



Frankfurt School
UNEP Collaborating Centre
for Climate & Sustainable Energy Finance

“GREEN
TRANSFORMATION” &
GLOBAL INVESTMENT
-
ARE WE ON TRACK?

Ulf Moslener
(with Karol Kempa)

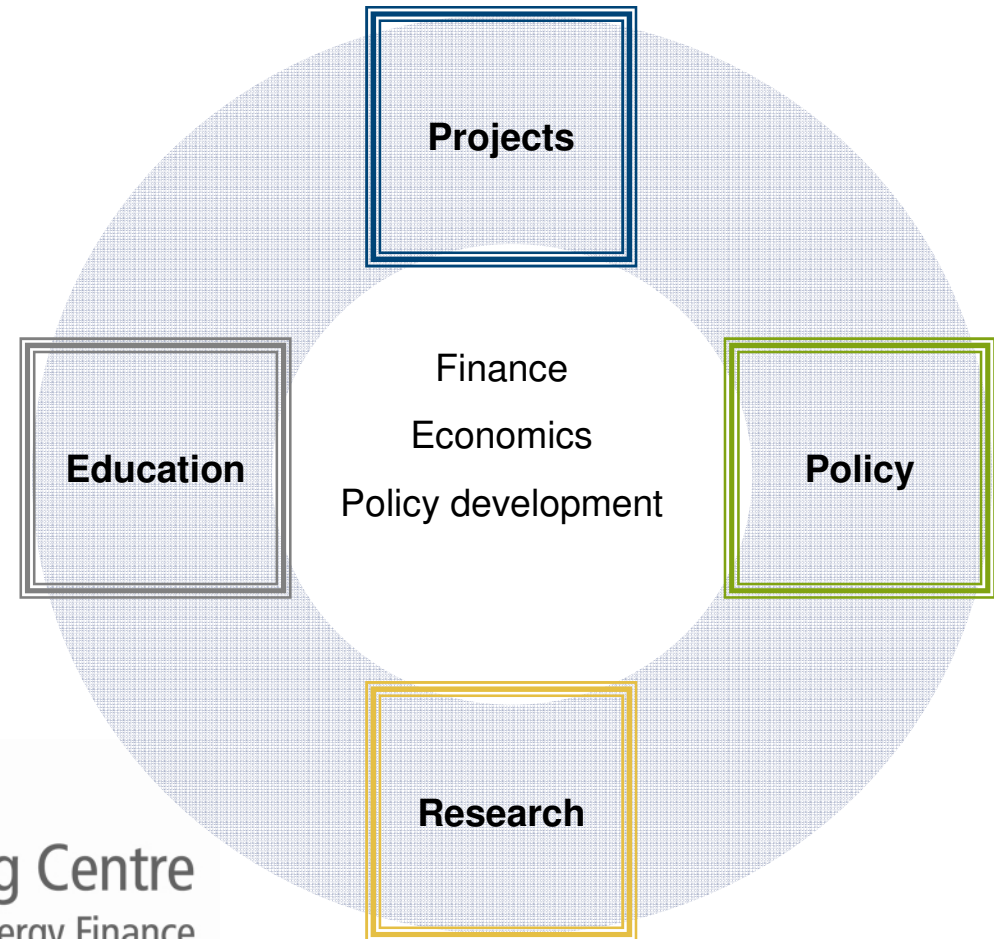
DIE, Bonn, 6 November 2012

CONTENT

- Investment needs – investment trends
- The climate policy shift
- Are we on track?

FRANKFURT SCHOOL – UNEP CENTRE

- Strategic collaboration:
UNEP -- Frankfurt School
- Research / applied research
- Implementing findings and
instruments in the field



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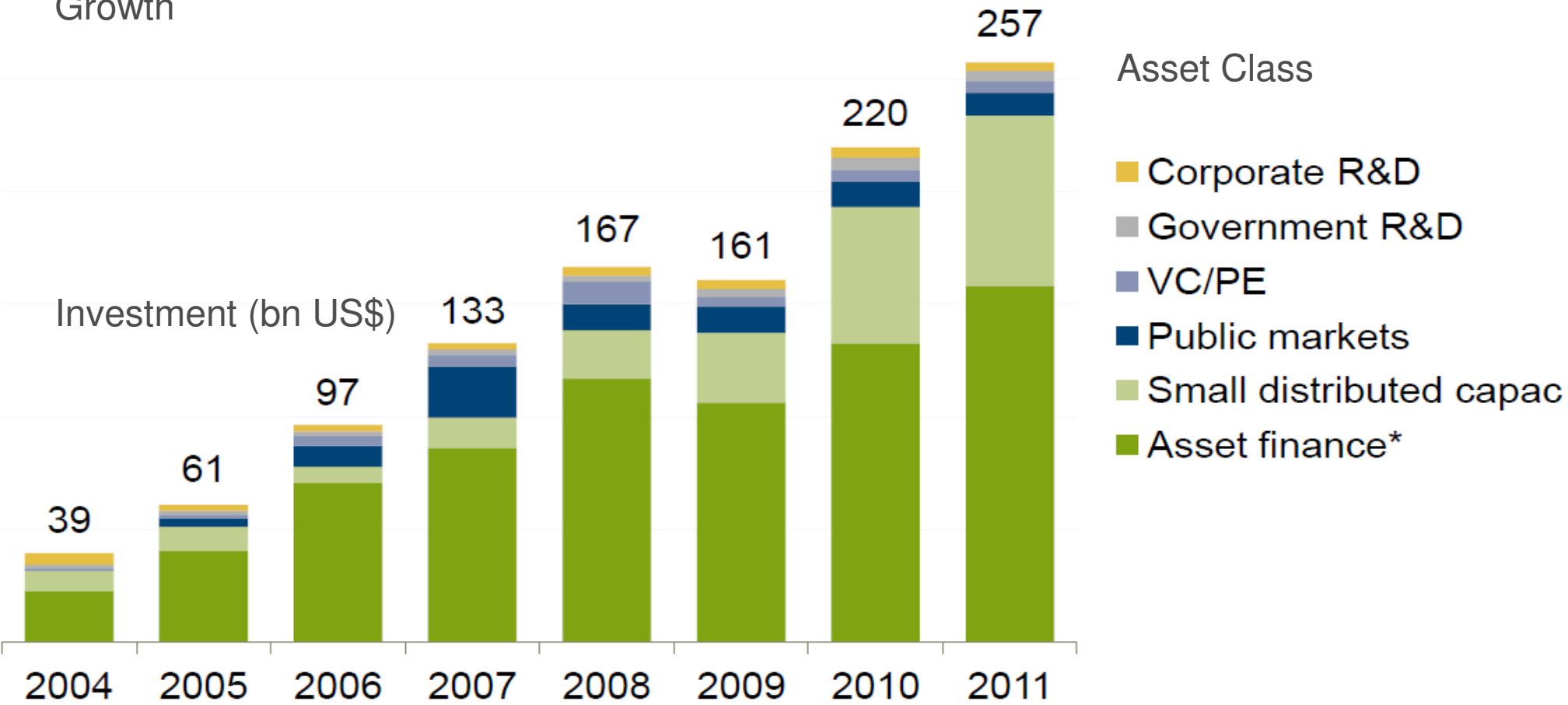
GLOBAL INVESTMENT NEEDS

Investment need (additional, per annum)	Study	Comment
200-210 bn US\$ until 2030	UNFCCC (2008)	Emissions 25% below 2000
660 bn US\$ in 2020; more thereafter	McKinsey (2009)	450 stabilization, no transaction costs of any kind
~1150 bn US\$ until 2050	IEA (2010)	Includes some innovation expenditures
...

GLOBAL INVESTMENT TRENDS (RENEWABLES ONLY)

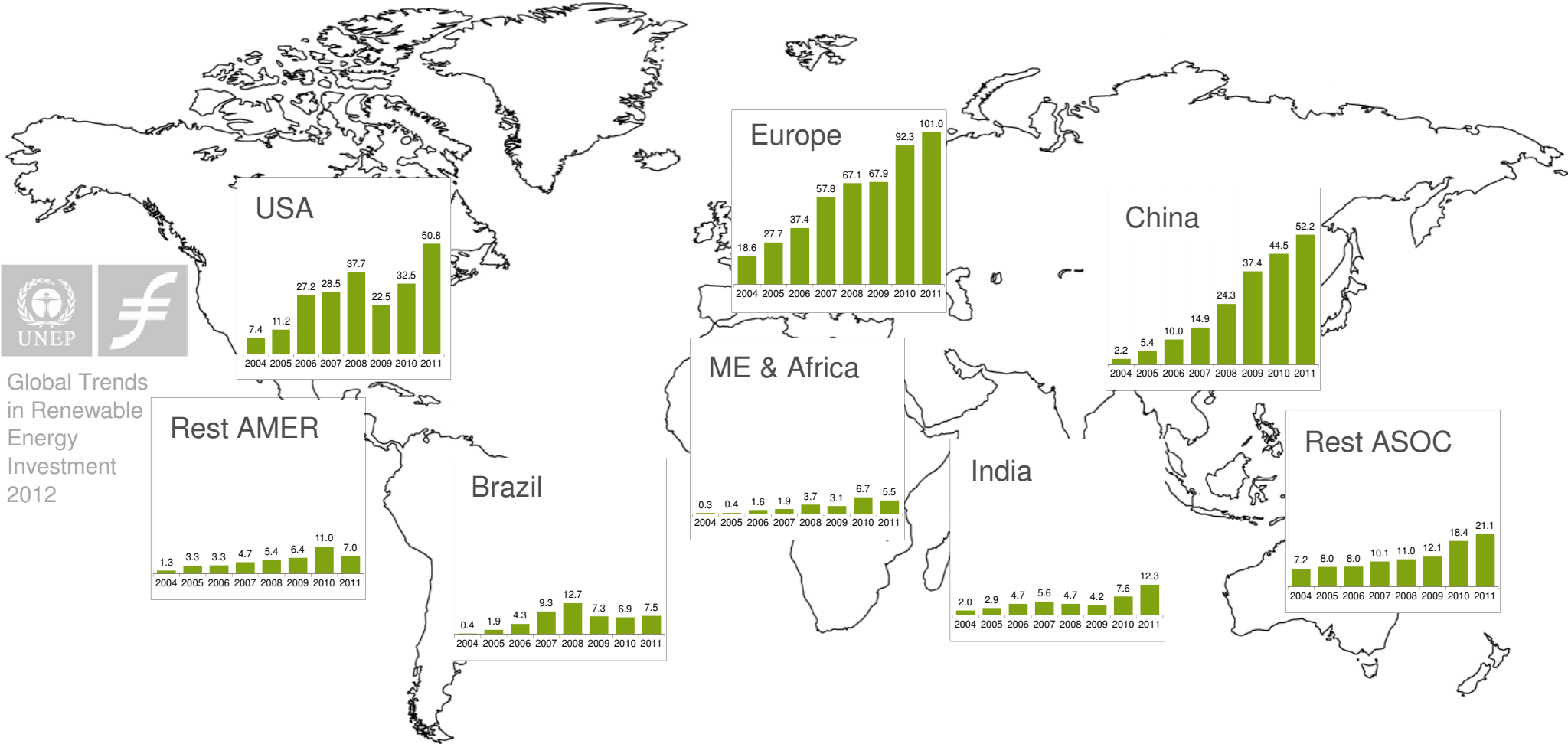
54% 59% 38% 25% -3% 37% 17%

Growth



Source: UNEP, BNEF, FS (2012)

GLOBAL NEW INVESTMENT IN RENEWABLE ENERGY BY REGION

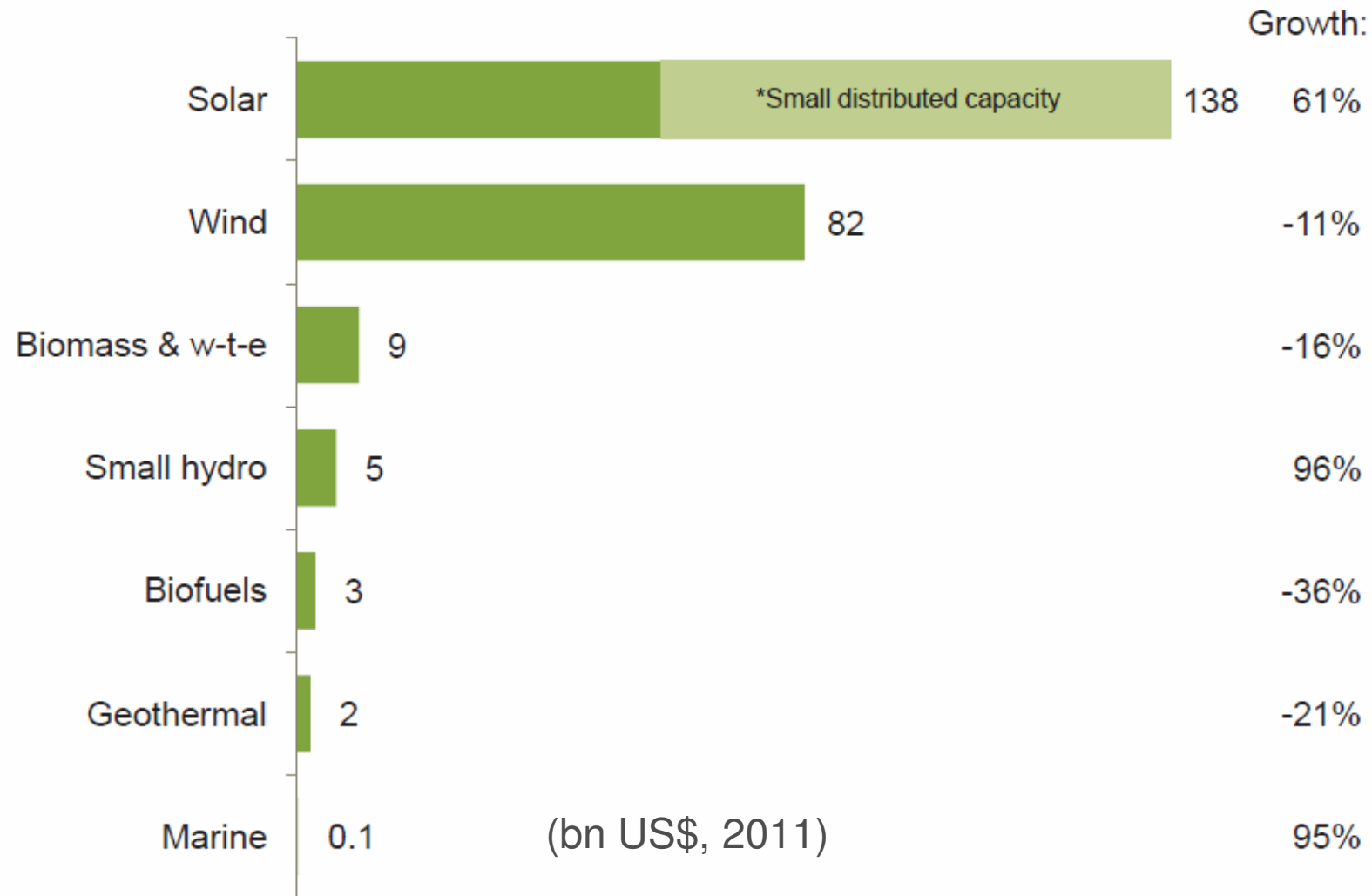


Global Trends
in Renewable
Energy
Investment
2012

Note: New investment volume adjusts for re-invested equity. Total values include estimates for undisclosed deals. This comparison does not include small-scale projects.

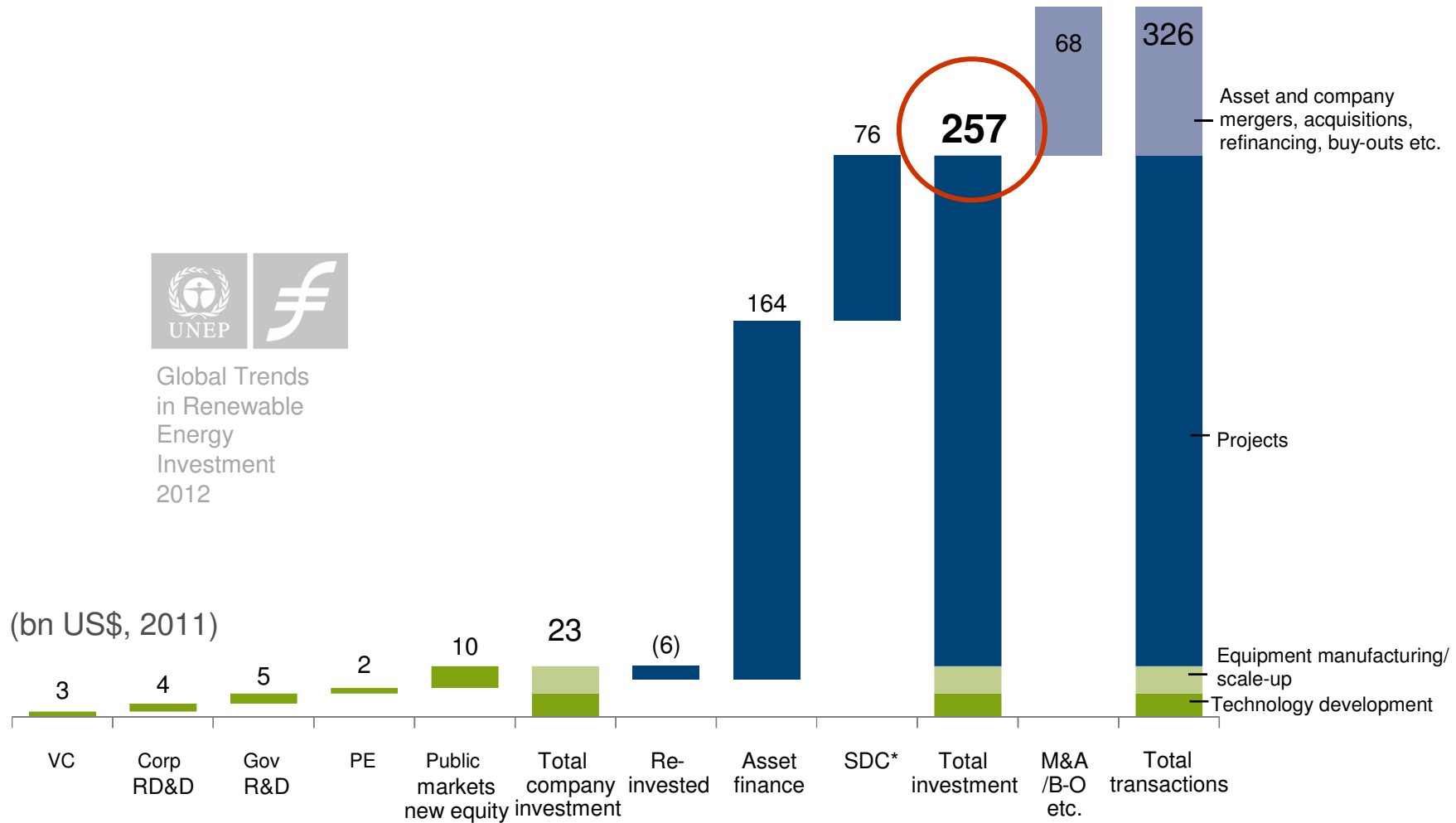
Source: UNEP, BNEF, FS (2012)

ASSET FINANCE AND SMALL DISTRIBUTED CAPACITY BY SECTOR



Total values include estimates for undisclosed deals.

GLOBAL TRANSACTIONS IN RENEWABLE ENERGY



Note: SDC = small distributed capacity. Total values include estimates for undisclosed deals. Figures may not add up exactly to totals, due to rounding.

Source: UNEP, BNEF, FS (2012)

INVESTMENT BOOM -- EQUITY BUST ?



RENEWABLE POWER GENERATION AND CAPACITY AS A PROPORTION OF GLOBAL POWER



Note: Renewable power excludes large hydro. Renewable capacity figures based on Bloomberg New Energy Finance global totals.

Source: UNEP, BNEF, FS (2012)

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CLIMATE POLICY INSTRUMENTS

Policies are driving the structural change !

Policy	Target
Standards	„anything“
Emission tax / Emissions trading	CO2
Feed-in-tariffs / „Green“ permits	renewables
Investment subsidies	„anything“

ECONOMIC INSTRUMENTS AS LITERATURE'S "FIRST CHOICE"...

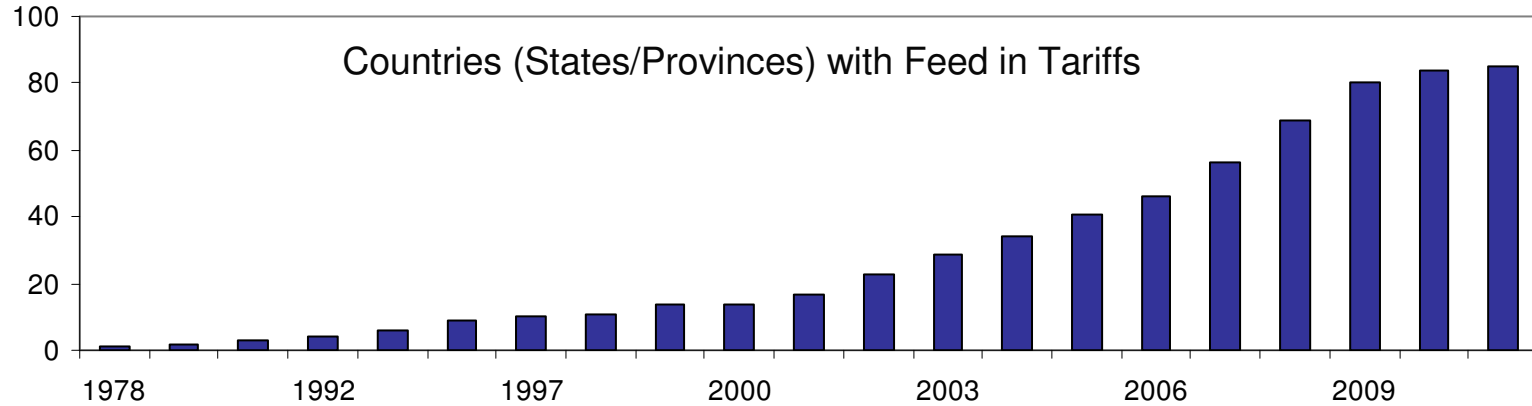
- **Decentralized** mechanism to correct **market failures** Pigou 1920
- Increased economic **efficiency** Montgomery 1972
- Examples: emission taxes, tradable emission permits, abatement-related subsidies, ... Jaffe/Stavins 1992
Tietenberg 1995 ...

Some Climate-Related Market Failures

- Environmental Externalities
- Innovation Spillovers (Arrow 1962, Acemoglu et al. 2009, ...)
 - Here: deployment & diffusion; spillover may be related to
 - operating the technology
 - investment itself
- Capital Market Imperfections (Stiglitz 1993)
 - Lack of a (liquid) market for long-term debt (“long term contracts”)
 - Imperfection on the credit markets
 - Monitoring externalities

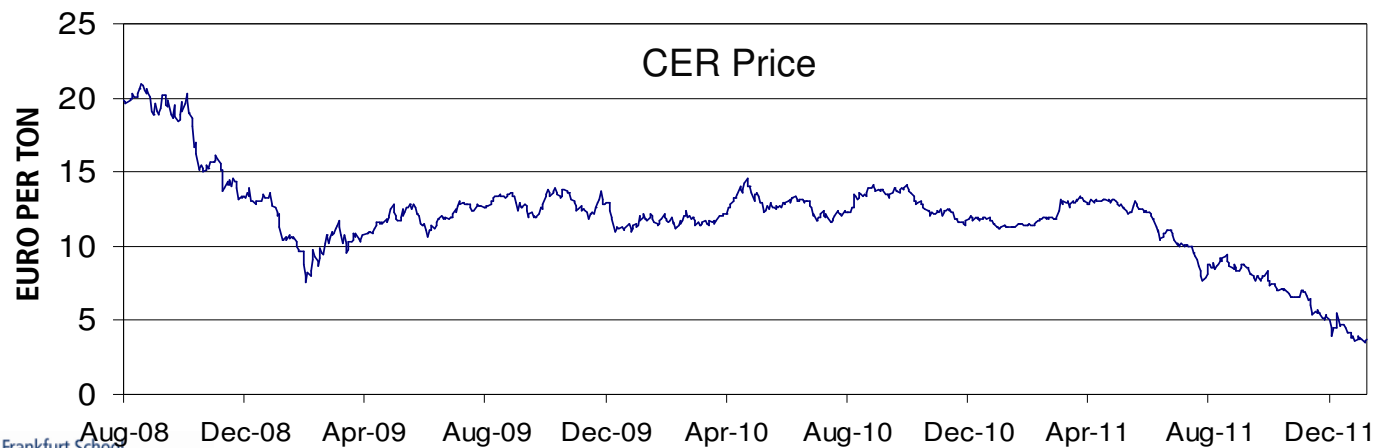
RECENT TRENDS IN CLIMATE POLICY (1/2)

Increasing number of countries using Feed in Tariffs



Source: REN21 (2011)

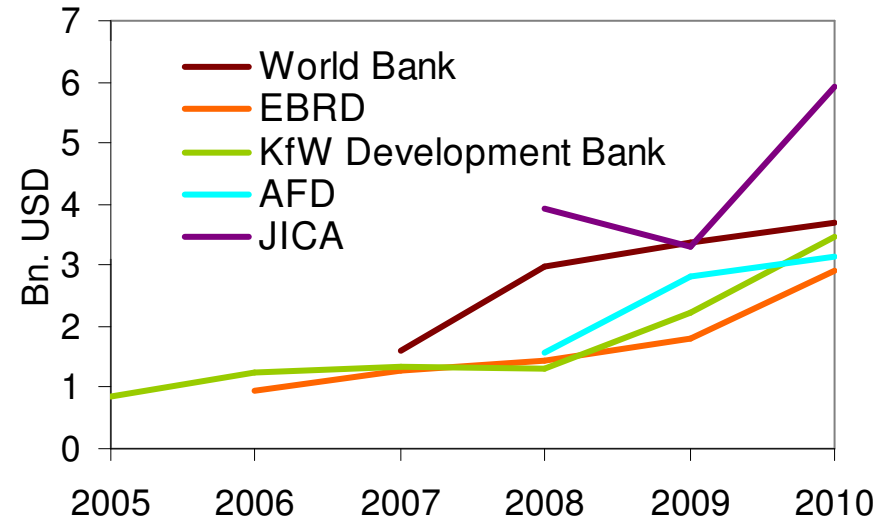
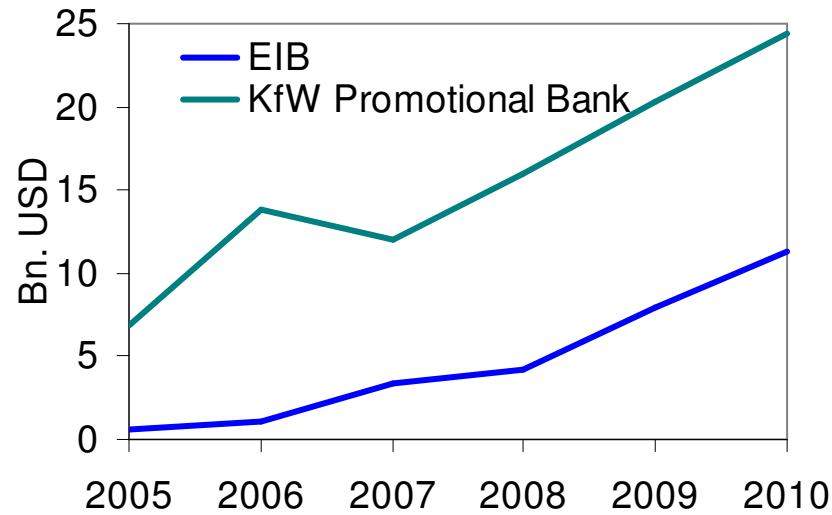
Decline of global CO₂ price signal



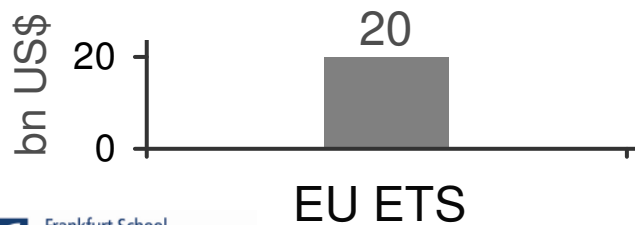
Source: EEX

RECENT TRENDS IN CLIMATE POLICY (2/2)

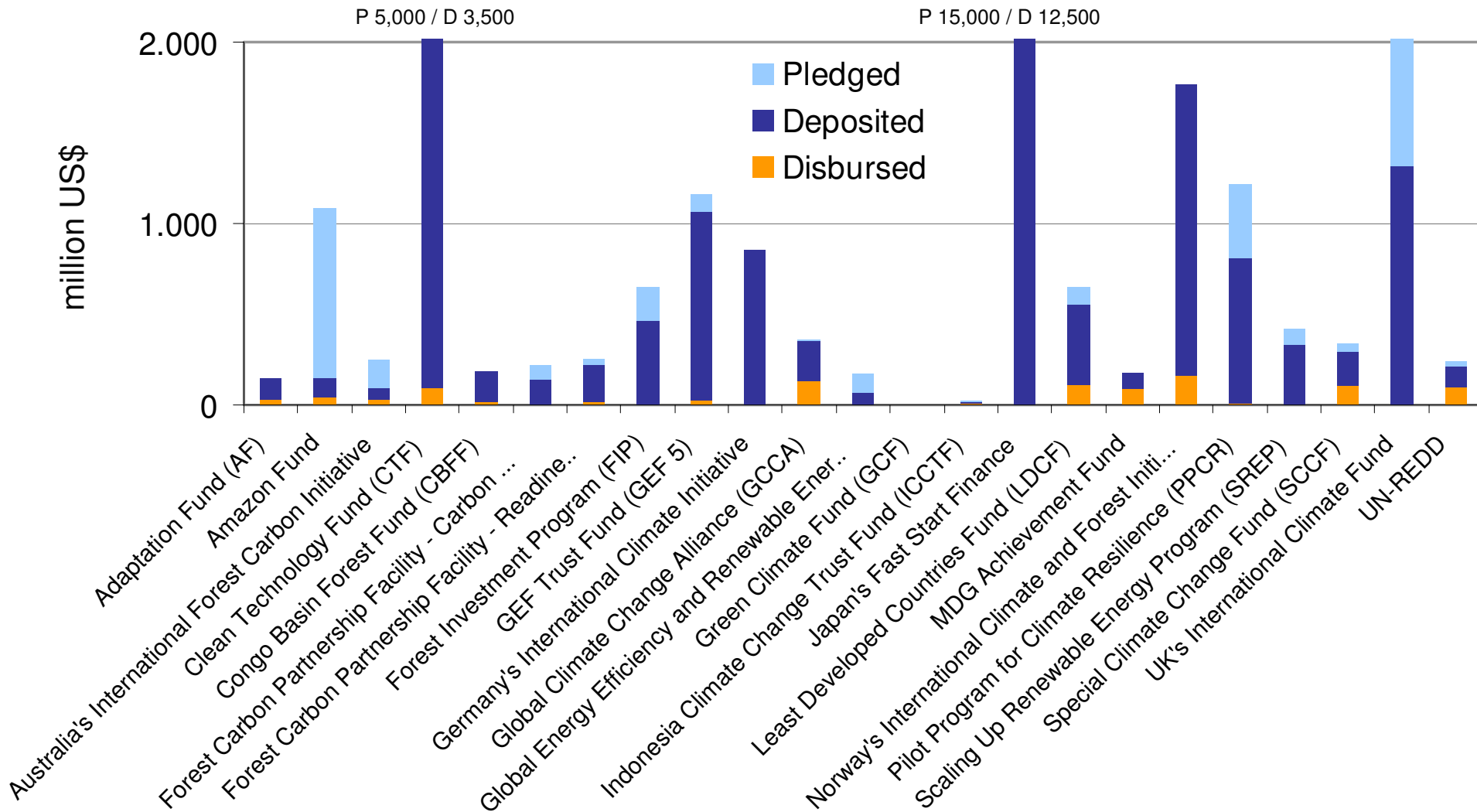
Investment subsidies sharply rising – Selected examples of RE/EE financing:



Size of the flows is significant (2011):



CLIMATE FUNDS

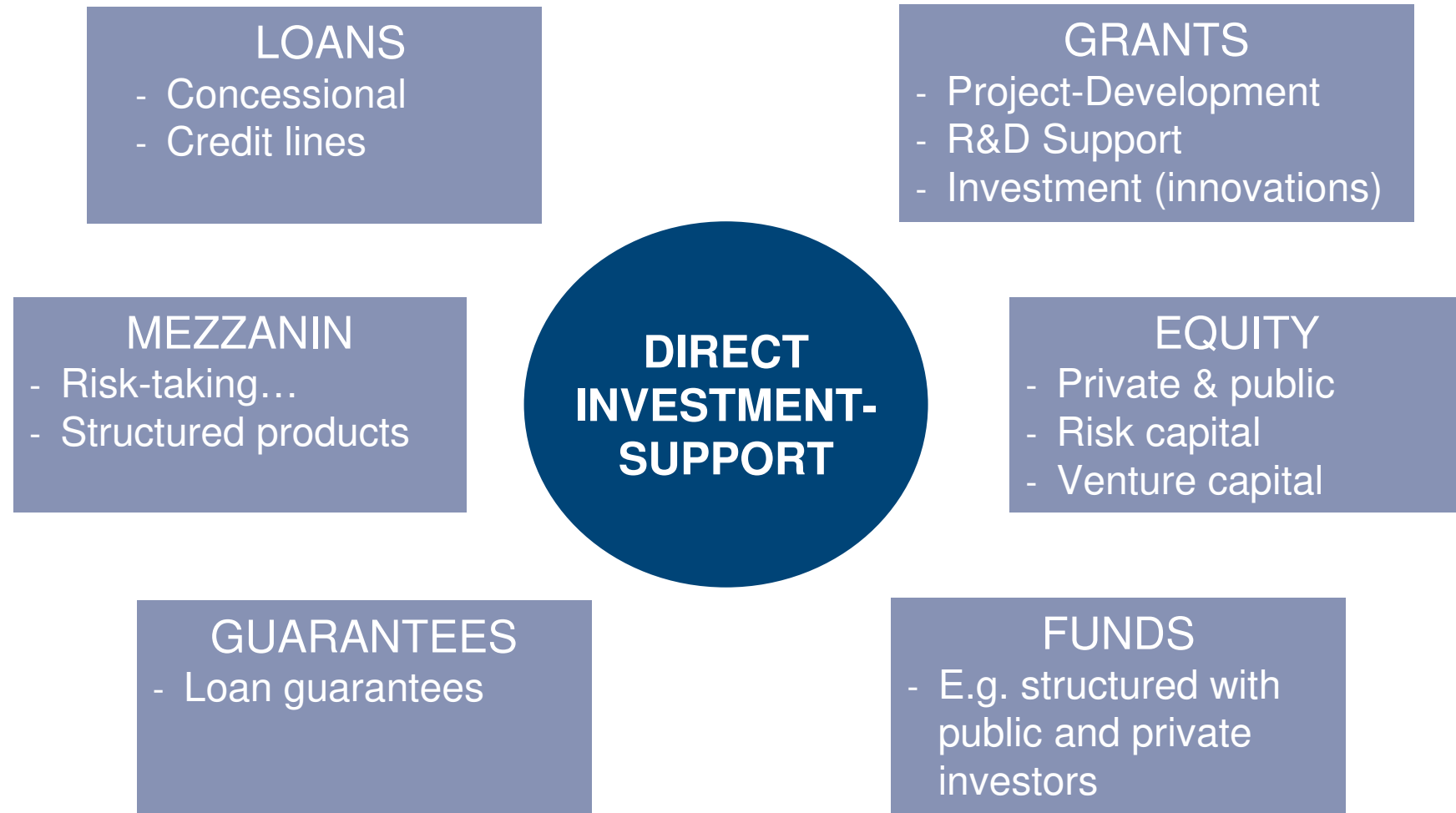


Source: Climate Funds Update (2012)

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FULL MENU OF PUBLIC FINANCE SUPPORT



CORRECTING MARKET IMPERFECTIONS?

Instrument	Emission Externality	Innovation Externality	Capital Market
Grants	grant = value of avoided externality (difficult, case by case)	grant = value of spill-overs (yes, if spill „lump-sum“)	long-term financing (no) imperfect credit markets and monitoring externality (perhaps)
Low-interest loans	add. value of subs. loan = value of avoided ext. (difficult, subs. rises w loan)	add. value of loan = value of spillo-vers (yes, if spill w investment)	long-term (yes) monitoring externality and imperfect credit markets (plausible but: other effects related to credit worthiness)
Guarantees	See above	See above	potentially very useful (but: effects related to credit worthiness and moral hazard)

CONCLUDING REMARKS

Generally

- **Structural change** happens – but needs to be scaled up
- Rents different along the **value-chain**
- Political action strongly shifts towards **investment support**
- Inefficient investment support **risks** substantial **cost increases**

Instruments of direct investment support

- Can have an important role but have to be used **with care**
- Mobilize **private investment** – instead of crowding out
- **Global CO₂ price essential** to provide orientation

THANK YOU FOR YOUR ATTENTION!

Prof. Dr. Ulf Moslener

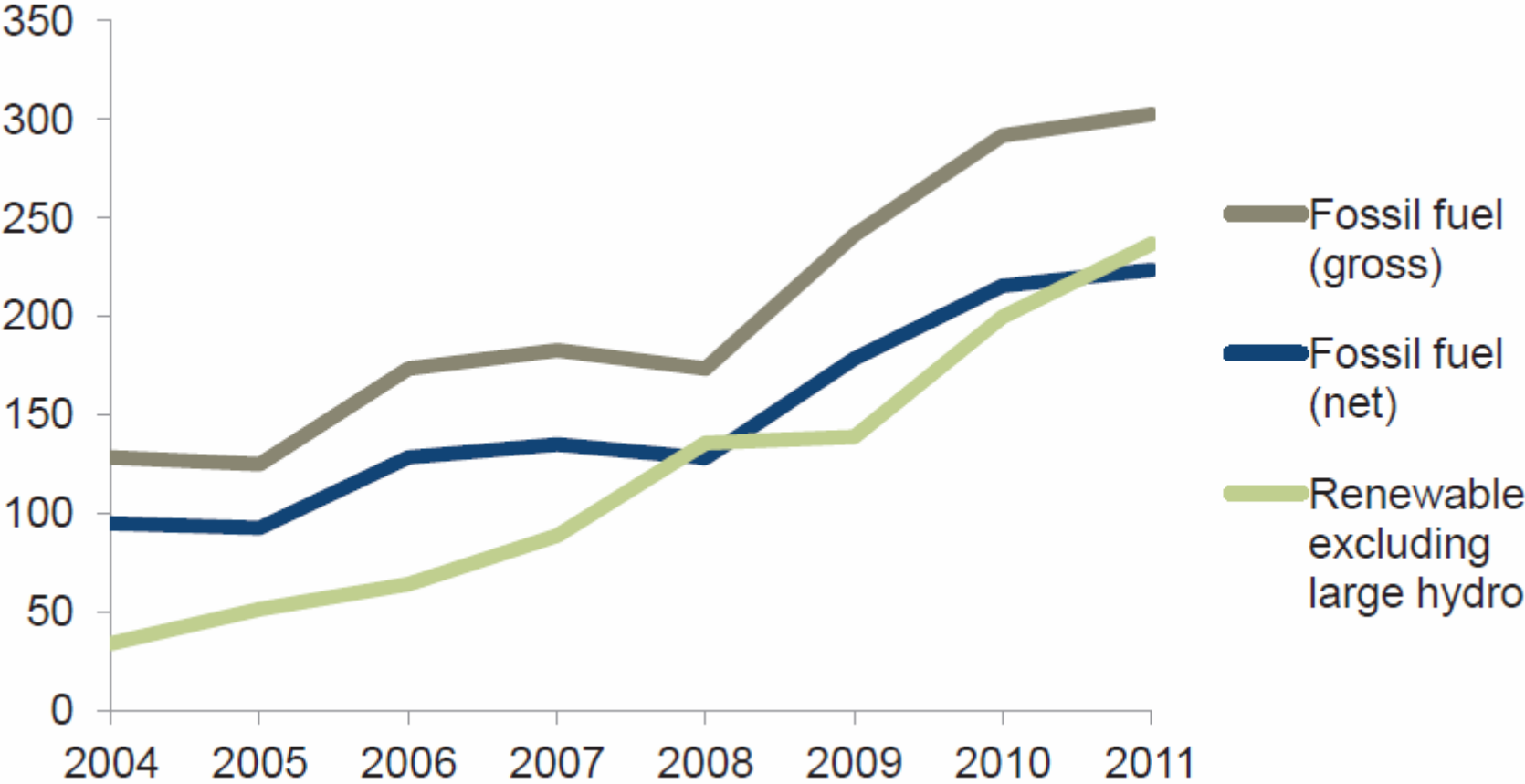
Head of Research
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<http://fs-unep-centre.org/>



Backup

INVESTMENT IN CLEAN ENERGY VS CONVENTIONAL CAPACITY, 2004 - 2011 (\$bn)



Fossil fuel investment is calculated from EIA and IEA data. Renewable energy investment includes asset finance and small-scale projects, but excludes large hydro.

Source: UNEP, BNEF, FS (2012)

GREEN ECONOMY

