

Welcome to DE-US.net webinar!

Your hosts



Prof. Dr. Reimund
Schwarze



Prof. Peter B Meyer, PhD



Dr. Stephan
Bartke



DE-US.net – Get involved!

DE-US.net is your

- network
- of young and senior professionals
- interested in shaping the City of Tomorrow

DE-US.net facilitates

- ✓ the exchange of ideas and innovations
- ✓ the access to expert knowledge
- ✓ the access markets in Germany, the USA and beyond.

Join us at <http://de-us.net>!

How it works

- Peter and Reimund will present
- YOU can send your questions / comments
 - In the **chat box** below
 - Or by email to **webinar@de-us.net**
 - Tweet them to **@de_us_net**
- During and after the presentation, we will answer to the questions



DE-US.net webinar I/2017

2017 September 13th

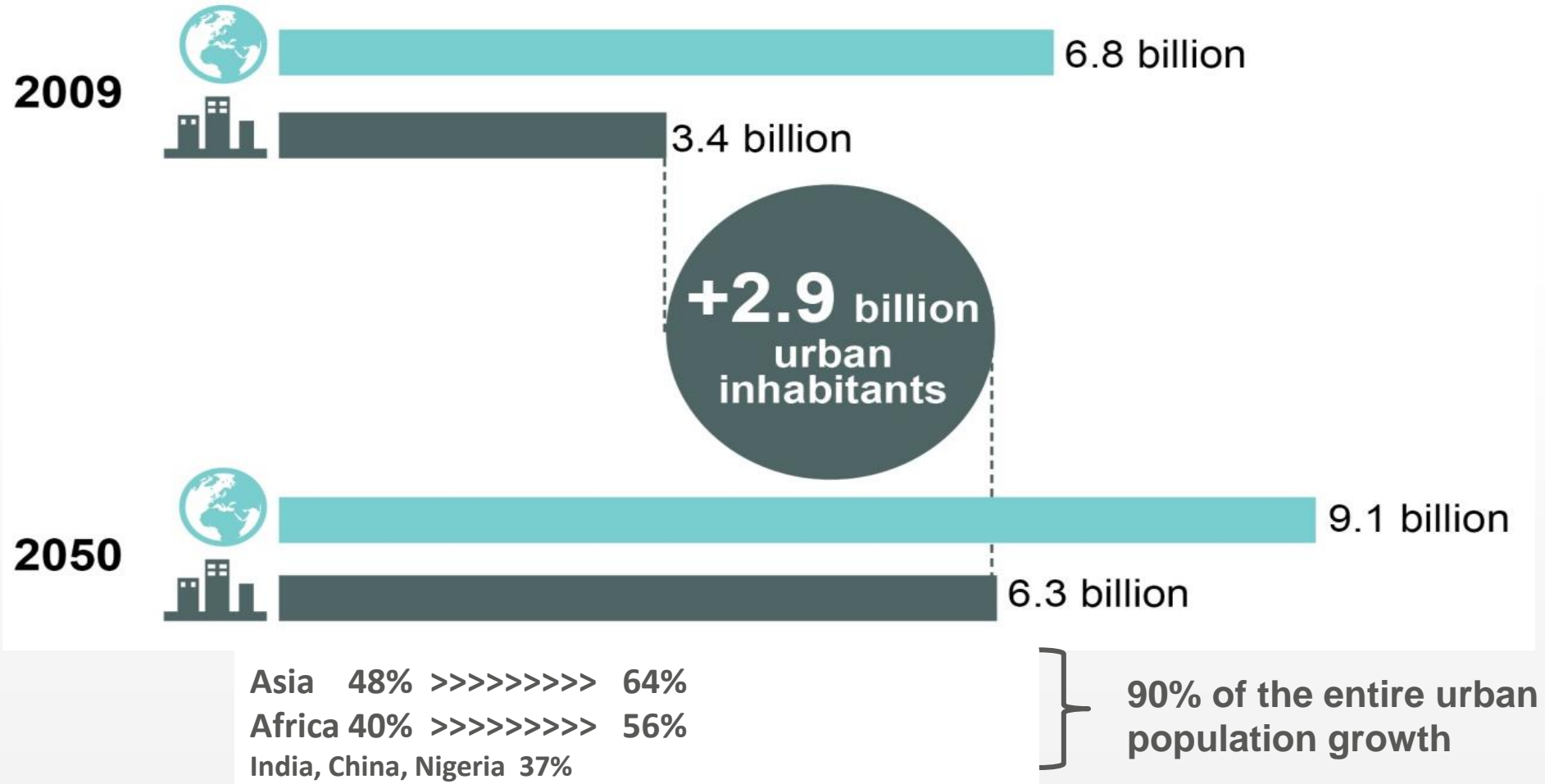
Urban Climate-Resilient Infrastructure Finance

in the Paris Accord Era

Peter B. Meyer (EPSG, USA) and Reimund Schwarze (UFZ, Germany)



„Our struggle towards sustainability will be won or lost in cities.“ (Ban Ki Moon, 2012)



Outline

- 1 Urban climate infrastructure finance issues
- 2 Paris-Accord: Builds on bottom-up financing solutions
- 3 Carbon pricing and carbon risk disclosure as panaceas - mechanisms, experiences and challenges
- 4 Pulling pieces together: The need for co-benefits frameworks
- 5 Conclusion & take home message

1. Urban climate finance issues

The Need: average annual infrastructure investment need of some US\$ 5.7 (WEF 2013) to US\$ 6.5 (CCFLA 2016) **Trillion**

The Issue: not enough financing – only US\$359 **Billion** invested internationally in 2012, falling to \$331 bill in 2015 (CPI)

The Perceived Problem: only 4% of the 500 largest cities in developing countries were creditworthy in international financial markets and 20% are creditworthy in local markets

The Reality: infrastructure financing may be available but too expensive – or the needs may exceed even creditworthy cities' capacity to service the debt – and may appear to be a less immediate need than other current expenditures

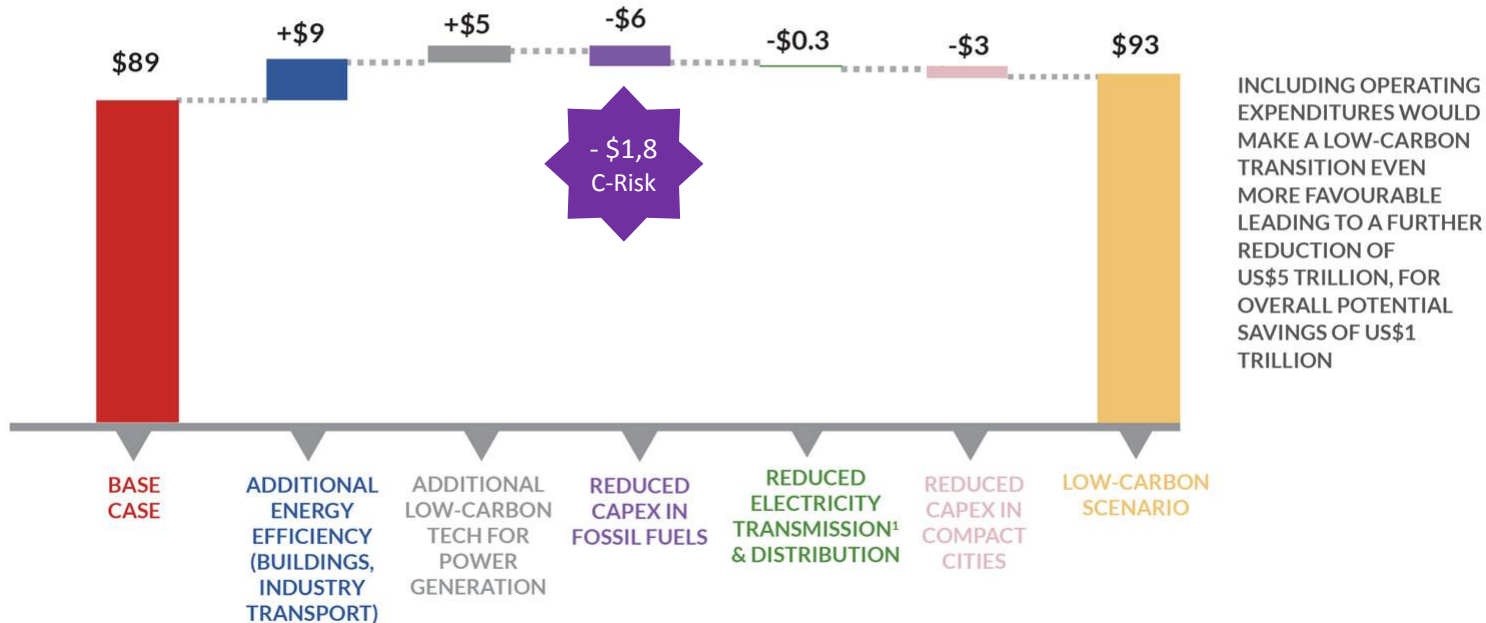
The Way Forward: such infrastructure could compete on current cost grounds if carbon risks and lifetime returns on investment are considered

Global Commission on the Economy and Climate

Global investment requirements 2015–2030, US\$ trillion, constant 2010 dollars

GLOBAL INVESTMENT REQUIREMENTS, 2015 TO 2030, US\$ TRILLION, CONSTANT 2010 DOLLARS

Indicative figures only
High rates of uncertainty



Source: Better Growth, Better Climate.³⁹

... But what is 'infrastructure' – really?

Most definitions – and investment decisions – focus on physical structures, i.e.

“hard infrastructure”

- Buildings
- Utilities
- Transportation systems
- Communications networks

But there is also a “soft infrastructure” of health care, education, emergency and support networks, the so-called “safety net”, and other welfare programs. It may be associated with physical structures, e.g. parks, public pools, schools, libraries

Climate-resilient infrastructure is a mix of hard and soft infrastructure that is resilient to climate change. It is an essential component of climate adaptation, particularly since it underpins quality of life, business continuity and growth

Green Infrastructure is hard and soft infrastructures providing “nature based solutions” for urban climatic challenges, e.g. urban forests, constructed wetlands, environmental education



Availability of public funds and market access is only half the issue, ...

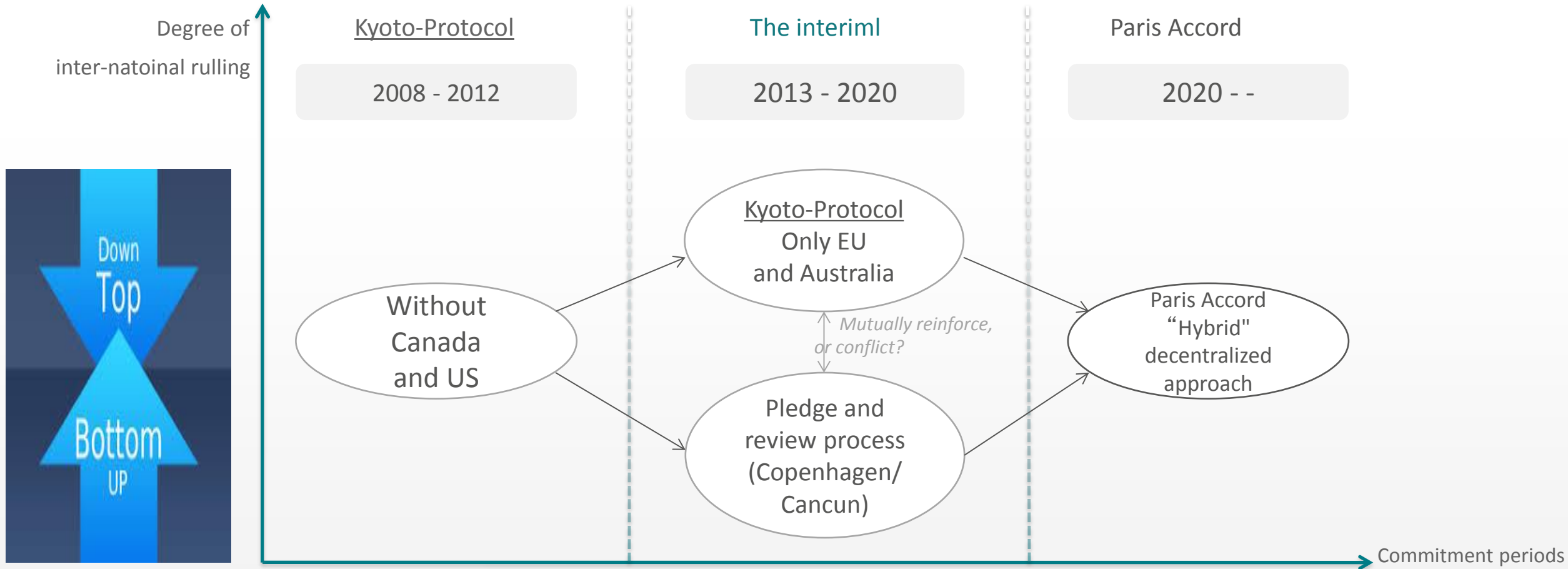
We find both “**hard**” and “**soft**” barriers to **C**limate **I**nfrastructure **F**inance (CIF) of cities:

- Many reports highlight the limited availability of public funding on urban CIF. Only \$55 B out of a total of \$391 B in climate finance is delivered through grants and low cost project debt
- Many reports refer to the global need to improve creditworthiness of cities. Only 4% of the 500 largest cities were creditworthy in international financial markets and 20% were domestically creditworthy.
- **Soft factors** such as **ideology** may block commitment of available funds. Without prior **political commitment**, available sustainable infrastructure investment options may never get examined
- **Sources of funding – and their priorities** – may shape local commitment to climate resilience in infrastructure investments. When priorities are identified by an external funding source as factors in eligibility, project plans often get modified to assure access to funds
- That means that local political will is not fixed and may be **malleable by supra-local policies and actors**

2. Paris-Accord: Builds on bottom-up financing solutions

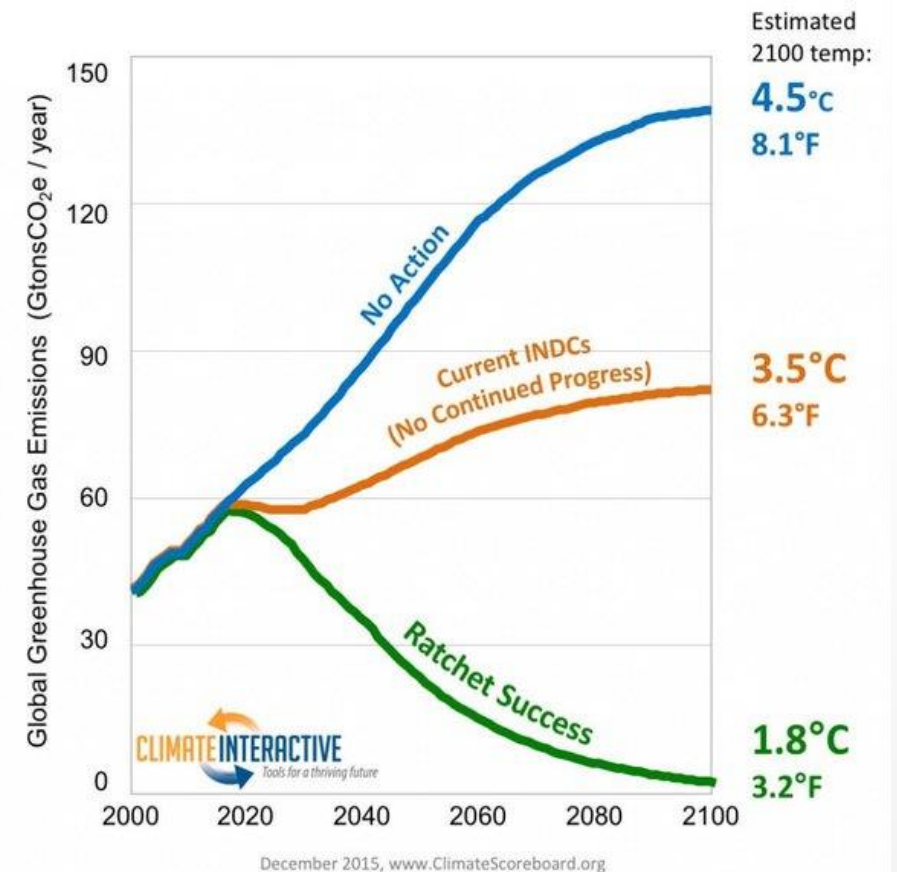


The Paris Accord, a regime shift in UN climate policy



Long-term goals, national pledges and ‘ratcheting’

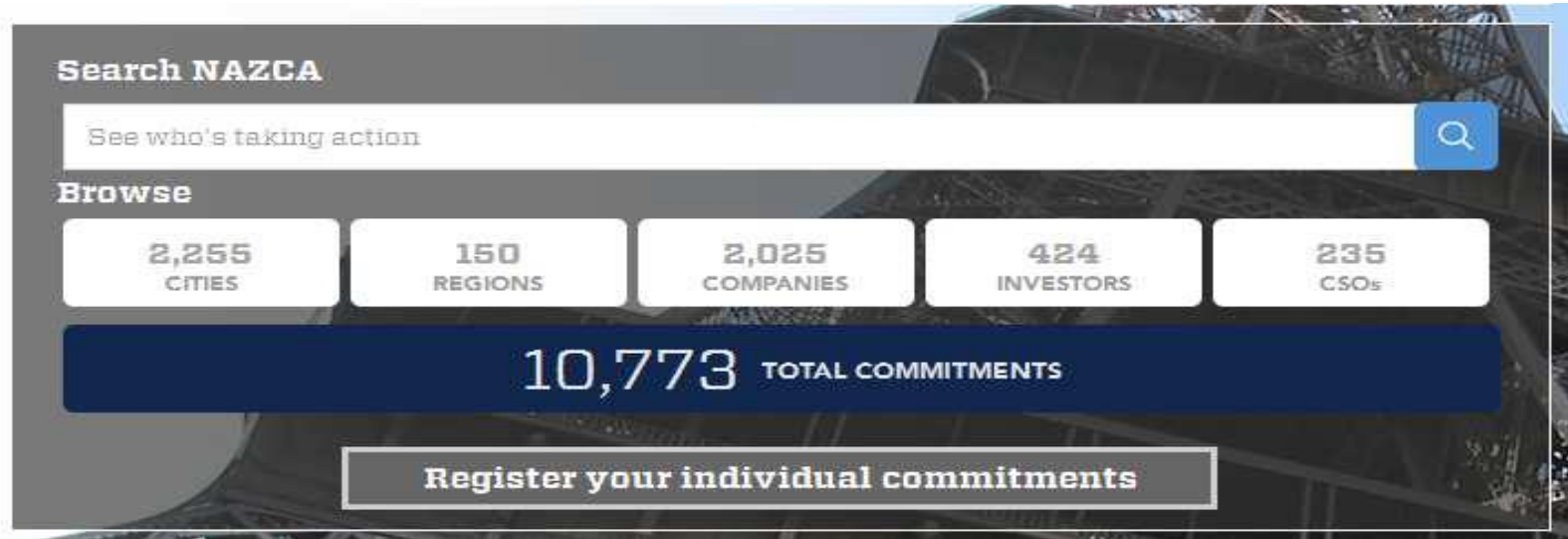
- **Long term goals:** Stay significantly below 2° C global temperature change, strive for 1.5° C
- **Key instrument:** Nationally Determined Contributions (NDCs)
- Current NDCs for 2020 are likely to lead to a warming of at least 3° C; unless a more stringent approach can be agreed for 2030 by ‘ratcheting’ NDCs upward, the international regime will not be able to deliver the long term goals
- Long-term goals can be thought of as being “**transformational**”, sending a signal to city planners, businesses and financial markets



Market mechanisms in the Paris Accord

- **Cooperative Approaches (CA)**, create “internationally transferred mitigation outcomes” (ITMOs), intended to achieve higher ambitions at the national level
- **Mechanism “to contribute to the mitigation of greenhouse gases and support Sustainable Development” (labelled SDM)** works under the authority and guidance of the UNFCCC; it shall make use of existing experiences under the Kyoto Protocol to share mitigation technologies and expertise across countries and cities
- **Non-market based mechanisms** intended to strengthen and coordinate the interplay of activities of private sectors (Art. 6.8), mostly lack any detail on proposed structures and implementation
- **Non-Public Sector roles** in setting private sector opportunities to act remain ill-defined

Solutions Agenda, a new interplay between subnational, private initiatives and UN climate policy



- ✓ **Breakthrough Energy Coalition** – to ‘Form a network of private capital committed to building a structure that will allow informed decisions to help accelerate the change to the advanced energy future.’
- ✓ **Caring for Climate** – ‘an initiative mobilizing business leaders to implement and recommend climate change solutions and policies by advancing practical solutions, sharing experiences, informing public policy and shaping public attitudes.’
- ✓ **Global Alliance for Buildings and Construction** – ‘aims to gather countries, cities and public and private organizations of the building sector value chain, in order to scale up the implementation of ambitious actions toward the "below 2° C" pathway in buildings and construction sector.’

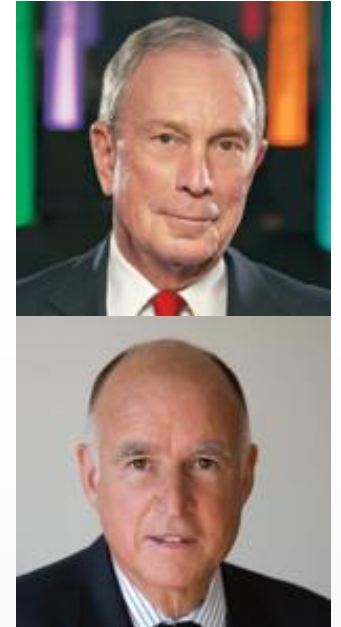
The U.S. Pull-out and America's pledge

“We, the undersigned mayors (227), governors (9), college and university leaders, businesses and investors (1,650) are joining forces for the first time to declare that we will continue to support climate action to meet the Paris Agreement”

-- J. Richard Gray, Mayor of Lancaster, PA, Jim Kenney, Mayor of Philadelphia, PA, William Peduto, Mayor of Pittsburgh, PA ... Amazon, Apple ... Bloomberg LP, ... Facebook, Twitter ... Walmart ...

New York Governor Cuomo, **California Governor Brown**, and Washington Governor Inslee Announce Formation of **United States Climate Alliance** ...

“It is my hope that the UNFCCC, on behalf of the Parties to the Paris Agreement, will accept and acknowledge **America's Pledge** as a **parallel submission** alongside any future submission provided to you by the current executive branch of the U.S. federal government.”

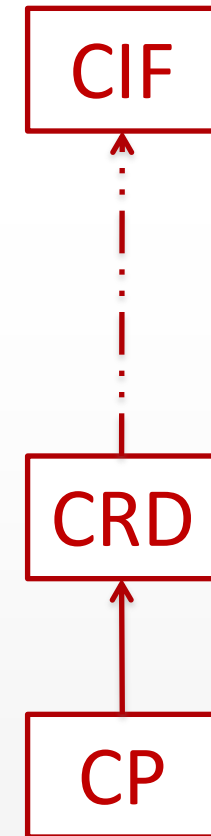


How Paris Accord helps to solve the ‘other half’ of the issues

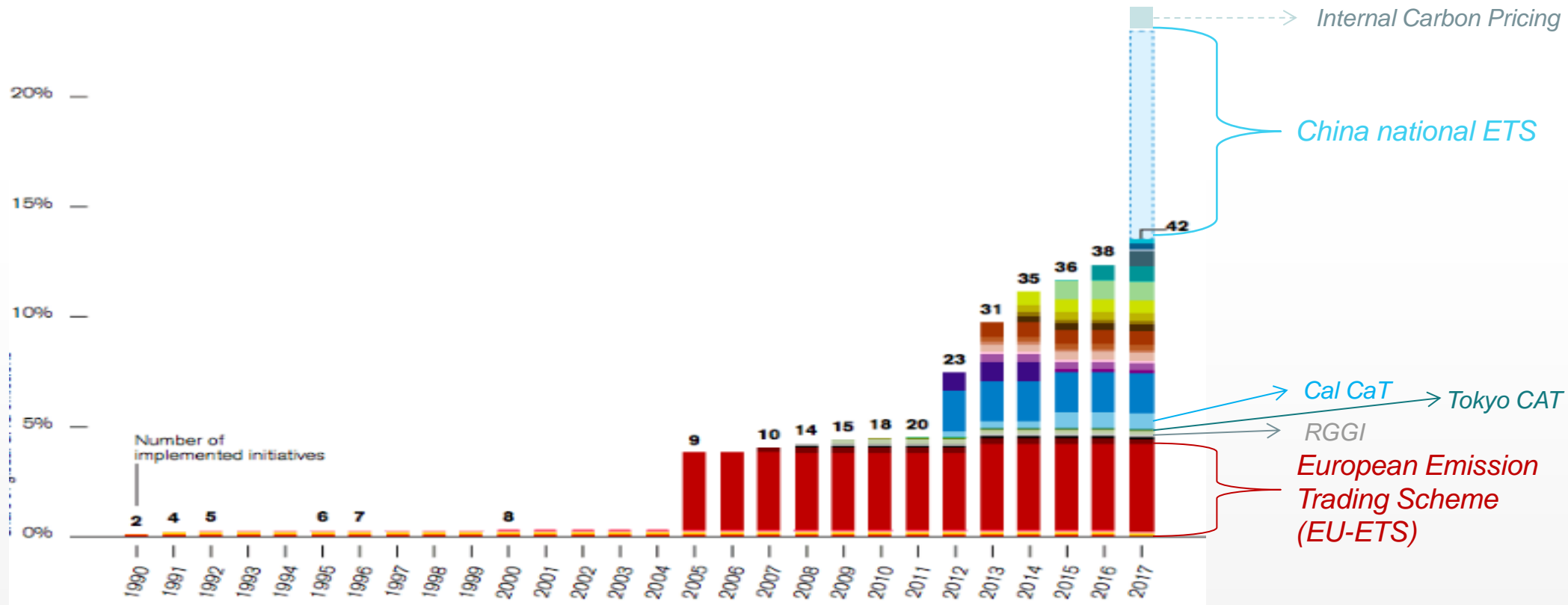
- Ideology may block commitment of available funds to sustainable or climate-responsive physical infrastructure
 - **National commitments on GHG reduction may change ideologies**
- Without prior political commitment, available sustainable infrastructure investment options may never get examined
 - **With no ideological barriers and an incentive to find the most efficient means of reducing emissions, new options will be welcomed**
- Available sources of funding – and their political priorities – may shape local commitment to climate resilience in infrastructure investments
 - **Where local financing capacity exists, as in the US and Germany, we already see sub-national commitments growing**
- That local commitment is not fixed and may be malleable by the actions and programs of supra-local political and social entities
 - **Precisely: That is why the Paris Accord makes a difference!**

3. Carbon pricing and carbon risk disclosure as panaceas - mechanisms, experiences and challenges

- Climate Infrastructure Finance (CIF) depends on predictions of the risks of higher future costs of carbon, that is Carbon Risk Disclosure (CRD)
- Carbon Pricing (CP) helps offers a means for measuring climate-related risks and opportunities in financial terms
- Such measurements are essential to scenario projections that are routinely used in assessing prospective risk in the presence of uncertainty
- **CP is thus essential to CIF availability**



The growing world of 'effective carbon pricing'



World Bank Group (2016). Regional, national and subnational carbon pricing initiatives: Share of global GHG emissions covered

The Regional Greenhouse Gas Initiative

RGGI formed in 2008 by nine US states: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island and Vermont

- 90% of all allowances are distributed by auction; total allowances declining 2.5% each year
- Member states cut carbon emissions by 30%, 2008-2015; rest of US (excl. California) dropped only 14%
- RGGI states' economies outgrew the rest of the US 25% to 21%
- \$1.37 B in proceeds have been invested in GHG mitigation efforts
- Expected to provide \$4.67 B in lifetime energy bill savings
- Over their lifetime, RGGI investments should save 76.1 M MMBtu of fossil fuels and 20.6 M MWh of electricity, reducing carbon pollution by 15.4 M short tons

California's cap and trade system

- Initiated in 2006 with the objective of reducing state emissions to 40% below 1990 levels by 2030
- Oil and gas companies, not just power companies, need emissions allowances
- As of the end of 2016, had achieved 97% of the emissions reduction target for 2020 set in 2006
- By 2017, nearly \$3.4 billion had been raised from the auctions for State agencies implementing GHG emission reduction efforts, and natural resources protection
- Price volatility arises as the result of the right to 'bank' auction allowances from prior years for future use
- Proposed regulation: Allowance price containment reserve

Figure 2. Secondary market prices for allowances (through July 13)



Source: Energy Innovation graphic with Intercontinental Exchange data via [CalCarbonDashboard](#)

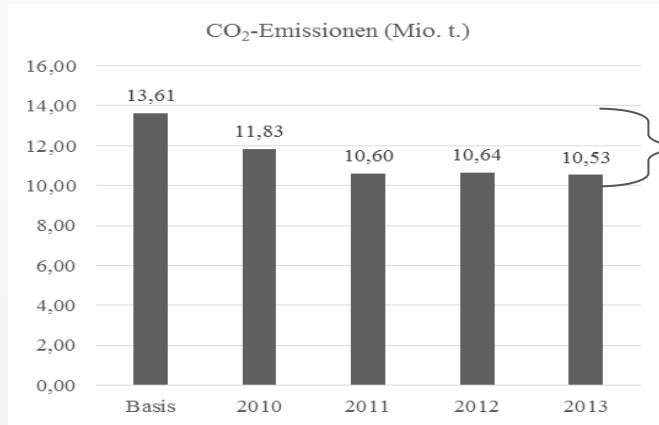
City ETS (Example of Tokyo)

Reduction goals for 2020

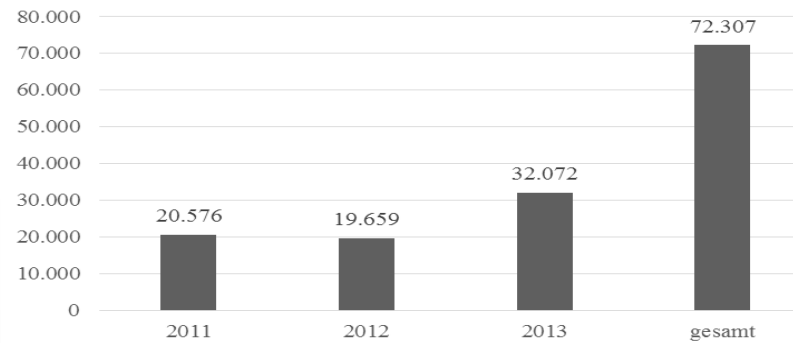
Base year 2000

	Periode I (2010-2014)	Periode II (2015-2019)
➤ Total	...	-25% (= 3.4 Mt)
➤ Industry -6%	-15%	
➤ Household	...	-19%
➤ Traffic -	...	-42%

- 2019 goals already achieved in 2014!

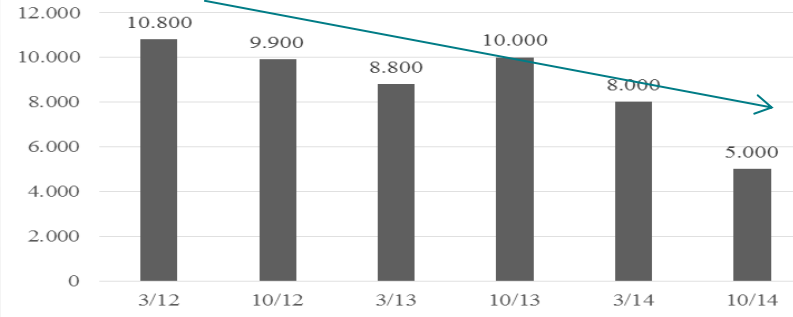


Anzahl transferierter Emissionsgutschriften



- Functioning market (but needs „ratcheting“ and „linking“ to other ETS)

Preise (¥)



The Carbon Disclosure Project, facts and trends

Voluntary Self-Generated Reports

	2013	2017
Companies	4500	5600
Cities	200	533
States and Regions	72	72

Source: CDP Official webpage; CDP (2013). The Facts, CDP, 2013. Own compilation

Company internal carbon pricing

Number of companies using / planning to use an internal price on carbon

Country	2015 Total	2016 Total	Increase from 2015 - 2016
Brazil	27	47	74%
Greater China	84	125	49%
India	27	44	63%
Japan	69	104	51%
Mexico	13	26	100%
Republic of Korea	48	64	33%
USA	147	210	43%

Steady increase of internal CP globally

Internal pricing, convergence and divergence

Energy industries	2014	2015	2016
BP	40	40	40
ConocoPhillips	46	51	38
Devon Energy Corporation	15	15	15
Encana Corporation	80	94,16	125
Enerplus Corporation			22,98
Eni SpA		40	40
Exxaro Resources Ltd		8,93	8,17
Exxon Mobil Corporation	80	80	80
Galp Energia SGPS SA			33,51
Hess Corporation			40
Imperial Oil		80	80
Keyera Corp.			22,98
Origin Energy			36,75
PTT			18,7
Royal Dutch Shell	40	40	40
S-Oil Corp		4,22	14,58
Statoil ASA		50	64
Suncor Energy Inc.		41,43	42,12
Total	32	28,06	27,92
TransCanada Corporation			61,27
Vermilion Energy Inc.		24,69	16,91
Vopak			27,92
	7	14	22

Utilities	2014	2015	2016
ACCIONA S.A.			80,42
AGL Energy		9,81	10,25
Ameren Corporation	30	53	53
Centrica		19,89	32,08
Colbun SA		5	5
Companhia Energetica Minas Gerais—CEMIG		0,95	1
CPFL Energia SA			0,28
E.ON SE		44,9	44,68
EDP—Energias de Portugal S.A.		67,35	67,01
Enagas		7,86	7,82
Endesa			12,29
ENEL SpA		12,35	12,29
Exelon Corporation			20
Gas Natural SDG SA		33,68	37,11
Iberdrola SA		33,68	33,51
Korea Gas Corp			85,75
Los Angeles Department of Water and USA Power		12,45	12,45
National Grid PLC	89,1	85,69	86,04
NiSource Inc.		20	30
Pennon Group	324	306,03	291,65
Severn Trent			21,29
Snam S.P.A		8,98	8,23
Suez Environnement		24,48	
TransAlta Corporation	23	22,6	22,98
United Utilities			23,48
Verbund AG			7,48
	4	18	25



Decisions need data, and data need standards

- Current costs and immediate effects are more readily known than benefits and future impacts
- Climate science has provided new data as has the experience of natural disasters linked to climate change
- Scenarios of carbon prices and risks at the sectoral level would help decision- making
- **Data on current conditions and future carbon cost scenarios are needed to shift the decision processes in favor of more sustainable infrastructure**
 - The need is for a standard that can identify cash flow generated by a GHG emissions-reducing investment, so as to make the project bankable, even if the city is not creditworthy
 - Prices exist – but they are not standardized: investors cannot tell if they are market prices or technology-specific.
- **A Market-Based carbon pricing process is the ideal basis for such as standard but is not yet available for wide-spread use**

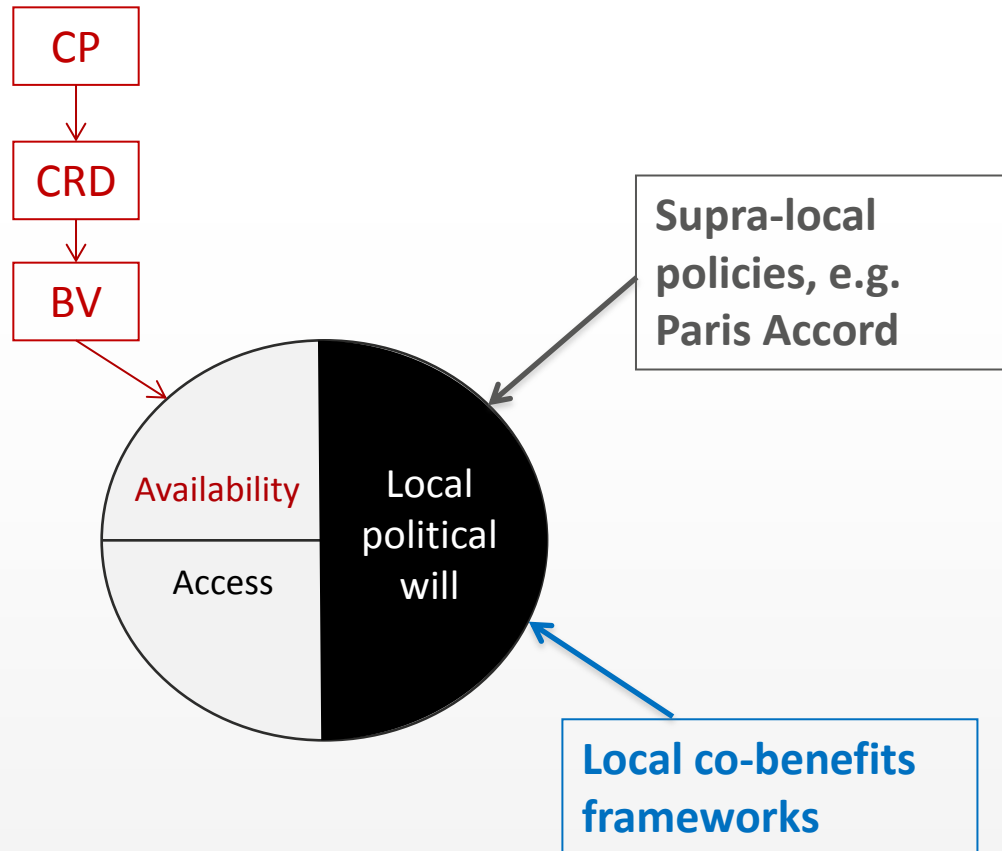
Post-Paris CP and CRD initiatives, still a way to go

- **Partnership for Market Readiness** -- supports countries pursuing market-based carbon pricing, but has a budget that is under \$200 Million
- The World Bank's **Transformative Carbon Asset Facility** was launched in Paris with a \$500 Million budget to 'create new classes of carbon assets'
- Article 173 of the **French Energy Transition Law (2016)** has set a new global standard for carbon and climate risk disclosures for both companies and institutional investors
- **But Carbon Risk Disclosure will permit access to previously unavailable capital**
- Asset Owners' Disclosure Project reports on some **\$38 Trillion**. But only 1% of insurers, 6% of pension funds, address **stranded assets**
- 8% of insurers assess climate risk; 16% of pension funds do. Only \$30 Billion of insurance assets and \$63 Billion of pension funds are in low-carbon investments.
- There is opportunity to attract further low carbon investment, **if cities start measuring climate risks**

So, climate risk accounting is mainstreaming

- Business and investment accounting standards increasingly are requiring climate risk disclosure
- The more this occurs in the private sector, the more **long term investors** – the ones with the most capital, such as pension funds and insurers – will see public sector climate mitigation efforts as supporting their other investments
- Simultaneously, those investors will increasingly consider returns on climate change adaptation projects as cost avoidance benefits contributing to debt service capacities from borrowers
- The Climate Disclosure Project was permitted to release actual internal carbon prices by only 17 companies in 2014; by 2016, 126 companies released their prices
- It appears that companies are using CDP publicity and climate risk disclosure to attract capital
- Litigation over failure to disclose climate risks may increase pressure on companies to disclose

4. Pulling pieces together: The need for co-benefits frameworks



- **Accessibility**, i.e. the capacity to service debt incurred for infrastructure, is a necessary, albeit insufficient condition for carbon infrastructure financing (CIF)
- **Carbon pricing (CP)**, carbon risk disclosure (CRD) and a form of ‘blended value’ (BV) movement would have a major impact on **availability** of funds
- **Local political will** is influenced by **supra-local policies** and actors such as the **Paris Accord**
- It also depends on the framing climate action as **local co-benefits** to the constituency

5. Conclusions & take-home message

- The Paris Accord relies on voluntary climate change mitigation efforts and thus depends on willingness to act
- Such willingness cannot be imposed from above but requires a bottom up approach
- **Connecting city need for infrastructure to city concerns for climate change is thus an essential element of success for the Paris Accord**

Peter B. Meyer, PhD <pbmeyer@Louisville.edu>

Professor Emeritus of Urban Policy and Economics
University of Louisville

President and Chief Economist
The E.P. Systems Group, Inc. <pbm@theepsystemsgroup.com>
New Hope, PA, USA

Prof. Dr. Reimund Schwarze <schwarze@europa-uni.de>

Professor International Environmental Economics
European University Viadrina

Department of Economics – Head of Climate Economics
Helmholtz Centre for Environmental Research GmbH – UFZ
<reimund.schwarze@ufz.de>



Thank you!

www.de-us.net

de-us.net



facebook.de/de-us



linkedin.com/groups/13504647



twitter.com/de_us_net

Now we answer to your questions



Prof. Dr. Reimund
Schwarze



Prof. Peter B Meyer



Dr. Stephan
Bartke

de-us.net



facebook.de/de-us



linkedin.com/groups/13504647



twitter.com/de_us_net