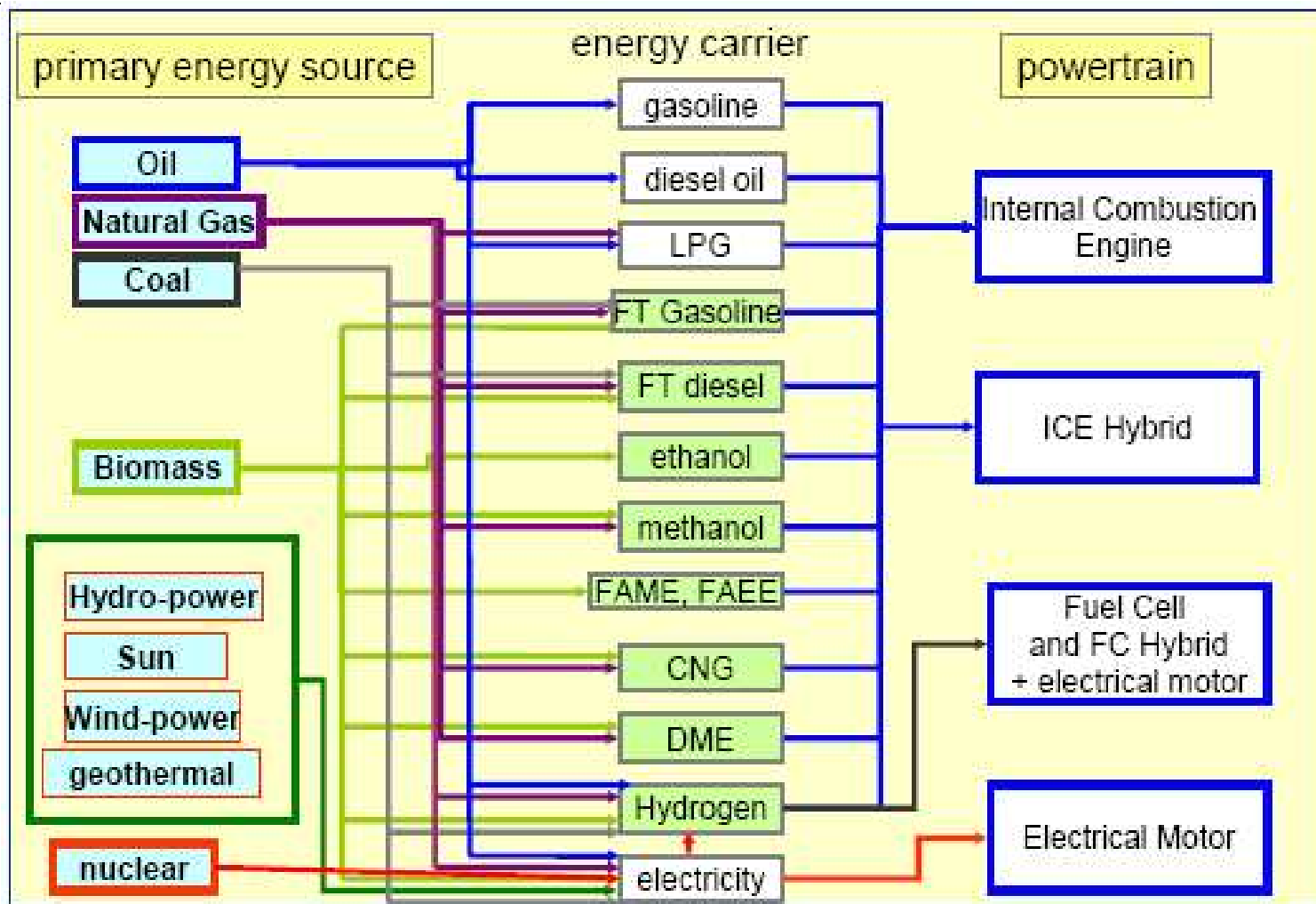


Category			Small		Medium		Large	
Installation Size			< 10kW	10 to 100kW	100kW to 1 MW	1 to 10MW	10 to 100MW	> 100 MW
Technology Mix in Each Market			100% PV		99% PV, 1% CSP		20% PV, 80% CSP	
2007 Share of Worldwide Solar Market (Installed Capacity and % of Installed Capacity)			7GW (84%)		0.7 GW (9%)		0.5 GW (7%)	
Installation Type			Distributed Generation					
							Central Generation	
Markets Served			Residential					
					Commercial			
							Utility	
							Base (50%), Intermediate (40%), Peak (10%)	
PV Based	Non Dispatchable	Non-Tracking PV						
		Tracking PV						
		CPV						
Thermal Based	Dispatchable (with storage)	Dish-Engine						
		Trough						
		Tower						
		LFR						
Installation Size			<10kW	10 to 100 kW	100kW to 1MW	1 to 10 MW	10 to 100 MW	> 100 MW

Legend: best suited
suitable

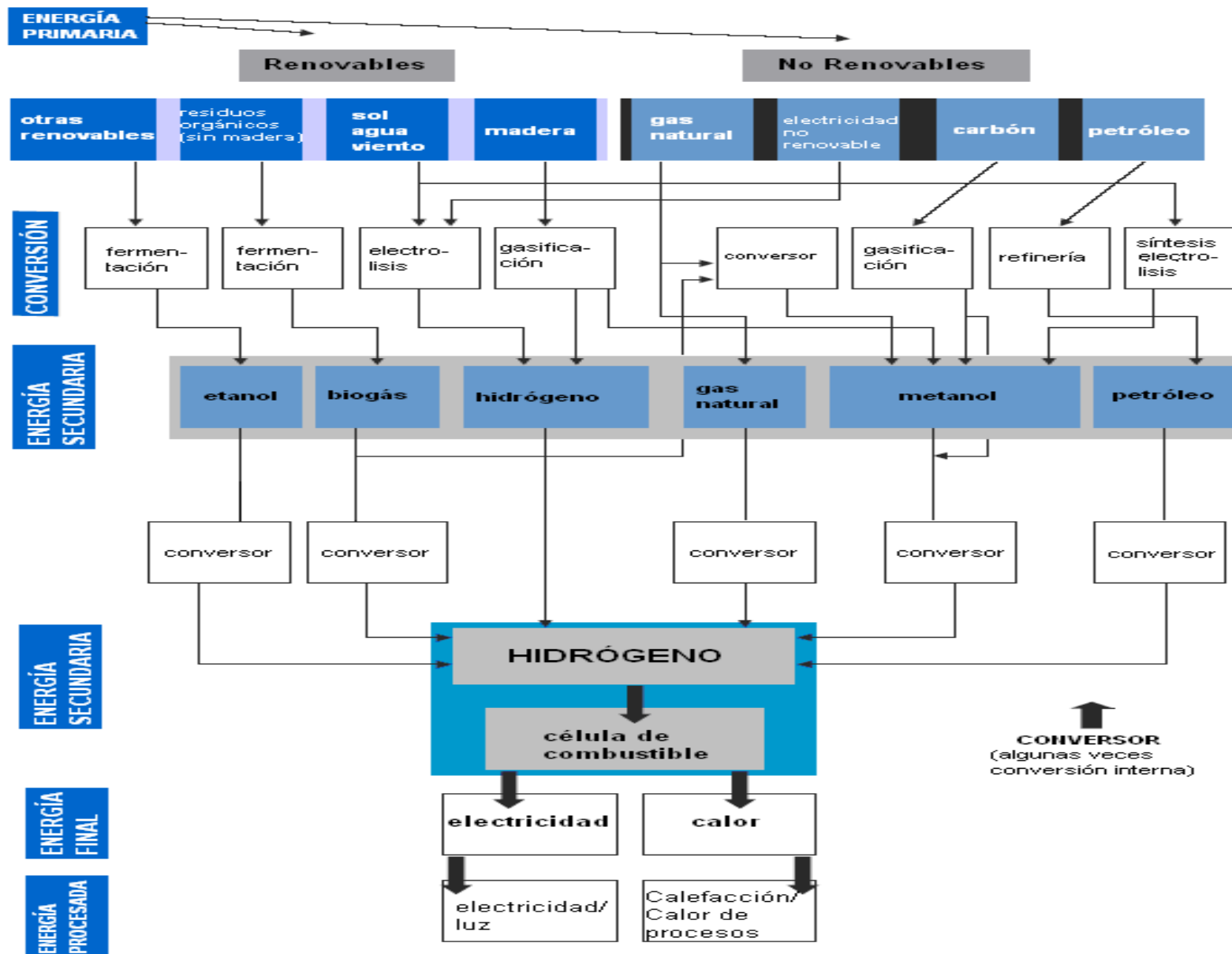


FUENTES ENERGÉTICAS PARA EL TRANSPORTE

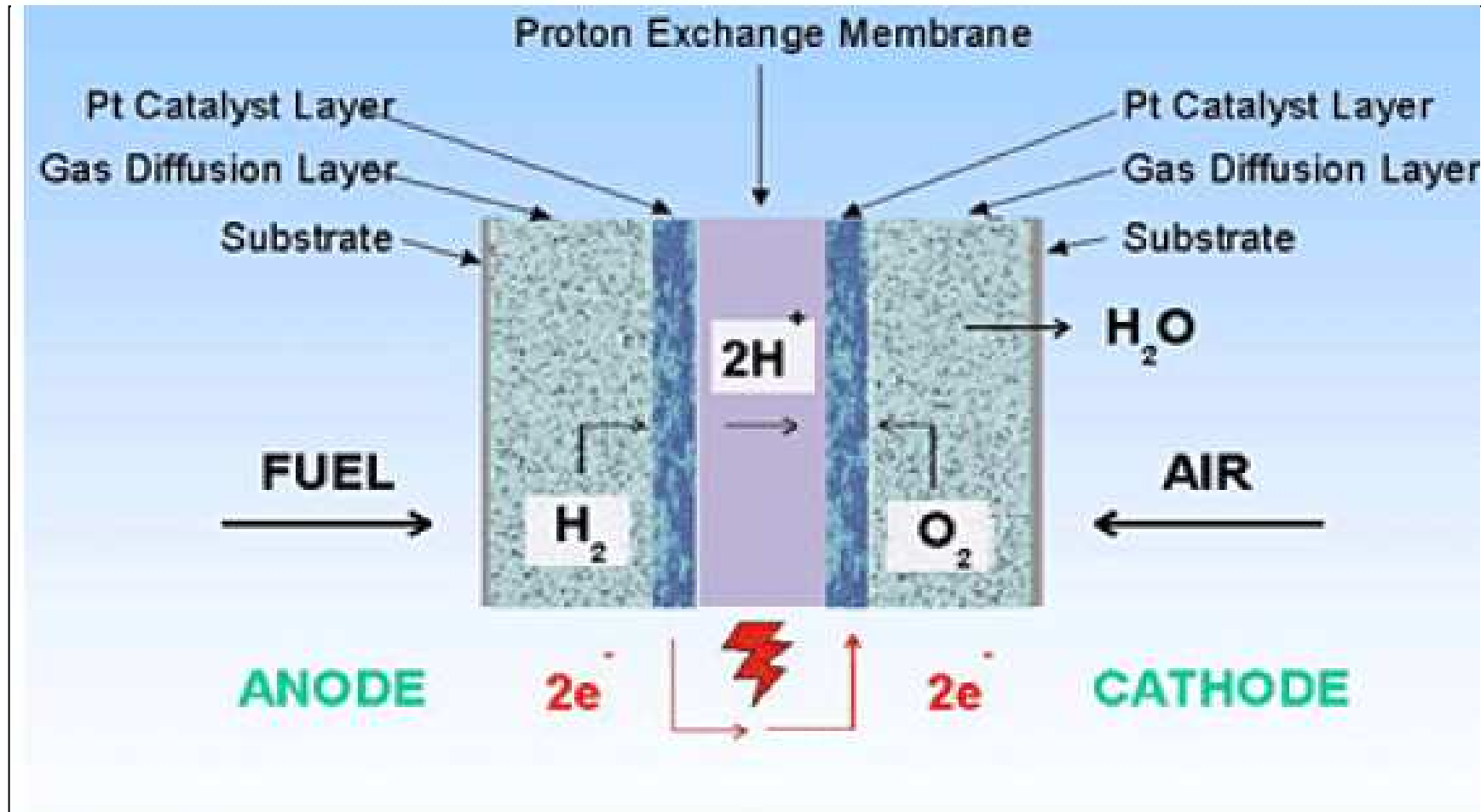


APLICACIONES DE LAS CÉLULAS DE COMBUSTIBLE

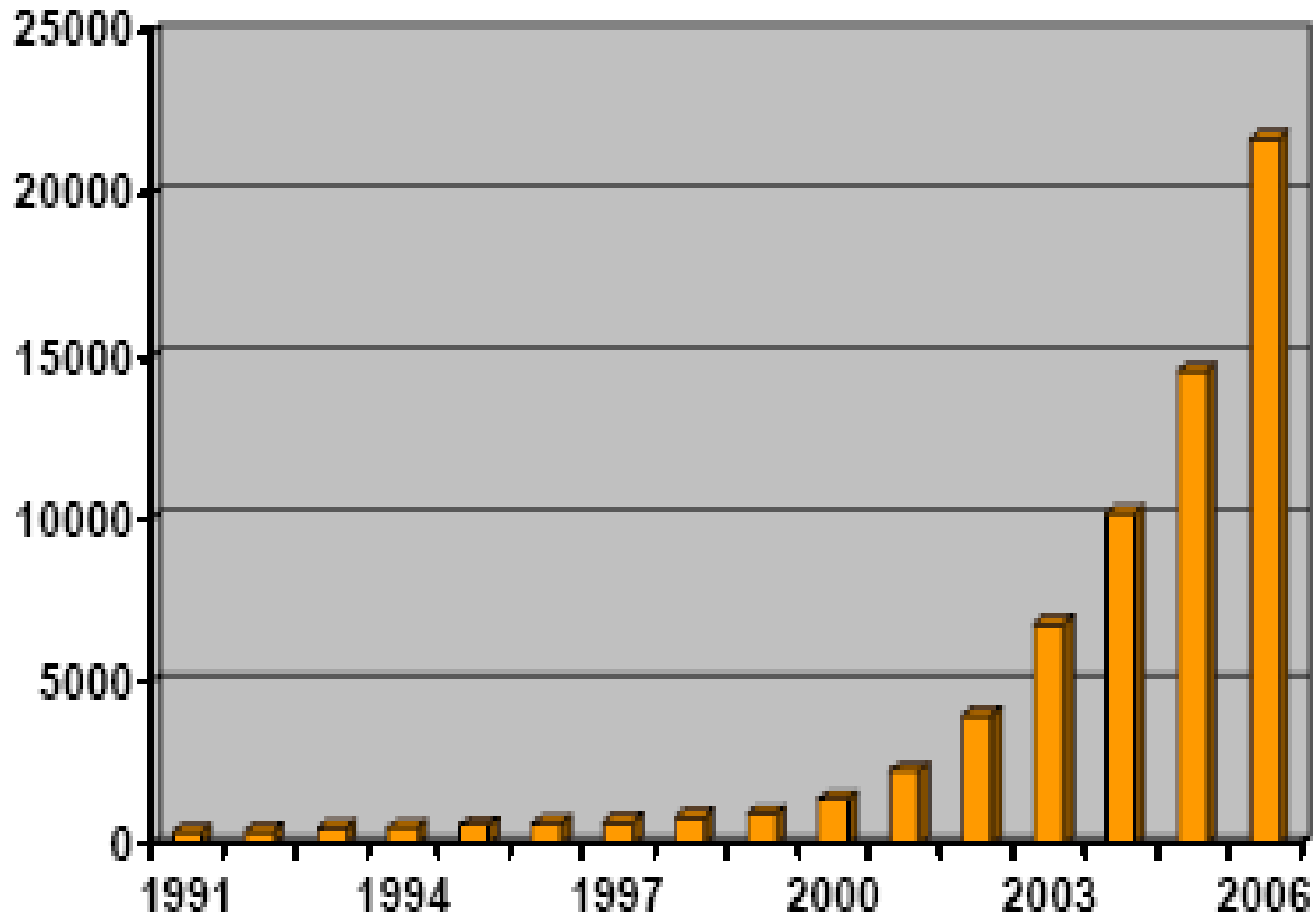
- Aparatos portátiles: competitivas
- Electricidad y agua caliente a las casas: cerca
- Producción de electricidad a gran escala: medio plazo
- Transporte:
 - Vehículos de carretera: medio plazo
 - Vehículos especiales: carretillas elevadoras, portamaletas, etc.; sillas de ruedas: competitivos
 - Barcos: algunos nichos de mercado tempranos
 - Trenes: medio-largo plazo
 - Aviones: medio-largo plazo



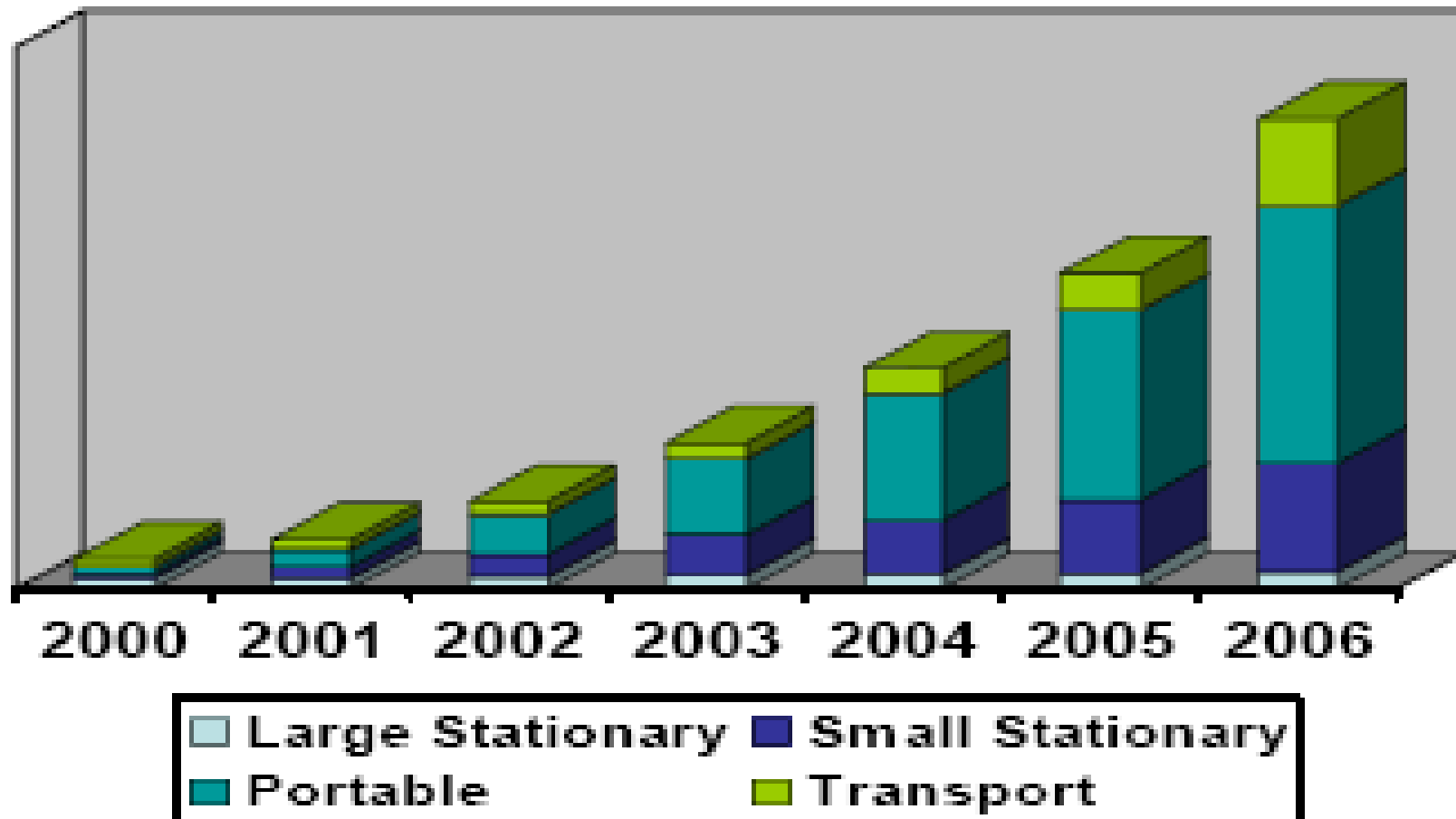
PILA DE MEMBRANA DE INTERCAMBIO DE PROTONES



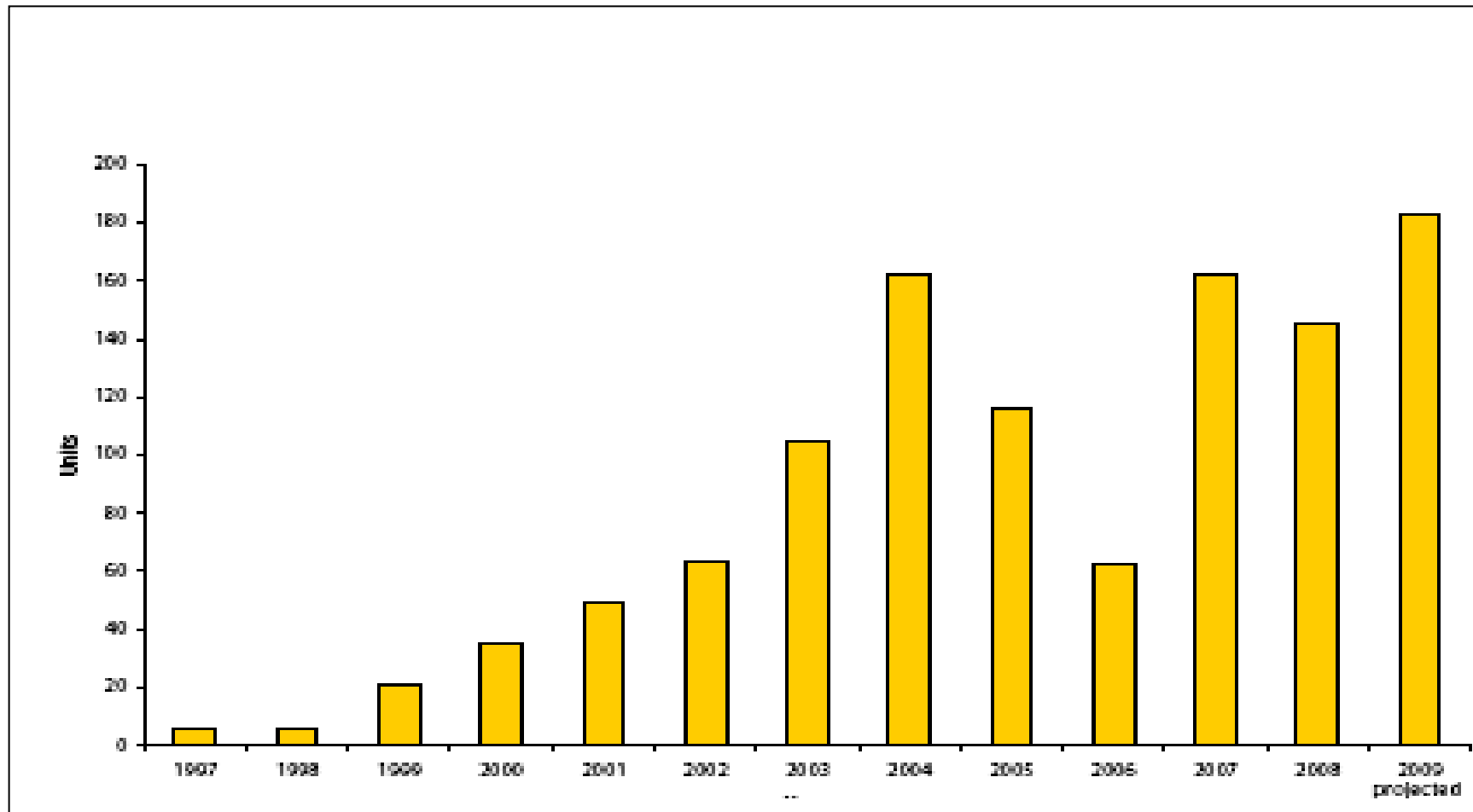
Cumulative Units 1991 - 2006



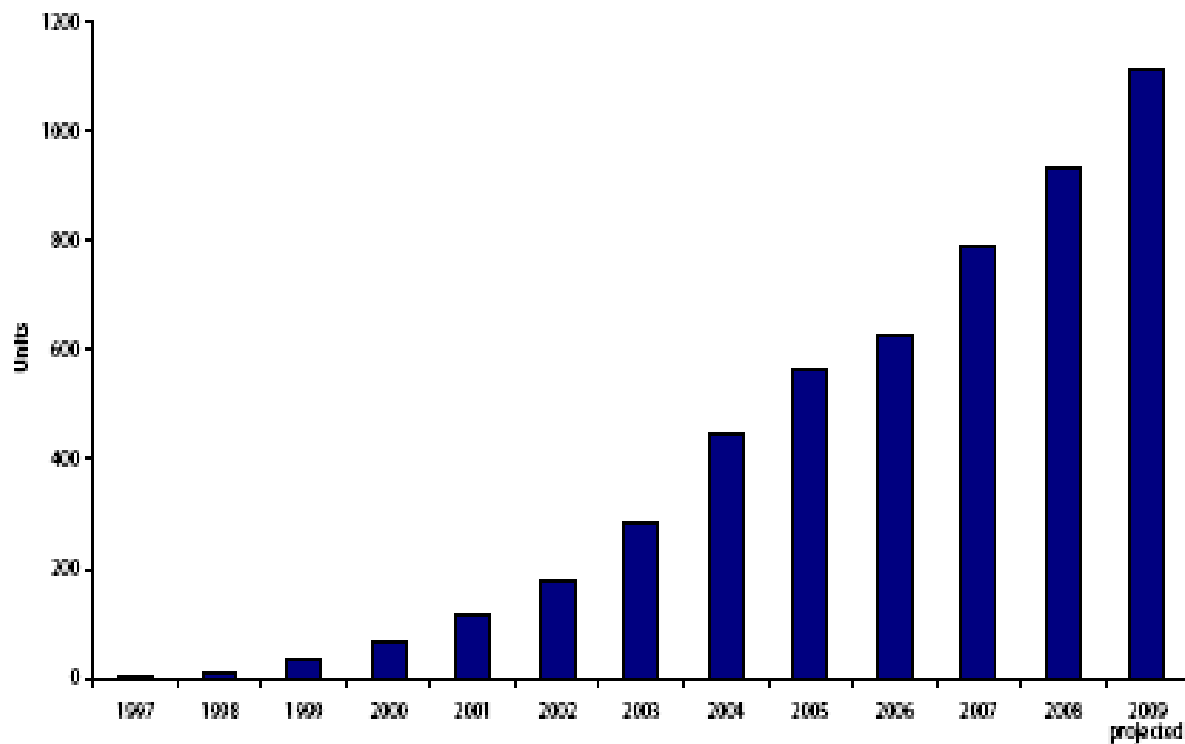
Change by Application



NÚMERO DE VEHÍCULOS DE CARRETERA ACUMULADOS



• Unidades Acumuladas



ESTACIONES DE SERVICIO

Cumulative Units

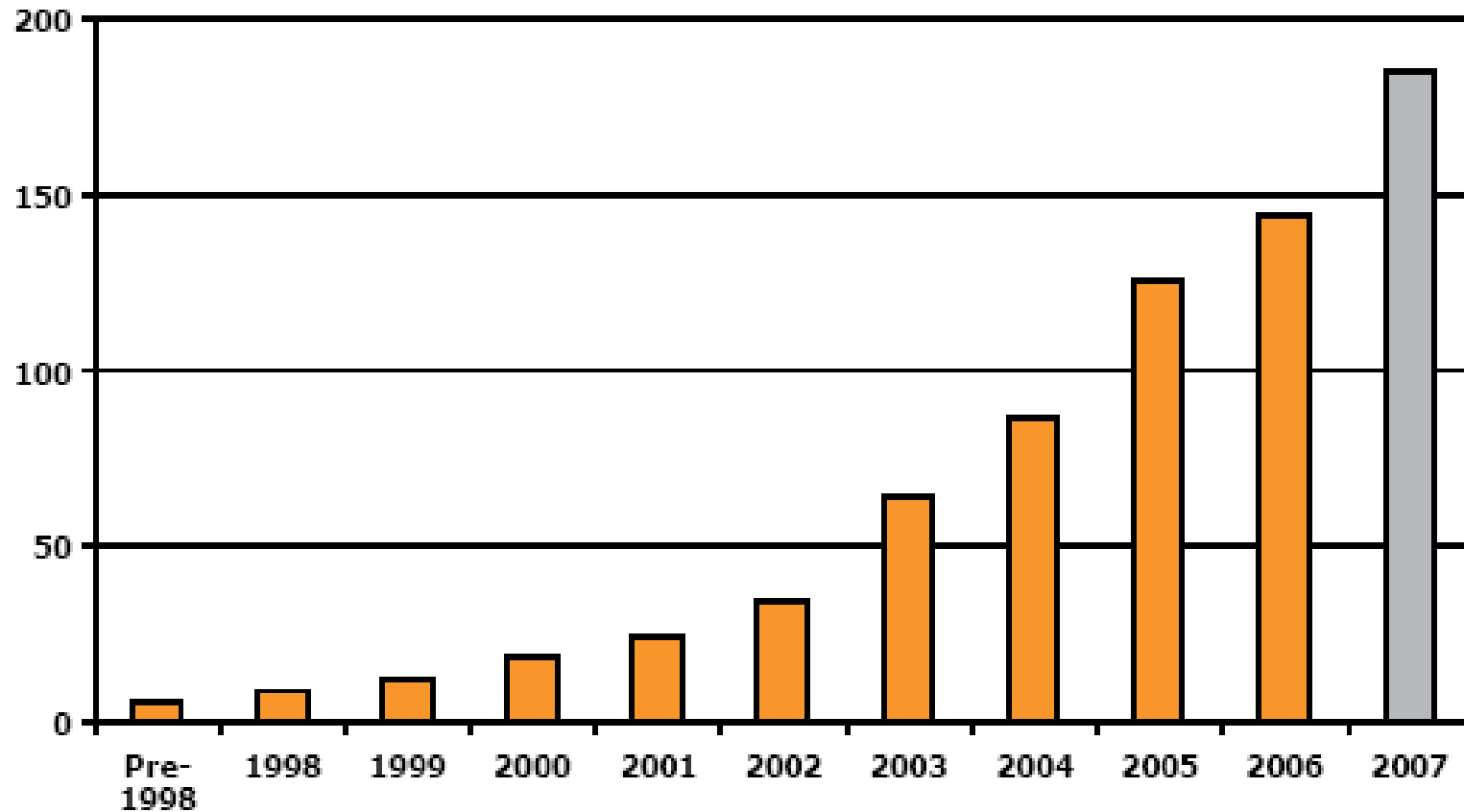


Table 1: Fuel Cell Vehicle Manufacturers' Current Timetable for Launch

Manufacturer	Year	Numbers	Notes
DaimlerChrysler (Germany)	2012 2015	10,000	Initial launch, Mass Market
Ford (USA)	2015		"commercial readiness"
GM (USA)	2010-2015 2025		Commercial viability Mass Market
Honda (Japan)	2010 2020	12,000 (in USA) 50,000 (in USA)	Start production
Hyundai (Korea)	2010		Road tests 2009
Toyota (Japan)	2015		Will cost US\$50,000