

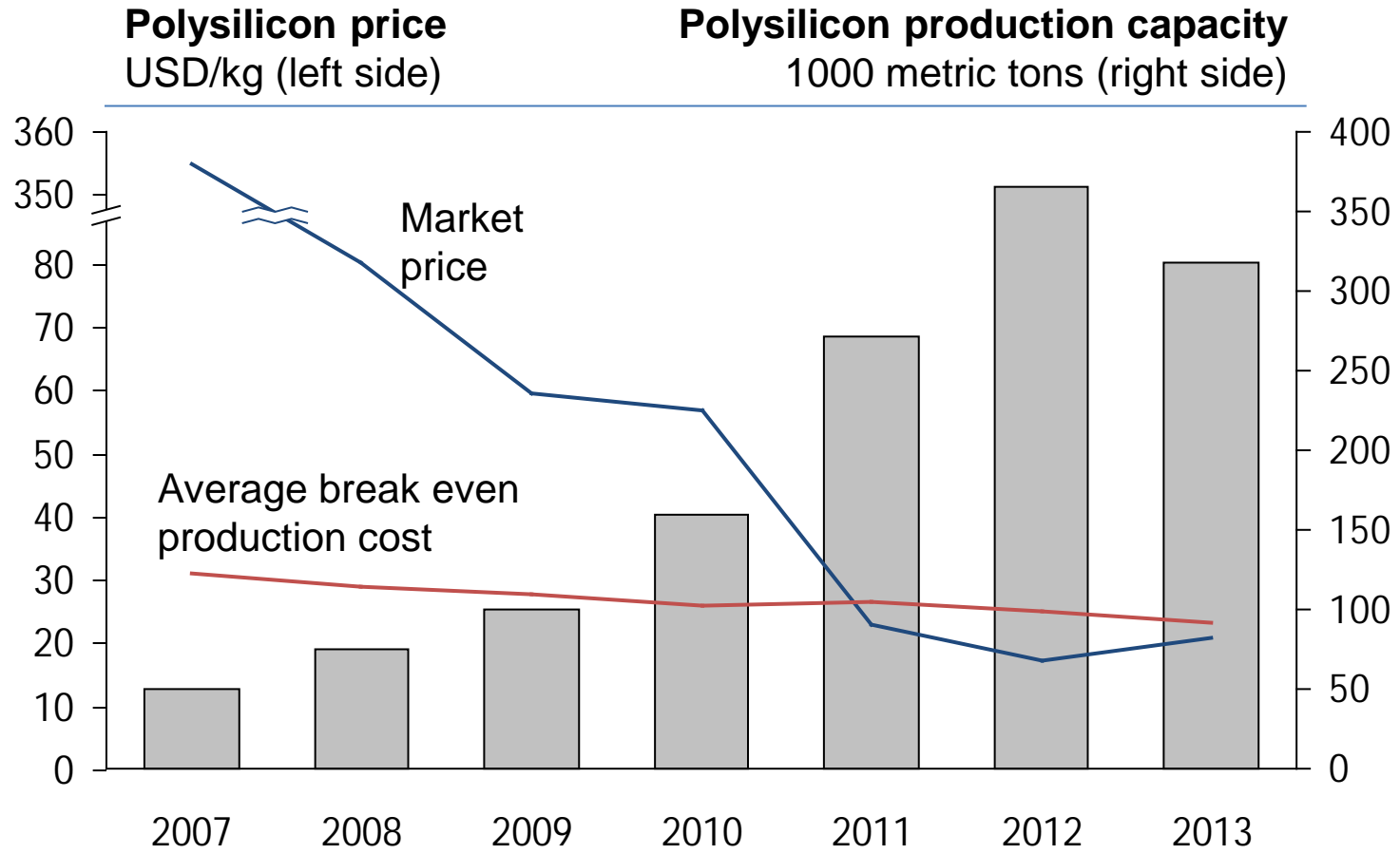
What is required to engage private industry

Jens Ulltveit Moe
Ny-Ålesund symposium
May 2014

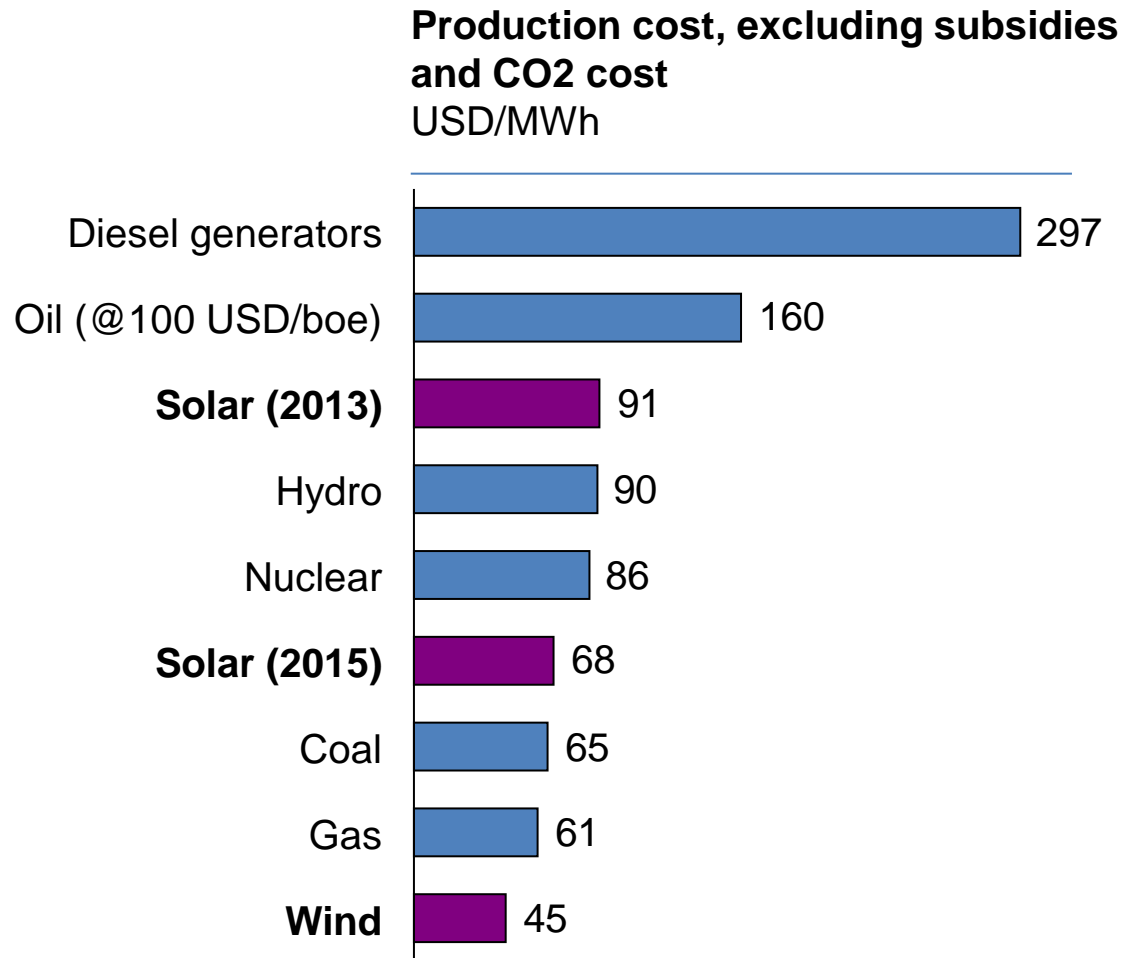
Renewables like other investments

- **Potential high profit**
 - Special situations
 - REC solar
 - Cost competitive
 - Reacts quickly to differences in return
- **Low risk, reduced profit expectations**
 - Government or consumers carry the risk
 - Market risk dominant
 - Cost gap to be covered
 - Pricing failure in fossil, cleanup cost not covered
- **Government support created renewables**
 - Subsidies
 - Technology

Poly investment exploded even with market risk

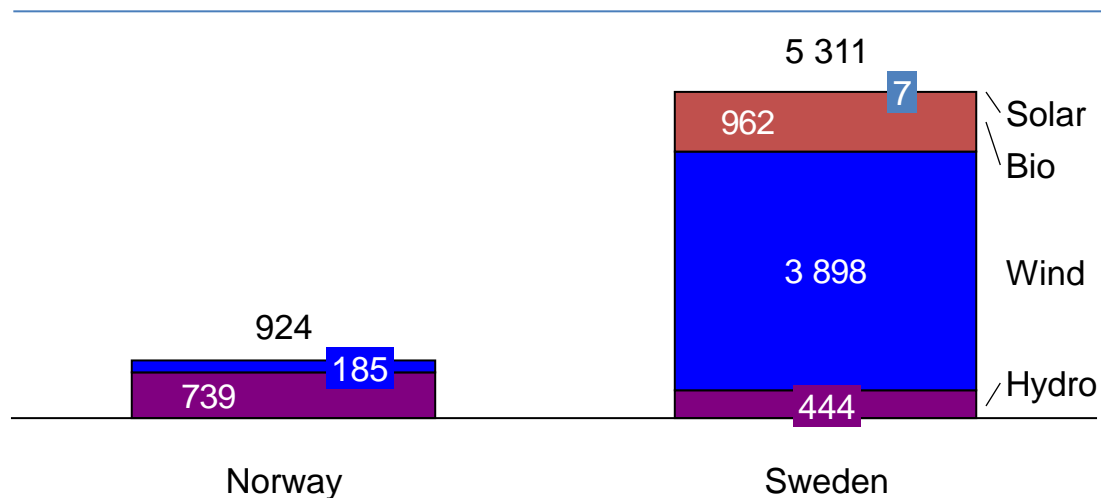


Some renewables competitive without subsidies



The market reacts fast to differences in financial return

























Renewable installations covered by green certificates, 2013
GWh



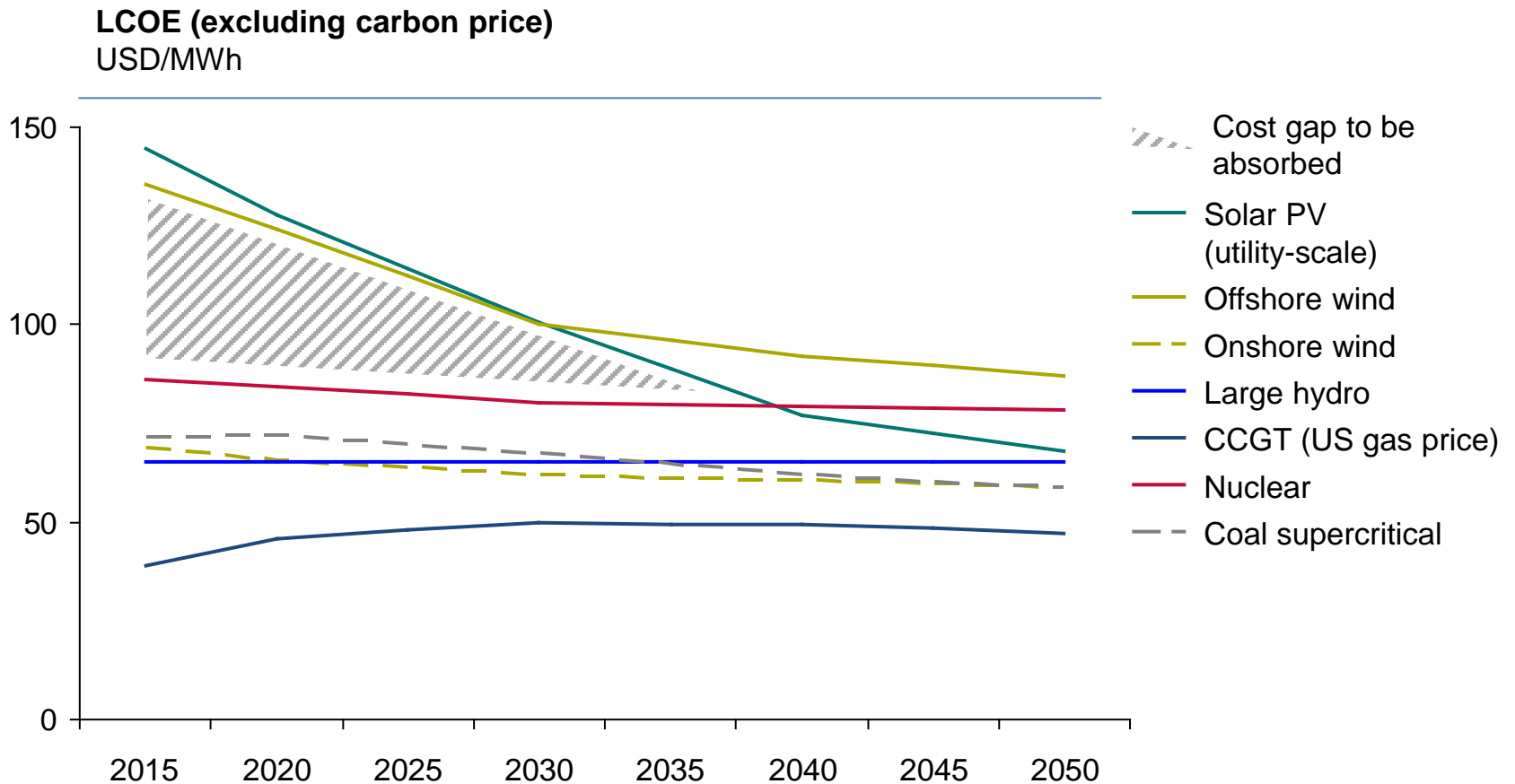
	Norway	Sweden
Tax-deductible depreciation	§ 20 % of remaining § 88 % depreciated after 25 years	§ 20 % of initial investment § 96 % depreciated after 5 years
Corporate tax rate	§ 27 %	§ 22 %
Property tax rate	§ 0.7 %	§ 0.2 %

Market risk is critical



	Regulatory	Construction	Market	Operations
CCGT				
Onshore wind				
Solar PV				
Offshore wind				
Nuclear				
Large hydro				

Cost gap to be absorbed



History frightens

§ **Bioenergy Boom and bust**

§ **Wind rapid uneven growth**

- Vestas near bankruptcy

§ **Solar, profitless growth**

- Government incentives created industry in Germany
- Wiped out by the Chinese

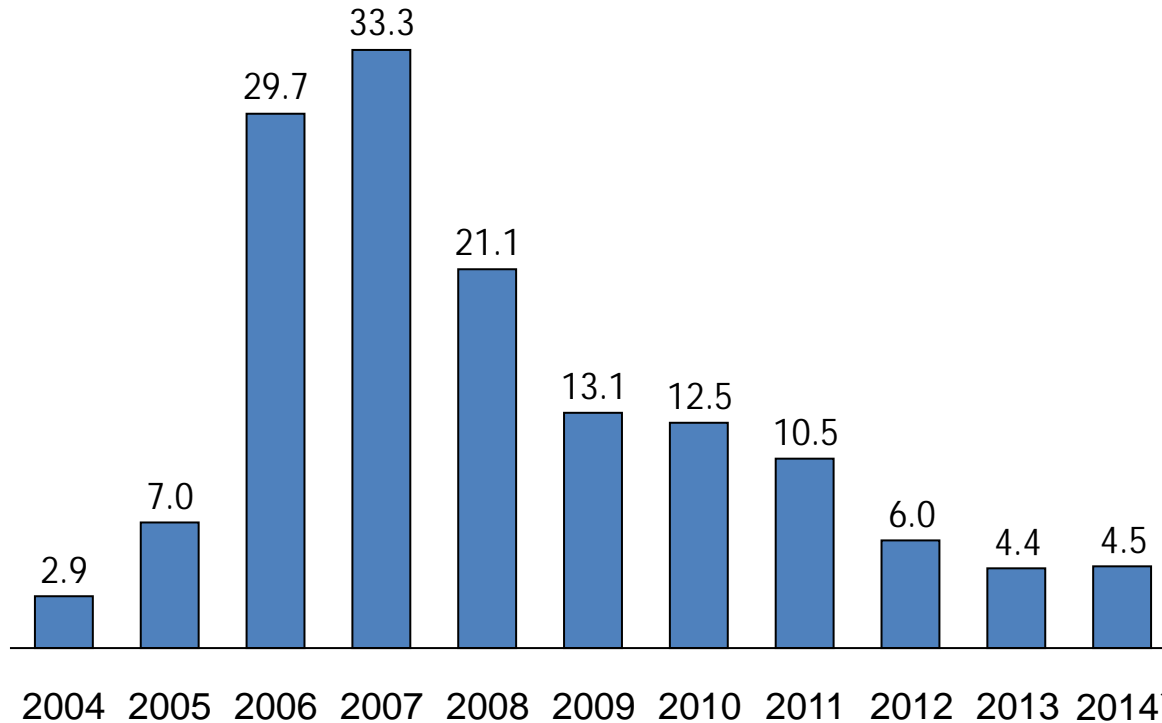
§ **Creative destruction**

- Major industries created, poor or no profits so far
- Still huge volume on incentives

§ **But technology has worked wonders**

Bioenergy boomed – and crashed

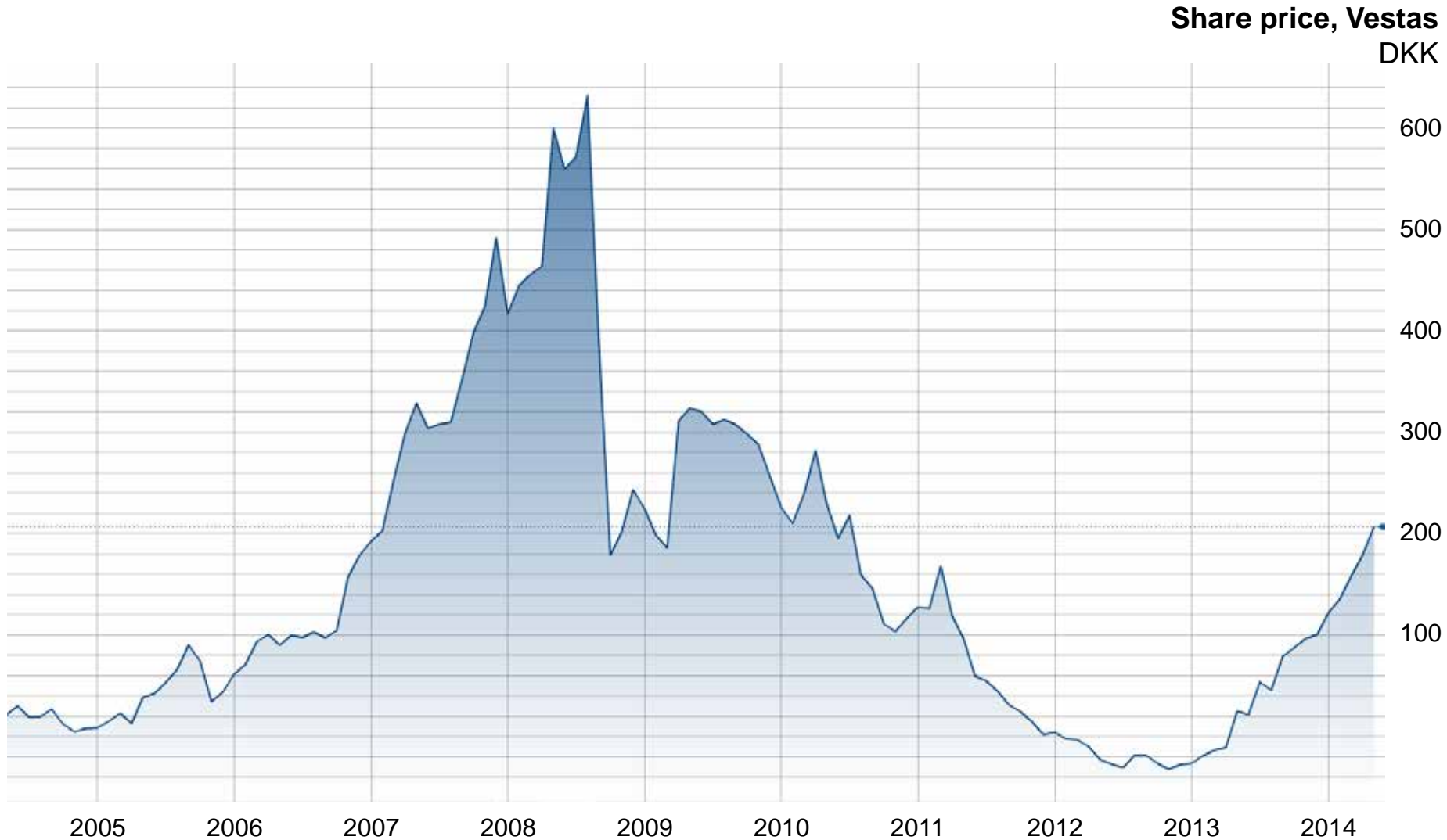
Annual global biofuels investments
USD billion



1: Annualized based on Q1 2014

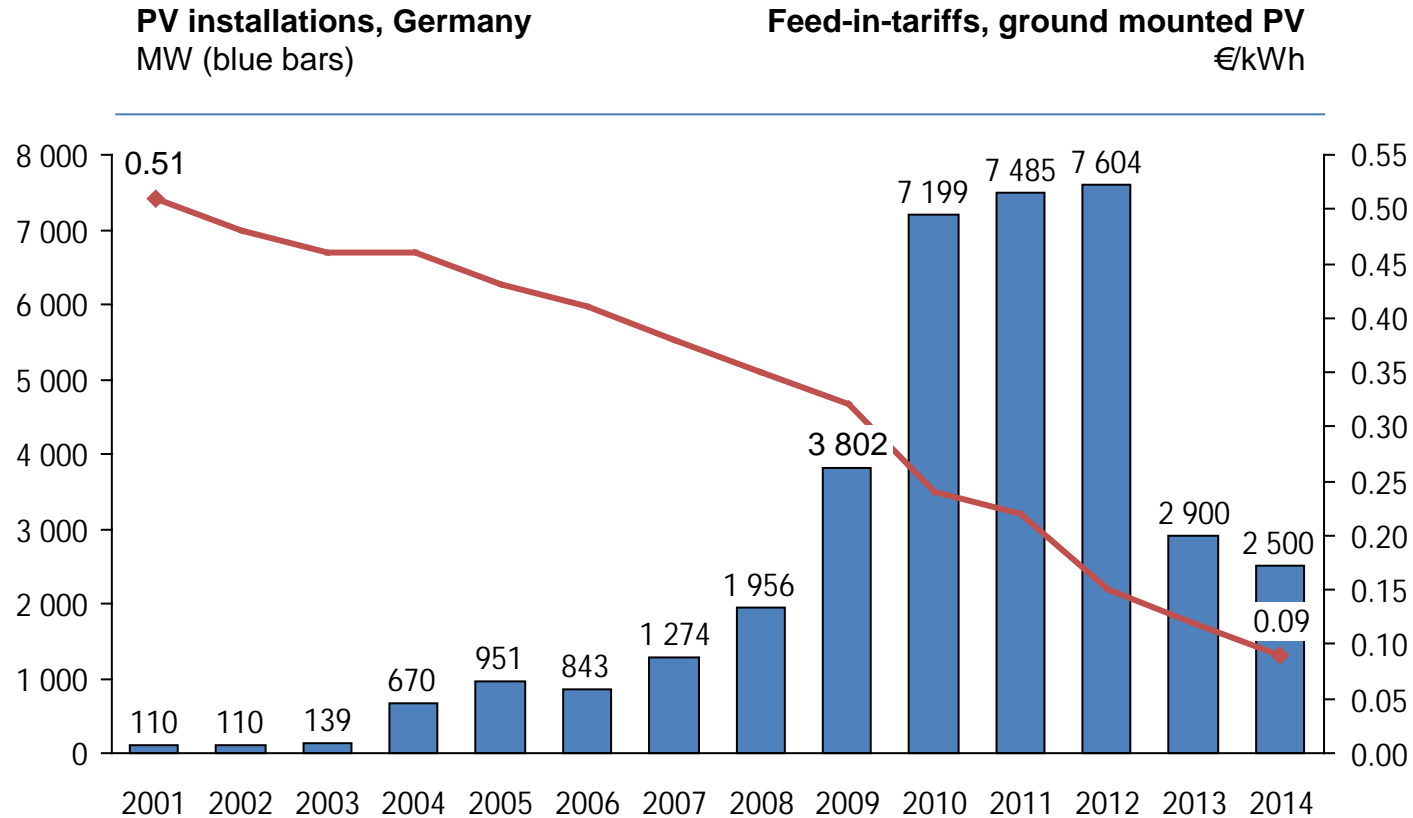
SOURCE: Bloomberg New Energy Finance (2014)

Vestas' ride has been rough

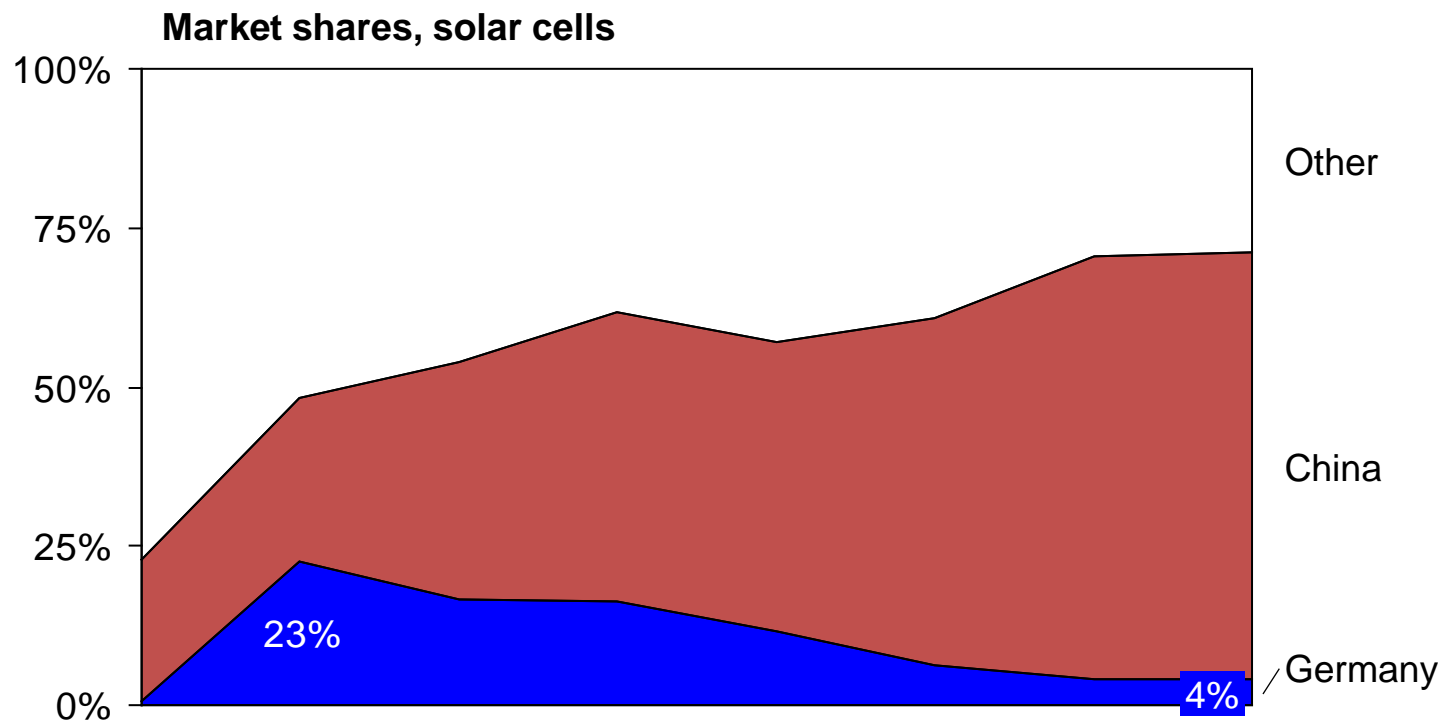


SOURCE: Vestas

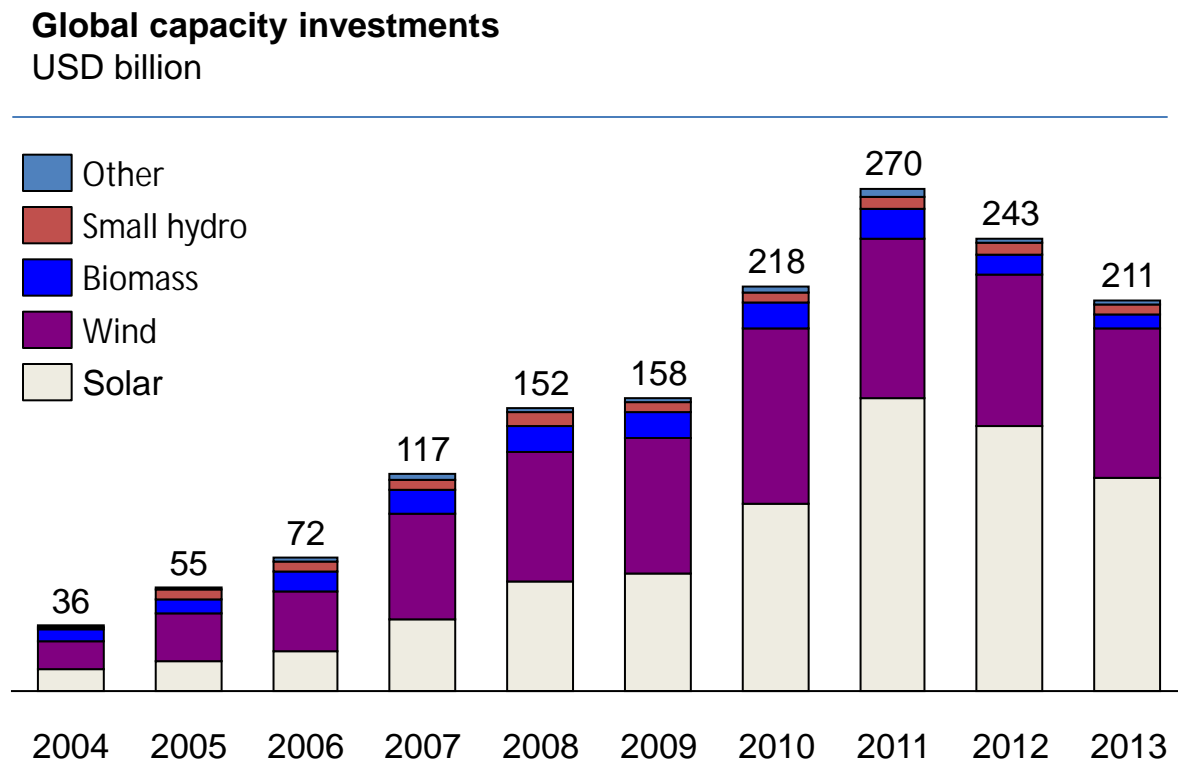
German incentives led to massive PV investments



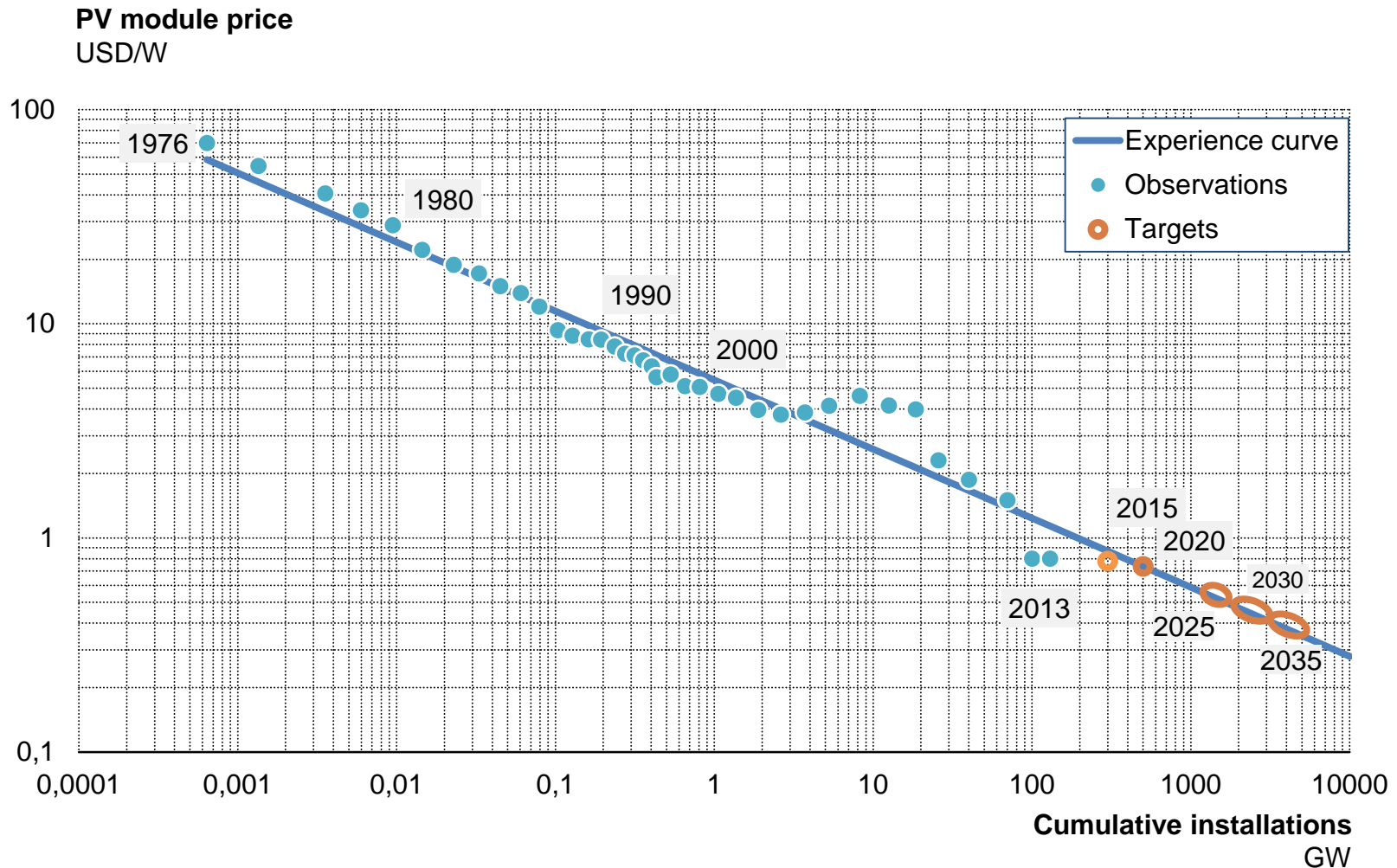
And created a German PV industry – which then was wiped out by China



Huge, but declining investments in renewables

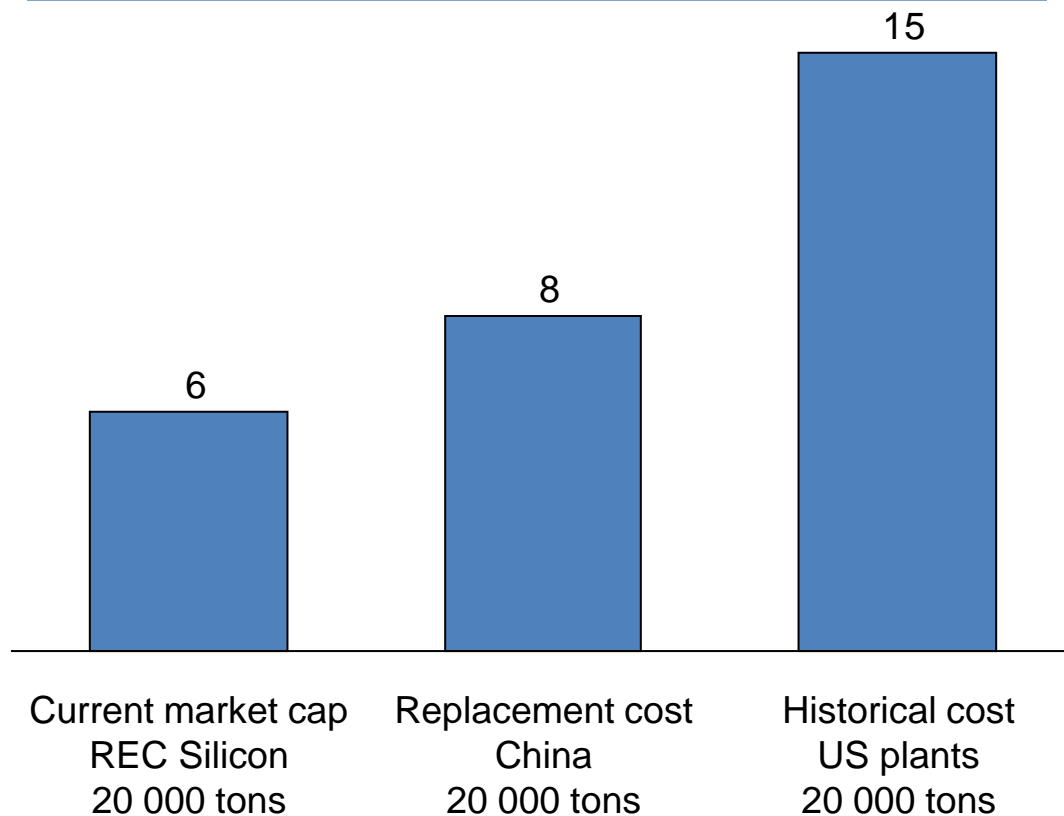


Technology works



Technology reduces replacement cost

**Market cap vs replacement cost and historical cost,
REC Silicon**
NOK billion



My rollercoaster

§ **Sold all oil assets, shifted to renewables - so far an economic mistake**

§ **Umoe bioenergy**

- Invested in boom
- Now working through bust, heavy losses
- Longer term premium on fossil
 - End Brazilian subsidies
 - Quotas in EU and US as advanced biofuels
- **Solar PV - RECsilicon**
 - Early attempt which I thankfully stopped
 - Success in late countercyclical investment

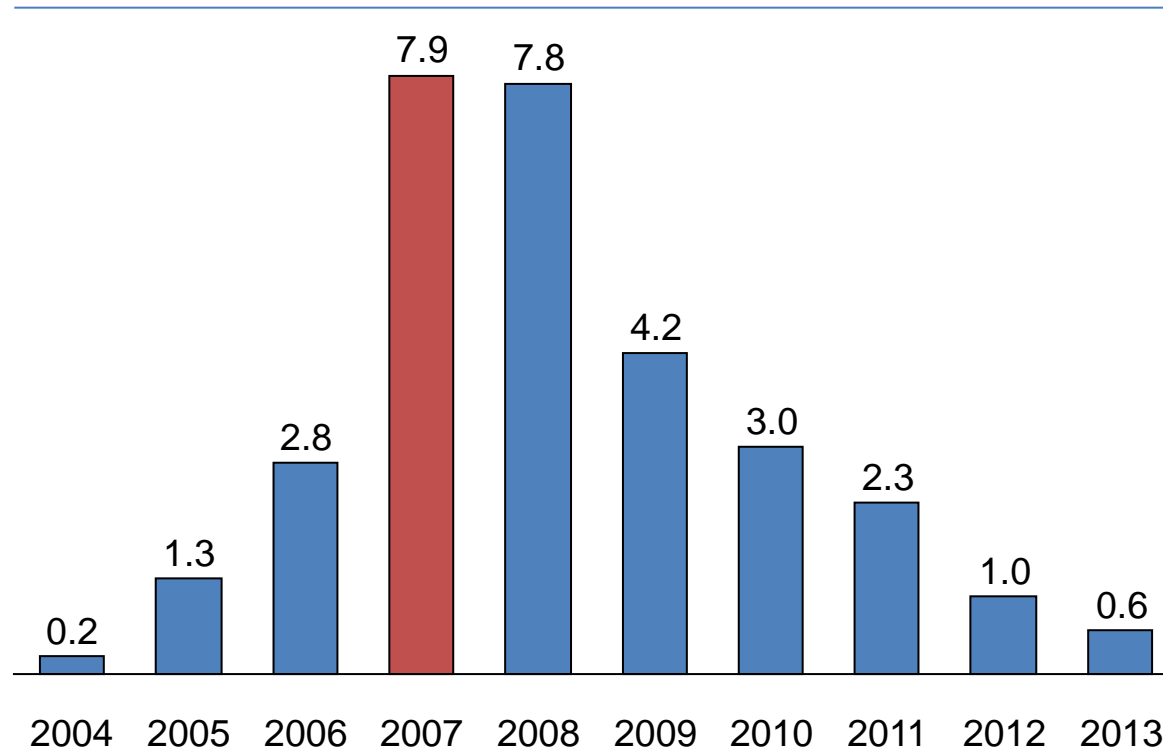
Umoe Bioenergy



UBE's sugar cane ethanol refinery and agriculture in Brazil

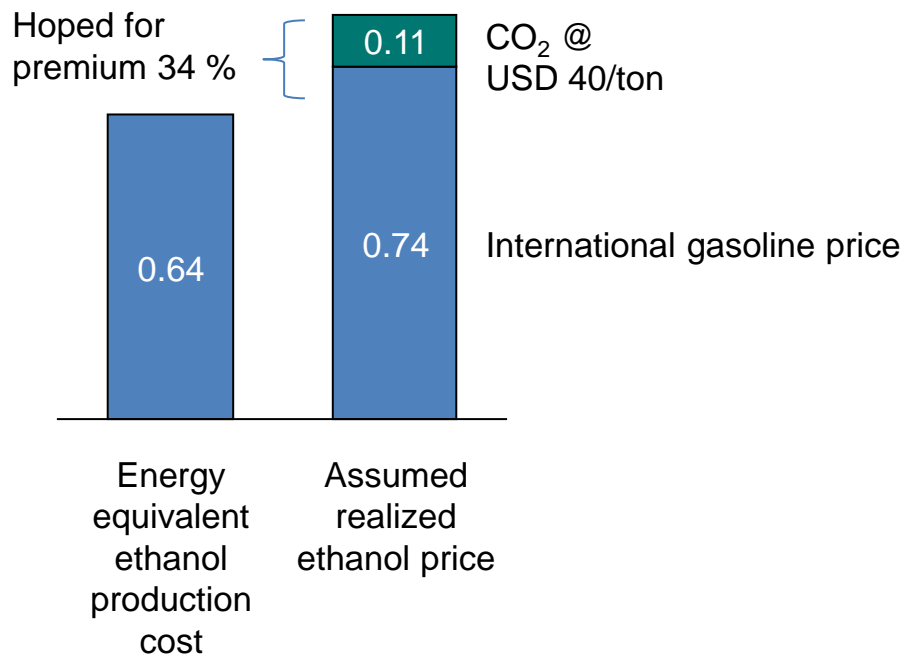
Umoe invested in Brazil in the middle of the boom

New biofuels investments, Brazil
USD billion



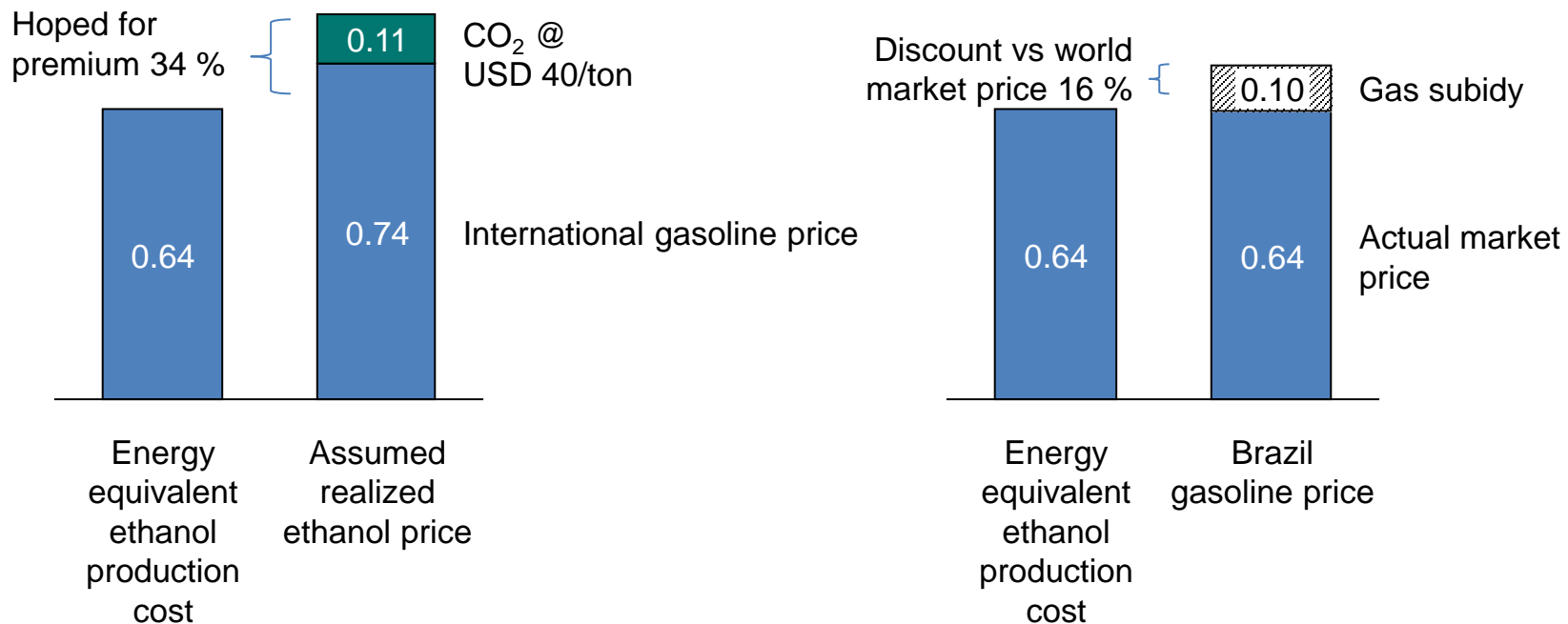
The investment case for Brazilian ethanol - looked good

Wholesale ethanol and gasoline prices, Brazil
USD/litre



The investment case for Brazilian ethanol - undermined by fuel subsidy

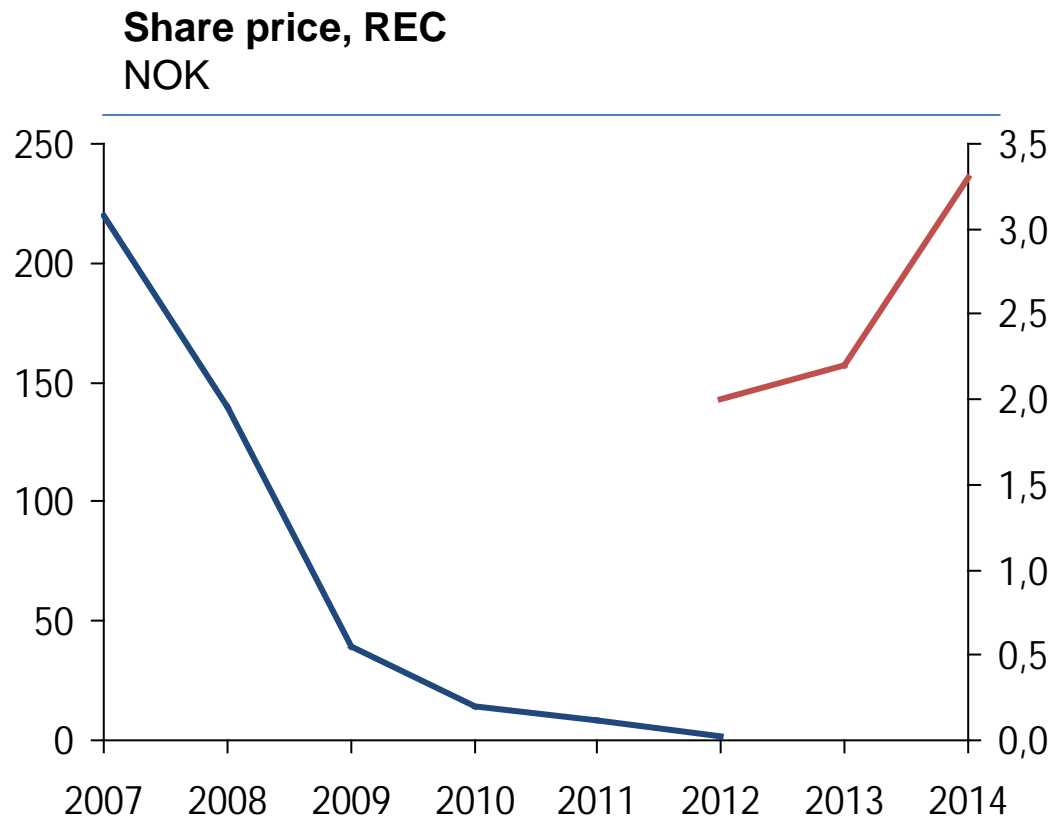
Wholesale ethanol and gasoline prices, Brazil
USD/litre



REC Silicon



Huge profit for late entry



What it takes for investors

§ **Potential fat profits**

- Special situations

§ **Cost competitive with fossil**

- Technology, rooftop solar, sugarcane ethanol

§ **Market risk reduced**

- subsidies
 - FIT
 - Certificates
 - Quotas
- Experienced political risk increases return required

§ **Carbon priced to bridge the gap**

- Tax
- Cap and trade
- Quotas