"Open Innovation and Government Support in Innovation"

Dr. Rick Harwig

TU/e Director,

Strategic Research Area Energy

Ottawa May 11th 2011

N.V. Brabantse Ontwikkelings Maatschappij BOM

TNO

Holst Centre

TiasNimbas Business School

TILBURG UNIVERSITY In association with: Eindhoven University of Technology

Vlerick Leuven Gent Management School

Rijksoverheid

PRODRIVE

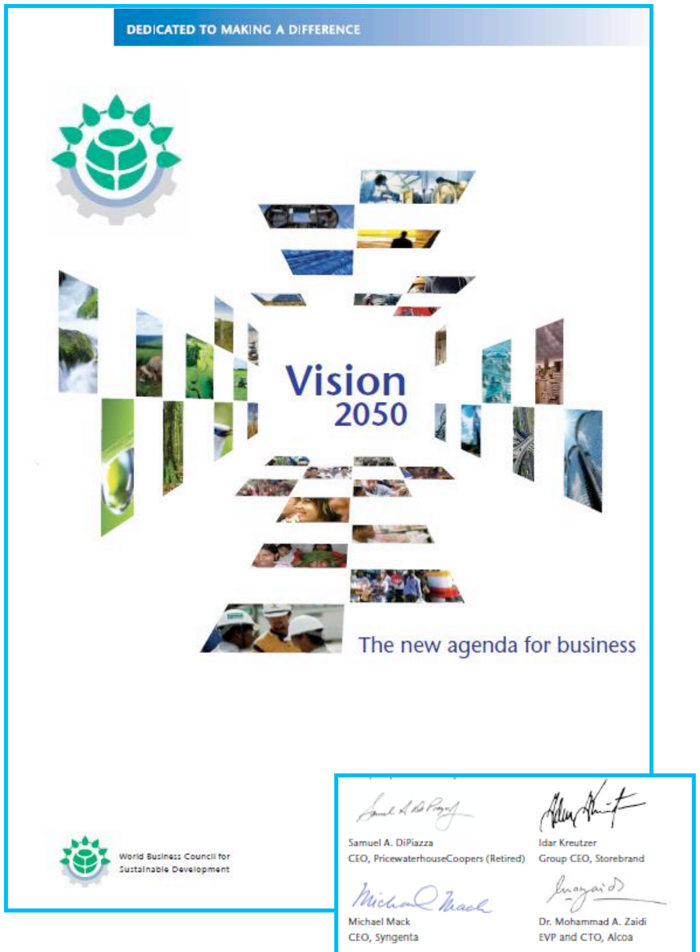
Harwig Innovation Services

TU/e Technische Universiteit Eindhoven University of Technology

Where innovation starts

“Vision 2050 lays out the challenges, pathway and options that business can use to create an opportunistic strategy, both regionally and globally, that will lead to a sustainable world.”

World Business Council for Sustainable Development, *Mohammad A. Zaidi, Alcoa*



Samuel A. DiPiazza Jr., CEO Pricewaterhouse Coopers

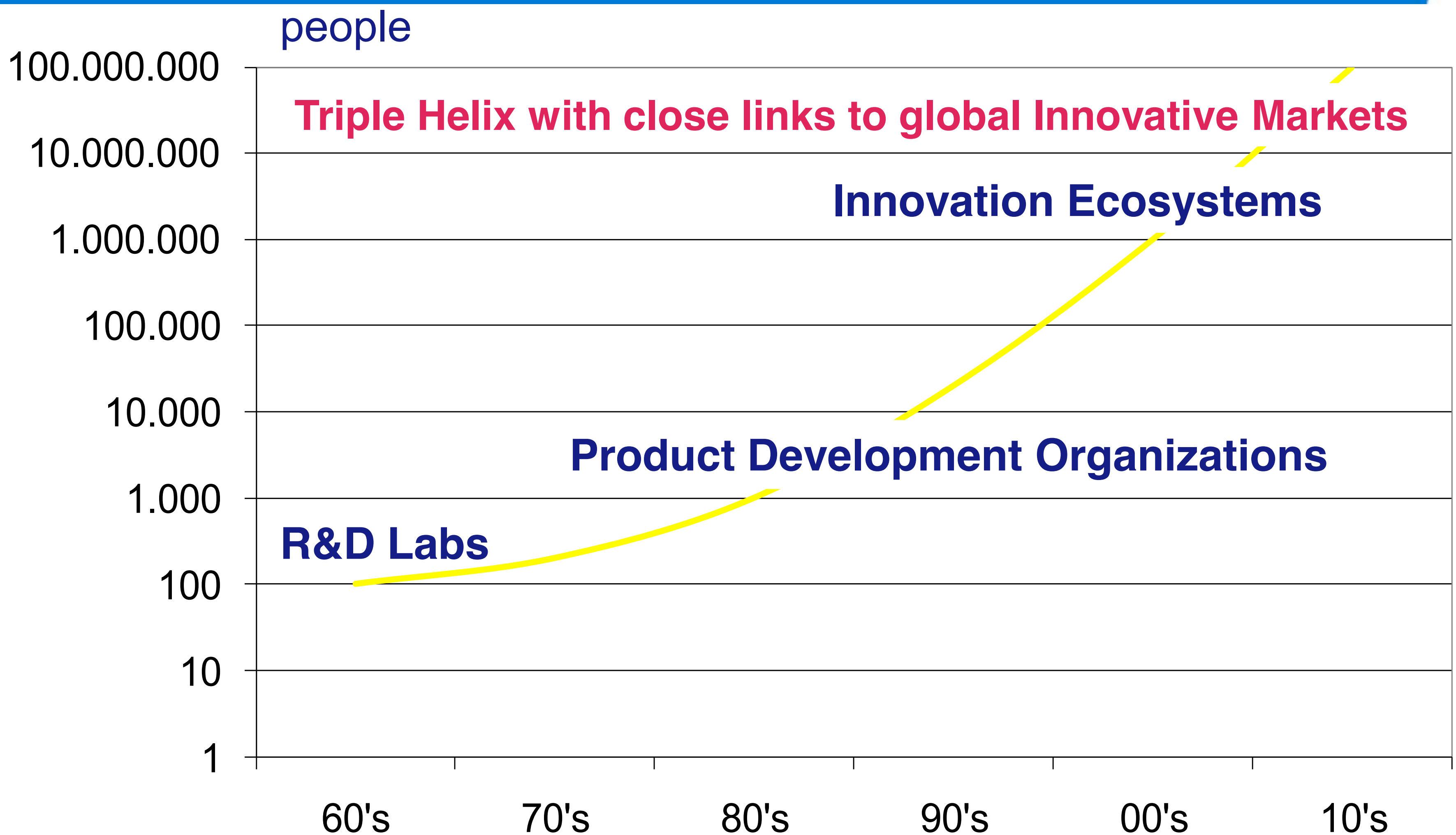
Idar Kreutzer, CEO Storebrand

Michael Mack, CEO Syngenta

Mohammad A. Zaidi, CTO Alcoa

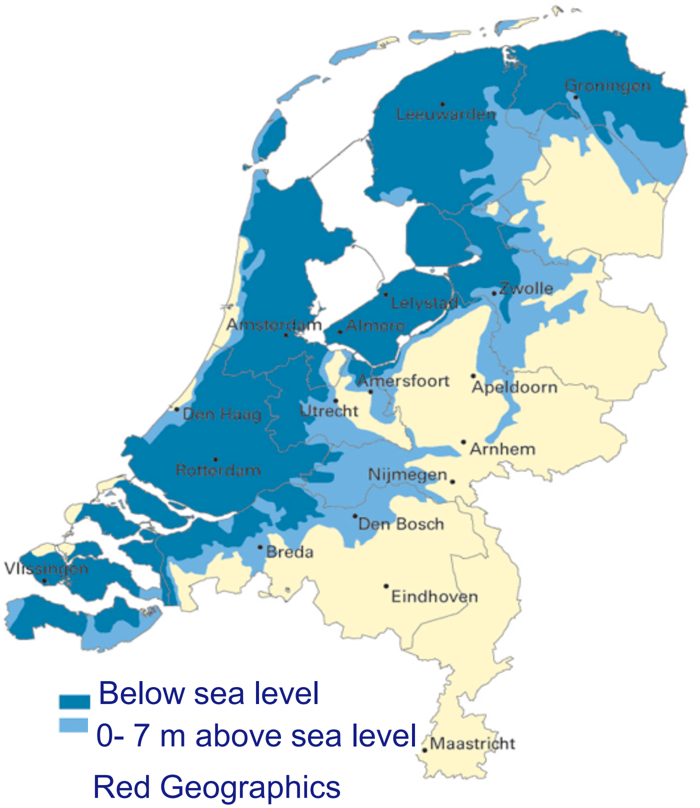
29 companies: Accenture, Alcoa, Allianz, ArcelorMittal, The Boeing Company, Duke Energy Corporation, E.ON, Eskom, Evonik Industries, FALCK Group, Fortum Corporation, GDF SUEZ, GrupoNueva, Holcim, Infosys Technologies, Osaka Gas Co., PricewaterhouseCoopers, The Procter & Gamble Company, Rio Tinto, Royal Philips Electronics, Sony Corporation, Storebrand, Syngenta International, The Tokyo Electric Power Company, Toyota Motor Corporation, Umicore, Vattenfall, Volkswagen, Weyerhaeuser Company

Today's organization for innovation: ecosystem



Source: Marco Iansiti, Brussels June 10 2003

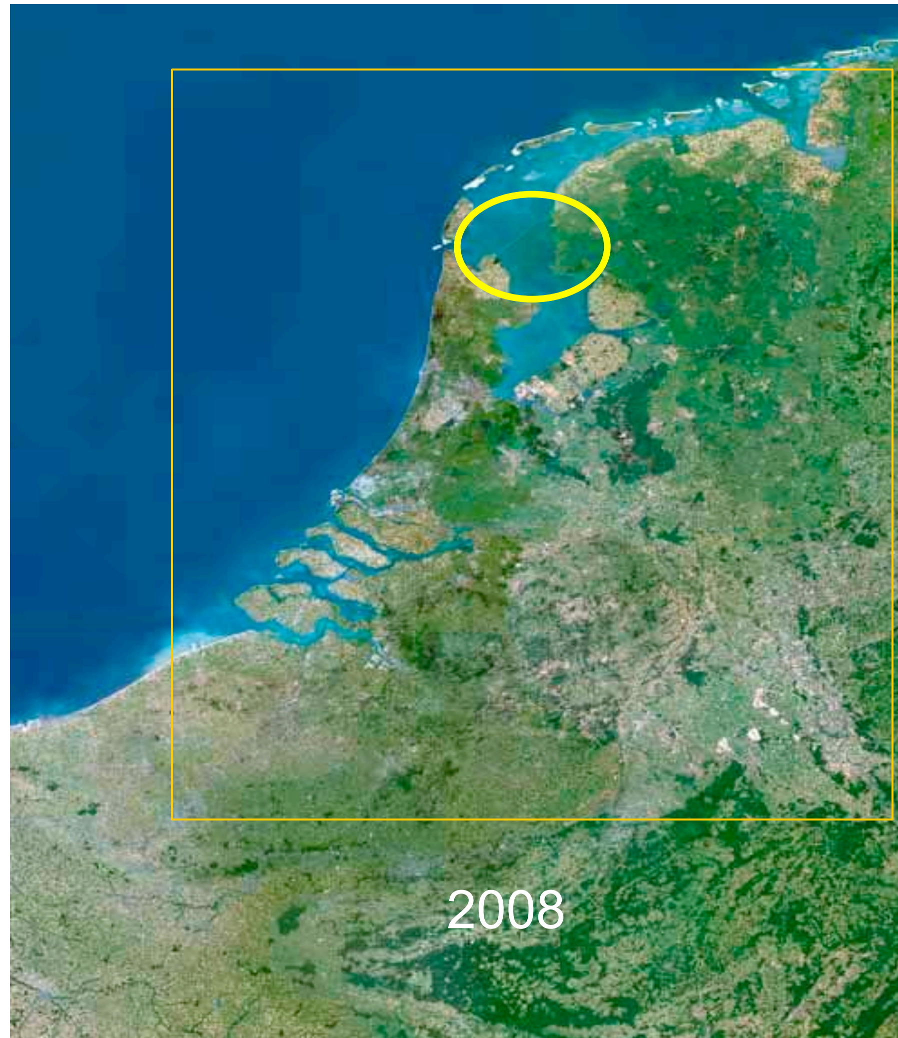
Europe’s mainland gateway, our Delta:
“created by diverse groups of people through constructive friction in order to survive and thrive”



~ 50 ~ 800 ~ 1250

http://www.natuurinformatie.nl/ndb.mcp/natuurdatabase.nl/i000414.html

~ in future ?



International Rhein Meuse Schelde Delta:
Europe's gateway and leading economic zone, serving Western Europe and the world

Living Earth Inc 15 Jan 2002

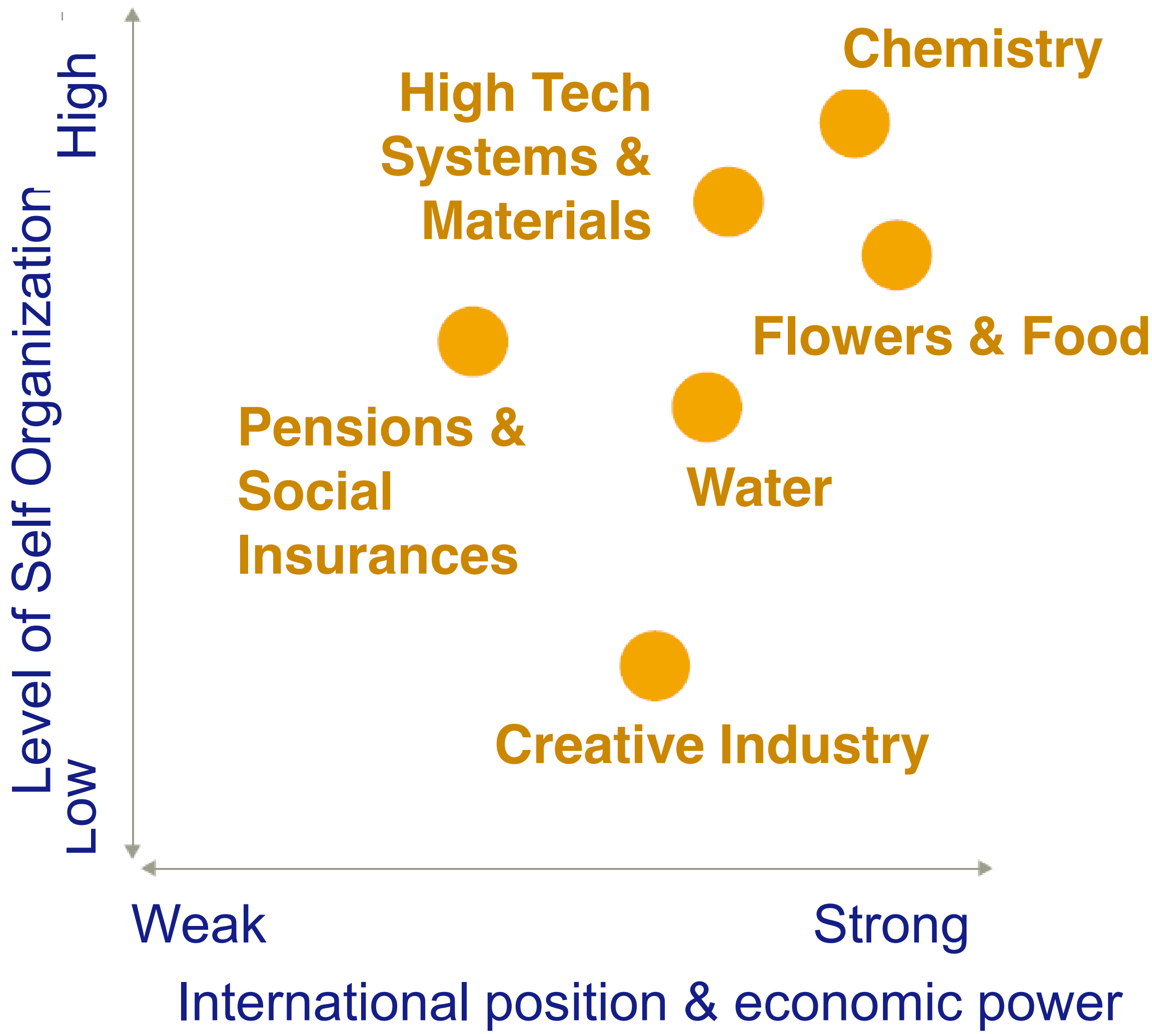
TOP 10 LARGE REGIONS: OVERALL

RANK	REGION	COUNTRY
1	South-east	UK
2	Ile-de-France	France
3	Nordrhein-Westfalen	Germany
4	Bayern	Germany
5	Centre-est	France
6	Flanders	Belgium
7	Scotland	UK
8	Catalonia	Spain
9	Baden-Württemberg	Germany
10	Ouest	France

Randstad: Amsterdam, Rotterdam, Den Haag, Utrecht, Eindhoven: Brainport ....

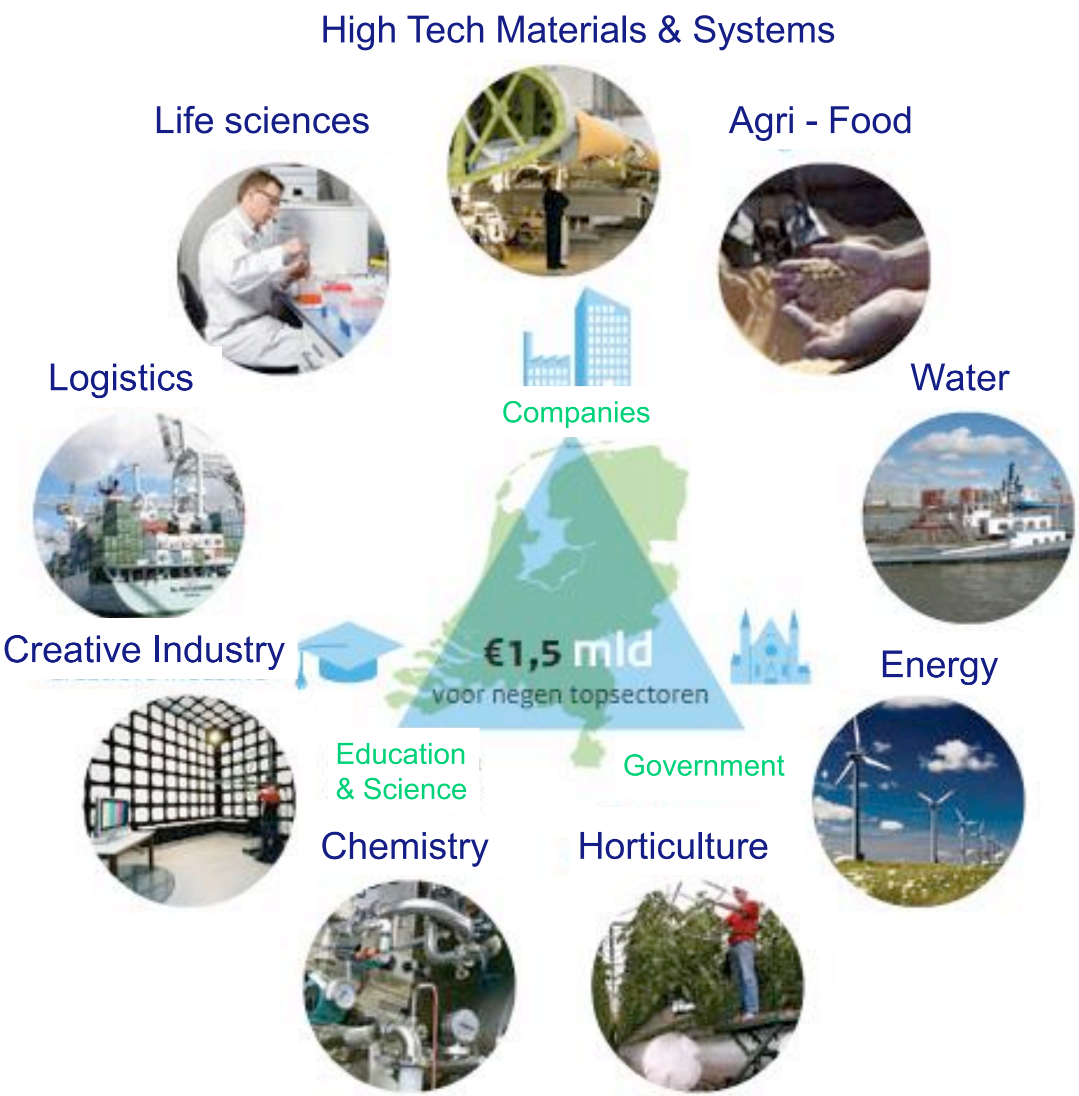
2009: status of Netherlands' 6 Key Areas, *Innovation Platform 2004*

Scheepbouwer Report



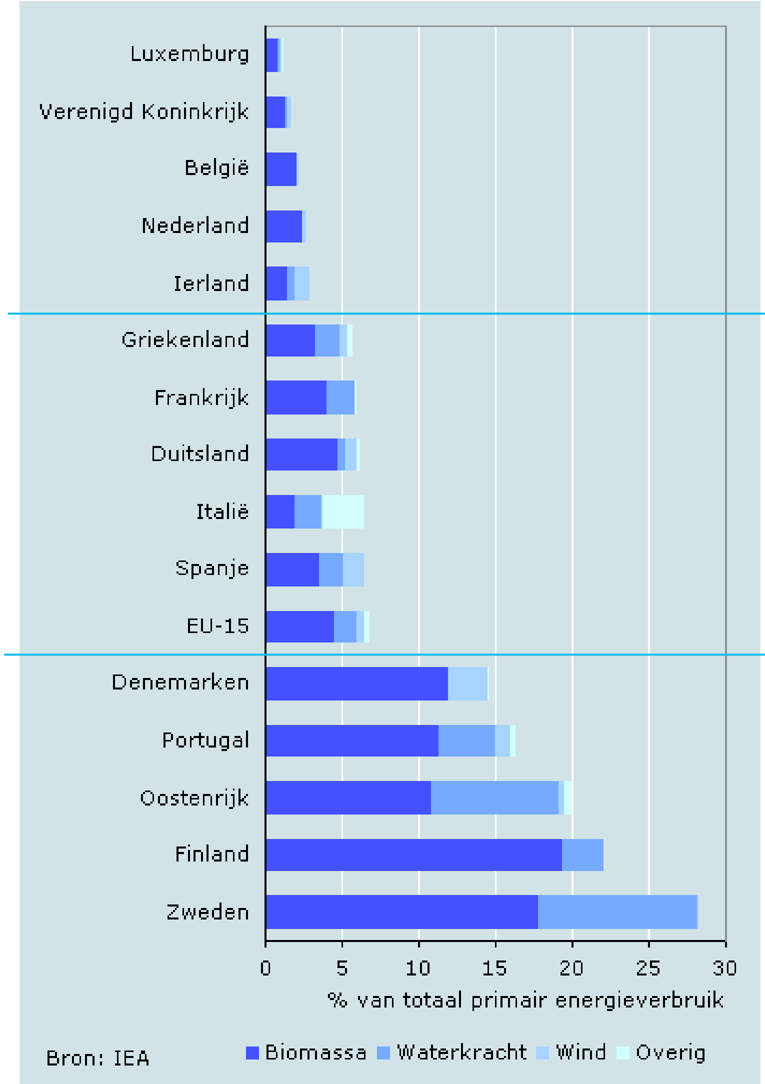
- 5/6 Better competitive position
- Better collaboration
- Roadmaps & Programs
- Need to improve further
- Creative Industry less developed: Yellow card
- 8 year period required

Netherlands’ 9 top sectors, 2011



- Per April 2011
- 9 Top sectors
- Advisory Bodies, Top Teams
  - Leader in the sector
  - Industry leader
  - Scientist
  - Government
- 1.5 B€ R&D&I NL funding for top sectors

2010 share Renewable Energy in Europe 15



Laggards

Early & Late Majority

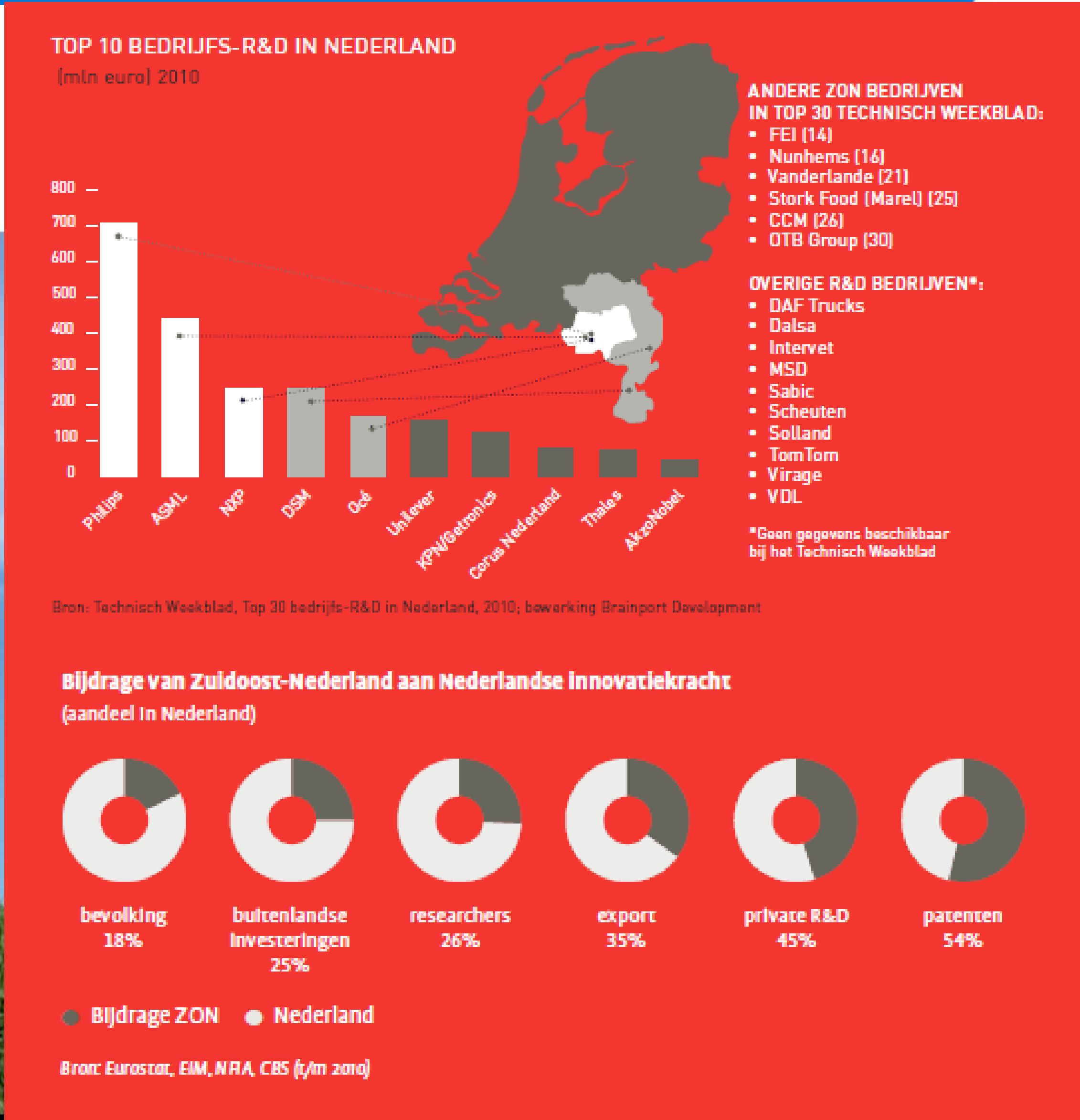
Early Adopters

Source: CBS-NL

Technische Universiteit Eindhoven University of Technology


Brainport 2020
TOP ECONOMY, SMART SOCIETY

Our local environment: Brainport
People, Basics, Business and Technology



Financial Times´
Cities and Regions of the future 2010/2011

TOP 10 MICRO EUROPEAN CITIES

RANK	CITY	COUNTRY
1	Eindhoven	Netherlands
2	Cambridge	UK
3	Grenoble	France
4	Oxford	UK
5	Bordeaux	France
6	Basel	Switzerland
7	Neuilly-sur-Seine	France
8	Reading	UK
9	Galway	Ireland
10	Gent	Belgium

The Micro European City of the Future 2010/11 award went to Eindhoven in the Netherlands, primarily due to its high positions in the categories of economic potential and business friendliness. In the same category, Reading in the UK claimed Best Micro City for Infrastructure, while Monaco achieved Best Micro City for Quality of Life.

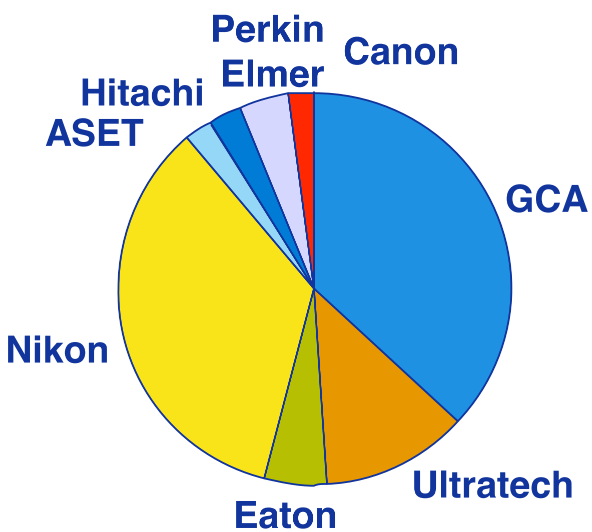
ASM-L Twinscan immersion stepper for semiconductor lithography

- Smaller features
  - Higher circuit density
  - Immersion litho
- Higher throughput
  - Twin stage
  - Faster mechatronics

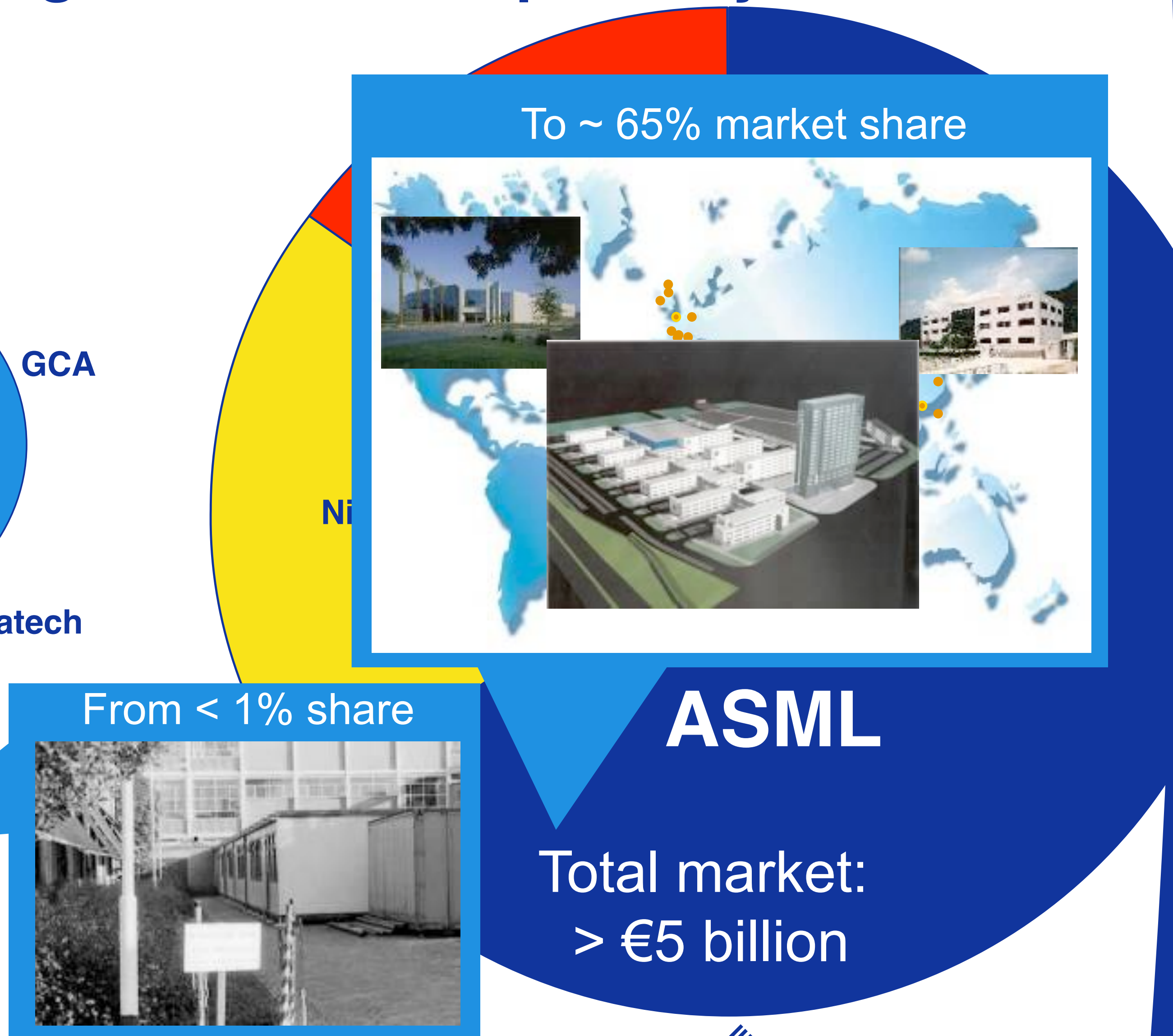
Source: ASML, SEMI

ASM-L Road to global leadership in 24 years

1984

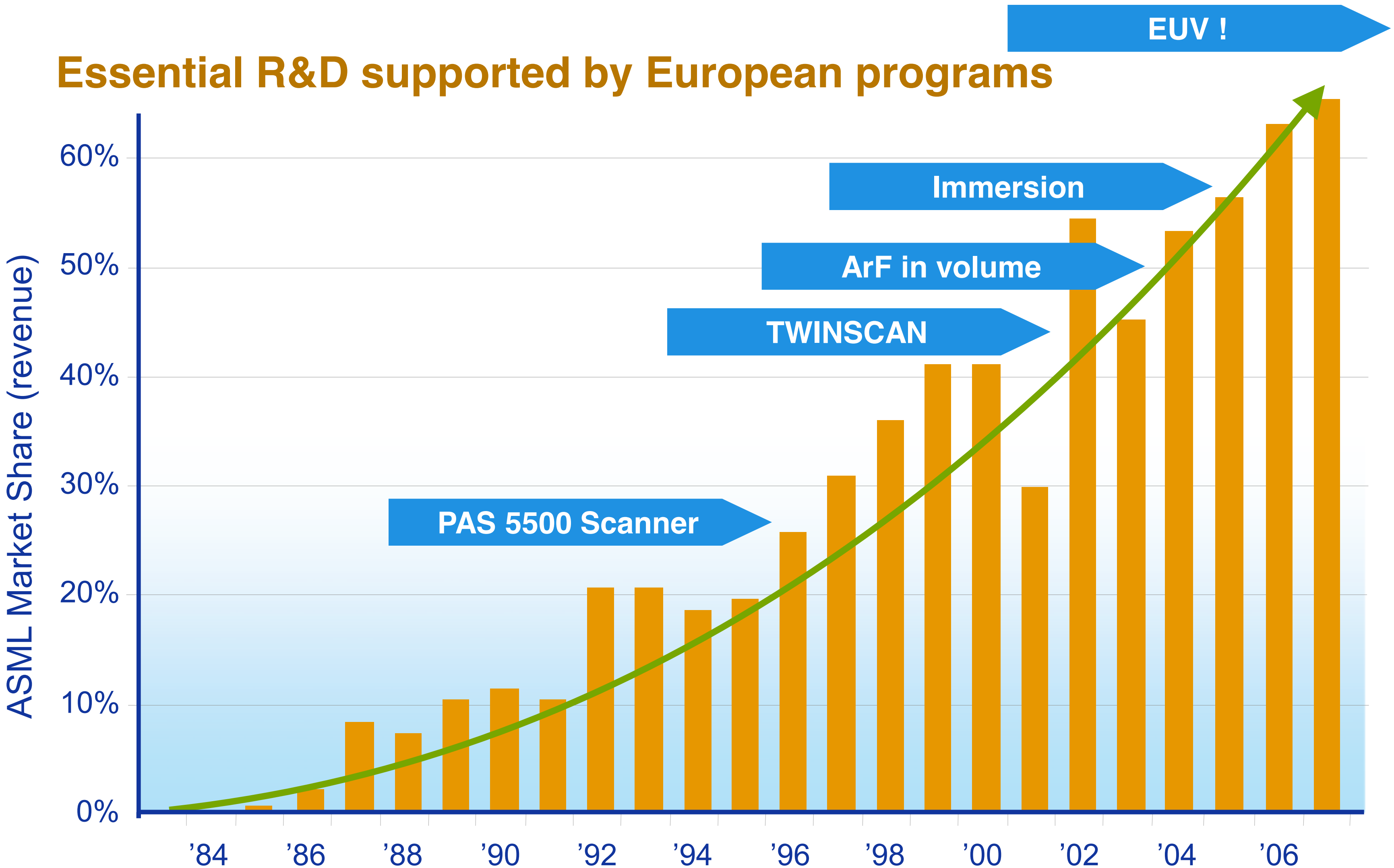


Total market:
€463 million



ASML

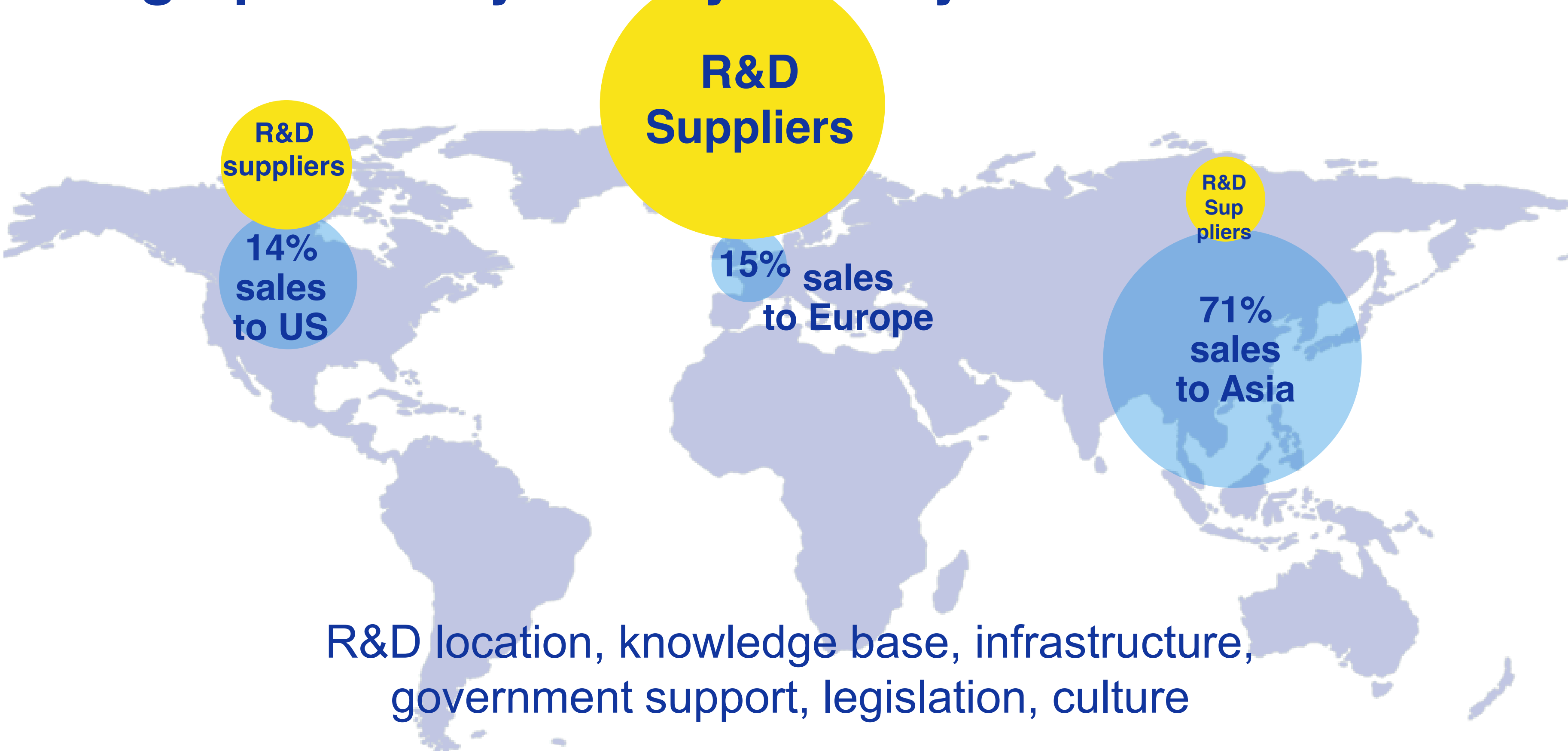
ASM-L Road to global leadership in 24 years



Source: ASML, SEMI

ASML

Geographical asymmetry for a systems market leader



R&D location, knowledge base, infrastructure,
government support, legislation, culture

versus

Customer area

Source: ASML Q2 and Q3 2008

ASML

Semiconductor equipment companies, 2008-2009, M$

Megatronics Magazine April 29, 2001

Company	Turnover 2008	Turnover 2009	delta (%)	Marketshare 2009 (%)
ASML	**3523**	**1617**	**-54,1**	**65,0**
Nikon	1255	777	-38,1	31,3
Canon	608	89,3	-85,3	3,6

Dutch government financial crisis arrangements

- Part time unemployment arrangement for manufacturing
  - Higher stability in crisis for goverment, companies and employees
- Knowledge workers arrangement for R&D&I
  - Ongoing support for extreme UV R&D and prototyping
  - Secondments to Universities and Institutes
  - New projects and revitalization of experts
  - Closer relationships, new opportunities, smart restructuring

Rebound Semiconductor equipment companies, 2009-2010, M$

Rank	Company	Turnover 2009	Turnover 2010	Growth (%)
1	Applied Materials	2441,0	5946,0	143,6
2	**ASML**	**1600,3**	**5043,5**	**215,2**
3	TEL	1653,1	4122,2	149,4
4	Lam Research	778,7	2433,2	212,5
5	KLA-Tencor	838,5	1812,0	116,1
6	Dainippon Screen	601,7	1379,5	129,3
7	Novellus	442,6	1128,7	155,0
8	Varian	266,7	766,7	187,4
9	Nikon	755,3	748,9	-0,8
10	Hitachi	334,6	567,0	69,5
	Others	3395,2	5441,6	60,3
	Total	13107,8	29389,3	124,2

Megatronics Magazine March 30 2011

The scope of innovation continues to change

Technology Research → **Product Research** → **Entrepreneurship**

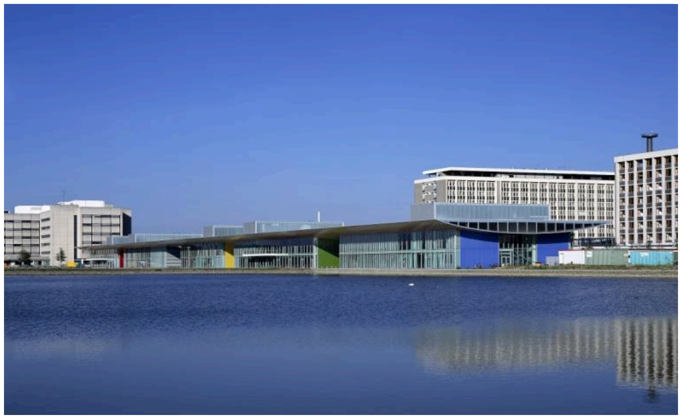
- Technology
- **Closed**
- Individual activity
- **Scientific attitude**
- Corporate funding

- Products
- **Selective partners**
- Project activity
- **Engineering attitude**
- Contract funding

- Solutions & Experiences
- **Open**
- Business start up
- **Innovation attitude**
- Investment funding

1980 1990 2000 2010

From "the laboratory is our world" to "the world is our laboratory"



Philips Research

Philips Businesses

From 1978 …

… to today

High Tech Campus Eindhoven

Spin-in of Technology

External suppliers

Institutes

Research

Start-ups

Philips Businesses

Technology spin-out

Joint Ventures with Philips

Open Innovation, Co-creation and Globalization at High Tech Campus Eindhoven

100 companies, institutes, agencies, VCs, services

- ☑ 8,000 people
- ☑ 50 nationalities
- ☑ Philips investment >500 M€

Corporate innovators

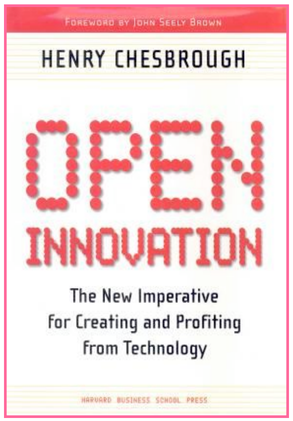
Research institutes

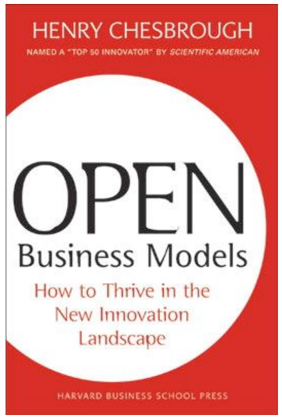
High Tech Campus Eindhoven

Consultancy & Services

Start Up companies

Henry Chesbrough: Open Innovation
How to Thrive in the New Innovation Landscape





- **A new future for Technology push**
  - **Business models more important than technologies**
    - **Ecosystems and players**
      - **Any business a service business**

TiasNimbas Business School

Tilburg University

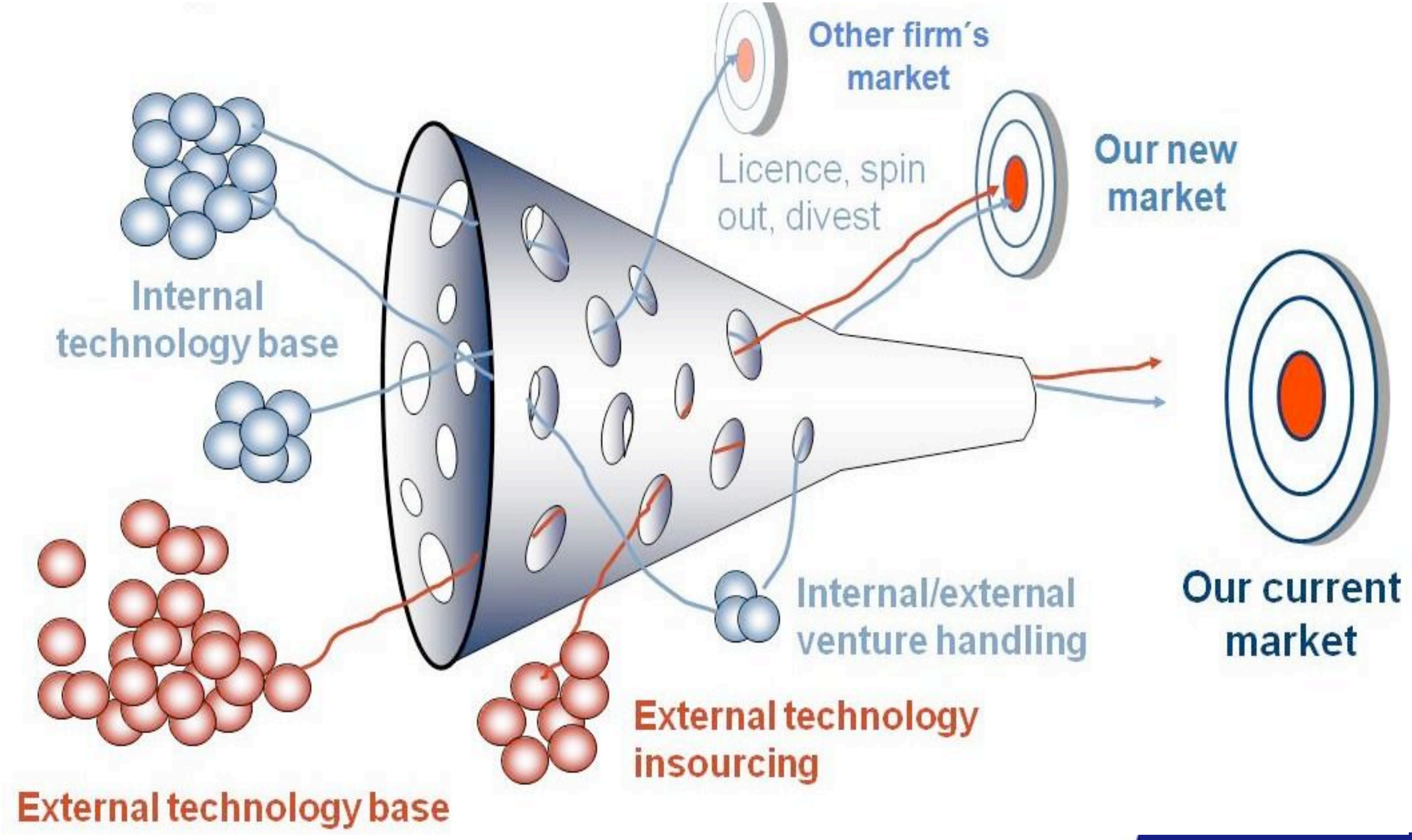
High Tech Campus Eindhoven

TU/e Technische Universiteit Eindhoven University of Technology
Where innovation starts

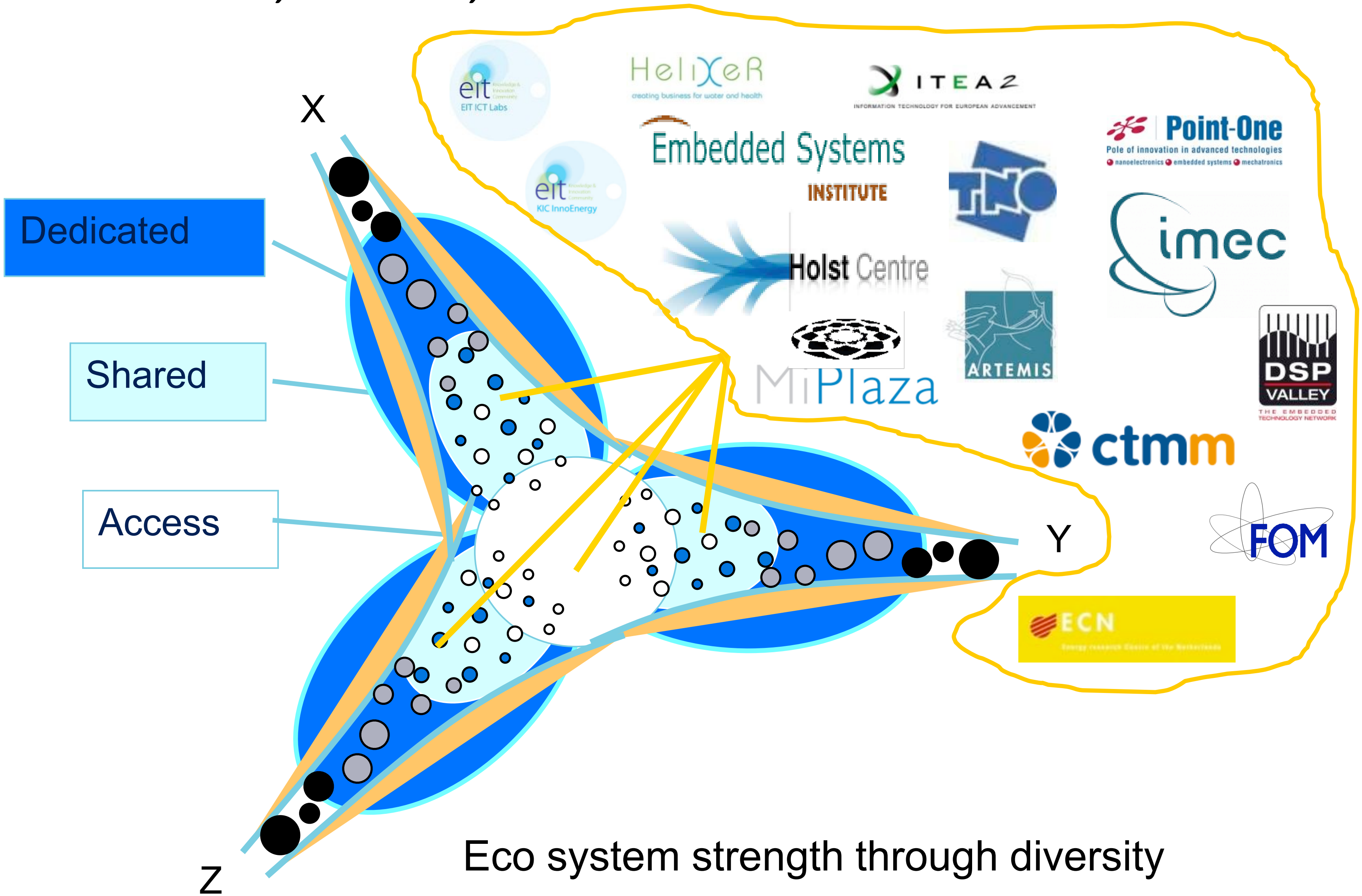
universiteit hasselt

Vlerick Leuven Gent Management School

Henry Chesbrough: Open Innovation
How to Thrive in the New Innovation Landscape



Joint R&D model: *Shared Facilities and R&D*
Common Access, Shared, Dedicated IP

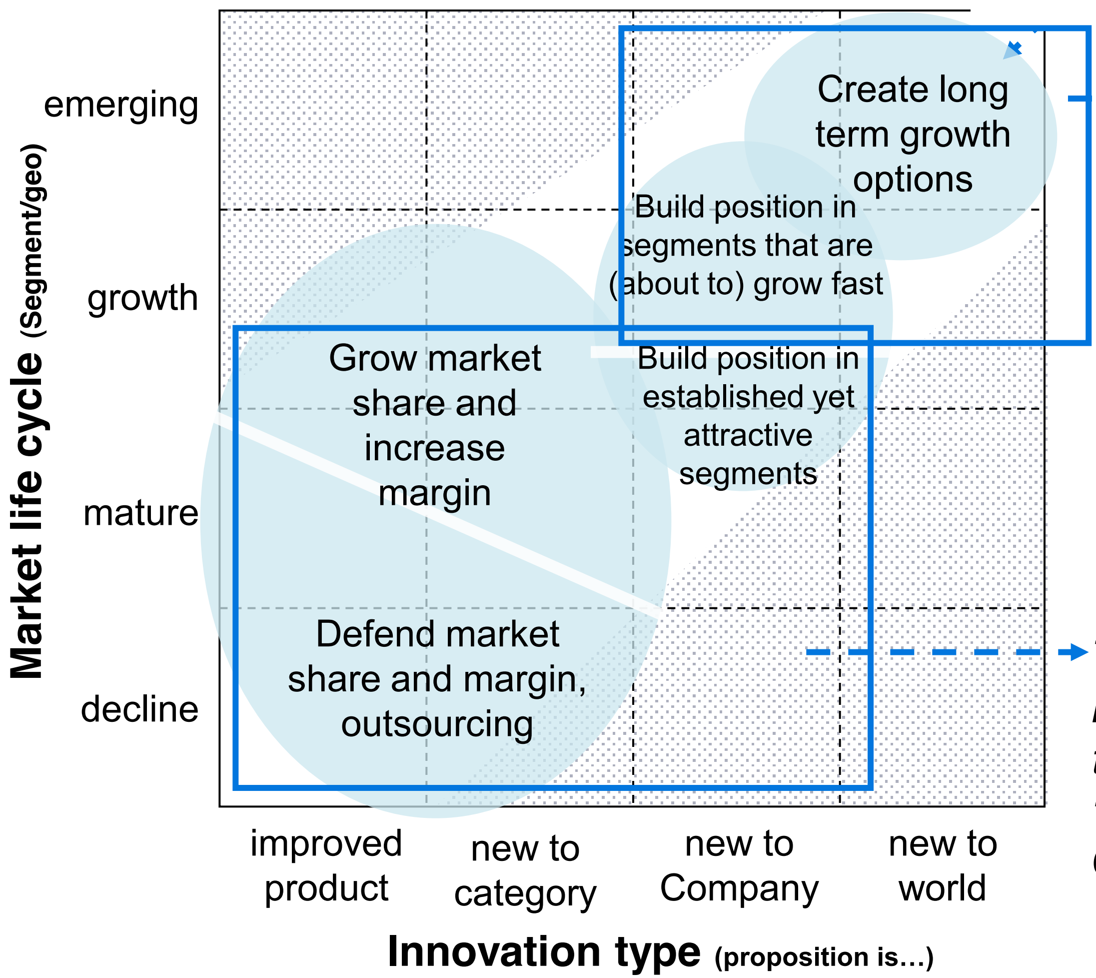


Eco system strength through diversity

PHILIPS

New processes & measures for innovation portfolio balance

On the diagonal we move from radical to incremental innovation serving different purposes



The 'new business' innovation types are typically managed as a separate activity using the Bell Mason framework

"BUSINESS CREATION"

*The 'existing business' innovation types are typically managed as **"PRODUCT CREATION PROCESS"***

Courtesy: Fred van Ommen and Corina Kuiper, Philips CTO office,

PHILIPS

Enabling different innovation perspectives

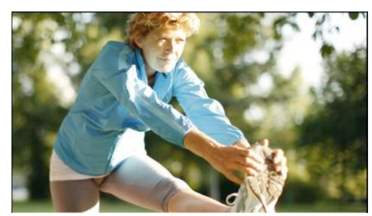
From market share battle in existing spaces to opening new spaces

Established business

- Product Creation
- Existing ecosystem
- Market share battle
- Customer insights known
- Leverage existing channels
- Based on business models
- Focus on execution/leverage
- Short/mid-term
- Existing organization

New business

- Business creation
- New ecosystem
- Crossing the chasm
- Changing customer behavior
- Building new channels
- Using new business models
- Learning / iterative
- Mid/long-term
- New capabilities



Courtesy: Fred van Ommen and Corina Kuiper, Philips CTO office,

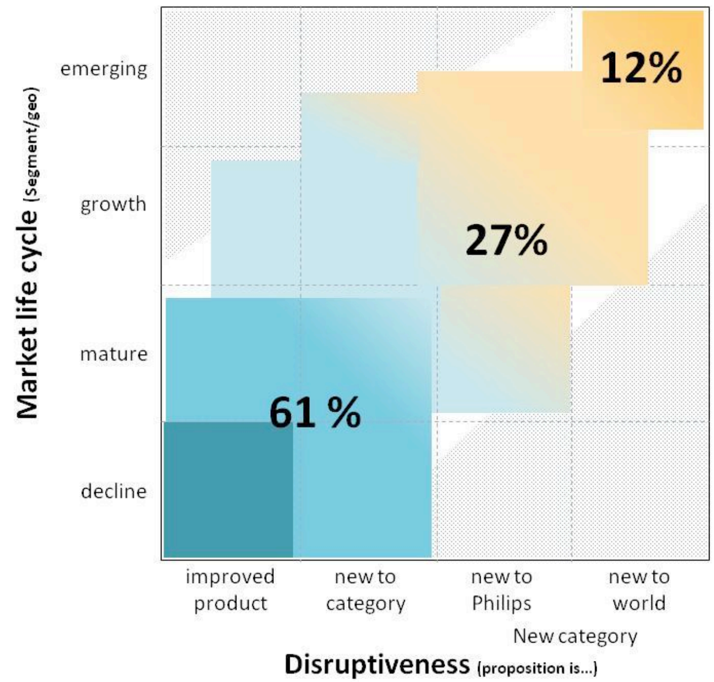
It is also framework for managing Innovation spend

Exhibit 1: Breakdown of the Portfolio by Project Types—Then and Now

	% of Projects in the Development Portfolio		
Development Project Type	**1990**	**2004**	**% Change from 1990**
New to world – true innovations	20.4%	11.5%	43.7% decrease
New product lines to the company	38.8	27.1	30.1% decrease
Additions to existing product line in company	20.4	24.7	20.8% increase
Improvements & modifications to existing company products	20.4	36.7	80.1% increase
Total	100.0%	100.0%	

Exhibit 3: Portfolio Breakdowns of the Best and Worst Performing Businesses in 2004 Compared to Businesses in 1990

	% of Projects in the Development Portfolio			
Development Project Type	**Best Performers 2004**	**Worst Performers 2004**	**Average Business 2004**	**Average Business 1990**
New to world – true innovations	17.05%	8.53%	11.48%	20.4%
New product lines to the company	25.87	22.99	27.12	38.7%
Additions to existing product line in company	26.82	22.01	24.66	20.4%
Improvements & modifications to existing company products	30.26	46.47	36.75	20.4%
Total	100.00%	100.00%	100.00%	100.0%

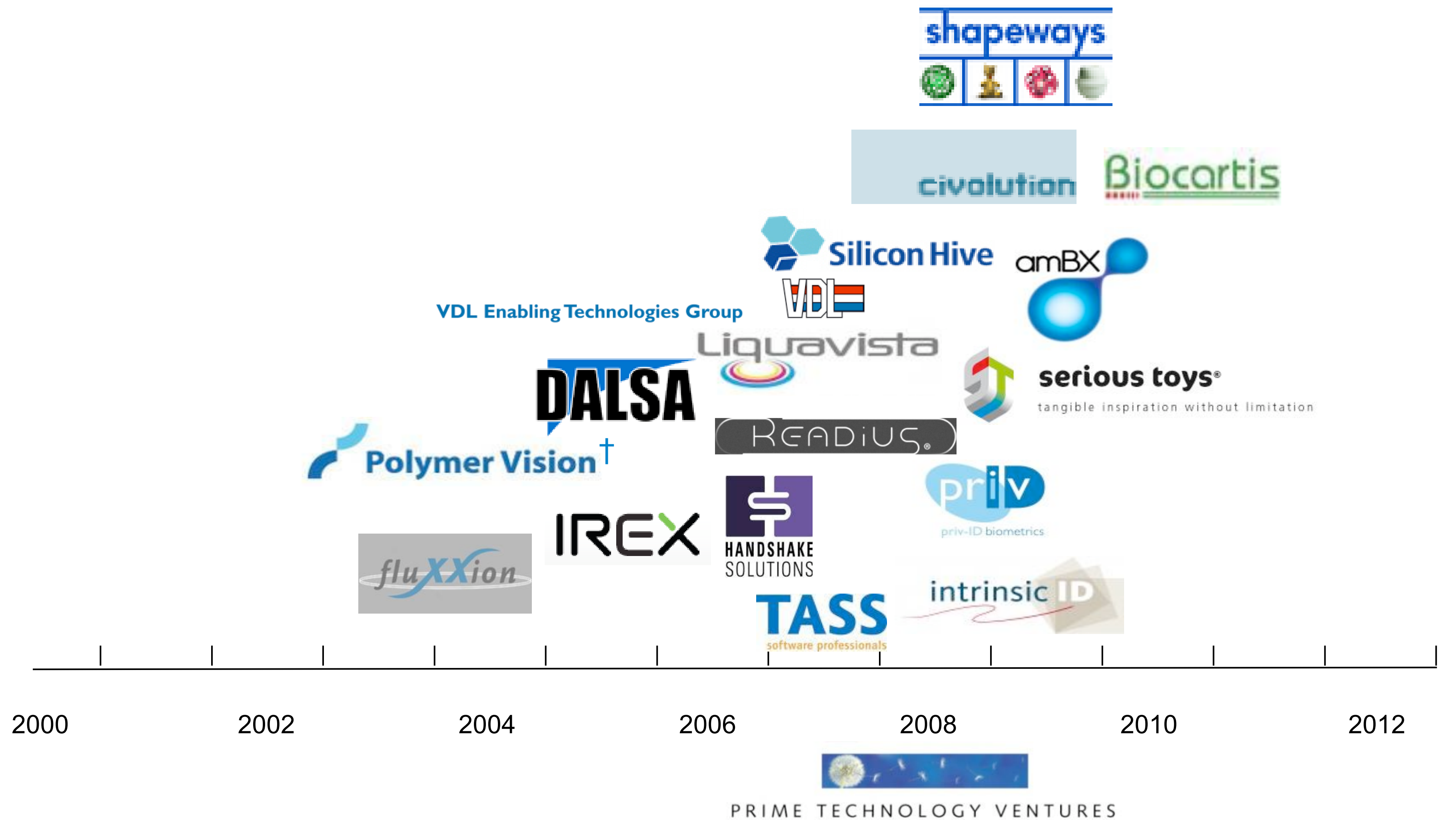


Robert G. Cooper: "Your NPD portfolio may be harmful to your business's health" PDMA VISIONS APRIL 2005

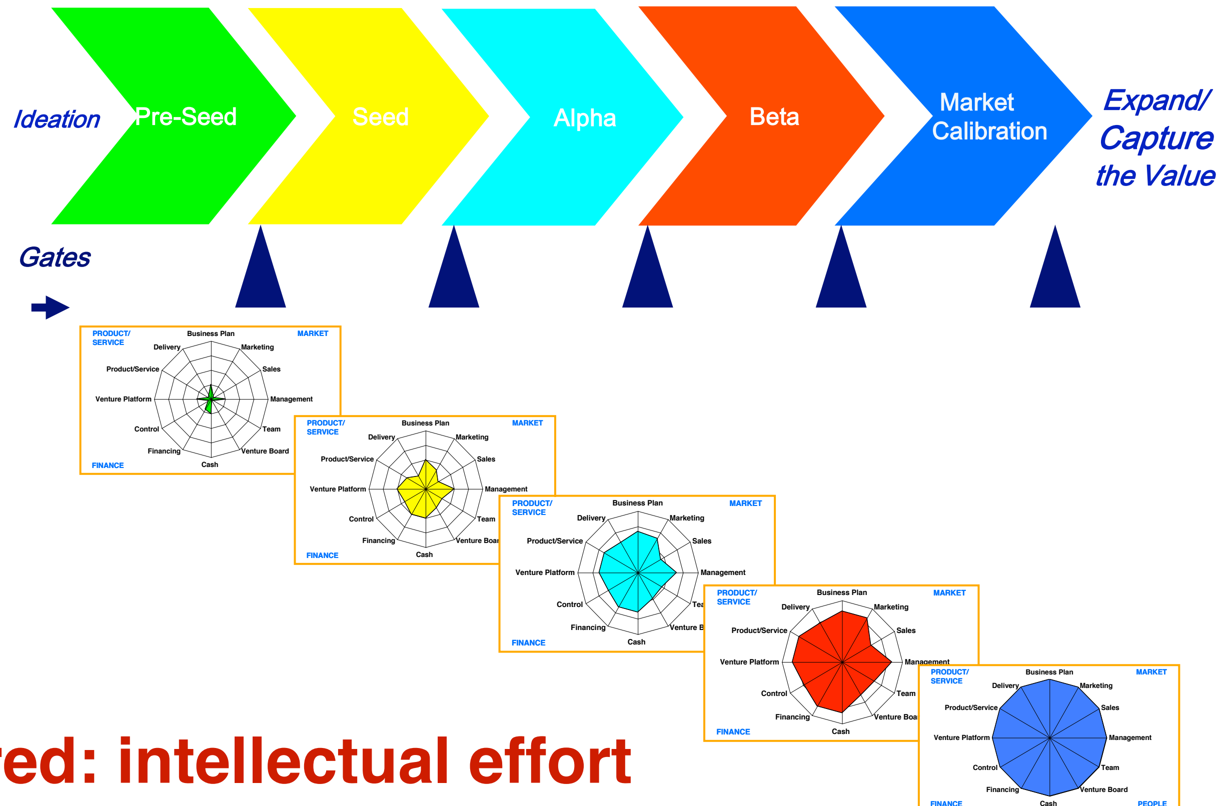
Courtesy: Fred van Ommen and Corina Kuiper, Philips CTO office,

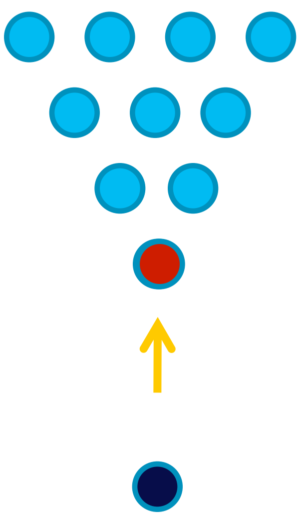
PHILIPS

Philips Corporate Technologies, spin offs & JV companies



Bowling alley strategy, start in the first most promising market with maximum long term impact & follow up





Required: intellectual effort to build a business rationale for the first potential market

Source: Bell - Mason

Technische Universiteit Eindhoven University of Technology

Towards TU/e Campus 2020 and 2040

Open Innovation at the TU/e campus,
where innovation starts

TU/e Technische Universiteit Eindhoven University of Technology

Open Innovation at the TU/e campus, *where innovation starts*

TU/e

ASML

océ

DAF
A PACCAR COMPANY

NXP

FEI

PHILIPS

DSM

Embedded Systems INSTITUTE

CTIT
Centre for Telematics and Information Technology

UNIVERSITEIT VAN TILBURG

Fontys Hogescholen

3TU.

NIRICT

FOM

DPI DUTCH POLYMER INSTITUTE

TNO

eit KIC InnoEnergy

stw

KENNISPOORT

Incubator 3+
meer, beter, sneller

N.V. Brabantse Ontwikkelings Maatschappij

BOM

Brabant Center of Entrepreneurship

Brainport Development

Eindhoven
leading in technology
City of Light 2010

peer+ Smart Energy Glass

UNIT 040

OptiMal Forming Solutions

MTT micro turbine technology bv

AccTec BV

TERRA FOOTPRINTING

HEAT power

WTTK architecten

inViso

DTI Drivetrain Innovations

B-invented

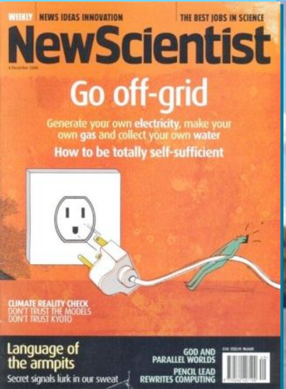
Hybrid Catalysis

XPRESS Precision Engineering

IME TECHNOLOGIES

Progression-Industry

Smart people, buildings and cities



Only solar energy meets the 20 TW challenge

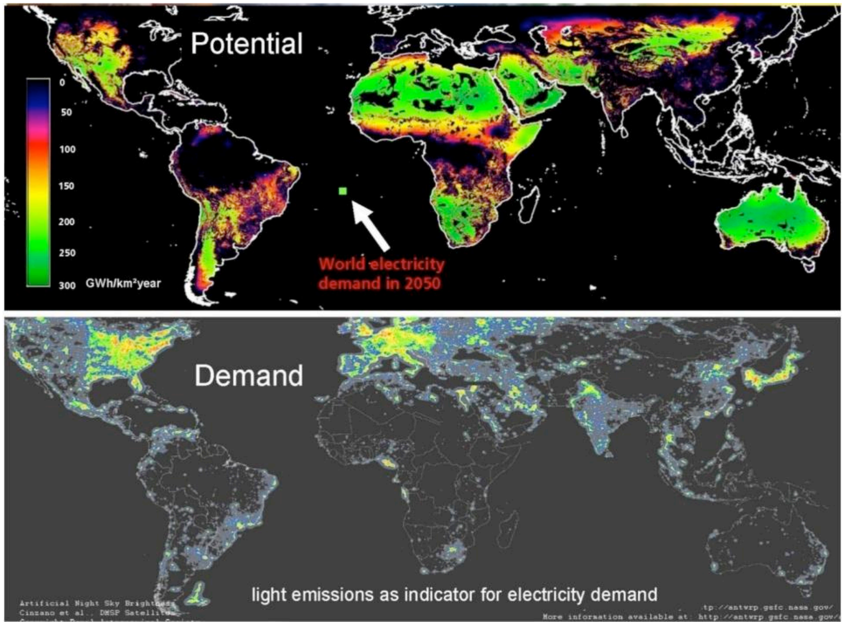
Solar	100,000 TW	at Earth surface
	10,000 TW	technical value
Wind	14 TW	
Biomass	6 TW	
Hydroelectric	1 TW	
Tide/Ocean	1 TW	
Geothermal	2 TW	

Sources: *Arthur Nozik, NREL*
Eicke Weber, Fraunhofer Institute

Wafer based

Thin films

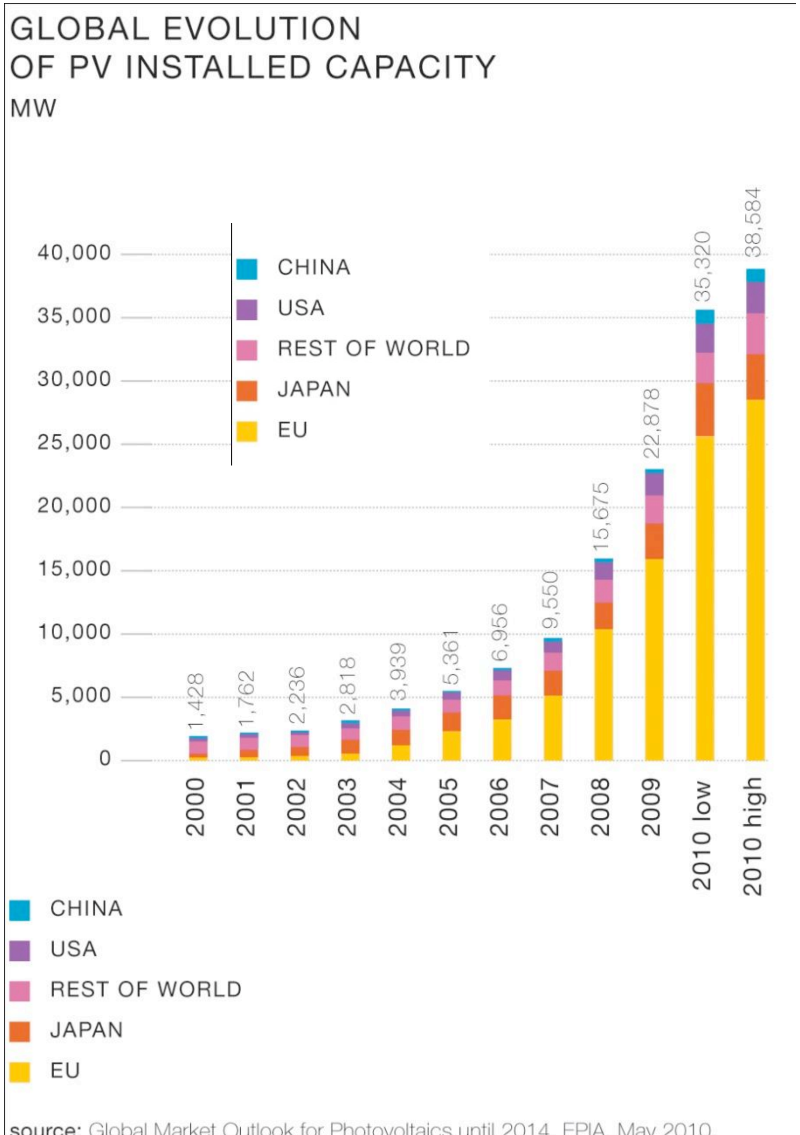
Storage and networks are part of the terawatt challenge!

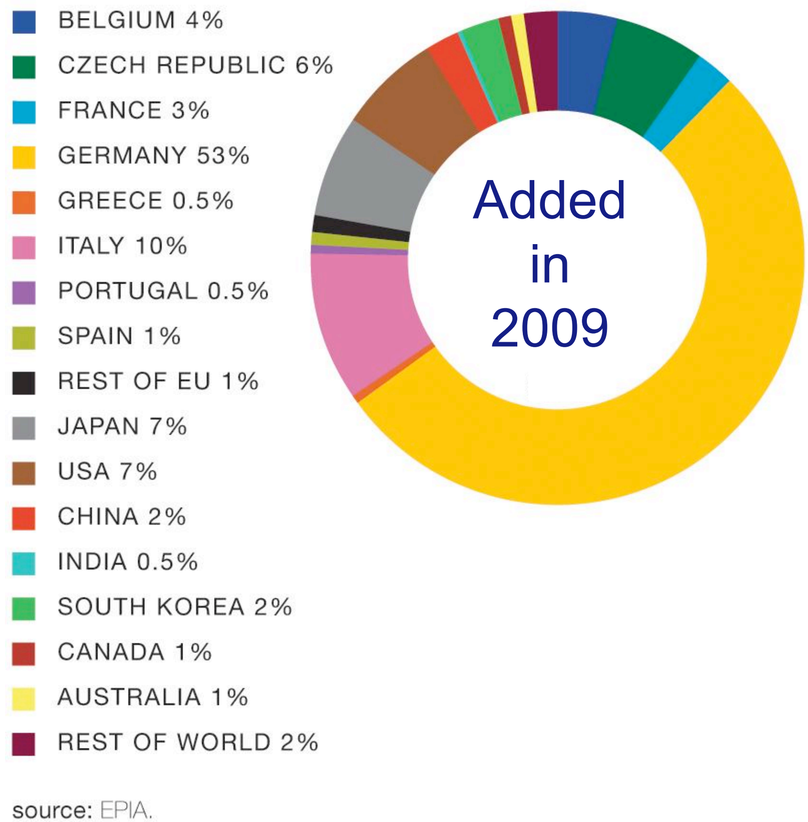


2010: Germany continues to be the largest photovoltaic market globally

- Nearly doubled installations in 2010 with over 17 GWp installed, around half of all installed solar capacity worldwide
- Electricity feed-in tariff to be reduced mid 2011, closer to grid parity, with lower solar system prices
- Annual turnover of EUR 10 billion and employing more than 133,000 workers.
- Experienced workforce and an outstanding infrastructure of equipment suppliers, component manufacturers, developers, financial institutions and installers.
- Germany also provides direct access to world's largest PV markets and top R&D institutes

World PV market in 2009:
Europe, especially Germany leading in installed capacity





EPIA

TU/e Technische Universiteit Eindhoven University of Technology

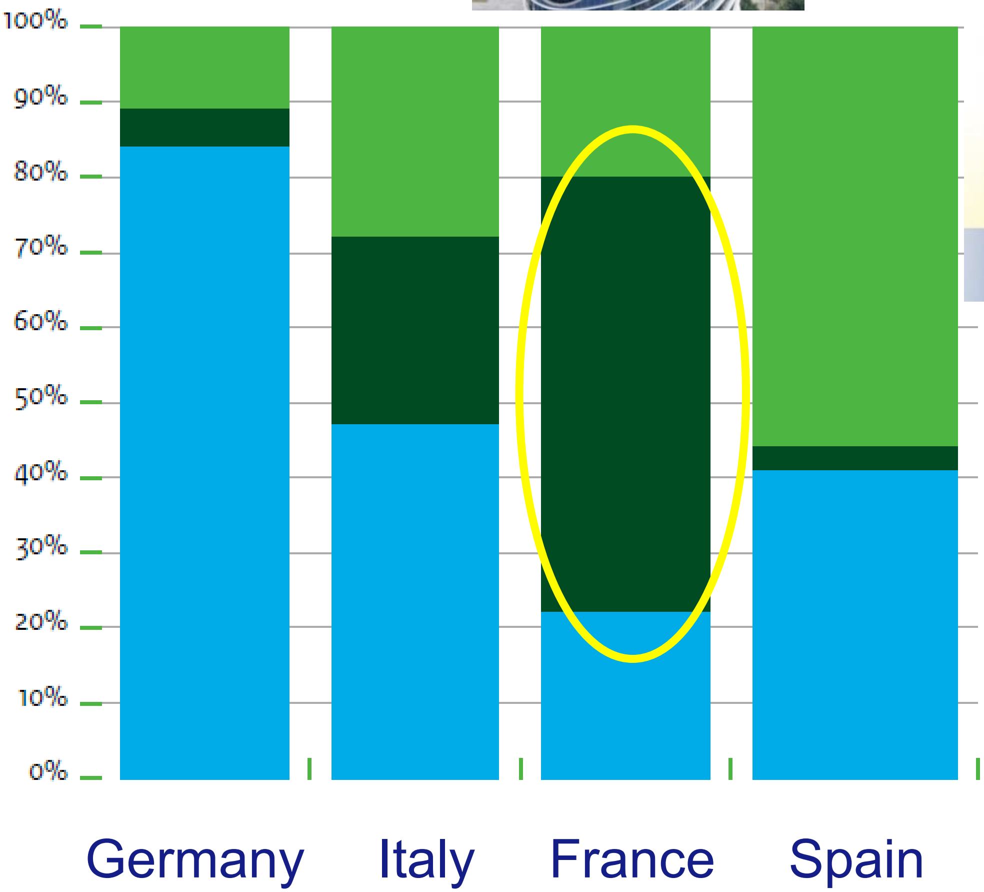
Ultrafast Atomic Layer Deposition by Solaytec, *TNO Project Team & Partners*

PRODUCT DEVELOPMENT	MARKET DEVELOPMENT

German wet processing equipment producer RENA GmbH and BOM have invested in SoLayTec

SoLayTec will apply ALD in the solar market for passivation in the production of solar cells

Different focus in different countries



solar | glass Scheuten

Source EUPD, 2009

Area with zero net energy, zero CO_2 emission

Part of PV-project City of the Sun

- Heerhugowaard, 2.45 MW ,
- Also Alkmaar en Langedijk, 1.25 MW
- Heerhugowaard is largest partner SunCities
- Energy neutral neighbourhood with ISO++ houses
- 3 windturbines, 6.5 MW
- Energy neutral municipality by 2030
- European targets: reduction through PV-systems
- Project partners England and Germany
- Finished March 2008

Heerhugowaard
Stad van kansen

TU/e Technische Universiteit Eindhoven University of Technology

"Open Innovation and Government Support in Innovation"

Dr. Rick Harwig
TU/e Director,
Strategic Research Area Energy

Ottawa May 11th 2011

Technische Universiteit
Eindhoven
University of Technology

Where innovation starts