

La demanda tecnológica

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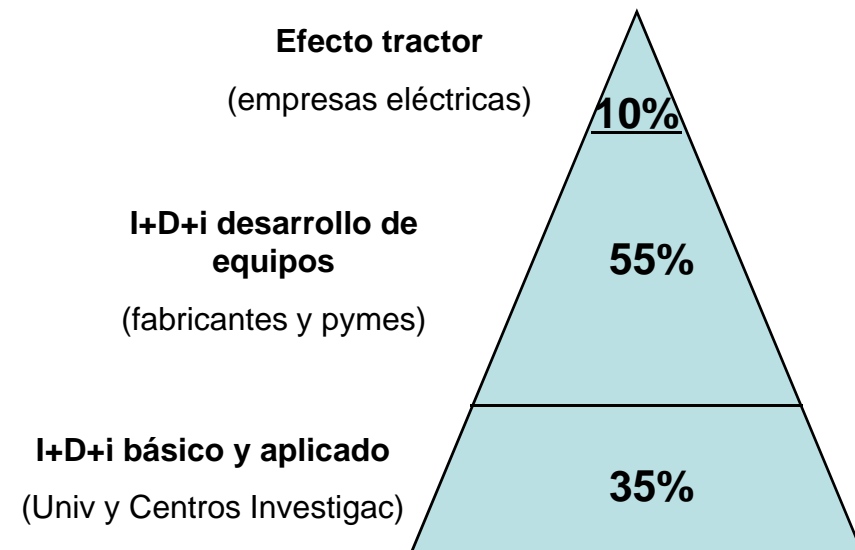


I+D+i de la electricidad en España 2008

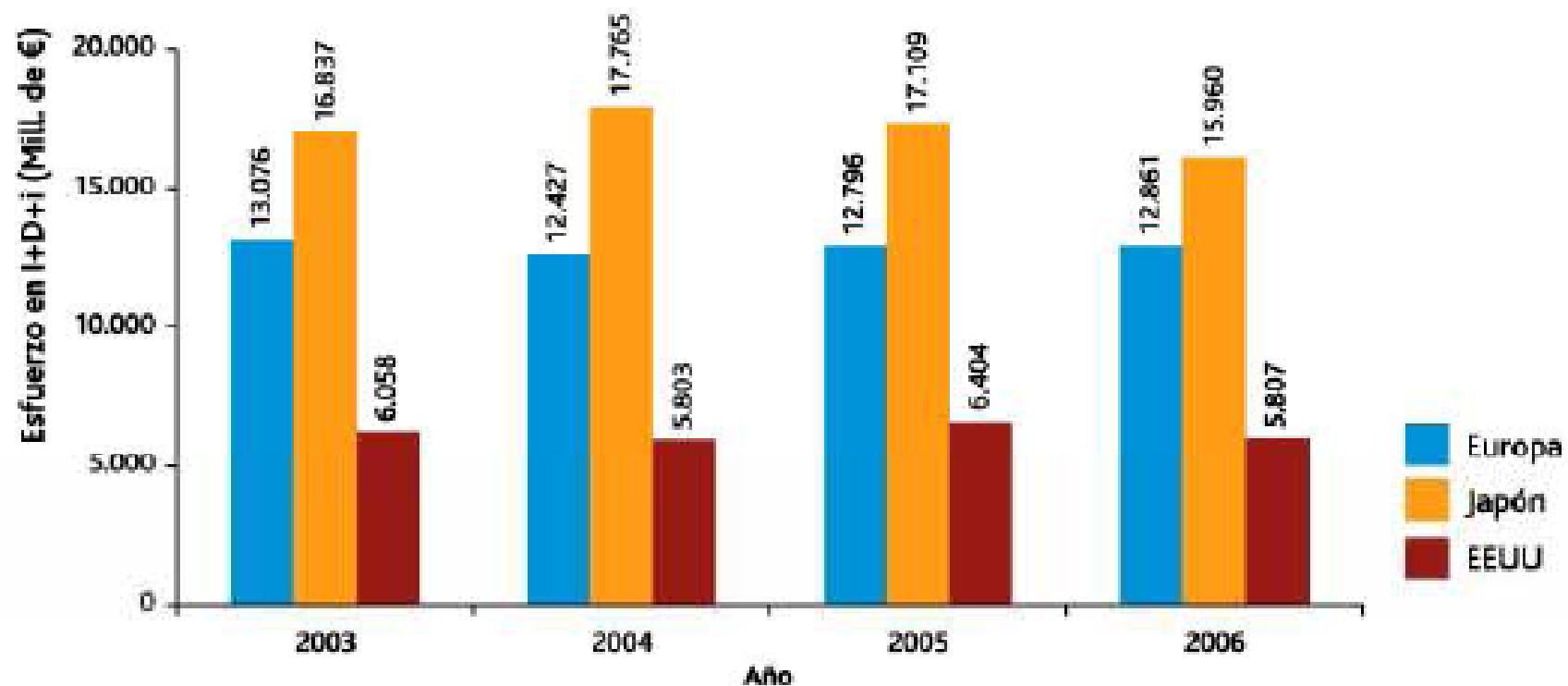


ALTRAN

- Un sector crítico para la economía
- En proceso de transformación
- Con las empresas eléctricas haciendo de tractor
- 1.200 mill Eur anuales en I+D+i
- 13.000 personas en I+D+i



35.000 mill Eur anuales, a nivel mundial



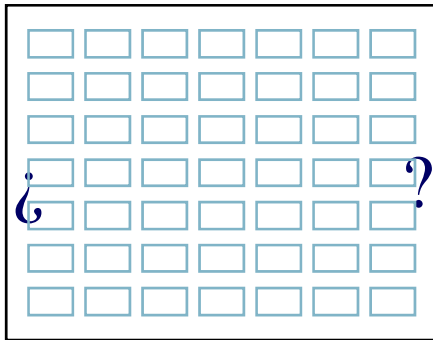
El conjunto de empresas eléctricas españolas compararía con el top 5 de utilities a nivel mundial

Compañía	País	Inversión en I+D+i (mill. de €)	Cifra de negocio (mill. de €)	Empleados	Inversión en I+D+i/ Cifra de negocio	Inversión en I+D+i/ empleado (miles de €)	Patentes (WIPO)
Electricite de France *	France	389	58.932	155.968	0,66%	2,5	60
Korea Electric Power	South Korea	363	22.350	37.490	1,62%	9,7	14
Tokyo Electric Power	Japan	229	33.448	51.560	0,68%	4,4	74
RWE	Germany	135	45.149	72.793	0,30%	1,9	29
Kansai Electric Power	Japan	133	16.414	30.674	0,81%	4,3	70
Total Empresas eléctricas	Spain	116	39.844	62.767	0,29%	1,9	6
Chubu Electric Power	Japan	106	13.687	16.245	0,77%	6,5	6
Vattenfall	Sweden	97	16.159	32.308	0,60%	3,0	20
Hydro-Quebec	Canada	64	7.440	19.116	0,86%	3,3	45
Kyushu Electric Power	Japan	62	8.921	18.495	0,70%	3,4	13
Tohoku Electric Power	Japan	60	10.565	22.417	0,57%	2,7	3
Taiwan Power	Taiwan	49	8.894	26.300	0,55%	1,9	0
Electric Power Development	Japan	43	3.958	5.068	1,09%	7,4	7
Chugoku Electric Power	Japan	42	6.621	14.449	0,64%	2,9	16
Shikoku Electric Power	Japan	33	3.671	8.147	0,92%	4,1	4
British Nuclear Fuels	UK	33	2.103	22.287	1,55%	1,5	84
E.ON	Germany	27	64.555	82.733	0,04%	0,3	7
Terna	Italy	27	1.308	3.457	2,03%	7,7	0
Hokkaido Electric Power	Japan	24	3.416	5.826	0,70%	4,1	2
Energie Baden	Germany	22	13.266	20.259	0,16%	1,1	0
Enel	Italy	20	37.497	56.588	0,05%	0,4	10
British Energy	UK	19	4.451	5.039	0,43%	3,2	0
Fortum	Finland	17	4.481	8.910	0,38%	1,9	56

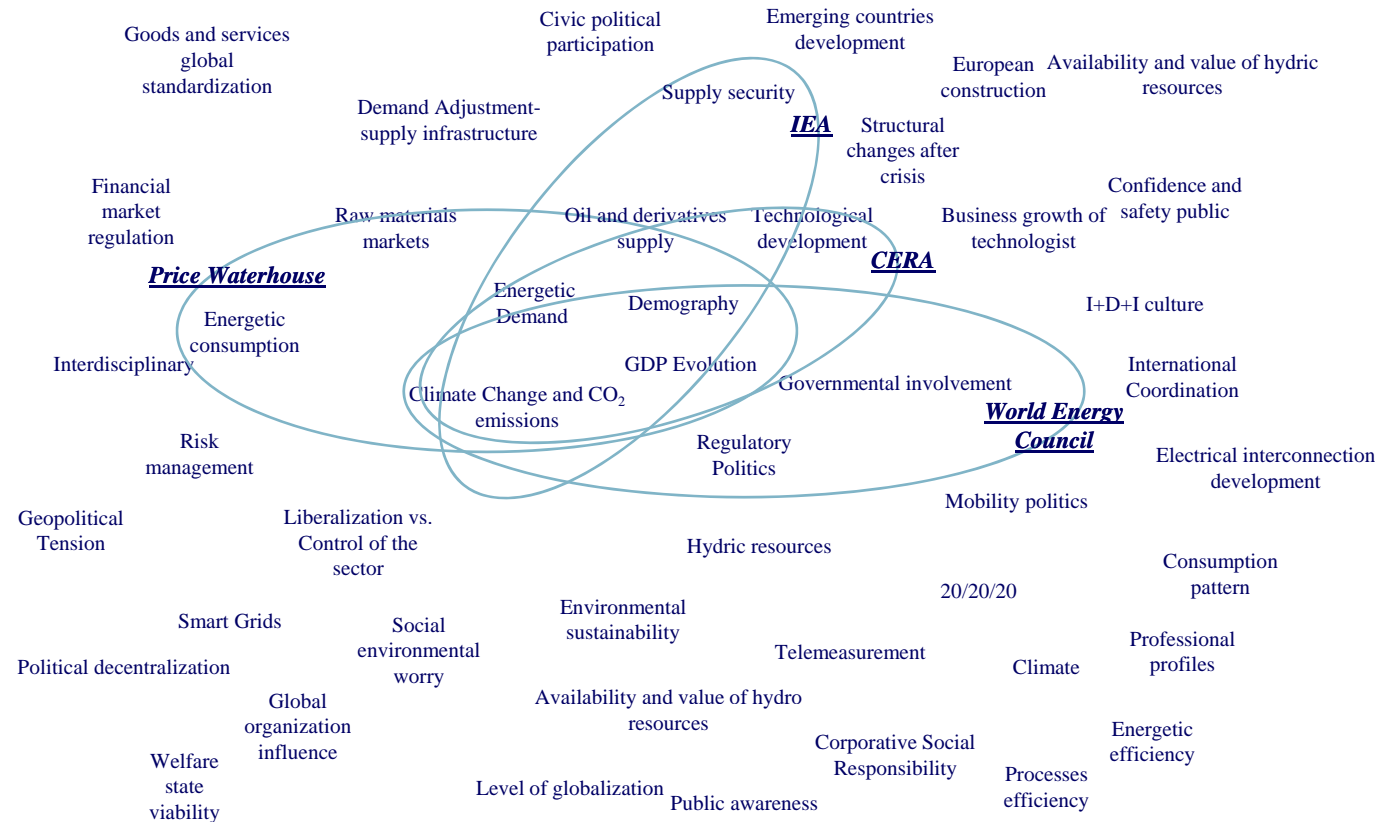
1. RETO / CUESTION a plantear

Hacia dónde debe evolucionar el portfolio de I+D+I de una empresa eléctrica para cumplir los objetivos de su Plan Estratégico?

2. DRIVERS con impacto en el RETO / CUESTION

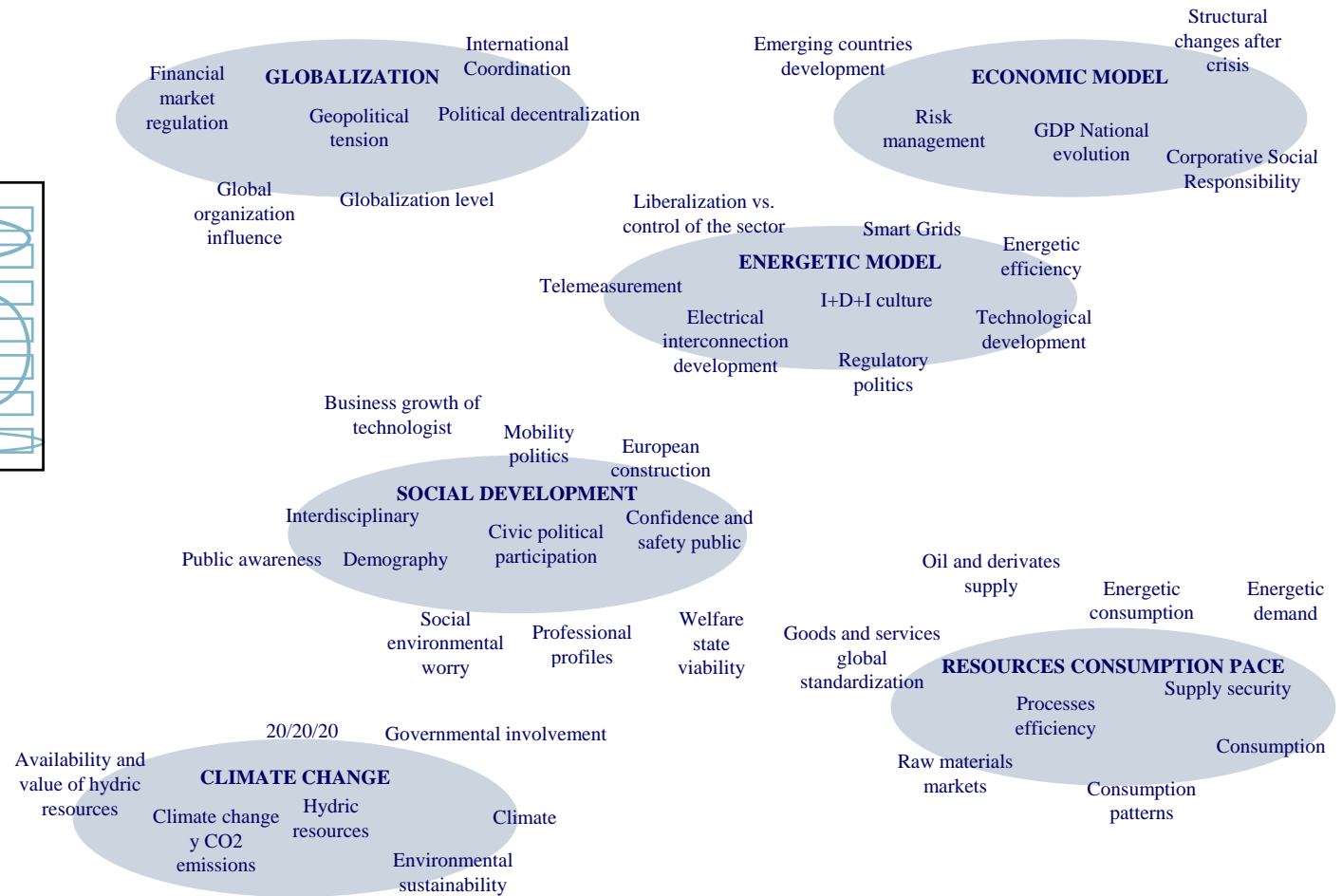
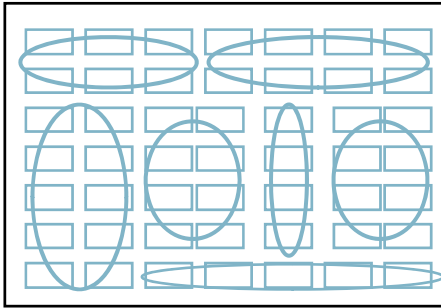


○ Drivers used for the marked organization



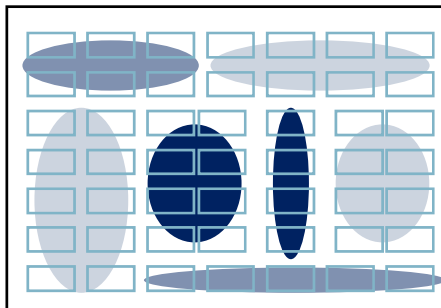
3. DINAMICAS PRINCIPALES




• The main *drivers* are grouped in the main dynamics:

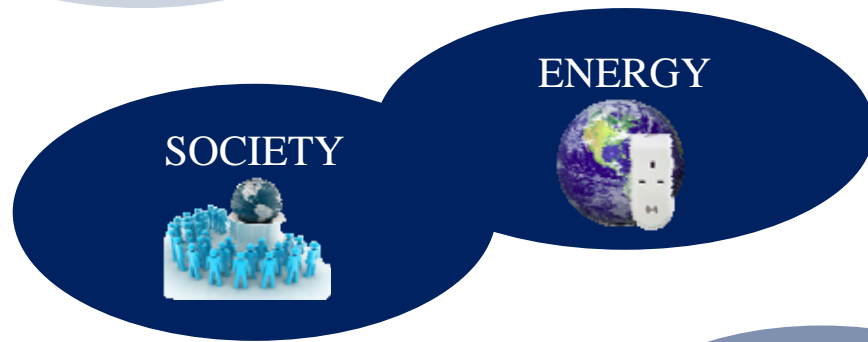


4. DINAMICAS “CORE”

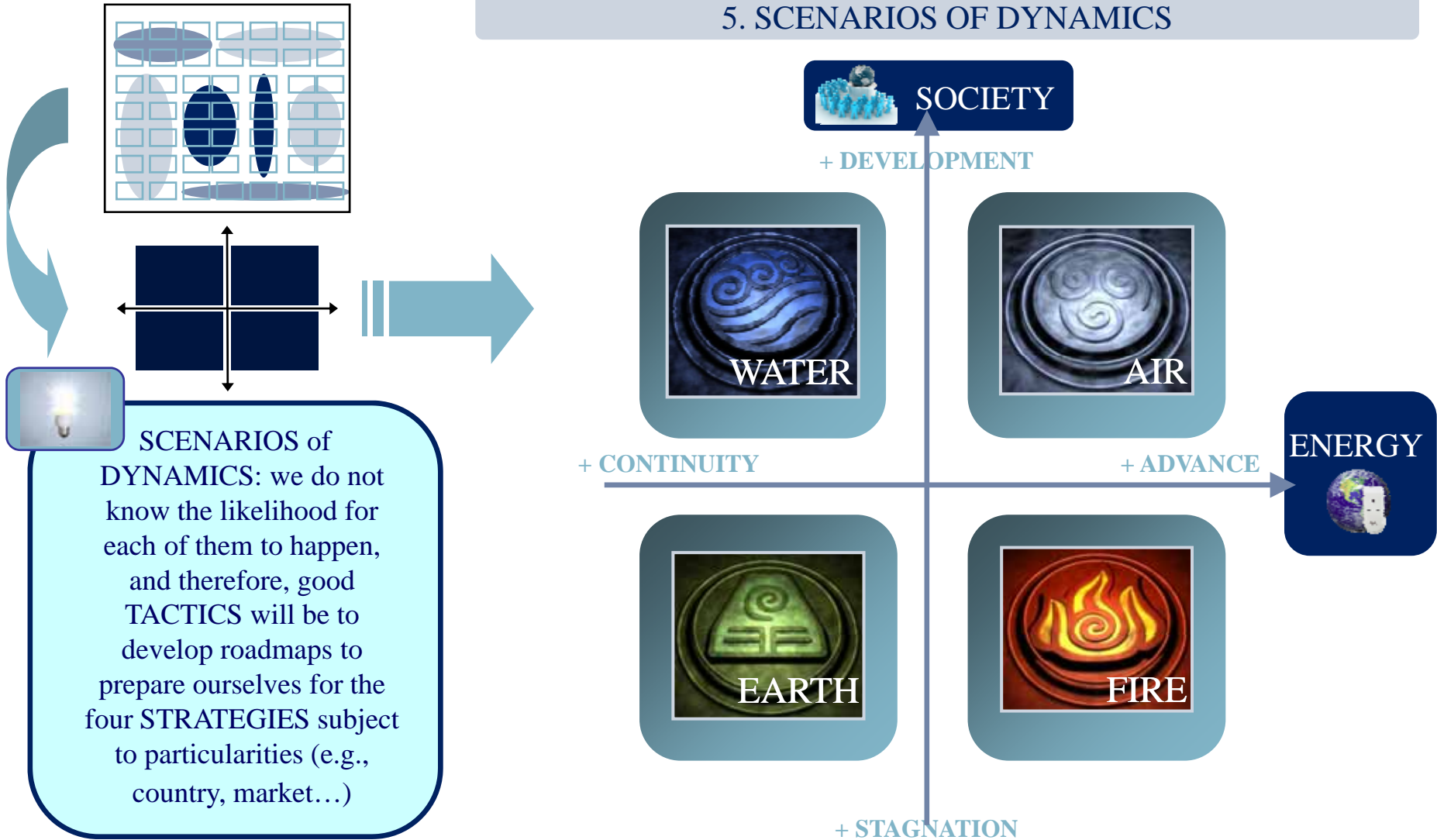
- Dynamics are classified according to the main nature of their drivers: predictable-trend type, highly uncertain and those being uncertain and resulting the most relevant to determine the different possible trends



-  Trend based dynamic. Calculable development
-  Uncertain future development dynamic
-  Uncertain dynamics but decisive for the objective question



5. SCENARIOS OF DYNAMICS



SCENARIOS of DYNAMICS: we do not know the likelihood for each of them to happen, and therefore, good TACTICS will be to develop roadmaps to prepare ourselves for the four STRATEGIES subject to particularities (e.g., country, market...)

- “GLOcal” model prevails
- Decentralization of the decision centres
- Sustainability will not be the true main theme in the political agenda

GLOBALIZATION



CLIMATE



- World emission reductions will not be reached until 2025
- EU 20/20/20 COM remarks business opportunities in the low emission techs market (currently 227000 M€/year)
- Mild regulatory actions due to not catastrophic evidence of climate change

ECONOMY



- High capital costs due to the financial crisis. Later sustained growth with turbulences
- More regulatory activity
- “Project economy” in most advanced countries

- Enough oil offer until 2020. Price tensions. National enterprises as oil operators
- Coal is the most growing fossil resource
- Lithium (50% as Bolivian resources) will be relevant in the batteries development

RESOURCES



- 60 % of the world population will live in cities (ONU-HABITAT)
- Possible doubts in the medium term concerning climate change
- Wealth distribution: more geographically than socially
- Exponential population growth that ensures services demand

SOCIETY



ENERGY



- The client becomes more relevant and greatly influences the business model
- The security of supply will be the very first political priority
- Competition among renewables becomes necessary in middle term

CCS

- Captura post-combustión
- Oxycombustión
- IGCC
- Almacenamiento CO₂
- Captura Contaminantes
- Centrales de Alta Eficiencia (700°C)

Eficiencia en instalaciones Generación

Renovables

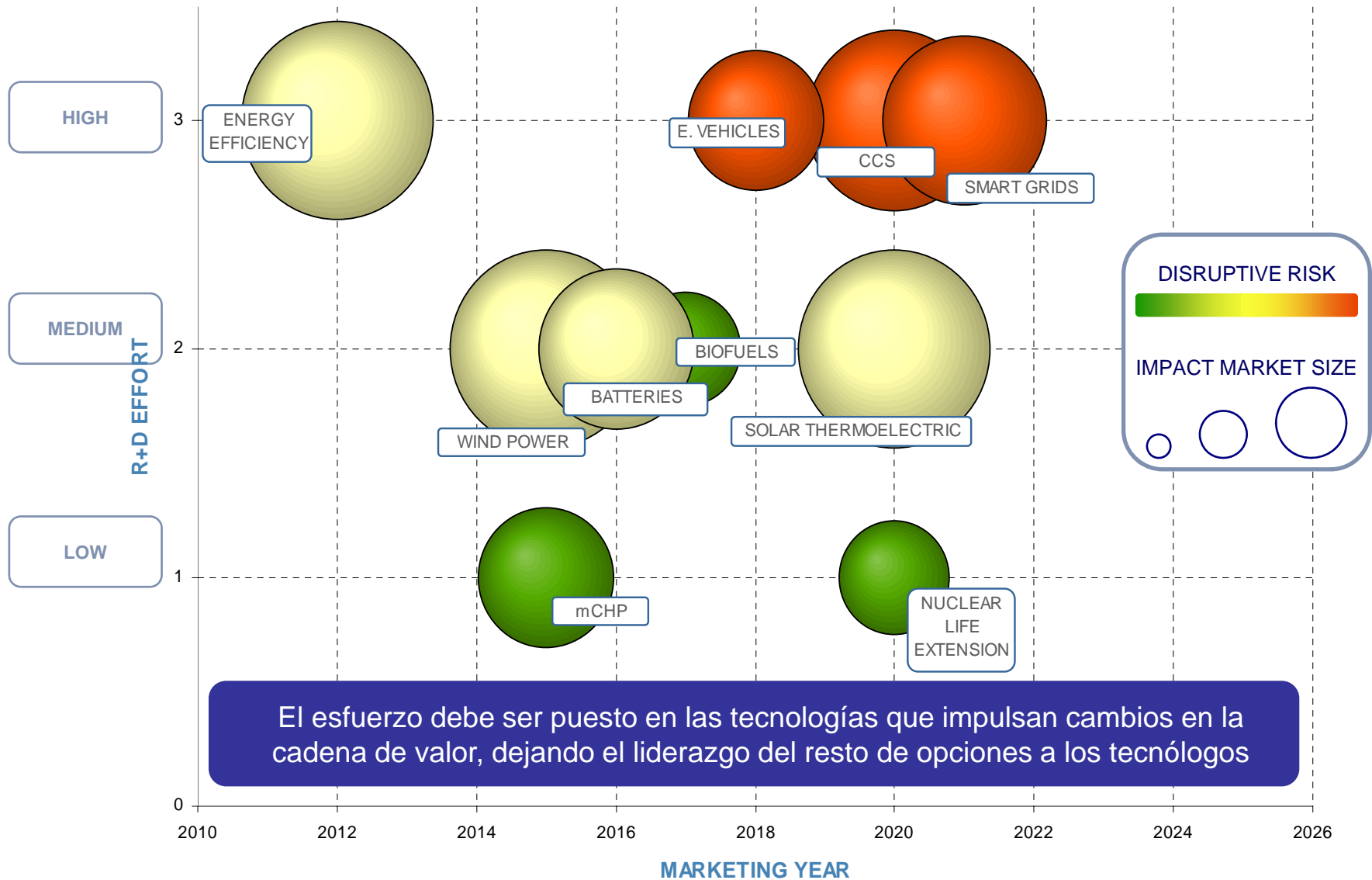
- Eólico
- Solar
- Biomasa
- Geotermia
- Energía marina
- Almacenamiento energético

Generación distribuida y eficiencia usuario final

- Smart grids
- Movilidad Eléctrica
- Domotica

Nuclear

- Extensión vida útil
- Residuos



El esfuerzo debe ser puesto en las tecnologías que impulsan cambios en la cadena de valor, dejando el liderazgo del resto de opciones a los tecnólogos

Endesa R&D Model – “Innovation to Cash”

