

# Energy system and power electronics: the role of ECSEL JU

Roundtable on Relevance of ECS in the energy domain

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Head of Programmes



ECSEL JU



ARTEMISIA ASSOCIATION  
The association for R&D actors in the field of ARTEMIS

## PRESS RELEASE

December 2007

January 09, 2008

Major European industrial sectors to cooperate in a 2.4 Billion Euro programme aimed to boost innovation and competitiveness on embedded systems

ARTEMISIA, the association for R&D actors in the field of embedded systems, welcomes the decision of the Council on December 20, 2007, to adopt the Regulation on the establishment of the ARTEMIS Joint Undertaking, as the embodiment of ARTEMIS Joint Technology Initiative. The ARTEMIS Joint Undertaking



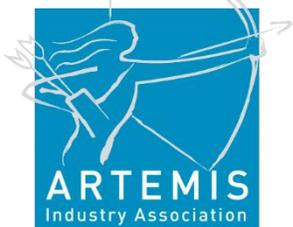
Press Release

February 2008

1 + 1 + 1 = 1

Three Billion Euro Programme launched to boost European Research on Nanoelectronics

Paris, February 4, 2008 – Today the ENIAC Joint Undertaking has officially established, marking the start of the research programme adopted by the European Council to strengthen European competitiveness



27 June 2014



ECSEL  
Joint Undertaking



Published on 09 Jul 2014 / External News

## ECSEL JOINT UNDERTAKING COMING INTO LIFE



EPoSS  
European Technology Platform  
on Smart Systems Integration

Three official steps eventually created ECSEL and thus started the official cooperation between 3 groups of partners: the Industry Associations, the Participating States and the European Commission. Step one was taken when the 'Electronic Component and System for European leadership (ECSEL) JU', a Joint Undertaking under Art. 187 of the Treaty on the Functioning of the European Union, was established by Council Regulation (EU) No 561/2014 that entered into power on 27 June 2014.

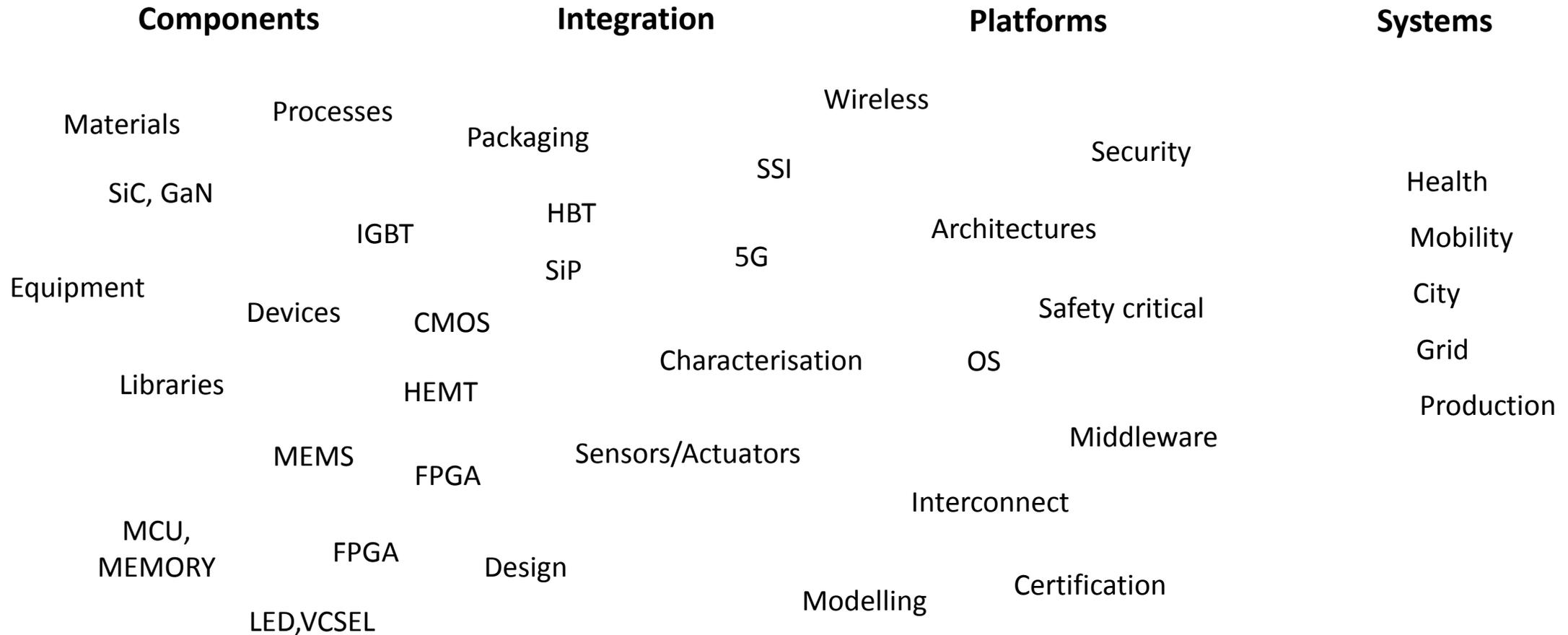


43500 PERSONYEARS  
4000 PERSONYEAR EACH YEAR

3Ccar	CRAFTERS	ENCOURAGE	InForMed	OSIRIS	SCOTT
3DAM	CRYSTAL	END	INTEGRATE	PANACHE	SE2A
ACCUS	CSI	ENLIGHT	IoE	PANORAMA	SemI40
ACROSS	CSSL	EnSO	IoSense	PaPP	SeNaTe
ADMONT	D3CoS	EPAMO	JEMSIP_3D	PARSIMO	SESAMO
AGATE	DCC+G	EPPL	LAB4MEMS	PLACES2BE	SILENSE
Almarvi	DELPHI4LED	EPT300	Lab4MEMSII	PLACYD	SILVER
AMASS	DEMANES	eRamp	LAST-POWER	POLIS	SIMPLE
AQUAS	DEMETER	ERG	LENS	POLLUX	SMARCOS
Arrowhead	DENECOR	E-SCOP	MANTIS	PowerBase	SMART
ARTEMOS	DENSE	ESEE	MAS	PRESTO	SmartPM
ASAM	DESRIE	ESIP	MAT	PRIME	SMECY
ASTONISH	DEVI	ESONA	MEG	Productive4.0	SOFIA
ASTUTE	E2COGAN	EuroPAT-IMASIP	MegaMakt2	PROMINENT	SWARMS
AutoDrive	E2SG	EXIST	MERCURE	pSAFECER	SYSMODEL
BASTION	E4a	GreenElec	VRManufacturing	ISIELD	TAKE5
BATTMAN	E450EDL	HEECS	MICROPRINCE	R2POWER300	TAKEMI5
CAJAL4EU	E450LMDAP	HIGH PROFILE	MIRANDELA	R3-COP	TARANTO
CAMMI	eDIANA	HoliDes	MIRTIC	R3-PowerUP	THINGS2DO
CESAR	EEM450PR	IDEAS	MODERN	R5-COP	TOISE
CHARTER	EEMI450	iFEST	MOTORBRAIN	RECOMP	VARIES
CHESS	e-GOTHAM	iLAND	NANOCOM	REFERENCE	VeTeSS
CHIRON	ELESIS	I-MECH	NANOTEG	RobustSENSE	VIDaP
CONCERTO	EMC2	IMPROVE	nSafeCer	SafeCOP	WAYTOGO FAST
CONNECT	EMMON	INCITE	nSHIELD	SAFESENS	WInSiC4AP
COPCAMS	ENABLE-S3	INDEXYS	OPERA	SCALOPES	With-Me
					WSN-DPCM



# ECSEL programme covers this...



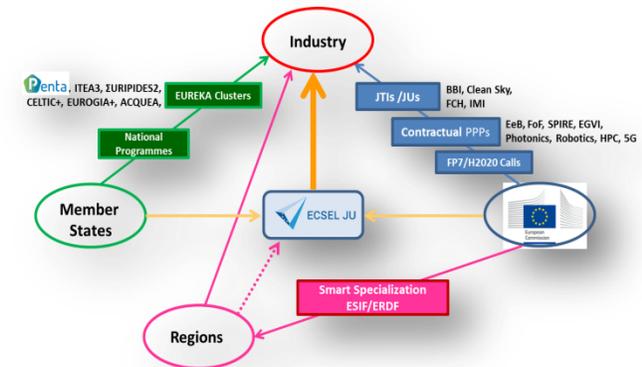
## ➤ Implement Horizon 2020:

- Develop favourable conditions for investing in knowledge and innovation
- Achieve smart, sustainable and inclusive growth



## ➤ PPP-model with 3-way funding

- The European Union (1.17B€, via EC/H2020)
- The ECSEL Participating States (>1.17B€)
- The Private Members (~ 5B€, minus grants)
- Build upon ARTEMIS/ENIAC JU experience and achievements



# GOVERNING BOARD

Executive  
Director

OFFICE



Public Authorities Board



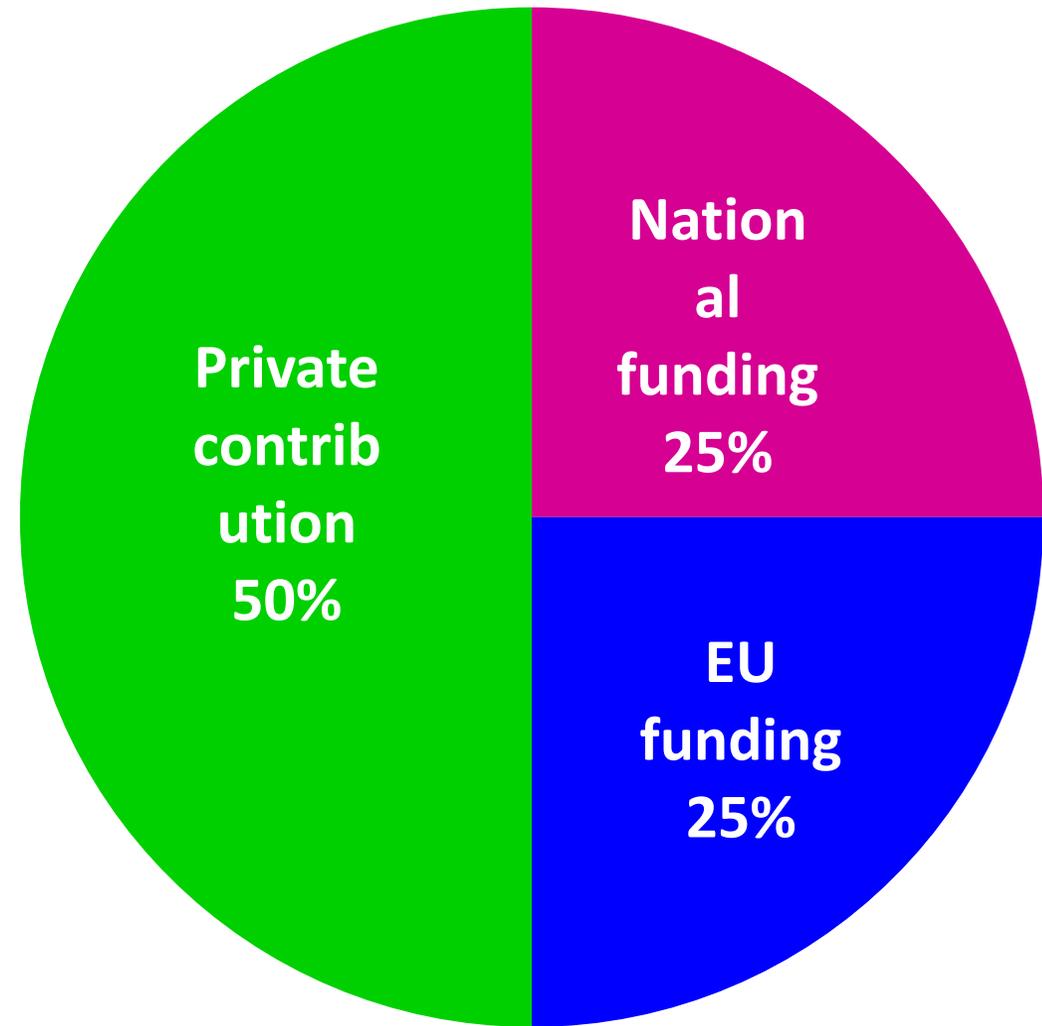
Private Members Board



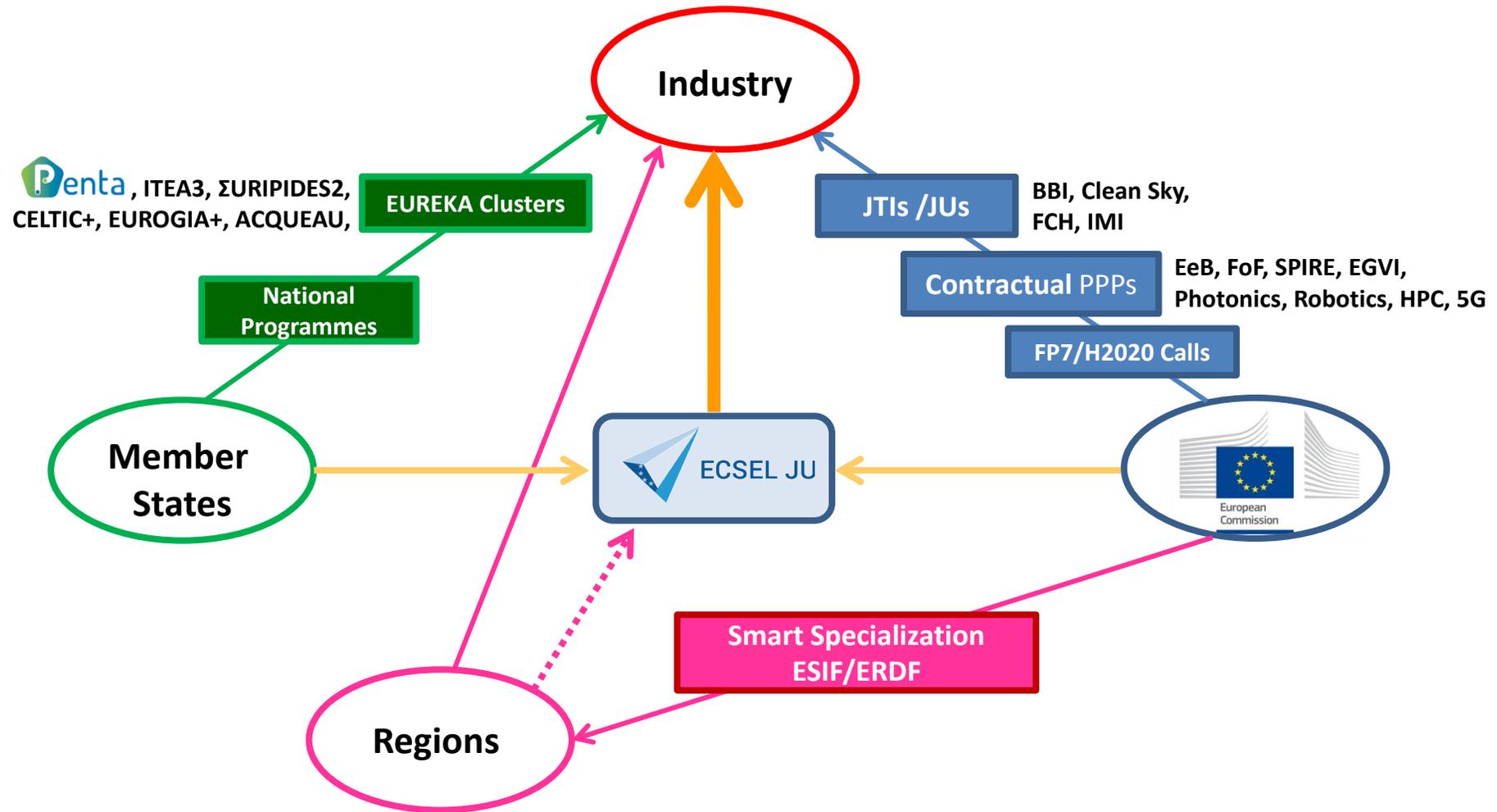
## COMMUNITY OF EUROPEAN R&D&I PARTICIPANTS

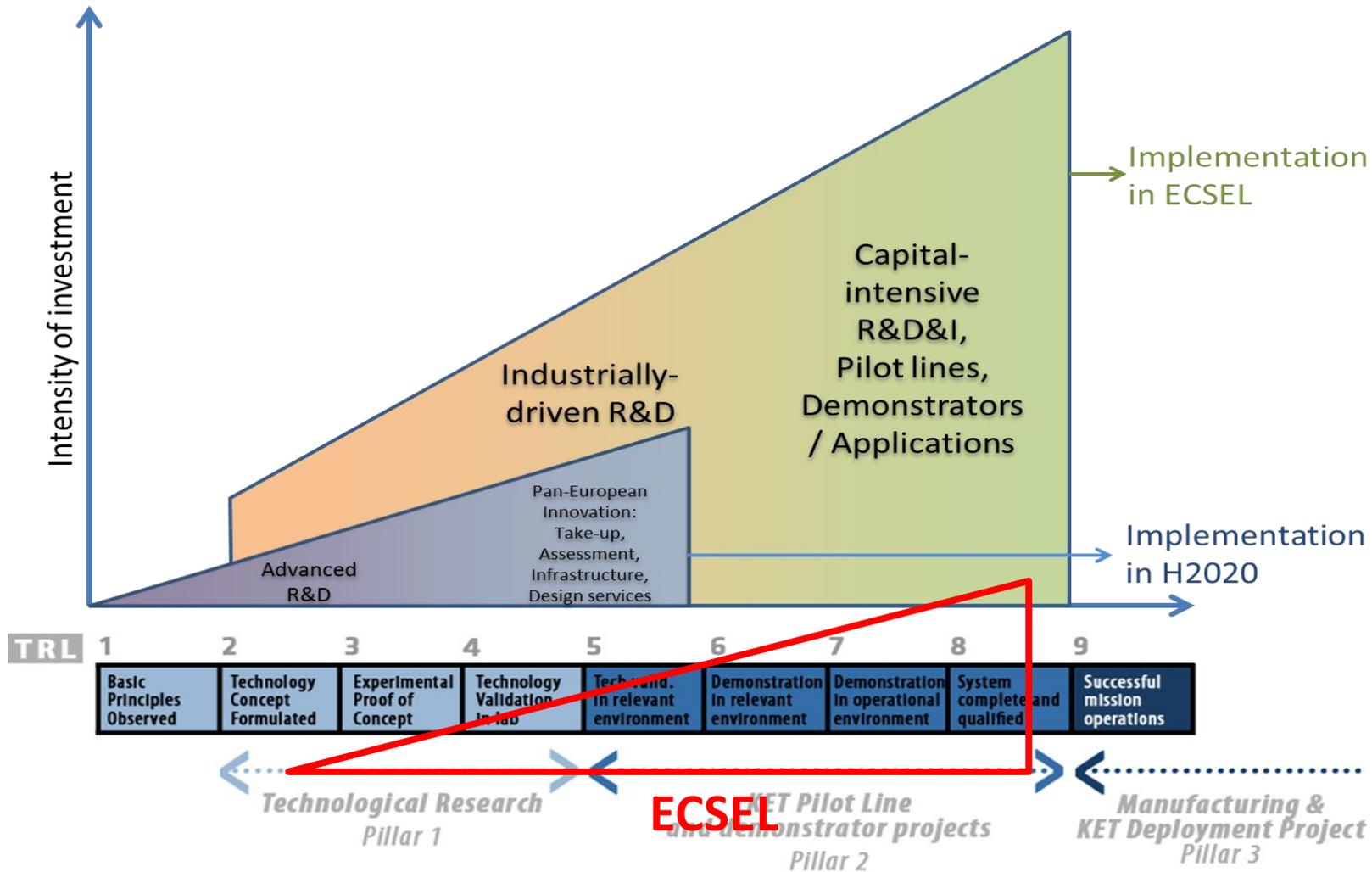


- Dependent on partner type
- Dependent on national funding rules



# Complementing other instruments





# Multi Annual Strategic Programme

<b>1</b>	<b>ECS for Sustainable Power Generation and Energy Conversion</b>
1.1	Highly efficient and reliable ECS for all kind of electrical energy generation – decentralized to large power plants, cross link to processes and materials
1.2	Smart and micro <b>converter reference architecture</b> with integrated control
1.3	<b>Highly integrated power electronics</b> , actuators for safe and reliable DC and AC grids
1.4	<b>Converter on a chip</b> or integrated modules
<b>2</b>	<b>ECS for Reduction of Energy Consumption</b>
2.1	<b>Implementation</b> of smart electronics in <b>smart grid nodes</b> including system integration with communication interfaces
2.2	ECS for controlled power/drive trains and illumination
2.3	<b>Smart electronic components</b> for (MV/LV)DC power supply implemented in e.g. buildings, factories, infrastructure and vehicles/planes)
2.4	<b>Distributed DC network</b>
2.5	Smart electronic components for MV/DC grid integration of <b>storage</b> and renewable
2.6	<b>Fully connected ECS</b> for e.g. illumination and city energy use
<b>3</b>	<b>ECS for Efficient Community Energy Management</b>
3.1	<b>monitoring</b> of energy infrastructure and cross domain services (e.g. maintenance, planning and IoT services)
3.2	Decreased integration costs in <b>self-organizing grids</b>
3.3	Smart systems enabling optimized heat / cold and el. power supply
3.4	ECS support for standalone grids and self-organization incl. Scavenging
3.5	Smart systems enabling optimized <b>power to fuel</b> and <b>coupling of transport and el. Power sector</b>
3.6	New energy market design. e.g. self-coordinated energy supply in local grids



Title	Budget
300mm Pilot Line for Smart Power and Power Discretes	181,854,561
Wide band gap Innovative SiC for Advanced Power	23,073,386
Innovative smart components, modules and appliances for a truly connected, efficient and secure smart grid.	20,828,431
Power Semiconductor and Electronics Manufacturing 4.0	61,908,343
Enhanced substrates and GaN pilot lines enabling compact power applications	88,104,346
R2 extension to 300mm for BCD Smart Power and Power Discrete	40,133,662
Optimal SiC substrates for Integrated Microwave and Power Circuits	5,597,570
Enhanced Power Pilot Line	74,818,528
Production and Energy System Automation for sustainable and friendly cities	67,799,362
Development of Advanced GaN Substrates and Technologies	59,638,873
Environmental Sensors for Energy Efficiency	29,122,435
Energy Efficient Converters using GaN Power Devices	26,271,910
Enabling Power Technologies on 300mm wafers	43,654,819
Energy to smart grid	34,032,714
DC Components and Grid	18,417,695
Interactive Power Devices for Efficiency in Automotive with Increased Reliability and Safety	9,950,109
Sustainable-Smart Grid Open System for the Aggregated Control, Monitoring and Management of Energy	6,840,821
Battery Management with Solar Powered Devices	5,773,504
Internet of Energy for Electric Mobility	45,432,229
ENERGY FOR A GREEN SOCIETY	25,711,684
Embedded Intelligent Controls for Buildings with Renewable Generation and Storage	6,368,738
Large Area silicon carbide Substrates and heteroepitaxial GaN for POWER device applications	16,285,285
SMART GAS METERS FOR OPEN COMMUNICATION ARCHITECTURE AND ENERGY ORIENTED SERVICES	15,480,095
Micro and Nano Technologies Based on Wide Band Gap Materials for Future Transmitting Receiving and Sensing Systems	3,297,691
Smart Power Management in Home and Health	19,827,133
Embedded Systems for Energy Efficient Buildings	17,330,468
<b>TOTAL</b>	<b>947,554,391</b>

2016  
15  
2014  
2012  
2011  
2010  
2009-2008

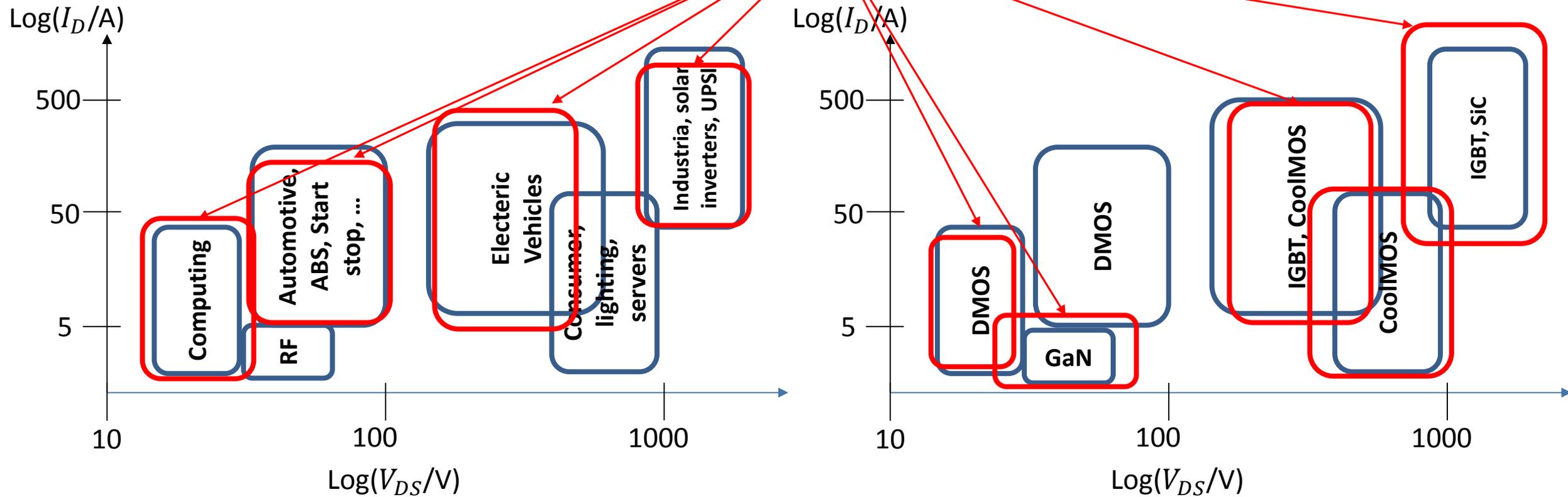
Not included are projects with power electronics for automotive and RF



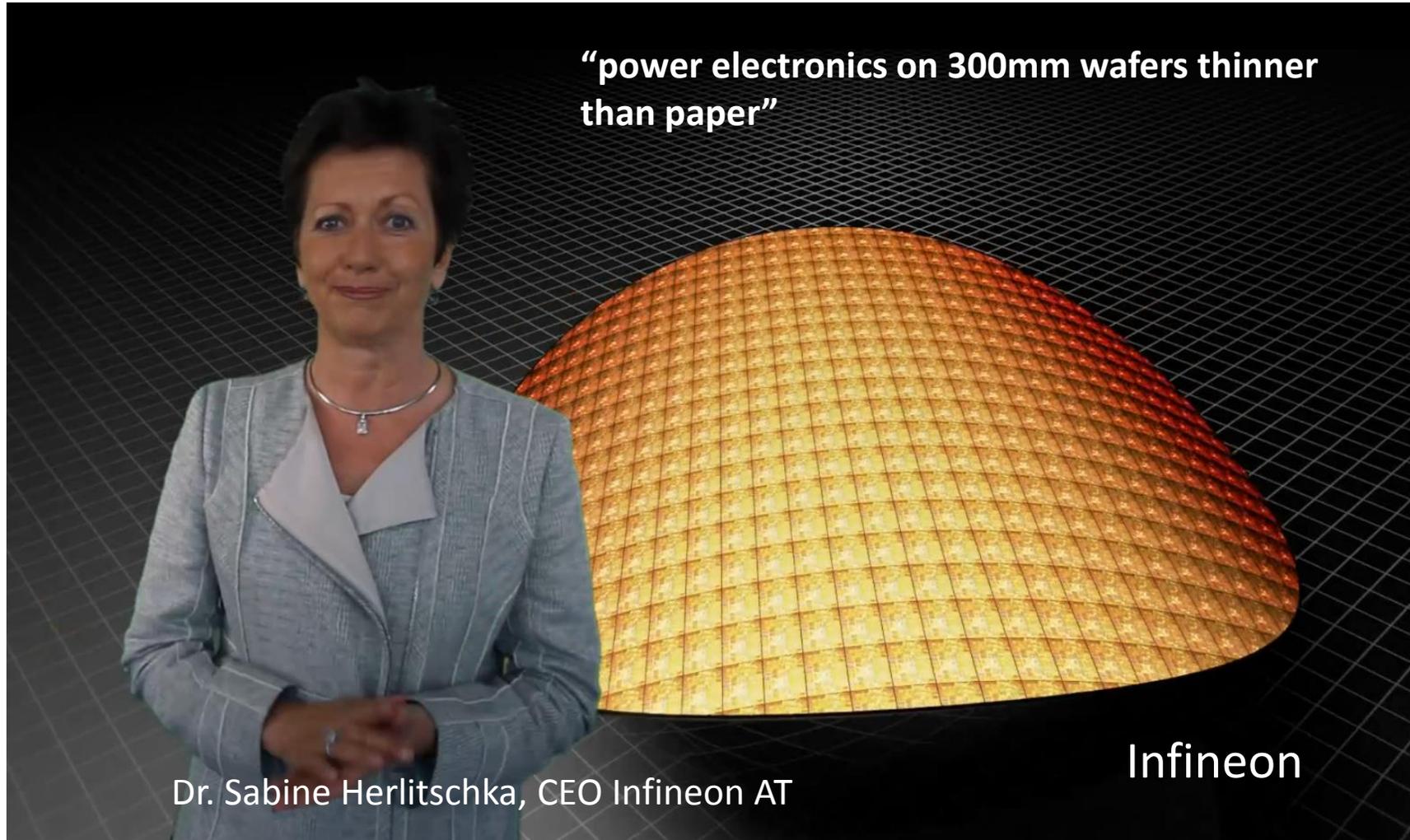
## Application domains

**ECSEL**

## Technology domains



# Power Electronics on 300mm Si



EPS	LE	OTHER	SME	Total	National Funding M€
DE	60	31	21	18%	53.4
IT	29	49	19	16%	38.9
AT	33	21	9	10%	19.1
ES	13	26	21	10%	11.7
FR	28	12	11	8%	17.2
NL	26	8	16	8%	11.4
FI	10	8	9	4%	6.4
SE	5	4	13	4%	6.5
UK,NO,BE,CZ,SK,PL,PT, DK,IE,EL,HU,IL,LV,RO, CH, EE,SL	32	53	46	21%	32.3(*)
Total	236	212	165		196.9

(\*) of which 12.2M€ from BE



Top according to budget  
in energy projects  
ENIAC/ARTEMIS/ECSEL

List represents 70% of  
total budget

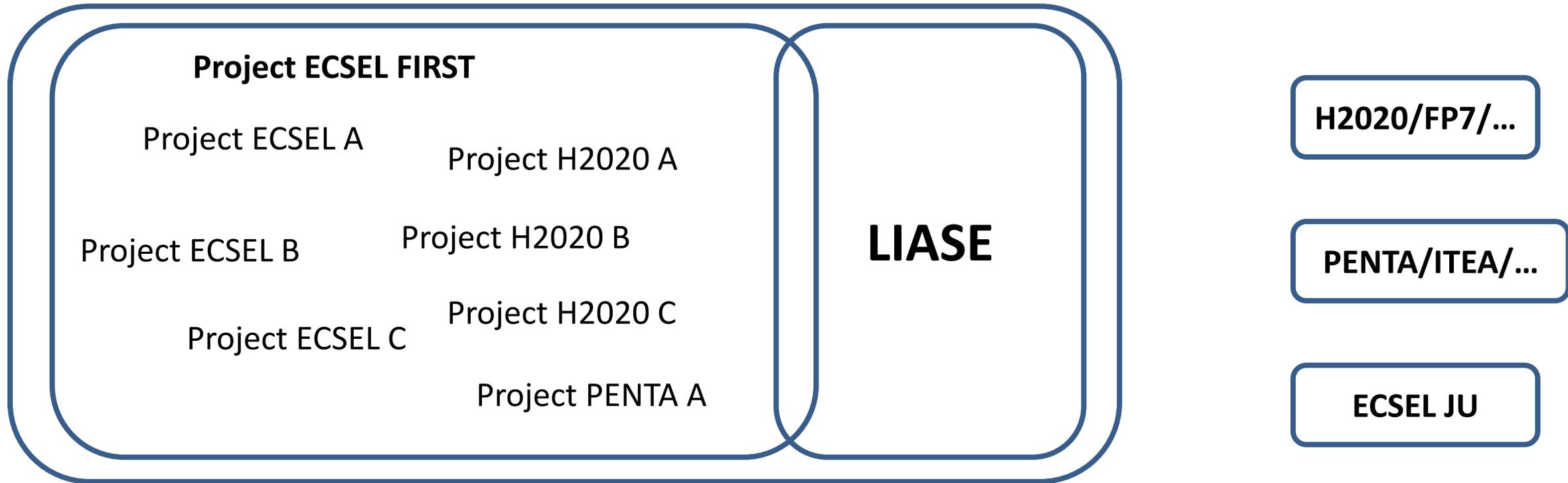
Ranking according to  
budget from large to  
small

INFINEON TECHNOLOGIES
STMICROELECTRONICS
SOITEC
ON SEMICONDUCTOR BELGIUM BVBA
IMEC
AMS AG
CEA & EA
NXP SEMICONDUCTORS
FRAUNHOFER GESELLSCHAFT
SIEMENS AG
TELEFUNKEN SEMICONDUCTORS
PHILIPS ELECTRONICS
PHILIPS MEDICAL SYSTEMS
ACCIONA INFRAESTRUCTURAS S.A.
ROBERT BOSCH GMBH
PLANSEE SE
SEMIKRON ELEKTRONIK GMBH & CO. KG
CONSORZIO NAZIONALE INTERUNIVERSITARIO PER LA NANOELETTRONICA
HELIOX
POLITECNICO DI TORINO
INDRA
FRONIUS INTERNATIONAL GMBH
SILTRONIC AG
STIFTELSEN SINTEF
VALEO SYSTEMES DE CONTROLE MOTEUR SAS
CENTRO RICERCHE FIAT SCPA
THALES
TECHNISCHE UNIVERSITEIT EINDHOVEN
LULEA TEKNISKA UNIVERSITET
VALTION TEKNILLINEN TUTKIMUSKESKUS
EPCOS
BESI
ENEL
SiCrystal AG

LPE S.p.A.
APPLIED MATERIALS
ALMA MATER STUDIORUM - UNIVERSITA DI BOLOGNA
EPIGAN NV
LANTIQ
Novasic S.A.
ELMOS Semiconductor AG
III V LAB
AZZURRO Semiconductors AG
AVL LIST GMBH
TECHNISCHE UNIVERSITAET DRESDEN
Nmb-Minebea GmbH
FUNDACION TECNALIA RESEARCH & INNOVATION
ZODIAC AERO ELECTRIC SAS
SCHNEIDER ELECTRIC INDUSTRIES SAS
ORONA SCOOP
ELTEK AS
ATOS ORIGIN SOCIEDAD ANONIMA ESPANOLA
GREEN POWER TECHNOLOGIES SL
BITRON S.p.A.
RWTH AACHEN
SLOVENSKA TECHNICKA UNIVERZITA V BRATISLAVE
TECHNOLUTION BV
AT & S AUSTRIA TECHNOLOGIE
GAS NATURAL SDG SA
APOJEE
QINETIQ LIMITED
ELSTER GMBH
CTR Carinthian Tech Research AG
ITRON GMNH
ION BEAM SERVICES
MICRON SEMICONDUCTOR
AB SKF
IKERLAN S.COOP.
IQUADRAT INFORMATICA SL



# A new tool: Lighthouse Initiative (LI)



A « container » of coordinated activities (=projects)  
coming from different programmes  
working towards common goals

TOGETHER WITH A **Lighthouse Initiative Advisory Service (LIASE)**

SUPPORTED by ECSEL JU

BUT independent of the different programmes including ECSEL JU



# How can you make a project on power electronics?

- Is it in the MASP?
- What kind of consortium?
- How large can the project be?
- What about national funding?
- Questions?

