



FDI in R&D and Environmental Technologies

(FDI in *Eco-R&D*)

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Eco-R&D

- **Challenge for environmental sustainability: NEW SOLUTIONS**
 - **New industrial processes (low carbon)**
 - **New energy sources**
 - **New waste management methods...**



NEW TECHNOLOGIES!

≈

Investment in *Eco-R&D*

- **Key-element: KNOWLEDGE!!!!!!!**

R&D : High concentrated!!

- **Total world patent applications (EPO) – 1981-2010:**

- ◆ **In a few countries:**

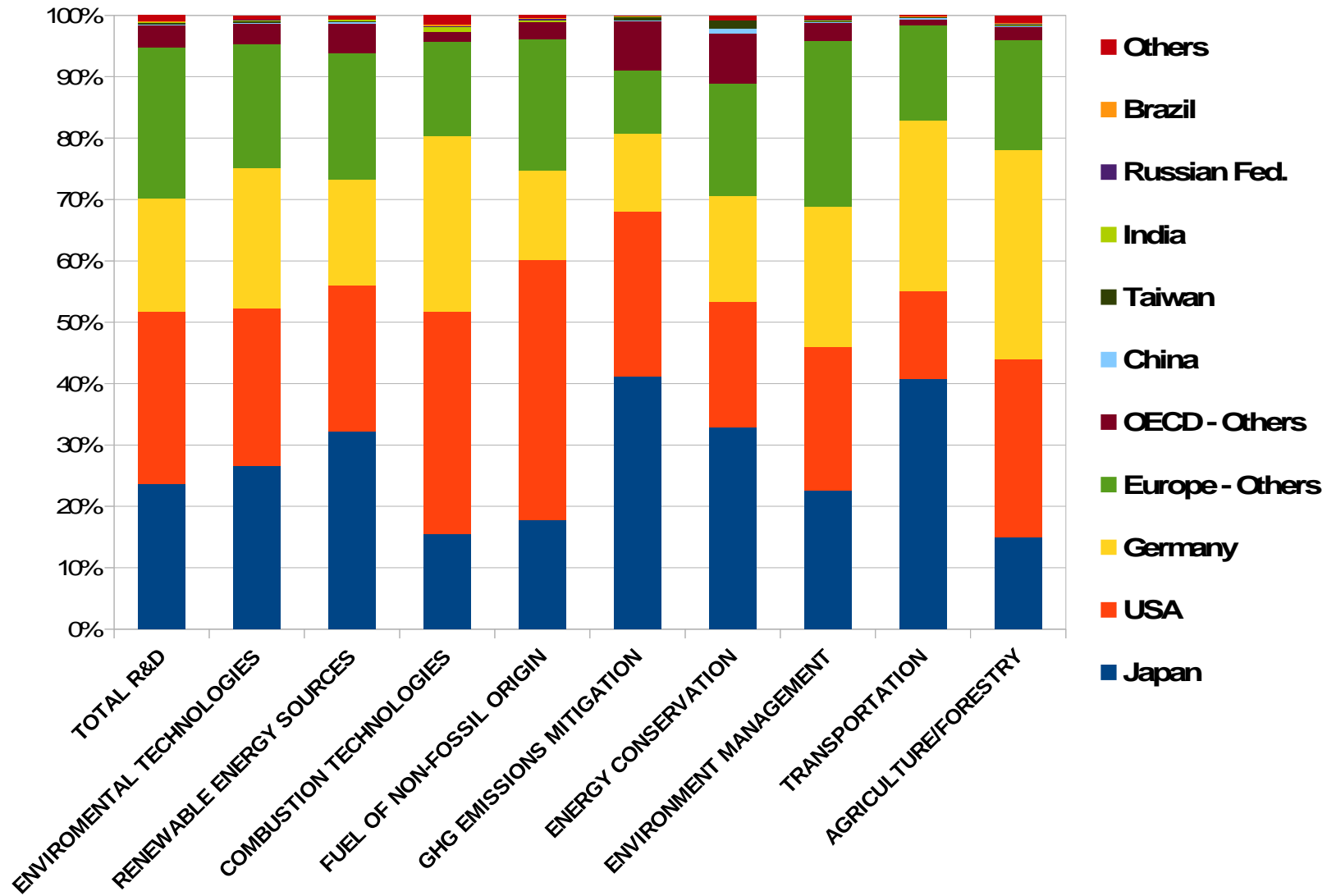
USA+JAPAN+GERMANY > 70%

- ◆ **In a few Multinationals:**

Top 500 MNC \approx 65%

- **Environmental technologies?????**

Eco-R&D: Geographical Distribution – 1980-2011



Source: Author's calculations based on data from Urraca-Ruiz, Durán-Romero (2013, 2014), EPO PATSTAT (2012) and ORBIS BVD (2013)

Environmental Technologies

TECHNOLOGY FIELD	SUBGROUPS
1 Renewable energy sources	Geothermal Hydroenergy Solarenergy Wind energy
2 Combustion Technologies	Alternative energy production Combined cycle power plant or gas turbine Intergated gasification combined cycçe
3 Fuel of Non-fossil origin	Biofuels Biodiesel Bioethanol Biogas
4 GHG Emission mitigation	Fuel cells
5 Energy conservation	Storage os electrical energy Measurement of electric consumption Storage of thermal energy Low energy lighting Thermal building insulation Recovering mechanical energy
6 Environmental Management	Air pollution abatment Water pollution abatment Waste management Soil remediation Environmental Monitoring
7 Transportation	Technologies specific to propulsion using combustion engine Technologies specific to propulsion using electric motor Technologies specific to hybrid propulsion Fuel efficiency improving vehicle design
8 Agriculture & Forestry	Forestry techniques Alternative irrigation techniques Soil improvement

Source: Urraca-Ruiz, Durán-Romero (2013, 2014)

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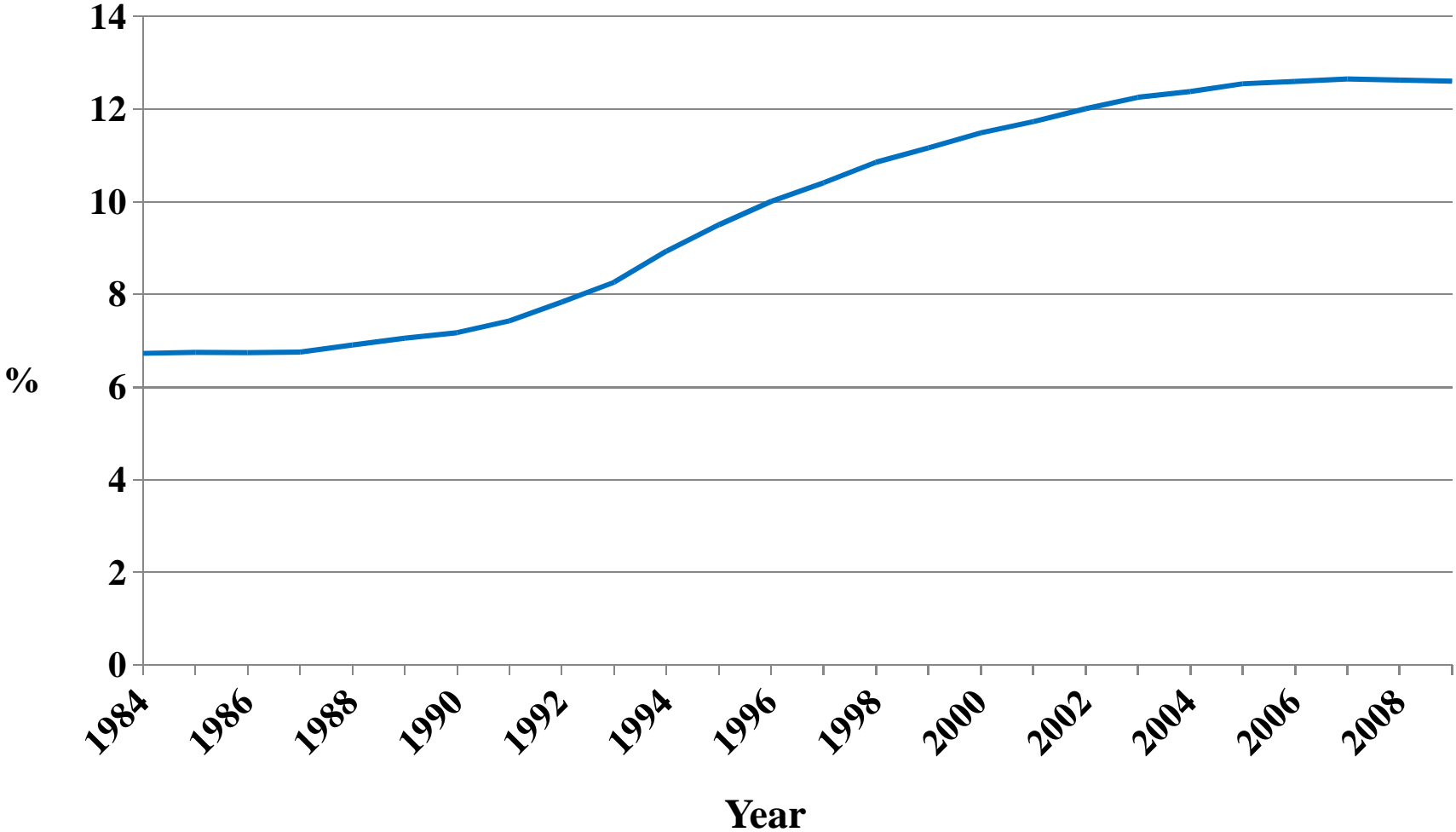
FDI in R&D: a important way for technology tranfer and spillovers and competences capture !!!

FDI in R&D:

How important is it?

**Are MNCs doing R&D outside
their home country?**

Internationalization rate (%) of R&D – 1984-2010

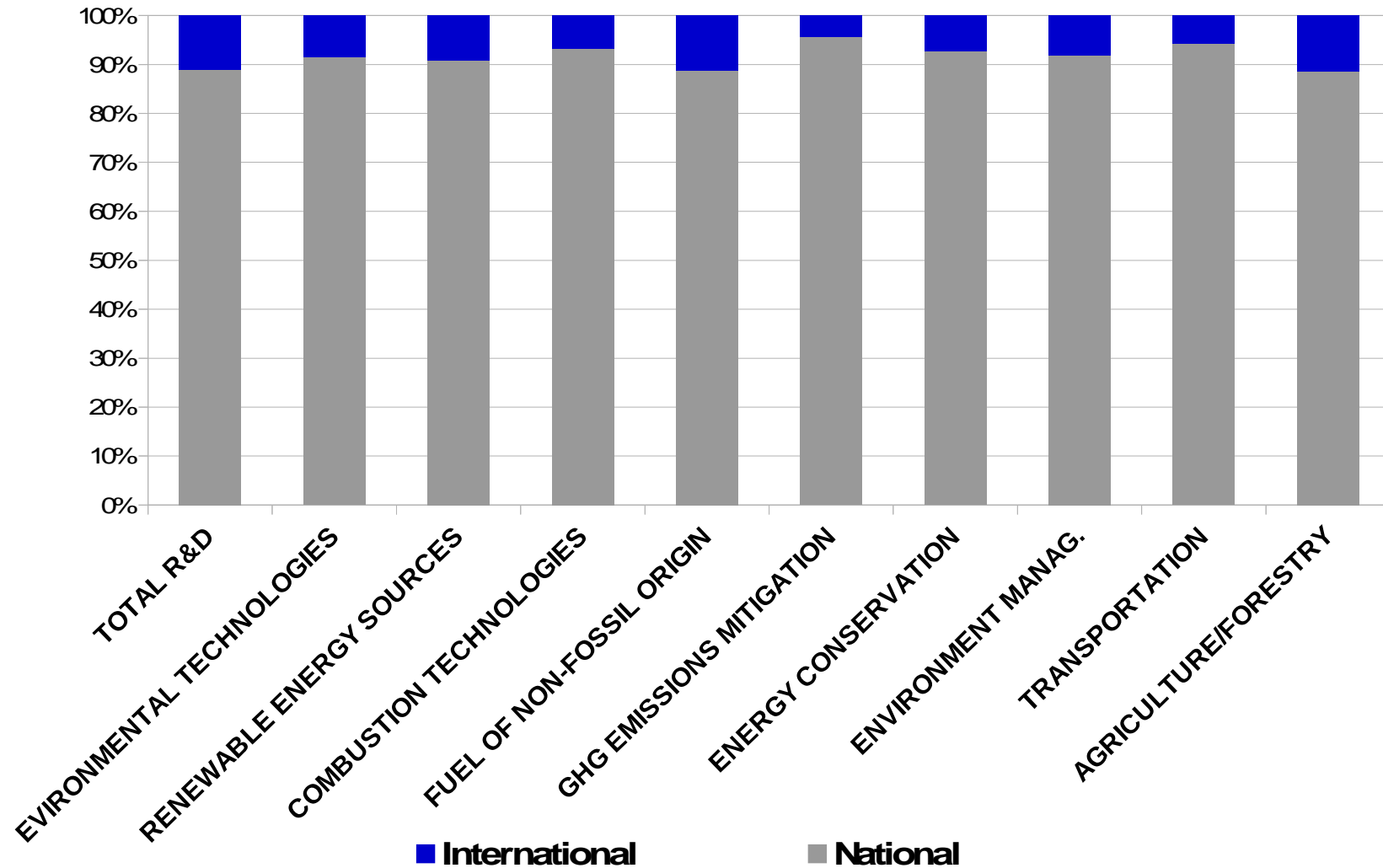


Source: Author's calculations based on data from EPO PATSTAT (2012) and ORBIS BVD (2013)

**FDI in R&D
and environmental technologies
(FDI in *Eco-R&D*):**

How important is it?

Internationalization rate (%) of *Eco-R&D* – 1981-2010



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FDI in *Eco-R&D*:

Where does it go?

Where does it come from?

Are EMMs integrated in this scenario?

FDI in *Eco-R&D*: Host X Home Country – 1981-2010

	Home-country													Total
	USA	Japan	Germ.	Europe Others	OECD Others	Taiwan	China	Sing.	India	Saudi Arabia	South Africa	Russian Fed.	Others	
Host-country	USA													1969
Japan														414
Germany														1369
Europe Others														3641
OECD Others														586
Taiwan														32
China														127
Singapore														33
India														77
Saudi Arabia														2
South Africa														15
Russian Fed.														86
Others														316
Total	2588	434	1809	3473	226	33	14	14	5	7	5	5	54	8668

Source: Author's calculations based on data from Urraca-Ruiz, Duran-Romero(2014, 2013), EPO PATSTAT (2012) and ORBIS BVD (2013)

FDI in *Eco-R&D*: Top EMMs Patent Applicants

MNC	Home-country
ASIA PACIFIC FUEL CELL TECHNOLOGIES, LTD.	Taiwan
YFY INC.	Taiwan
INNOLUX CORP.	Taiwan
TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY LIMITED	Taiwan
CHINA PETROLEUM & CHEMICAL CORPORATION	China
FOXSEMICON INTEGRATED TECHNOLOGY (SHANGHAI) INC.	China
MEMC SINGAPORE PTE. LTD.	Singapore
FLEXTRONICS INTERNATIONAL LTD.	Singapore
DR REDDY'S LABORATORIES LIMITED	India
BHARAT SERUMS & VACCINES LTD.	India
SAUDI ARABIAN OIL COMPANY (ARAMCO)	Saudi Arabia
THE PETROLEUM OIL AND GAS CORP. OF SOUTH AFRICA	South Africa
NIKOLAEV	Russia Fed.

Source: Author's calculations based on data from Urraca-Ruiz, Duran-Romero(2014, 2014), EPO PATSTAT (2012) and ORBIS BVD (201

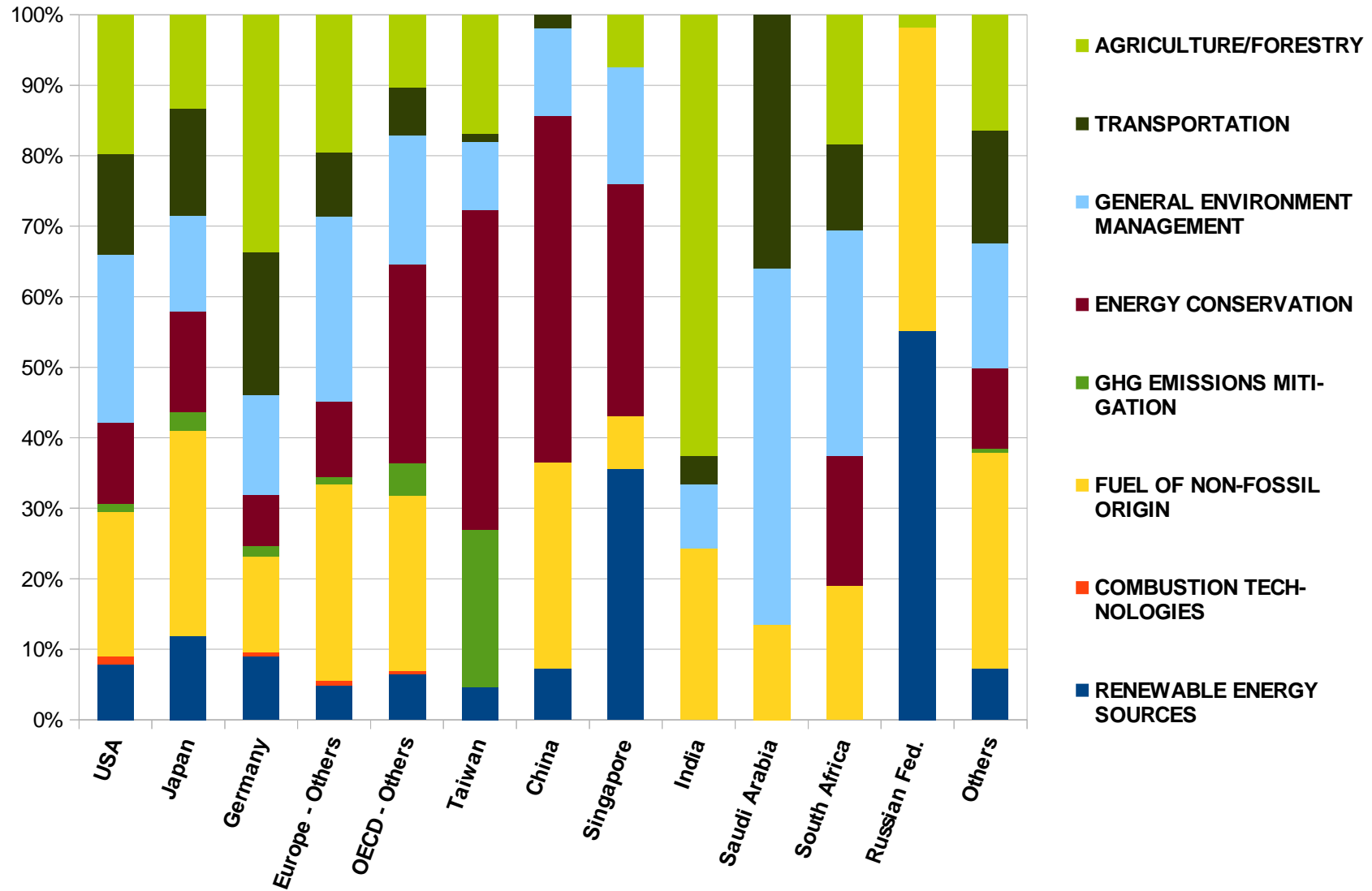
FDI in *Eco-R&D*:

Where does it come from?

X

Technological field?

FDI in *Eco-R&D*: Technological field distribution, by home-country – 1981-2010



Source: Author's calculations based on data from Urraca-Ruiz, Duran-Romero(2014, 2013), EPO PATSTAT (2012) and ORBIS BVD (2013)

Thanks!

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