

An aerial photograph of Zurich, Switzerland, showing the city's architecture, including several domed buildings, and the surrounding landscape with Lake Zurich and distant mountains under a clear blue sky.

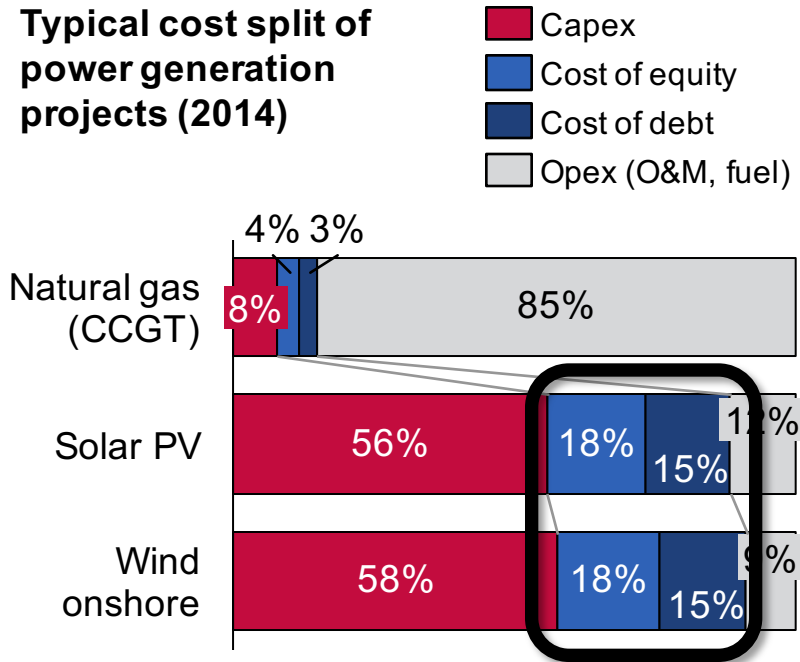
## Green growth policies for renewable energy: Reducing the cost of capital via state investment banks

2nd Conference on Financial Networks and Sustainability, Jan 17 2018, University of Zurich

Dr. Bjarne Steffen, Prof. Dr. Tobias S. Schmidt, Energy Politics Group, ETH Zürich

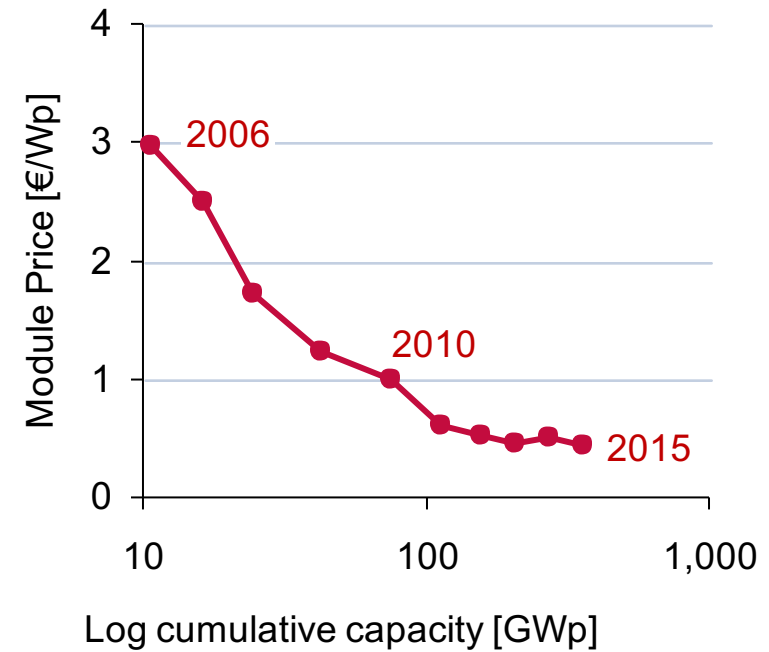
# Cost structure of green energy technologies differs from fossils

## Split of cost for different technologies



## Solar PV learning curve

Annual PV module price (2005-2015)

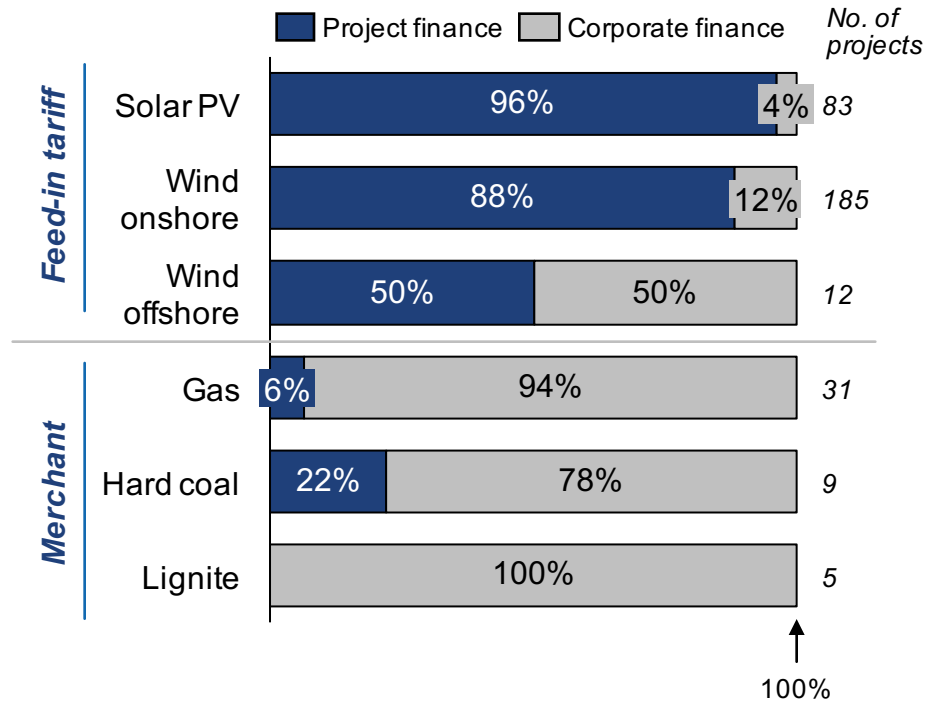


Schmidt, T. S. (2014). Low-carbon investment risks and de-risking. *Nature Climate Change*, 4(4), 237–239.  
 Fraunhofer ISE, Photovoltaics report 2017

# Result 1: (Cheap) project finance is crucial for renewables

## Renewables with much lower risk than fossil fuels – still, use more project finance

German power generation projects 2010–2015



## Key reason: small balance sheets of new players in industry

Results from regression analysis on rationales to use project finance



Negative financial synergies with existing business

- ~~1. Contamination risk~~
- 2. Debt overhang
- ~~3. Securitization~~



(Further) market imperfections

- ~~4. Information asymmetry btw. sponsor & lender~~
- 5. Agency owners & mgrs

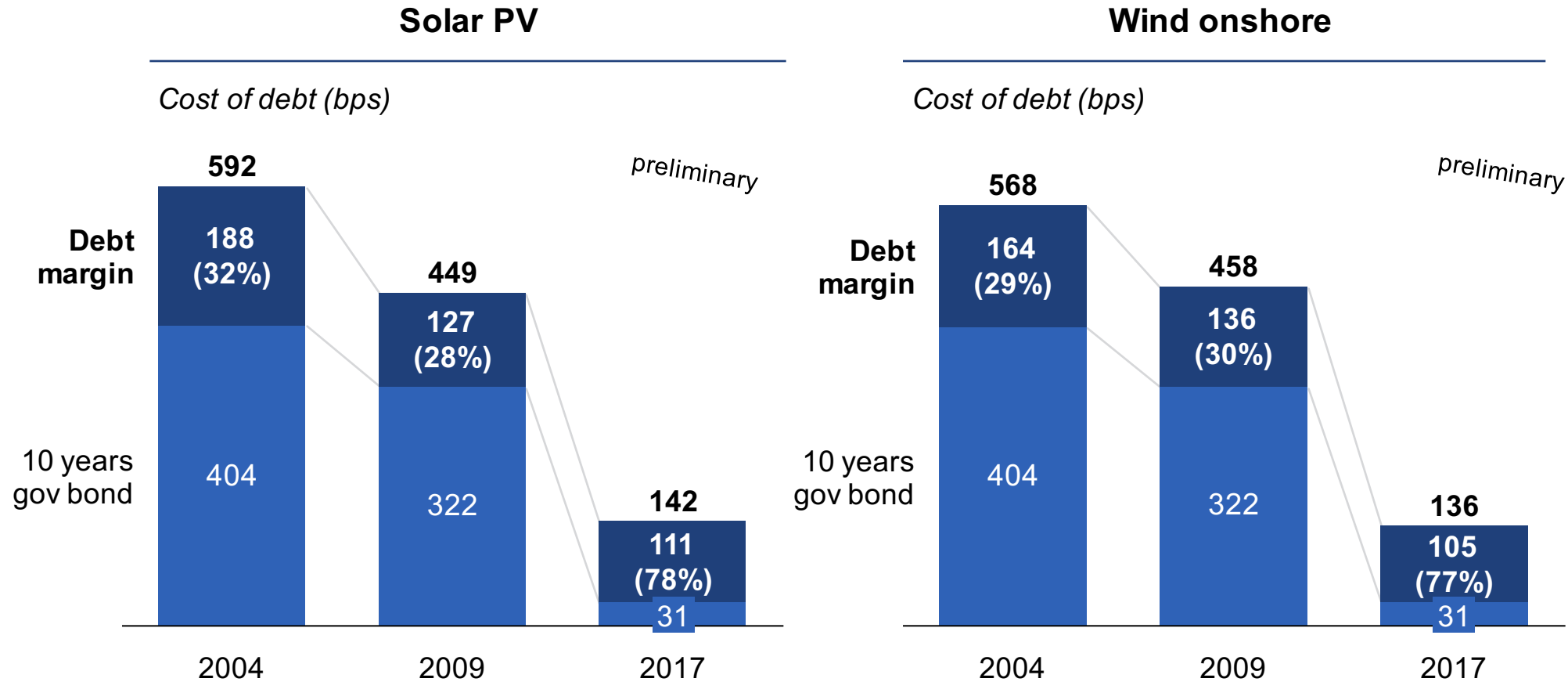


Considerations regarding org. structure

- ~~6. Horizontal joint ventures~~
- 7. Independence civic prjcts

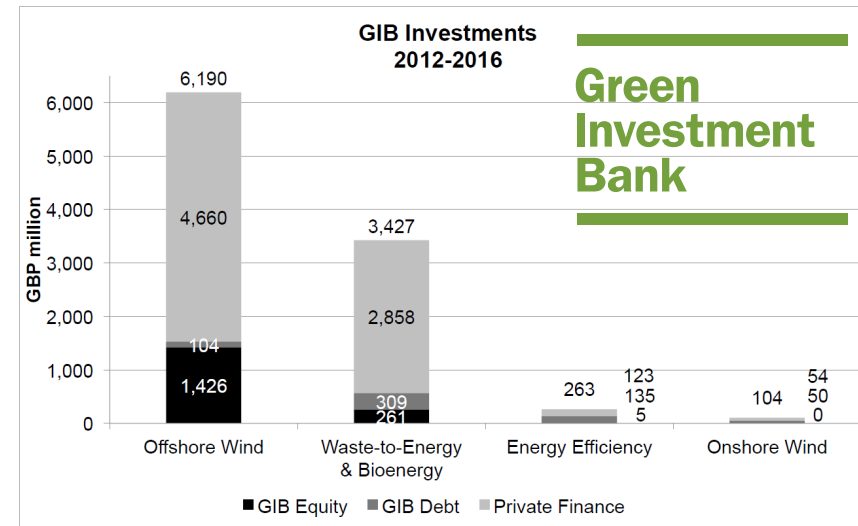
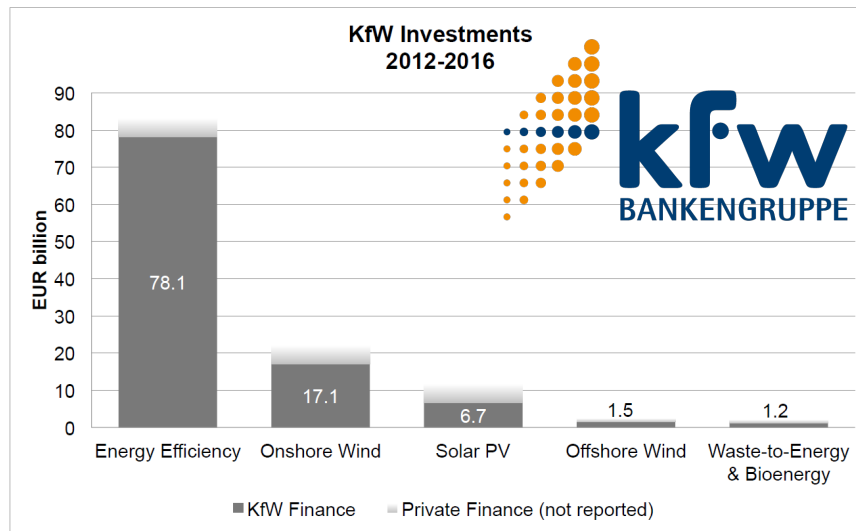
Steffen, B. (2018), The importance of project finance for renewable energy projects, *Energy Economics* (69), 280–294.

## Result 2: DE an example for strong decline in financing cost



Egli, F., Schmidt, T.S., Steffen, B. (2018), Dynamics of Renewable Energy Finance: The example of Germany, mimeo.

# State investment banks an important green growth policy?



RQ: What is the role of state investment banks in mobilizing private downstream finance for green technologies, thereby enabling innovation and technological change?

Geddes, A., Schmidt, T.S., Steffen, B. (2018), The multiple roles of state investment banks in low-carbon energy finance: An analysis of Australia, the UK and Germany, *Energy Policy*, forthcoming.

# Result 3: State invest banks crucial well beyond capital provision



## Interview study

### Data

- Comparative, qualitative study DE (KfW), UK (GIB), AU (CEFC)
- Semi-structured interviews with 56 developers and investors

Category	Organisation <sup>a</sup>	Technology Focus <sup>b</sup>	Country <sup>c</sup>	Interviewee's Role	
Developer	1	Project Developer	Wind, Solar PV	AU	Head of Business Development
	2	Project Developer	WIE	AU	Chief Executive Officer
	3	Project Developer	WIE	AU	Managing Director
	4	Project Developer	WIE	AU	Managing Director
	5	Project Developer	Bioenergy, WIE	GB	Independent developer
	6	Project Developer	Wind, Bioenergy	GB	Managing Director
	7	Project Developer	WIE	GB	Managing Director
	8	EPC, OEM	Wind, Solar PV	AU	Business Development Manager
	9	IPP	Wind	AU	Executive General Manager
	10	IPP	Wind, Hydro	AU	Executive Manager, Development
	11	IPP	Renewables	AU, GB, DE	Chief Financial Officer
	12	IPP	Solar PV	GB, DE	Project Developer
	13	IPP	Bioenergy	GB, DE	Independent developer
	14	IPP	Wind, Solar PV	GB, DE	Manager, ESG
	15	IPP	Wind, Solar PV	GB, DE	Executive General Manager
	16	IPP	WIE, Bioenergy	GB, DE	Head of Origination
	17	OEM	Wind, Solar PV	AU	Head Structured Finance
	18	OEM	Small-scale wind	AU, GB, DE	General Manager
	19	OEM	Renewables	AU, GB, DE	Sales Manager, Renewables
	20	OEM	Renewables	AU, GB, DE	Senior VP Project Development
	21	OEM	Wind	GB, DE	Senior Investment Manager
	22	Utility	Renewables, FFs	DE	Managing Director
	23	Utility	Renewables, FFs	DE	Head Business Development
	24	Utility	Wind, Solar PV	GB, DE	Business Development Manager
	25	Utility	Wind, Solar PV	GB, DE	Managing Director
Investor	26	Commercial Bank	Renewables, FFs	AU	Executive General Manager
	27	Commercial Bank	Renewables, FFs	AU	Senior Consultant
	28	Commercial Bank	Renewables, FFs	AU, GB, DE	Director Corporate Clients
	29	Commercial Bank	Renewables, FFs	AU, GB, DE	Consultant, Green Banking Expert
	30	Commercial Bank	Renewables, FFs	GB, DE	Consultant, Innovative Finance
	31	Gov't funding entity	Renewables	AU	Transactions and Development
	32	Green Bank	Renewables	GB, DE	Relationship Manager, Arranger
	33	Invest Advisors	Renewables	AU	Principal Financial Advisor
	34	OEM investors	Renewables, FFs	AU, GB, DE	Managing Director
	35	Invest platform	Renewables	GB	Managing Director
	36	SIB	Renewables, EE	AU	Division Director
	37	SIB	Renewables, EE	AU	Researcher
	38	SIB	Renewables, EE	AU	Department Director
	39	SIB	Renewables, EE	AU	Associate Director
	40	SIB	Renewables, FFs	DE	Department Director
	41	SIB	Renewables, EE	GB	Department Head
42	SIB	Renewables, FFs	GB, DE	Investment Officer	
43	SIB	Renewables, FFs	GB, DE	Project Assessor	
44	SIB	Wind, Renewables	GB, DE	Team Head, Wind Power	
Expert <sup>d</sup>	45	Sustainable Bank	Renewables	GB, DE	Chief Financial Officer
	46	VC Investor	Renewables, FFs	AU, GB, DE	Director
	47	Consultancy	Renewables	AU, GB, DE	Arranger, Due Diligence
	48	Consultancy	Renewables, FFs	GB, DE	Associate Principal, Energy
	49	Consultancy	Wind	GB, DE	Senior Consultant, Power Market
	50	Consultancy	Wind	GB, DE	Partner, Energy and Resources
	51	Energy Think-tank	Renewables	GB	Director, Finance, Energy Policy
	52	Envir. Consultancy	Renewables, FFs	GB, DE	Principal Consultant
	53	Envir. NGO	Renewables, FFs	AU, GB, DE	Director of Strategy and Finance
	54	Legal Consultancy	Renewables	AU	Partner, Project Finance, Energy
55	Legal Consultancy	Renewables	AU	Senior Associate, Project Finance	
56	Legal Consultancy	Renewables	AU, GB, DE	Partner, Arranger	

### A. Capital Provision and De-risking Roles

- Direct funding for crucial gaps, concessional or commercial terms
- De-risking instruments (e.g., guarantees)

### B. Educational Role

- Specialist internal expertise (e.g. accurately assessing risks)
- Financial innovation & standardization

### C. Signaling Role

- SIB reputation crowding-in private equity & debt
- “SIB participation signal” with effect on financing cost

### D. First or Early Mover

- Early movers with respect to new technologies (in the country), new deal structures, new manufacturers and developers

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## Summary and acknowledgments

**Financing conditions matter for key sectors of green growth such as renewables**

**Lower financing costs played their part for strong growth of renewables, e.g. in DE  
– besides general interest rate levels, financial sector experience curve important**

**State investment banks seem important policy instrument for green growth, with  
roles going beyond capital provision and de-risking**



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