Annex B. PRESENTATIONS FROM SPEAKERS

Green Technology Policy of Korea

“Green is Life”

2009.12

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Korea Institute of S&T Evaluation and Planning

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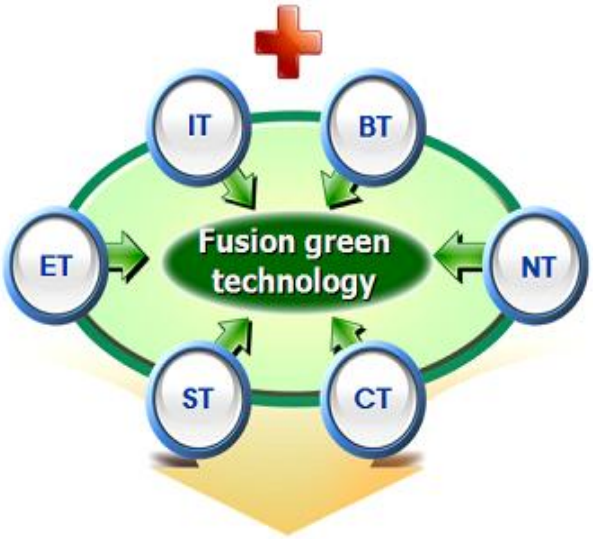
Introduction

Concept of green technology



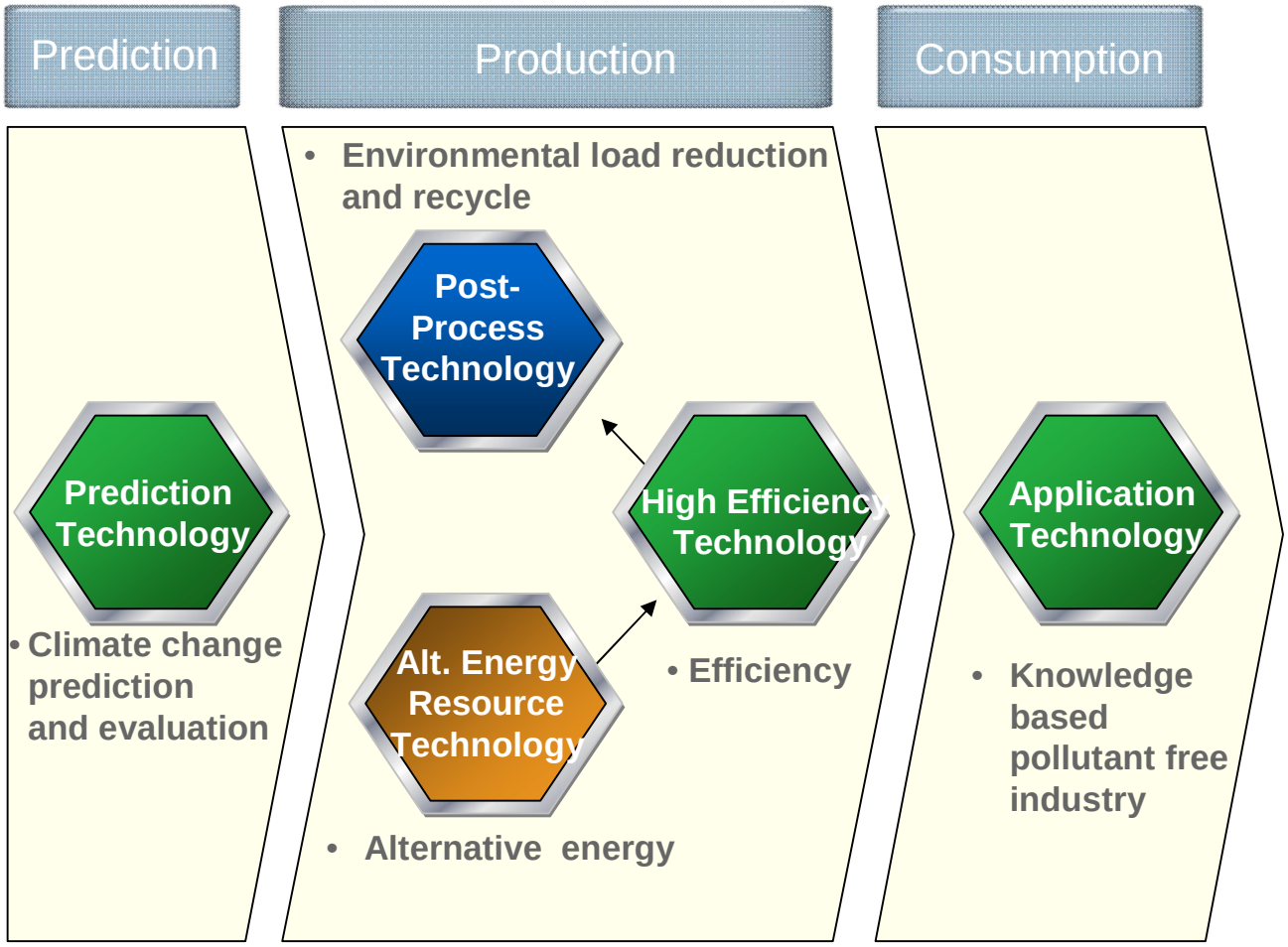
- Traditional green technology means eco-friendly resource utilization technology such as renewable energy, clean energy, etc (Technet, 07)

Traditional green technology : Renewable energy, Energy efficiency driven technology , Environmental technology , Climate change technology

Fusion green technology contributes to low-carbon and green growth to overcome the limitations of existing technologies or create a new market through convergence of new technologies or traditional products and industries

Introduction

Concept of green technology



Introduction
GT R&D masterplan

It will introduce national level green technology concept and investment direction and will be utilized as a mid-long term basic plan for systematic green technology development

Vision

Establishment of a green power country through green technology advancement

3 Goals

Green science & technology capability	Green industrial competitiveness	Environment sustainability
Technology level ('12) 80% compared to developed countries ('20) 90% compared to developed countries	Green tech employment creation ('12) More than 1.6 mil jobs shear in the global market ('12) more than 7% ('20) mare than 10%	Environment Sustainability Index (ESI) ('12) ranking in the top 20 ('20) ranking in the top 10

Introduction
Organizations

Presidential committee on green growth (PCGG)
Deals with R&D strategy, social issue, industrialization policy related on green growth

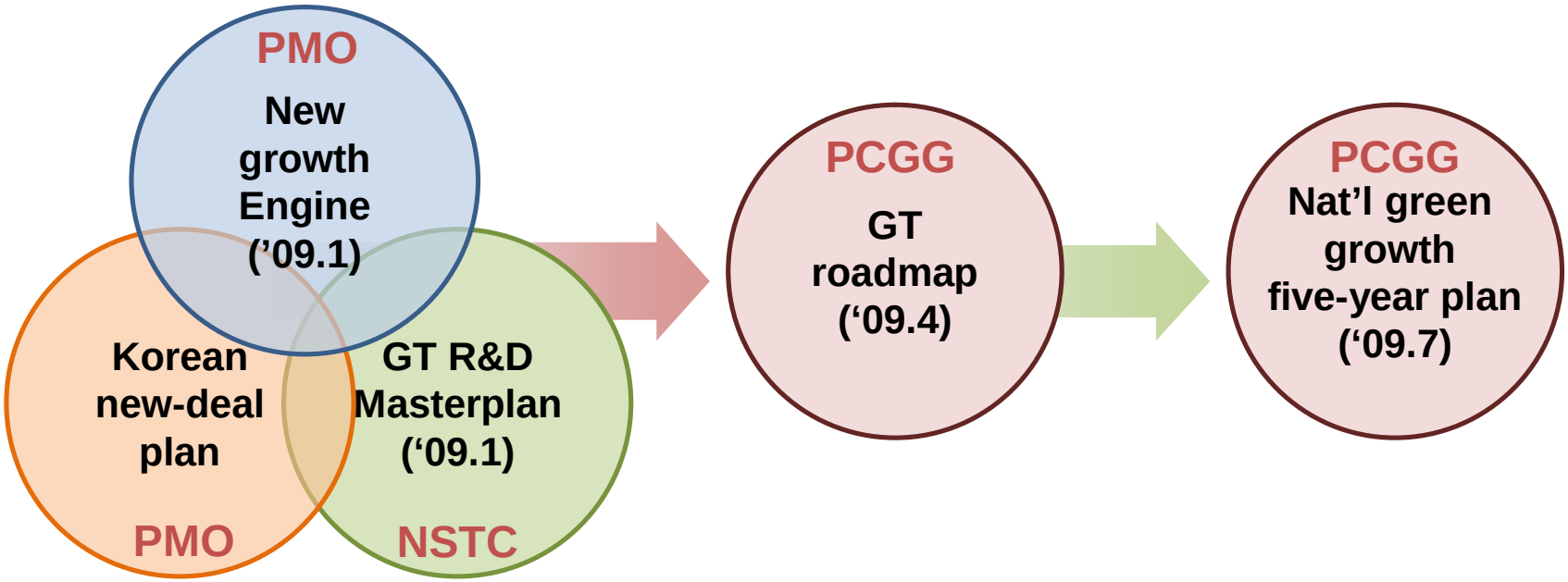
National S&T council (NSTC)
Deals with investment strategy and policy related on general R&D programs

Ministry of strategy finance
Budget coordination of R&D programs

Major policy and Key agenda for GT

Policy related with green technology

Three major policies support the green growth and green technology, and GT roadmap was constructed by PCGG based on the GT R&D masterplan



Major policy and Key agenda for GT

GT R&D masterplan and GT roadmap

Green technology R&D masterplan(‘09.1)

- Suggest the definition of green tech.
- Suggest the investment plan for green tech.
- Double national R&D expenditure on GT by 2012
- Select 27 high-priority technologies for selection and concentration strategy

Green technology roadmap(‘09.4)

- Divide 27 high-priority technologies into four groups
- Suggest investment strategy for each group
- Suggest the roadmap for the 27 technologies

R&D investment

Gov. R&D Investment

- R&D expenditure on green tech. is approximately 1.4 billion dollars (’08)
  - R&D expenditure on high-priority technologies : 1 billion dollars

Unit : million dollars

Year	’05	’06	’07
Nat’l R&D expenditure	7,029	8,764	9,575
R&D expenditure on GT	761	1,052	1,162
- Alt. energy source tech.	265	332	362
- High-efficiency tech.	294	482	515
- Post-process tech.	174	215	256
- Prediction tech.	28	22	30
Ratio of GT to total R&D expenditure (%)	9.8	12.0	12.1

Strategy for GT development

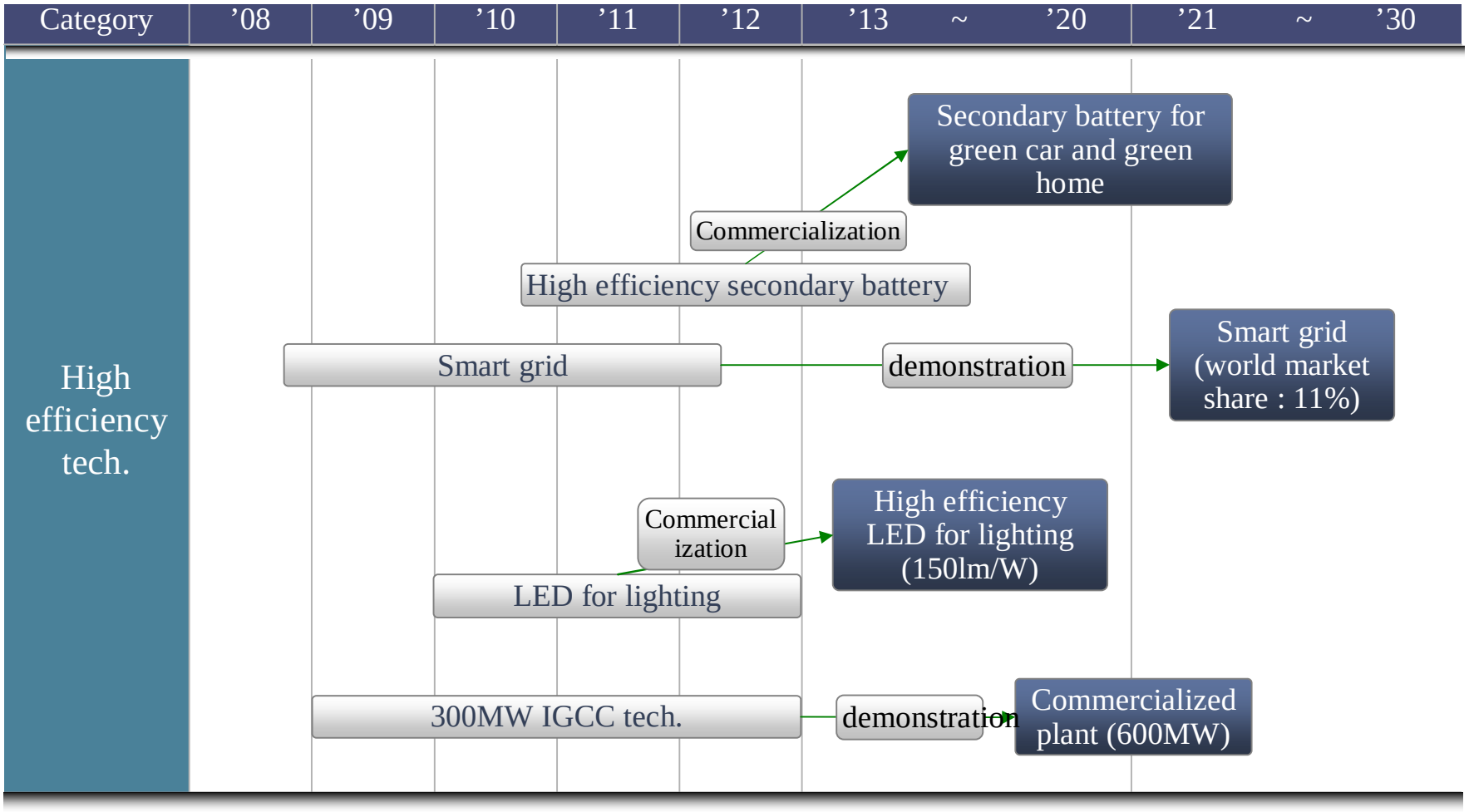
High priority technologies

Prediction Technology(3)	- Climate change prediction and modeling tech., etc.
Alternative Energy Technology(13)	- Low-price tech. of silicon-type solar battery tech. - High efficiency H_2 production and storage tech. - Next generation high efficiency fuel battery system tech., etc
High Efficiency Technology(10)	- Eco-friendly low-energy construction tech. - IGCC tech. - Energy storage tech., etc
Post process Technology(9)	- CO_2 capture, storage and process(CCS) tech. - Water treatment tech. - Eco-system restoration tech. - Alternative water resource tech., etc
Pollutant-free industry(1)	- Knowledge service - Virtual reality tech. etc

Strategy for GT development

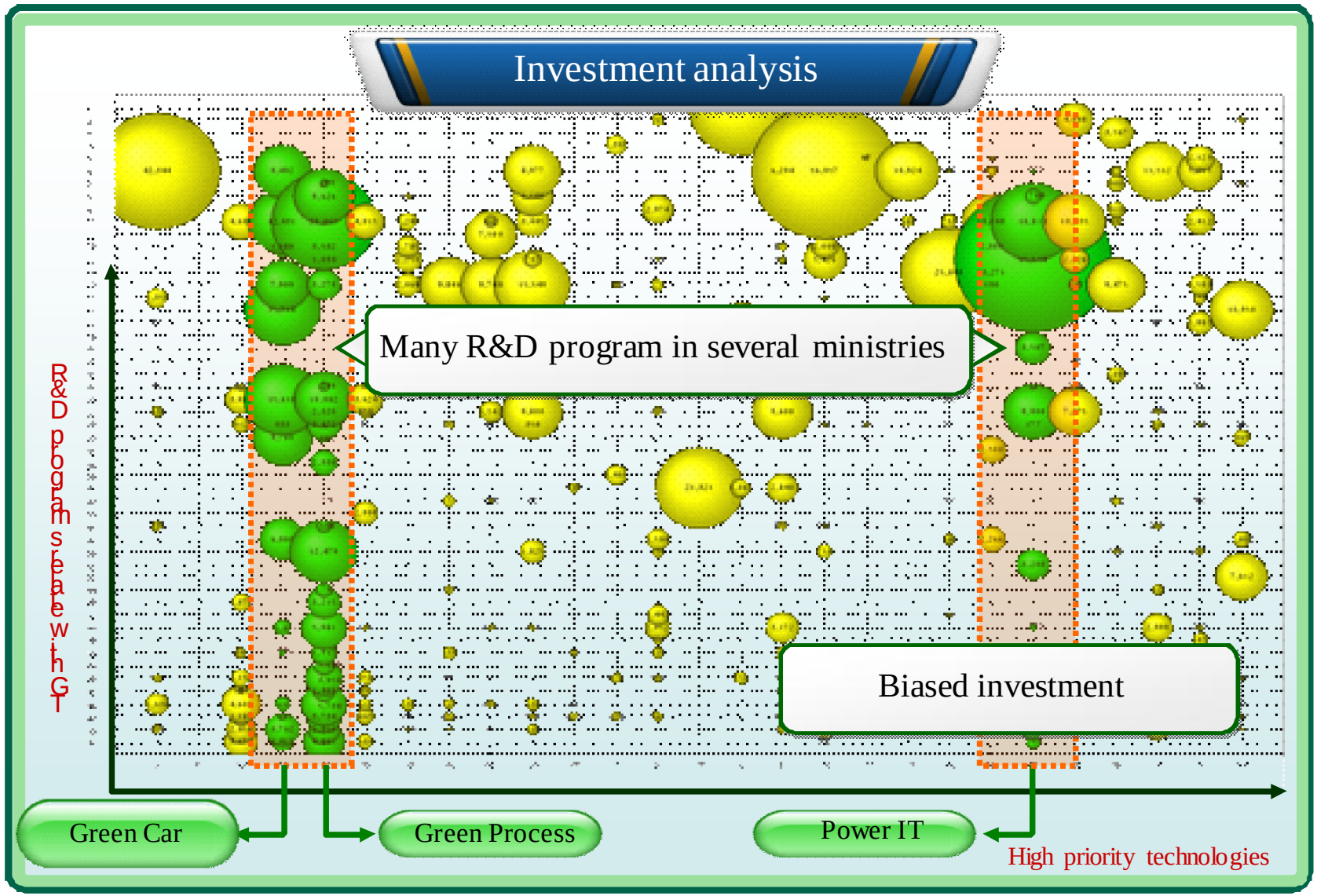
Technology roadmap

Roadmap for high efficiency technology (‘09-’30)



Strategy for GT development

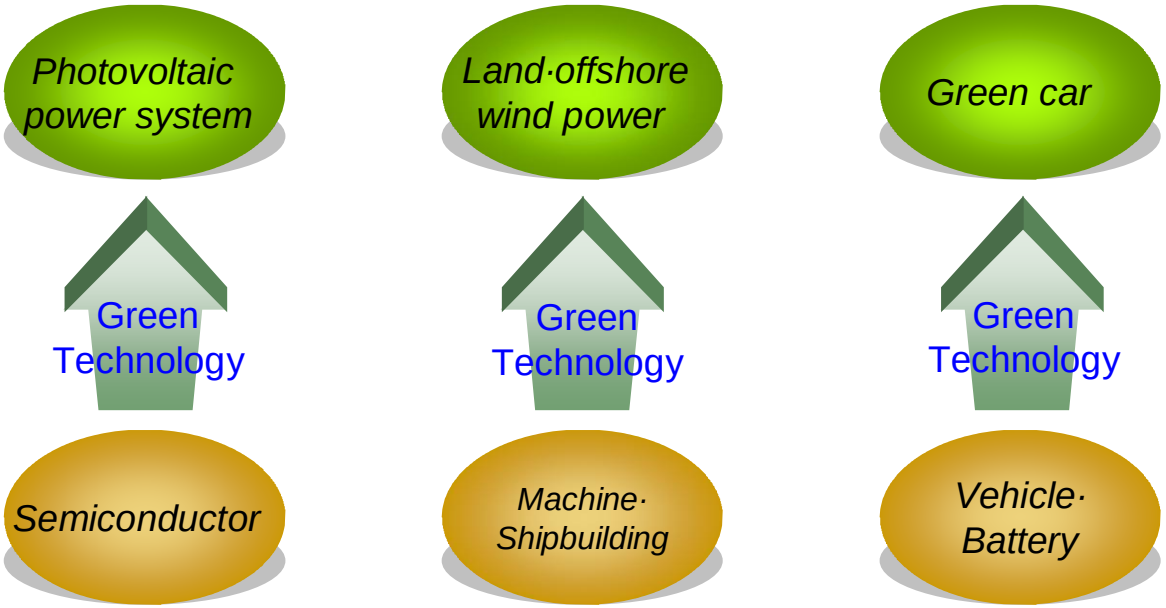
Improving investment efficiency of GT



Strategy for GT development

Green growth Strategy of private sector

- Green transformation using current growth engine technology
  - Apply green technology to the industry which is very competitive in Korea such as s emi-conductor, vehicle, ship, etc



  - Photovoltaic power system is based on semiconductor and display industry technology
  - Land and offshore wind power is based on machine and shipbuilding industry technology

Conclusion

- Green technology is essential for the green growth which includes environmental sustainability as well as industrial growth
- High-priority technologies(27 techs) are selected from green tech. for focused development
-
- Gov't R&D Budget for GT will be double by 2012
- Various plans related to green tech. are established, so update to the green tech. R&D masterplan is needed to include recent plans from several ministers

Agenda Setting for Green Growth Era

Herry Suhermanto
Directorate of Cooperative & SMEs Empowerment
Bappenas Indonesia

Green Growth is a policy focus for the Asia and Pacific region that emphasizes environmentally sustainable economic progress to foster low-carbon, socially inclusive development.

http://www.greengrowth.org/

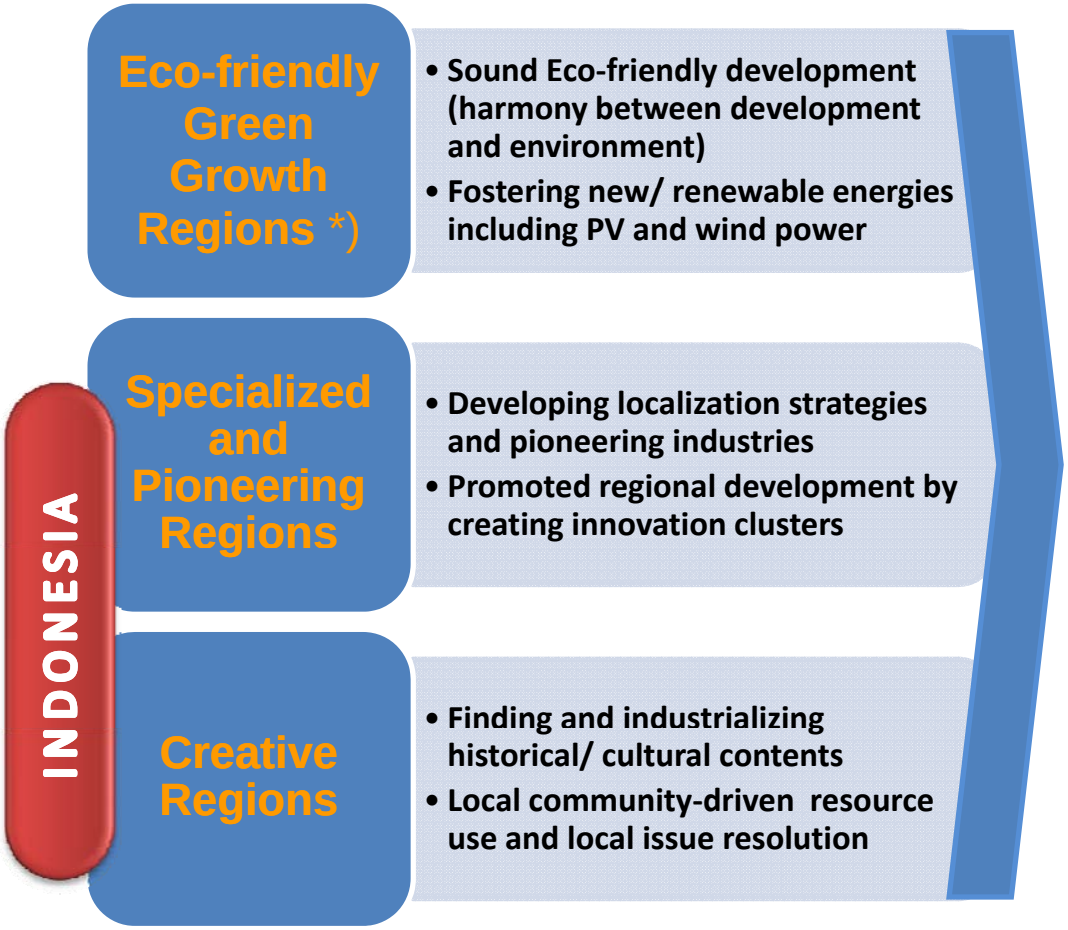
"Green growth can be seen as a way to pursue economic growth and development, while preventing environment degradation, biodiversity loss, and unsustainable natural resources use."

(OECD, 2010)

Issues to be Addressed

- *What market trends have created for green technology based SMEs?*
- *Can they be addressed with existing technology, or is new technology required?*
- *What drives the growth of these markets?*
- *What barriers do the SMEs face to access these markets green technology?*
- *How can government policies help overcome the barriers and facilitate access to these markets?*
- *What programs have been implemented to assist this green technology based SMEs?*

What market trends have created for green technology based SMEs?



1. Venture capitalists is willing to anticipate their investment in green/ clean tech
2. Crisis seems awakening economic players to correct the market and to shift the flow of funds to innovative ventures in green/ clean tech
3. Today green/ clean tech may still be costly relative to the dirtier ones
4. SMEs play major role in creating transitory economy to green growth –via new creative/ innovative firms
5. Energy and food security would be the base of SMEs in initiating green/ clean tech

**) Regionalization is adopted from invitation Criteria on Community Summit Orientation Session, MKE, South Korea, 23 April 2010*

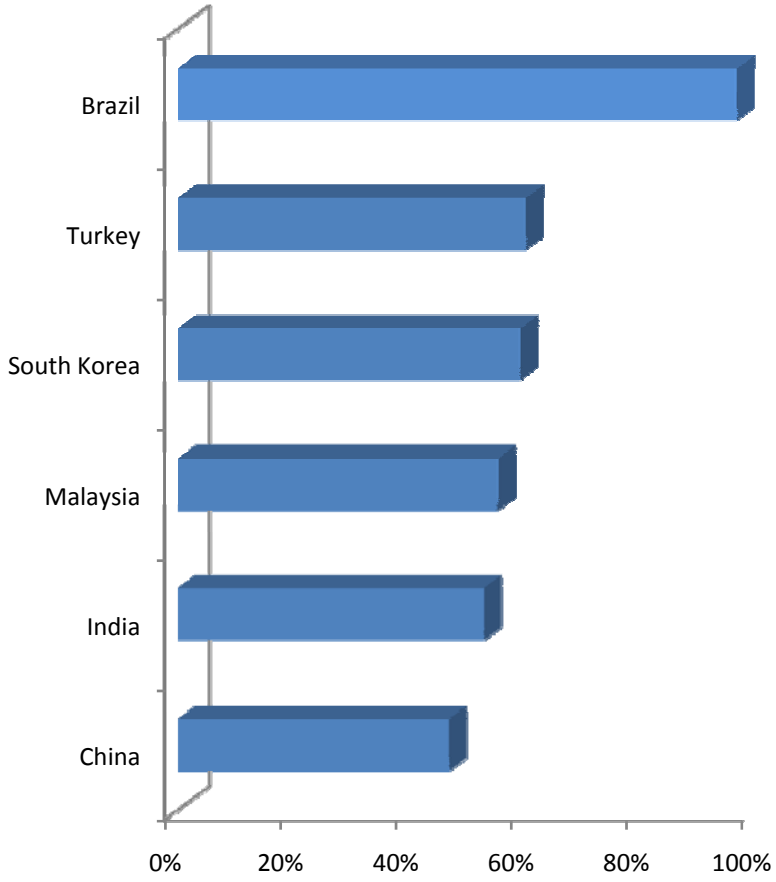
Can they be addressed with existing technology, or is new technology required?

What drives the growth of these markets?

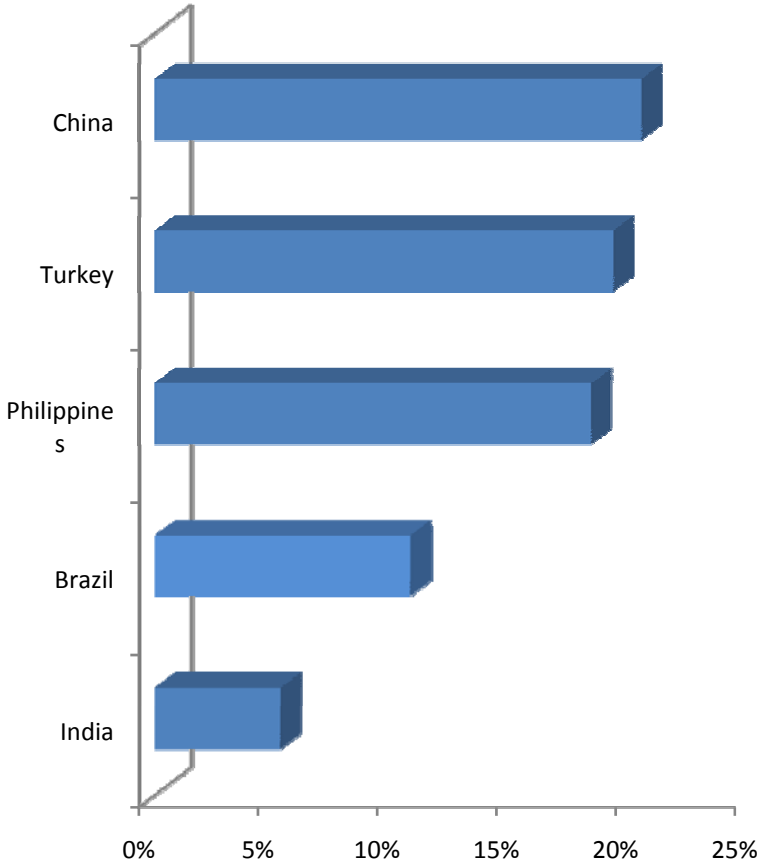
- ENVI • **APPREHENSION**
- GREEN • **INFORMATION**
- GREEN • **INNOVATION**
- GREEN • **CERTIFICATION**
- GREEN • **PRODUCTION**

1. Green Industry
2. Green Investment
3. Green Energy
4. Green Technology
5. Green Consumerism (market driven)

Broad-based innovation: % firms introducing a new product and/ or process



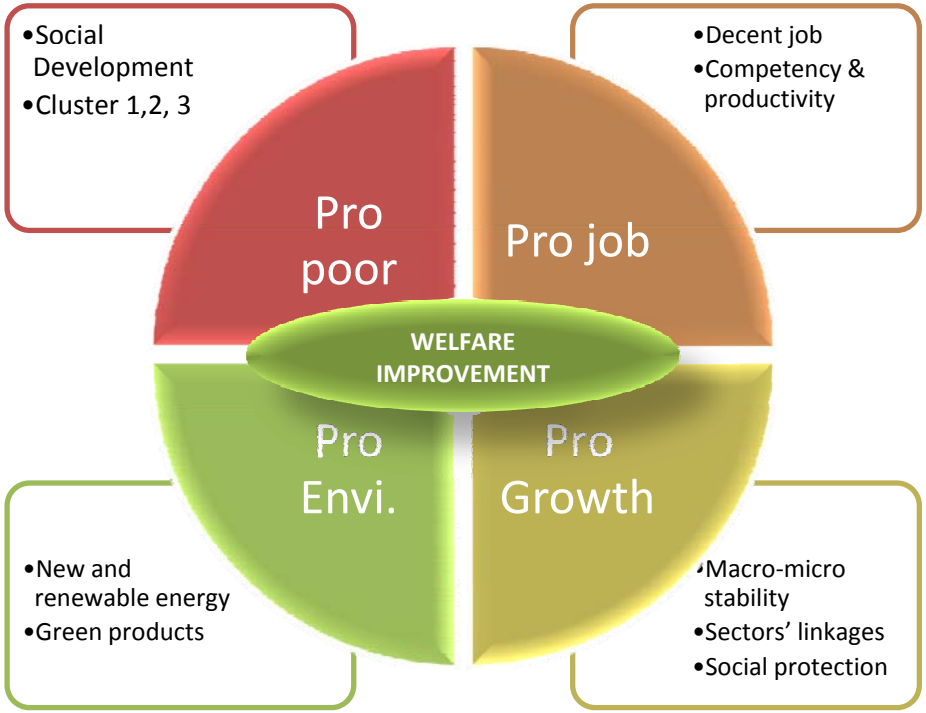
Information: % firms using foreign technology

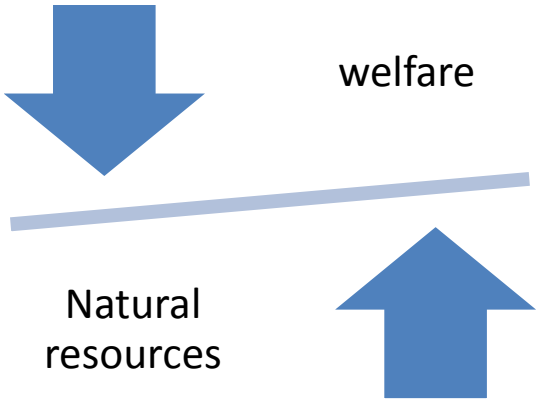


Source: World Bank/ IFC Enterprise Surveys, 1999-2008

Indonesia Essential Issues

- Population: 273,2 million in 2025
  - energy demand and consumption
    - rice: 35,5 million metric ton (2025)
    - electricity: 132 billion kWh/ capita/ year
    - drinking water: 4.900 billion liter/ year
  - waste (191,9 million metric ton of agricultural waste, 2008) and pollution
  - biodiversity
- Decreasing quality and quantity of natural resources
- Improving the People's Welfare



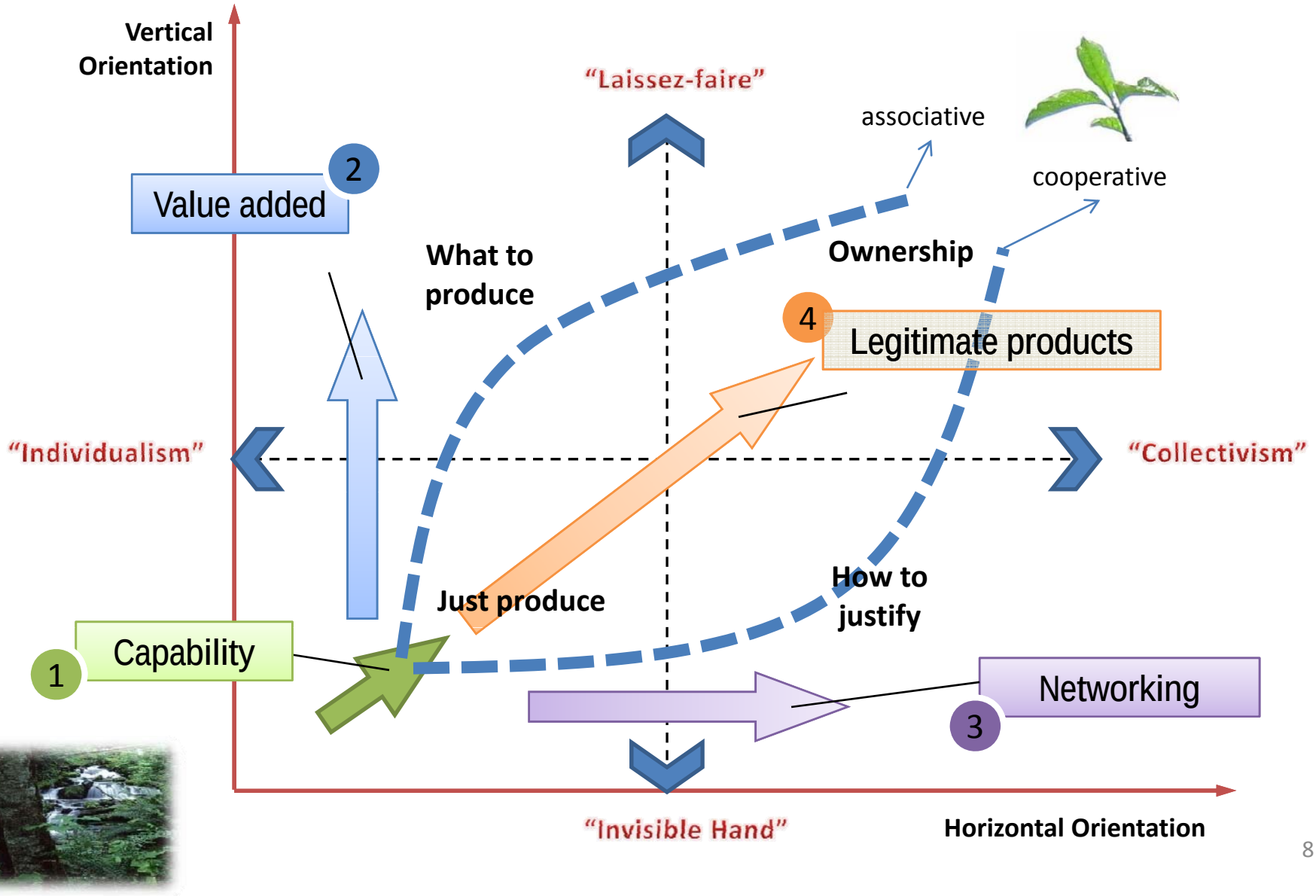


Go green?

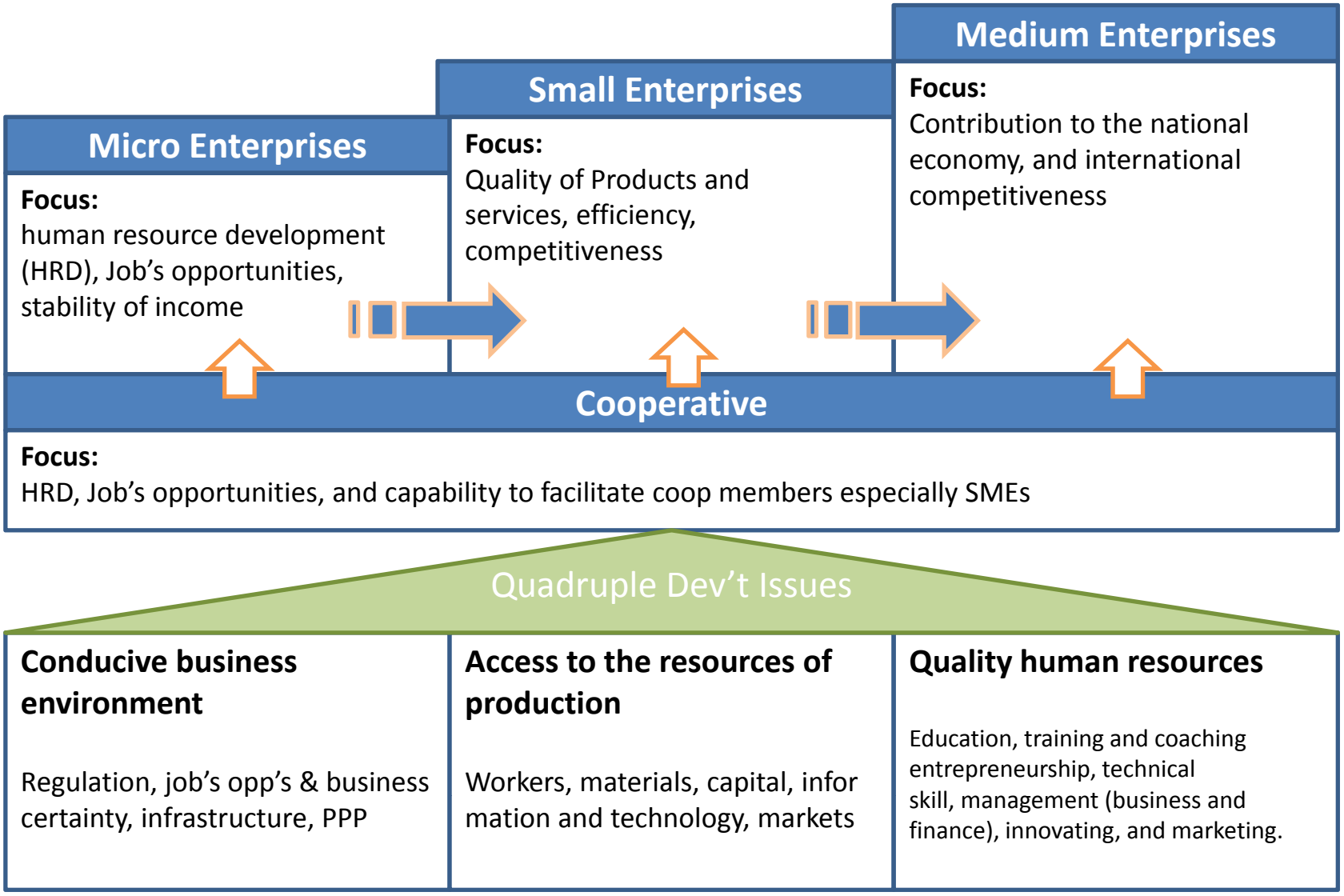
2010-2014

- Average growth: 6,3-6,8%
- Average Inflation: 4-6%
- Employment growth: 5-6% (2014)
- Poverty rate: 8-10% (2014)

What barriers do the SMEs face to access these markets green technology?



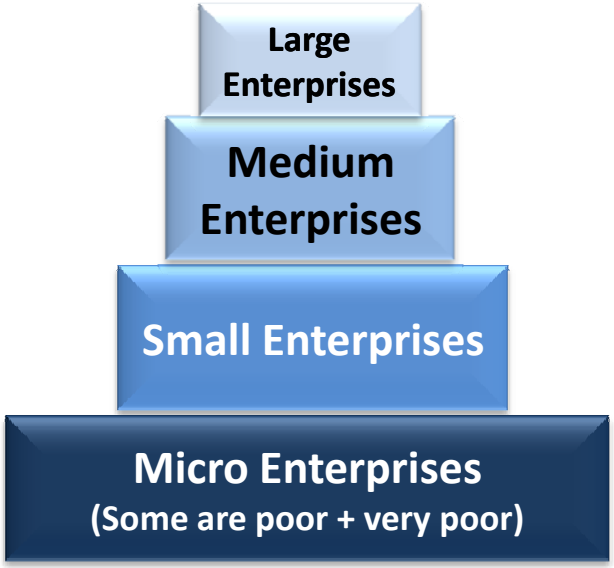
SMEs Development Strategy



SMEs Development

Imbalanced Growth Leading to Disparity in Economic Actors

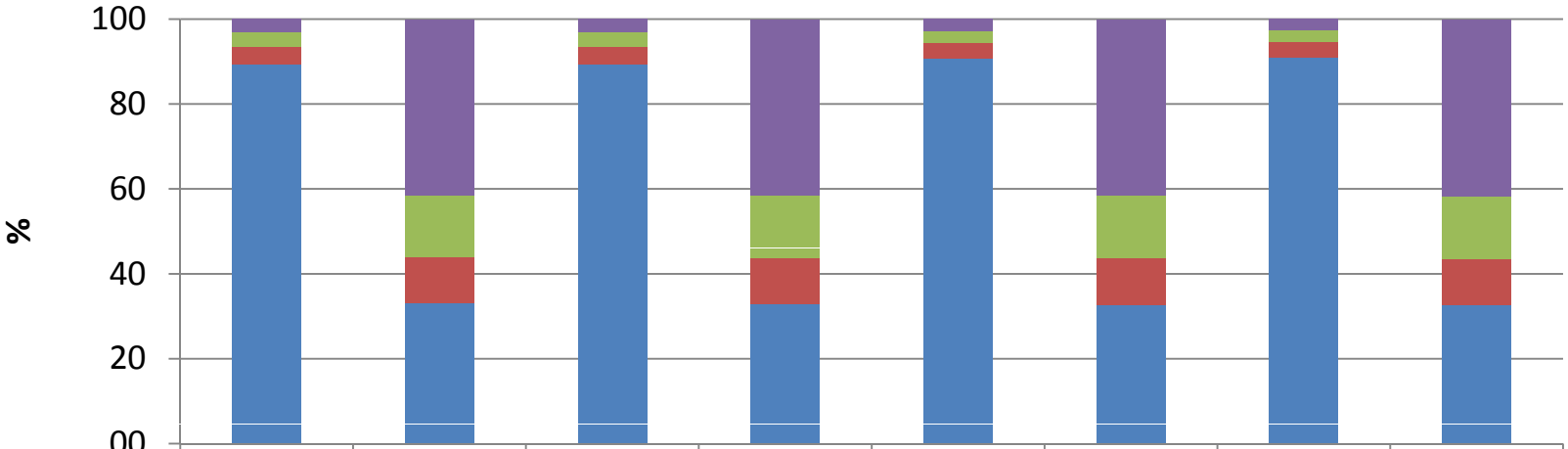
Natural Resources-based industry has contributed 24.8% to GDP and 48% to employment creation



1986	2006	2009
12.765	4.577	4.677
n/a	36.763	41.133
94.534	472.602	546.675
1.416.935	48.101.868	52.176.795

Sources: Tambunan, Suryanto & Agriva (2008, p. 20), and Statistic Indonesia & Ministry of CSMEs (2010).

Share of Employment and GDP among Economic Actors (2006-2009)

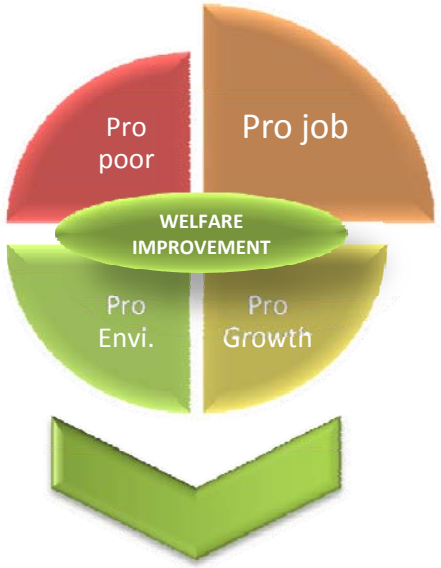


	Employment	GDP	Employment	GDP	Employment	GDP	Employment	GDP
Large	03	42	03	42	03	42	03	42
MSMEs	97	58	97	58	97	58	97	58
Medium	03	15	03	15	03	15	03	15
Small	04	11	04	11	04	11	04	11
Micro	89	33	89	33	91	33	91	33
	2006		2007		2008		2009	

Source : BPS & Ministry of Cooperatives and SMEs

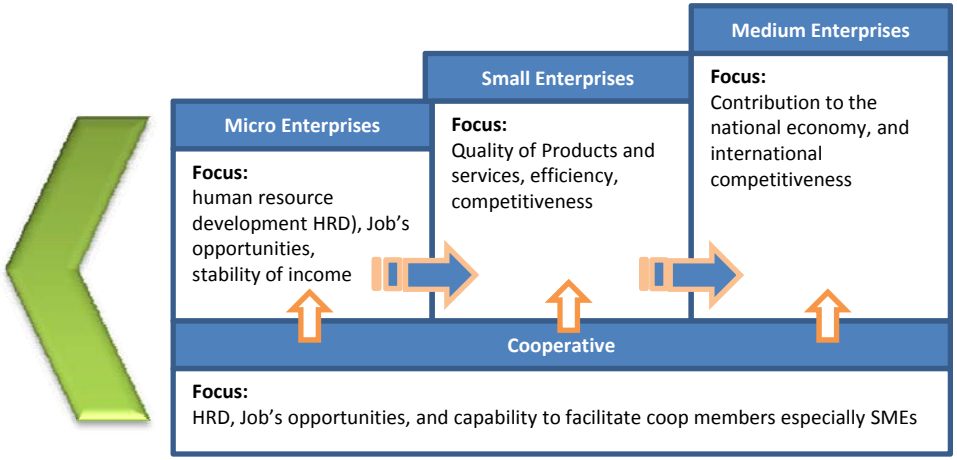
How Can Government Policies Help Overcome The Barriers And Facilitate Access To These Markets?

SMEs Main issues	
	▪ Lack of business plan ▪ High reliance on external support and funding ▪ Limited outreach due to lack of financial capacity ▪ Weak organizational structure → human resources capacity ▪ Limited facilities ▪ Limited numbers of new startup tenants



Development of Incubators: SMEs business upscale and technological transfer services institutions

1. creating environment concern entrepreneurs
2. bridging knowledge & technology → business
3. training, coaching , and advocating
4. providing other services (startup capital, patent, marketing)



THEREFORE:

Maintaining macro economic stability by supporting the growth of productive sectors which comprehend green knowledge and technology

1. Green Industry
   - Natural assets base industries – ecotourism
   - Creative industries: local and unique but meeting modern standards – cultural base
2. Green Investment –sustainable infras.
3. Green Energy –meets local specific needs: New & renewable energy (small scale and use local resources to fulfill energy needs for an isolated location).
4. Green Technology
5. Green Consumerism (market driven)

WELFARE

Job's creation

Technology and innovative activity	Access to finance	Capacity building	Institutional supports and communication

INCUBATORS

SMEs need to be up scaled and transformed as "green economic" agents

Suprastructures

to create a conducive environment and to provide sustainable consumption choices.

Business	**Government**	**Universities**

What Programs Have Been Implemented To Assist This Green Technology Based SMEs?

Institutions	Programs
Ministry of Industry & Trade (MoIT, now Ministry of Industry and Ministry of Trade)	▪ DAPATI Matching Grant (1997-2001) for technology upgrading services ▪ TA and Training Program (TATP, 2000-2003): matching grants for increasing use of IT consulting services by SMEs ▪ 30 One Stop Service (OSS) for business licensing, registration and investment
State Ministry of Cooperatives & SMEs	MAP (matching grant) program for SME cluster development; institutional strengthening 957 BDS providers (BDS-P) in 33 provinces
Ministry of Education	Voucher program: grants for university students/lecturers delivering technology services to SMEs
Others (program donors and counterparts)	Central Java Provincial Government (FPESD), Bank of Indonesia (KKMB), Chambers of Commerce (CDSME), etc.
	ADB, AusAid, CIDA, GTZ, IFC, SwissContact, The Asia Foundation, USAID, World Bank, & others

Previous Development

a. BIMAS - Indonesian green revolution → rice self-sufficiency in 1984/5 – technology and social innovation
b. IPTEK DAERAH: partnership between research institutes/ universities-local governments → appropriate technology for income improvement

New developments

a. NGO-private sectors → revitalization of cultural products → batik, tenun (traditional weaving), pottery etc
b. NGO-domestic and international community: local/ rural electrification and rural energy (biomass, bio-gas)
c. NGO-international community-private sectors (CSR) - Green activities – eco-tourism

Expected Roles of Stakeholders in Incubators' Development

- GOVERNMENT:
  - Providing affirmative actions to support green business through policy and regulation;
  - Improving business environment;
  - Supporting research and development → appropriate technology and innovation related to green growth arrangement;
  - Supporting the development of clusters and business partnership; and
  - Promoting and disseminating innovation/ technology.

- PRIVATE SECTOR:
  - Source of funding, innovation and product/ system development through corporate social responsibility;
  - Promoting and disseminating innovation/ technology;
  - Implementing partners for government programs; and
  - Developing clusters and market linkages.

- RESEARCH AND DEVELOPMENT INSTITUTIONS AND UNIVERSITIES:
  - Sources of innovation and technology;
  - Promotion and dissemination of innovation and technology;
  - Implementing partners for government programs; and
  - Providing training for technology adoption.

- CIVIL SOCIETY ORGANIZATIONS:
  - Promotion and dissemination of innovation and technology;
  - Implementing partners for government programs;
  - Facilitating the link to market and financial sources; and
  - Providing training, coaching and consultation.

- PUBLIC-PRIVATE PARTNERSHIP: Research and development; promotion and dissemination, local capacity development, institutionalization of innovation, and network development

Development of Incubators In Indonesia

Roles	Job creation, new business startup, technology transfer & adoption
Existing & operating	56 incubators in universities, foundation, government institutions
Reasons for establishment	Business opportunity and/or technology innovation
Funding	Incubators, government subsidy, cooperation with other institutions, fees from tenants, other domestic donors
Support & services	▪ Space & shared facilities ▪ Management & marketing advice/support ▪ Design & patent ▪ Seed capital & support for accessing external funds ▪ Training
Service charge	Based on the use of facilities, the capital provided by tenant, the advancement of the tenant's business, or free of charge
Sectors	Handicrafts, services, agribusiness, trade
Business incubation period	2-5 years
Beyond incubation	Some tenants maintain linkage with business incubators for business consultation, networking, marketing, management services, and ownership purposes

A US Sample of Incubator

- We urge entrepreneurs who share our vision to consider applying for admission to our incubator.
- Due to limited space, we only select companies that have a well developed and feasible business idea, a mission aligned with Bethesda Green, and the potential to have the greatest impact on the community and contribute to creating a vibrant 'green' sustainable business cluster.

The types of companies the incubator seek to attract for incubation are:

1. Green, socially responsible, sustainable companies that have a positive impact on our community
2. small local companies
3. Larger green companies with a local presence
4. Both for-profit companies and non-profit organizations
5. Companies from diverse sectors including software development, finance, technology, architecture, consulting and distribution
6. Companies addressing a myriad of issues including energy efficiency, green transportation, planning, design, neighborhood revitalization, recycling

http://www.bethesdagreen.org/Incubate/tabid/381/Default.aspx

Conclusion:

a. Develop incubators as institutions to disseminate related green knowledge and information; and, the know-how to practice it properly
b. Focus to the creation of green entrepreneurs equipped with capability of using appropriate green technology – with respect to local wisdom, ownership, sustainability, economic, environmental and social value
c. Provide incubators with related resources and services developed locally yet interconnected nationally and internationally – good prospect for SMEs to meet local needs and provided locally, yet able to supply bigger market with green products
d. Active Stakeholders participation: support for wider connections, upgrade standards to meet consumers' demand, promote and disseminate innovation and technology information; and creating a win-win environment via partnerships

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Identifying Green Technology Areas for SMEs

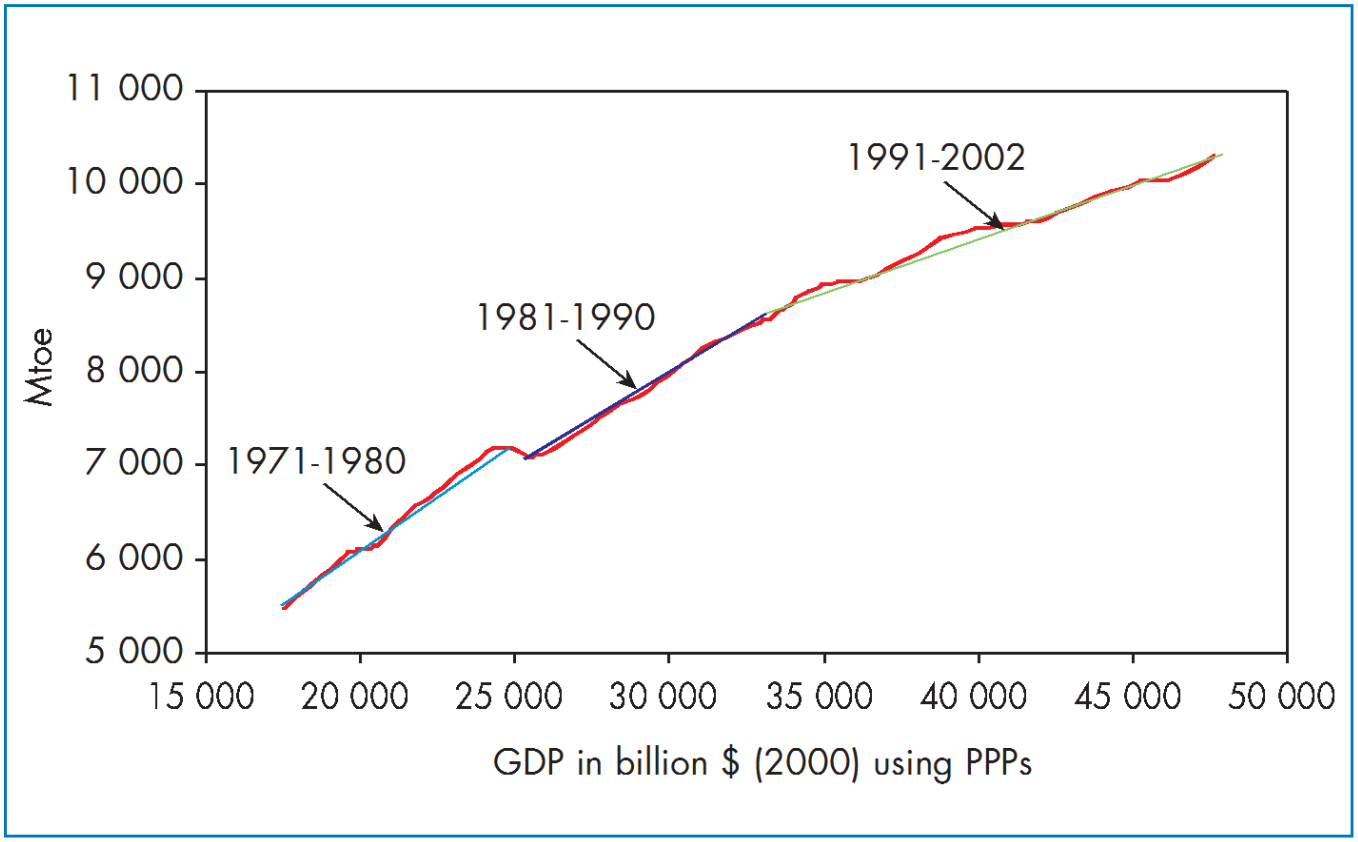
Morten Boje Blarke
Assist. Prof., M.Sc. Eng. Ph.D. Sustainable Energy Planning

Denmark's success in wind power and sustainable energy: Is replication possible?

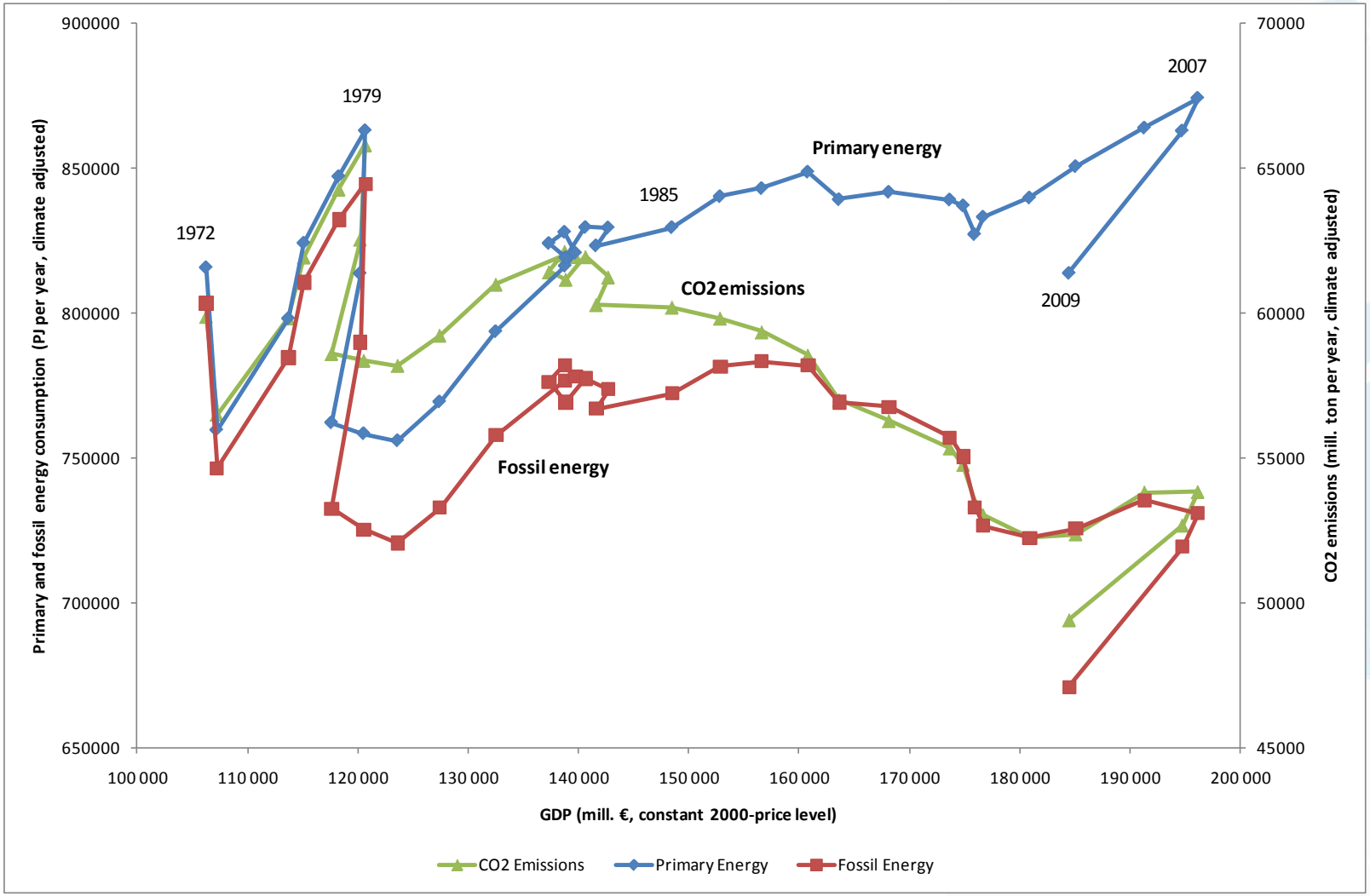
Earth Day, April 2009, USA

US is investing 150 billion dollars over 10 years for renewable energy

Global GDP and primary energy consumption



Slowly losing the addiction on fossils



1960's: Johannes Juul and the Gedser Wind Turbine

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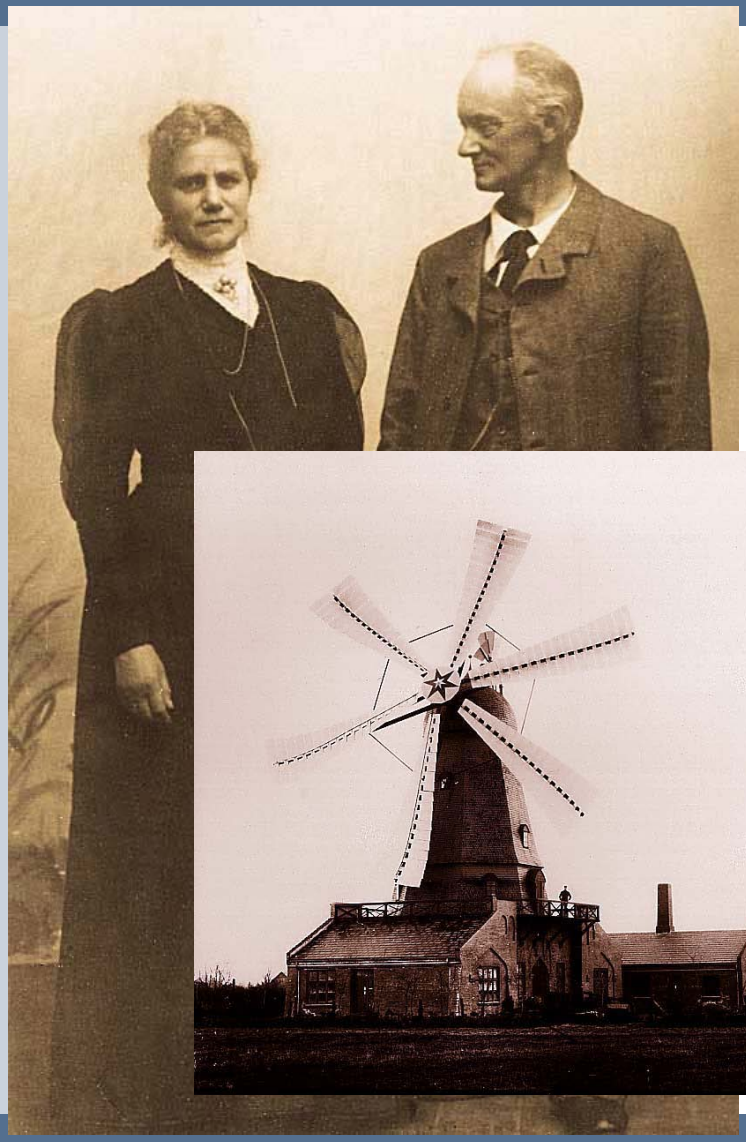


1940's and 50's: The Bogoe Wind Turbine

Juul was fighting a losing battle: Post-WW2 is a carbon-rush

1969: Juul and the Gedser Wind Turbine dies having taken
"... one small step for man, one giant leap for mankind".

... and the world could not care less.

1973 and 1979: The Oil Crises

1974 – 1984: Authorities were set to have nuclear energy replace oil and coal – but grassroots had other ideas

1985: Nuclear power banned from public energy planning

The Danish Parliament

Fremsat den 12. februar 1985 af Lone Dybkjær (RV), Jytte Hilden (S), Margrete Auken (SF) og Tinning (VS)

Forslag til folketingsbeslutning

om offentlig energiplanlægning uden atomkraft

Folketinget pålægger regeringen at tilrettelægge den offentlige energiplanlægning ud fra den forudsætning, at atomkraft ikke vil blive anvendt.

Bemærkninger til forslaget

Udredningsarbejdet vedrørende atomkraftens sikkerhed, økonomi og affaldsopbevaring er nu afsluttet, jfr. miljøministeriets rapporter af februar og marts 1984 om sikkerheden ved kernekraftværker, placering af kernekraftværker og vurdering af elværkernes salthorstundersøgelser samt energiministeriets rapport af november 1984 om forhold af betydning for elektricitetsproduktion på basis af kul og uran.

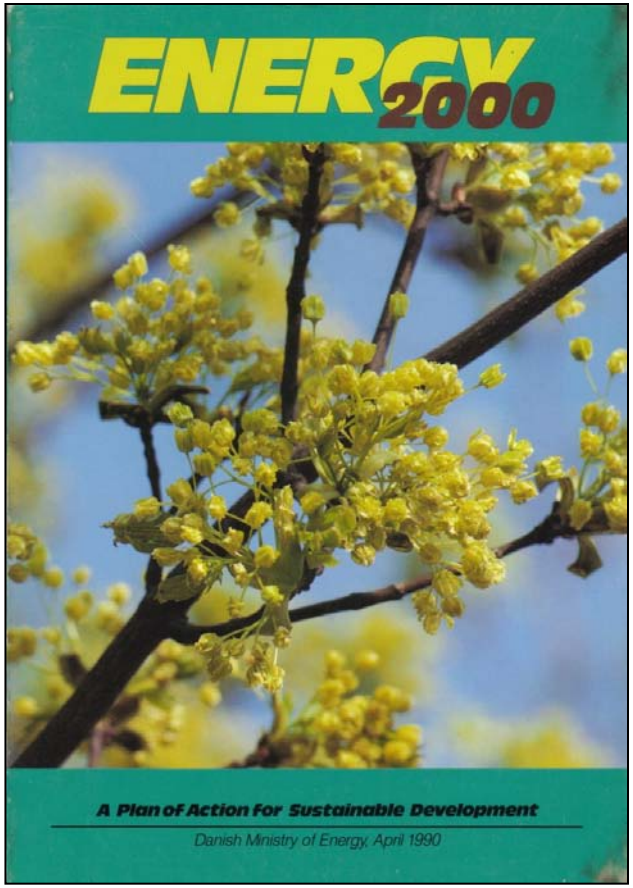
På denne baggrund er det forslagsstillernes opfattelse, at atomkraft med den viden og teknologi, der er til rådighed i dag, skal udgå af den danske energiplanlægning, hvorfor det pålægges regeringen at drage de nødvendige konsekvenser heraf.

Forslagsstillerne opfordrer energiministeren til straks ved begyndelsen af folketingsåret 1985-86 at give det energipolitiske udvalg en redegørelse for iværksatte og påtænkte foranstaltninger til efterlevelse af beslutningsforslaget.

Folketingsbeslutningen blev vedtaget ved 2. (sidste) behandlingen den 29. marts 1985, med 79 stemmer (S, SF, RV og VS), mod 67 (KF, V, CD, KrF og FP).

April 1986:
The Chernobyl Disaster

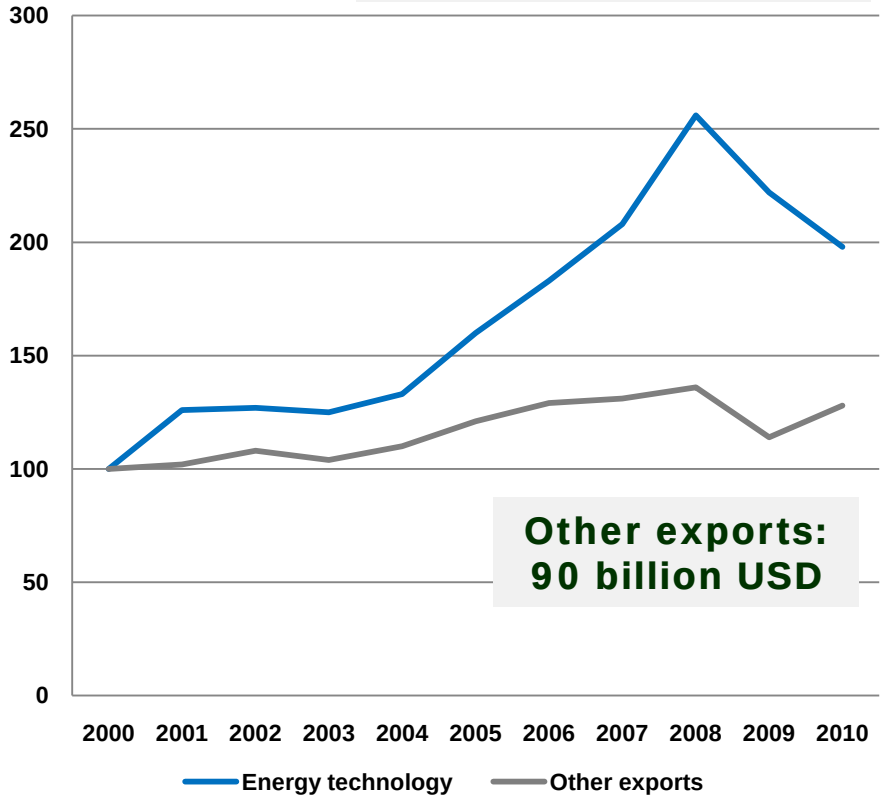
1990: The World's First Sustainable Energy Plan



Success Indicators: Energy Technology Exports and Jobs

Exports (10 % of total / 2010)

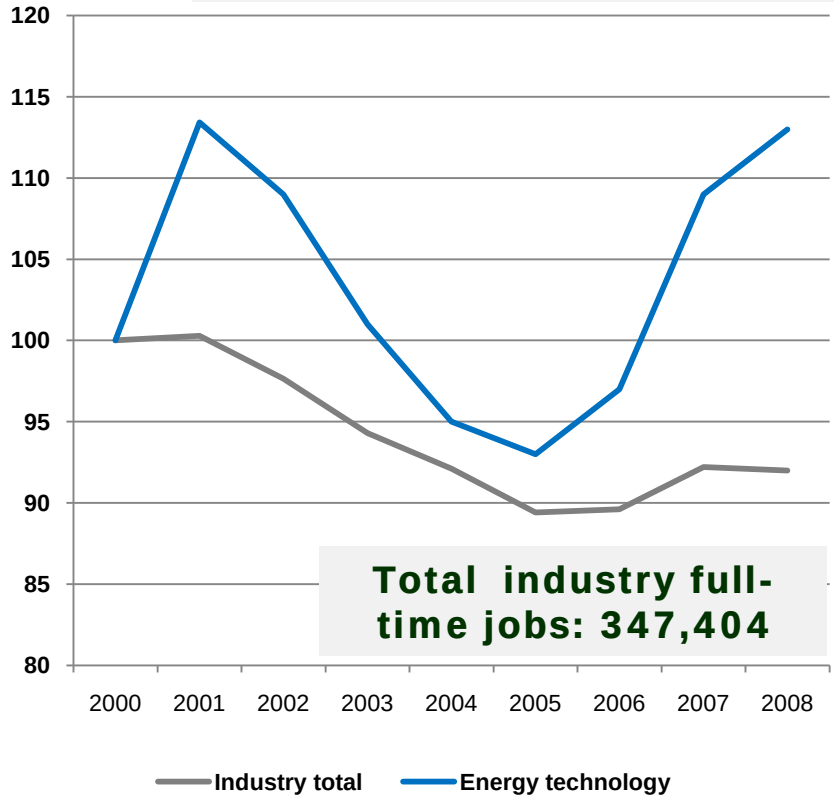
Energy technology exports 10 billion USD



Other exports: 90 billion USD

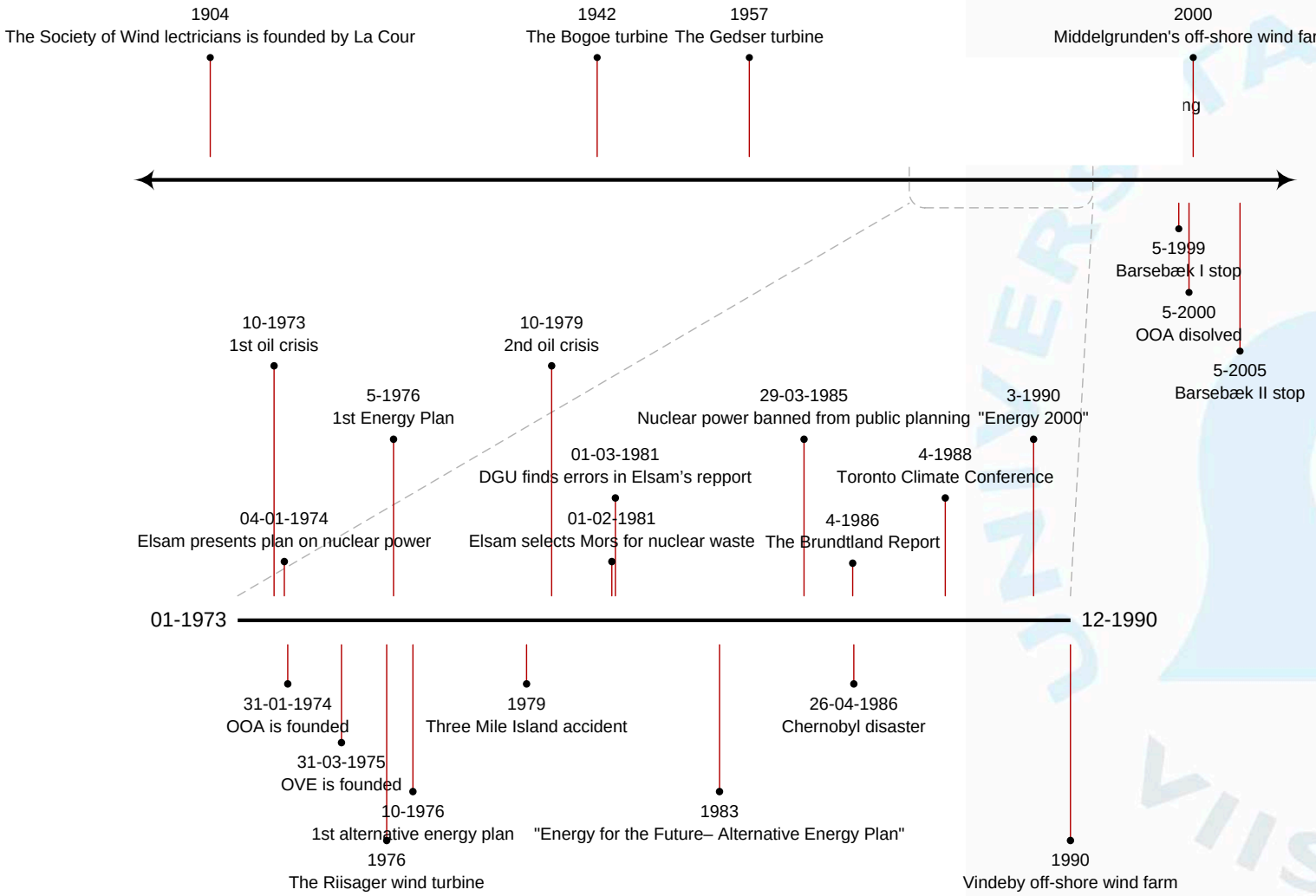
Jobs (12 % of total / 2010)

Energy technology industry full-time jobs: 41,106

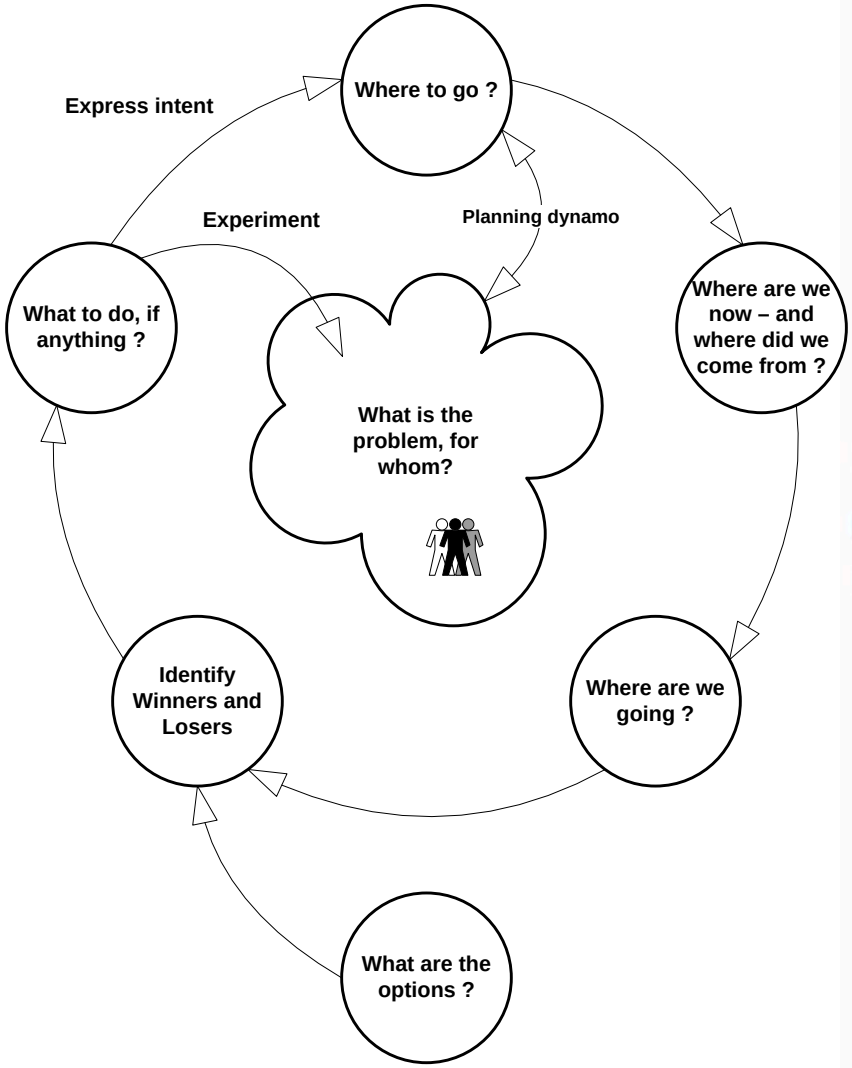


Total industry full-time jobs: 347,404

What's the secret to success ?



Understanding context



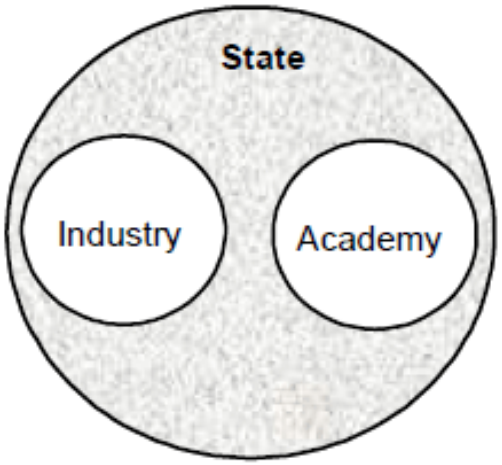
Conclusion

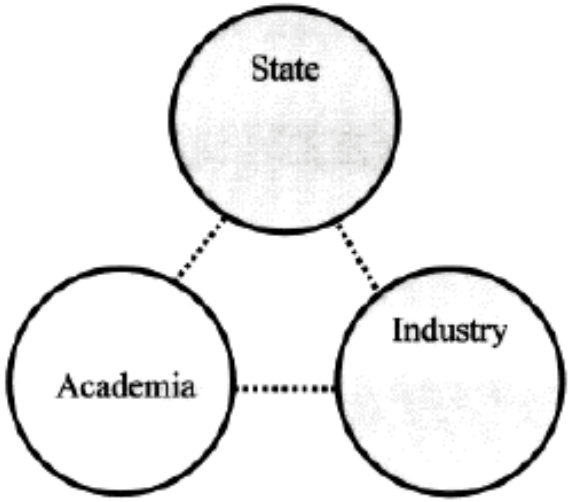
- No single event, decision, or policy may explain Denmark's success in wind power technology and sustainable energy
- Rather, developments are deeply rooted in complex contextual (social, political, economic, educational) conditions that may inspire, not be replicated

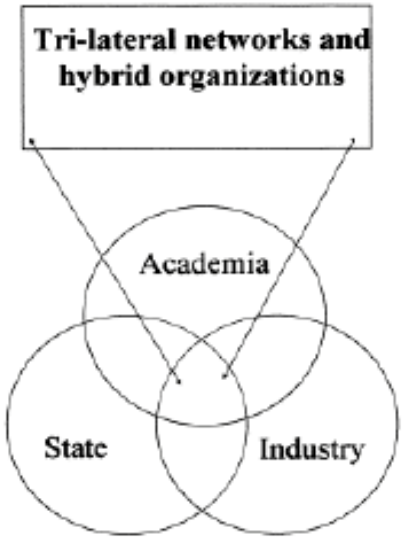
- Key inspirations:
  - Early SME developments were anti-establishment – venturing into technologies and territories that challenged vested interests
  - Early SME developments is characterized by small successes and big failures
  - Transparency in public utility decision-making and methods was crucial for academia to getting involved

Today's project-based multi-lateral development organisations

The triple helix of innovation and constructive conflict





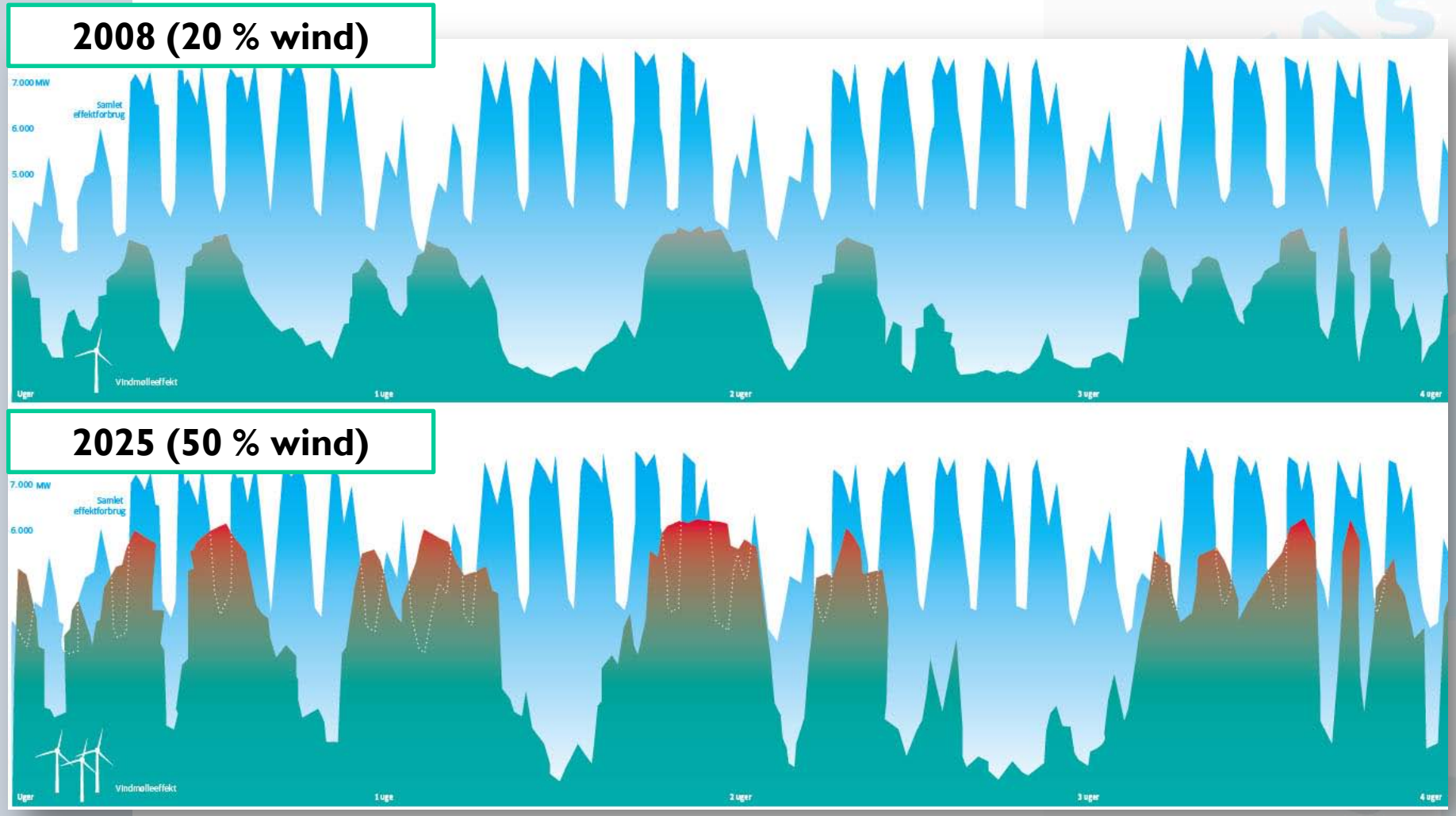


Source: Adapted of Etzkowitz & Leydesdorff (2000, p. 4).

US market developments – and President Carter's policy on renewables – were important to early Danish wind power developments

An example of events in Europe and the US markets that may bring leverage to Asian SME developments …

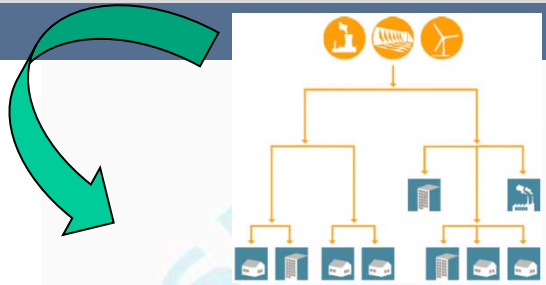
The Intermittency Challenge



Towards an Intermittency-Friendly Energy System

The rage is on about SmartGrids

Market	Annual volume
Communication Tech. : Smart Meters, network infrastructure, etc.	$20B in 2015 (Cisco)
Energy (!) Storage: Advanced batteries, flow batteries, etc.	$1.3B in 2013 (TechNavio)
Power Electronics: MOSFETs, solid-state transformers, etc.	$3.1B in 2016 (Electronics.ca)
Security: Cyber security hardware services and software	$3.7B in 2015 (Pike Research)



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Conclusion: Creating an SME-friendly context

- Failure is a pre-condition for success. Support risk takers.
- Transparent and democratic decision-making is pre-condition for constructive conflicts. Support diversity and productive opposition.
- Access to new markets is key. Invent domestic markets.
- Prepare to work in project-based multi-lateral development organisations. Support project-based education and celebrate entrepreneurship.
- Ignore forecasts. Maximize optionality! (Vinod Khosla June 26th 2011, Founder of Sun Microsystems on entrepreneurship conference)