## Regional Infrastructure Investment Plans:

# Potential for Advancing Sustainable Development?

By Robin Schmücker



Published by the Heinrich Böll Foundation North America Washington, DC, March 2018 © All rights reserved

Author: Robin Schmucker Design: Nicole Johnson Cover Photo: Boris Balabanov / World Bank – World Bank Photo Collection (Flickr). Photo ID: BB-BG003– License: (CC BY-NC-ND 4.0)

#### **Heinrich Böll Foundation North America**

1432 K Street NW
Suite 500
Washington, DC 20005
United States of America
T +1 202 462 7512
F +1 202 462 5230
E info@us.boell.org

www.us.boell.org

#### **Table of Contents**

List of Figures	2
Acronyms	3
Abstract	1
1. Introduction	1
2. The Infrastructure Investment Gap – A Window of Opportunity?	2
3. The Juncker Plan – Investment Plan for Europe	4
3.1. Economics and political background	4
3.2. Sustainability	7
3.2.1. Environment	7
3.2.2. Social impact	9
4. Program for Infrastructure Development in Africa (PIDA)	10
4.1. Economics and political background	10
4.2. Sustainability	12
4.2.1. Environment	12
4.2.2. Social impact	14
5. One Belt One Road Initiative – China	16
5.1. Economics and political background	16
5.2. Sustainability	19
5.2.1. Environment	19
5.2.2. Social Impact	21
6. Mega-infrastructure and private sector participation – Common feat	ures,
common risks	21
7. Concluding remarks	25
Sources	i

#### **List of Figures**

Figure 1: Global	SDG investment can	Data Source: Shah 2016	McKinsev 2016	.3
rigulo I. Clobal	ODO invoounoni gap.	Bala Obaloo. Onan 2010	, moranooy 2010	

Figure 2: Annual growth rate of gross capital formation in the EU and the US. Data Source: World
Bank national accounts data, and OECD national accounts data files
Figure 3: Structure of EFSI. Source: European Commission - State of the Union FAQs 2016
Figure 4: EFSI investments by sector. Source: European Commission 2016: Investment Plan for
Europe7
Figure 5: Estimated cost for PAP projects by sector. Source: African Union Commission 2010 11
Figure 6: Governing Bodies of PIDA. Source: African Development Bank 2017
Figure 7: PIDA transport routes. Source: African Union Commission 2010, BY-NC-ND
Figure 8:PIDA Energy grids and hydropower generation. Source: African Union Commission 2010, BY-
NC-ND
Figure 9: Energy pathways to poverty reduction. Source: Oxfam. Hogarth and Granoff 2015 16
Figure 10: Map of the Belt and Road Initiative network. Source: Mercator Institue for China Studies
(Merics). Online: https://www.merics.org/en/merics-analysis/china-mapping/china-mapping/

#### Acronyms

African Development Bank	MEP	Ministry of the Environment
Asian Infrastructure Investment	MOFCOM	(China)
Bank	MRG	Ministry of Commerce (China)
African Union	NEPAD	Minimum Revenue Guarantee
African Union Commission		New Partnership for Africa's
Belt and Road Initiative	ODA	Development
China Banking Regulatory	OECD	Offical Development Aid
Commission		Organisation for Economic
China Development Bank	PAP	Cooperation and Development
Civil Society Organisation	PIDA	Priority Action Plan
European Commission		Program for Infrastructure
European Fund for Strategic	PPP	Development in Africa
Investment	PSP	Public-Private Partnership
European Investment Bank	RE	Private Sector Participation
European Investment Fund	SDGs	Renewable Energy
European Union	(S)EIA	Sustainable Development Goals
Group of 20		(Social) Environmental Impact
Gross Domestic Product	SME	Assessment
Gross Capital Formation	SOE	Smal and Medium Enterprises
Information and Communication	SRF	State-owned Enterprise
Technology	UN	Silk Road Fund
Multi-lateral Development Bank		United Nations
	African Development BankAsian Infrastructure InvestmentBankAfrican UnionAfrican Union CommissionBelt and Road InitiativeChina Banking RegulatoryCommissionChina Development BankCivil Society OrganisationEuropean CommissionEuropean Fund for StrategicInvestmentEuropean Investment BankEuropean UnionGroup of 20Gross Domestic ProductGross Capital FormationInformation and CommunicationTechnologyMulti-lateral Development Bank	African Development BankMEPAsian Infrastructure InvestmentMOFCOMBankMRGAfrican UnionNEPADAfrican Union CommissionODABelt and Road InitiativeODAChina Banking RegulatoryOECDCommissionOECDCommissionPAPChina Development BankPAPCivil Society OrganisationPIDAEuropean CommissionPPPInvestmentPSPInvestmentSDGsEuropean Investment BankREEuropean Union(S)EIAGroup of 20SMEGross Domestic ProductSMEGross Capital FormationSRFInformation and CommunicationSRFMulti-lateral Development BankUN

#### Abstract

To achieve the United Nations Sustainable Development Goals on a global scale and to maintain projected growth rates, closing the infrastructure investment gap is critical and requires additional and substantial financial efforts. In this respect, this paper examines three regional infrastructure investment plans that aim to address this deficit: The Investment Plan for Europe, the Program for Infrastructure Development in Africa, and the Chinese Belt and Road Initiative. However, while representing legitimate endeavors to promote infrastructure investment, these plans also involve significant risks regarding environmental sustainability, social impacts, and unfavorable technological lock-ins for the next decades. The potential of these plans to contribute to sustainable development is limited by finance mechanisms such as public-private partnerships, the scale of the envisioned infrastructures, and the technologies applied. Downstream in project implementation, frameworks to safeguard sustainable criteria exist, although compliance in planning and implementation has to be improved as well as monitoring and enforcement of regulation through further capacity building. Upstream safeguards in investment codes as well as project identification and design are lacking. Only greater progress in these areas can ensure economic, social and environmental added-value.

#### **1. Introduction**

"Saving our planet, lifting people out of poverty, advancing economic growth... these are one and the same fight. We must connect the dots between climate change, water scarcity, energy shortages, global health, food security and women's empowerment. Solutions to one problem must be solutions for all."

- Ban Ki-moon

To address these issues and to achieve the necessary reorganization of society, investment in infrastructure plays a crucial role. Infrastructure design and service coverage determine the carbon-intensity, social inclusiveness, and development of our economies and provides people with access to markets and basic needs. Investment in modern infrastructure is, therefore, a major facilitator to achieve the goals formulated in the UN Agenda 2030 for Sustainable Development and the Paris Agreement (OECD 2017, UNDP 2017).

In a recent comprehensive report, issued in the framework of the German G20 presidency, the OECD makes the case for the added value of investments in green infrastructure and the severe costs if not doing so, stating:

"Countries are now facing a fundamental choice: The type of infrastructure investments they make will either support or seriously undermine future global well-being."

- OECD 2017

This is an impressive statement for an institution that is relatively conservative in its economic approach. According to an article of Rogelj et al. (2016) published in *Nature*, "the window for limiting warming to below 1.5 degrees Celsius with high probability and without temporarily exceeding that level already seems to have closed". Hence, the coming decade will determine the fate of climate action and as a consequence, there is immediate pressure to act (WBGU 2011, IPCC 2014).

Given the potential and necessity of infrastructure investment, this paper analyses three current regional infrastructure master plans: The Investment Plan for Europe (Juncker plan), the Chinese Belt and Road Initiative (BRI), and the Program for Infrastructure Development in Africa (PIDA). Combined, the endeavors will have a major impact on global climate action and sustainable development, even if they are not fully implemented. The paper will, at first, look at their economic and political background, and secondly, their alignment with social and environmental sustainability.

The following section will provide further insight into the role of infrastructure and the substantial investment gap that accumulated over the last years on a global stage,

particularly after the financial crisis of 2008 (OECD 2017). The case will be made that this gap provides a unique "window of opportunity" to align future investments to principles agreed upon in the Paris Agreement and the UN Sustainable Development Goals (SDGs). The following section will then look more closely at the individual master plans, as mentioned above. Subsequently, potential risks are summarized and frameworks to address these issues are presented. While the benefits of infrastructure investments are widely known, acknowledged and researched, the potential social and environmental as well as economic risks of these investment plans are insufficiently covered (Aizawa 2017). With respect to the mentioned regional infrastructure plans, this paper aims to provide a contribution in this respect.

### 2. The Infrastructure Investment Gap – A Window of Opportunity?

First, it makes sense to clarify the term "infrastructure investment gap" in the context of this paper. In an article on the "Global Infrastructure Forum" 2016, the leading event for infrastructure financing to achieve UN SDGs (EIB 2017), a senior World Bank official Marianne Fay (2016) created a simple model in the early 2000s to quantify the evolving infrastructure investment gap in Latin America. Projections, depending on a given growth path, are made based on the composition of certain transport, energy, water infrastructures at a certain point in time in relation to selected economic indicators and factors.

"Well, assuming countries grow this way and follow the patterns of the past, it's quite easy to deduce an investment pattern and an investment amount. I called this final figure the "infra-structure gap."

– Marianne Fay 2016

In a later comment, she pointed out two important problems that occur with such a model. First, there is an implicit assumption that there was no underinvestment in the past, accordingly, the extrapolation would also reflect underinvestment. Second, there is no assertion on what is needed, wanted and what can be afforded. Current trends like urbanization, the climate crisis, and rising inequality pose requirements on investment patterns that differ from those of ten years ago (Fay 2016). In other words, the quantitative extent of the infrastructure investment gap is highly dependent on the qualitative requirements – be it resilience, social inclusiveness, environmental compatibility, low carbon-intensity or its contribution to economic growth. To determine these requirements remains subject to political discussion and the Agenda 2030 and the Paris Agreement's Nationally Determined Contributions (NDCs) provide such guard rails. Having that in mind, a study by McKinsey (2016) estimated the needed investments in infrastructure:

"From 2016 through 2030, the world needs to invest about 3.8 percent of GDP, or an average of \$3.3 trillion a year, in economic infrastructure just to support expected rates of growth. (...) But if the current trajectory of underinvestment continues, the world will fall short by roughly 11 percent, or \$350 billion a year. The size of the gap triples if we consider the additional investment required to meet the new UN Sustainable Development Goals."

-McKinsey 2016 p. 8

Aniket Shah (2016) assesses the additional needed investment for the SDGs at one to two trillion dollars of which more than the half has to be directed to infrastructure. Whereas an precise number is hardly quantifiable, figure 1 provides the conception behind this.



Figure 1: Global SDG investment gap. Data Source: Shah 2016, McKinsey 2016

So how to close this gap in times of austerity and chronically limited state budgets? The private sector, including banks and institutional investors, have over \$120 trillion at hand that seeks profitable investments in times of the current low-interest environment (McKinsey 2016, Ross 2016). There is a strong consensus around the need to mobilize private money for infrastructure investment, but apparently less consensus to ensure that such investment is socially and environmentally sustainable.

The "billions to trillions" approach of the World Bank Group, the IMF and various multilateral development banks (MDBs) reflect this rationale on the global stage. As a joint statement of the IMF and the MDBs makes clear:

"Achieving the SDGs will require moving from billions to trillions in resource flows. Such a paradigm shift calls for a wide-ranging financing framework capable of channeling resources and investments of all kinds. (...) financing from private sources, including capital markets, institutional investors and businesses, will become particularly important."

- Joint statement of IMF and MDBs, 2015

This paradigm shift directly applies to the context of this paper. The MDBs include the World Bank Group, the African Development Bank (AfDB), the European Investment Bank (EIB) as well as the Asian Infrastructure Investment Bank (AIIB) and many more – they are among the main financiers of the respective infrastructure investment plans analyzed below. They have a particular focus on crowding-in private capital. In fact, private sector participation (PSP) is a common feature of these plans.

In this regard, the outcomes of the 2017 G20 Summit are consistent, since the role of private financing for infrastructure is explicitly promoted (G20 Leaders Communique 2017, The G20 Principles of MDBs' strategy for crowding-in Private Sector Finance for growth and sustainable development, the Hamburg Action Plan 2017, G20 Hamburg Climate and Energy Action Plan for Growth 2017). Also, the above-mentioned OECD paper "Investing in Climate, Investing in Growth" published in cooperation with the German Ministry for the Environment, makes the case for the mobilization of private finance (OECD 2017). Financing mechanisms such as public-private partnerships (PPPs) are at the top of the agenda, yet create various and severe challenges in terms of debt and social and environmental impacts (Alexander 2017). This will be further discussed in the course of this paper.

Rising social inequalities within countries and poverty reduction, climate change and environmental degradation require the alignment of future investments to ambitious goals not only regarding economic but also social and environmental sustainability. The following chapters will review the mentioned investment plans against this background and investigate the major criticisms of them.

#### 3. The Juncker Plan – Investment Plan for Europe

#### 3.1. Economics and political background

The investment plan for Europe, also referred to as "Juncker Plan" and named after the president of the European Commission (EC), was launched in 2015 as a multi-billion investment initiative with the official goal of addressing the investment shortfalls after the financial crisis in 2008. This plan is intended to significantly contribute to the Commission's priorities of economic recovery, enhanced (youth) employment rates and sustained growth in Europe (State of the Union FAQ 2016; European Commission 2016 (state of play); European Commission 2016 (evaluation). The present EU Commission is formed by a coalition of the Conservatives and Social Democrats. The plan can be regarded as an attempt to give the Social Democrats at least the appearance of a Keynesian dimension after years of austerity policy. Hence, the plan is a reaction to the failed European approach of "fiscal consolidation"

– basically another term for austerity – that failed to bring economic growth in Europe back on track (Sol 2017, Rinaldi and Núñez Ferrer 2017, Rubio, Rinaldi & Pellerin-Carlin 2016). The figure below illustrates the fluctuating and lower gross capital formation (GCF) of domestic investments in Europe as compared to the US since the financial crisis 2008/09. The lag becomes even more substantial when looking at declining ratio of European governmental GCF as a share of annual GDP, which is significantly below average compared to the US, Canada, Japan and others (McKinsey 2016).



Figure 2: Annual growth rate of gross capital formation in the EU and the US. Data Source: World Bank national accounts data, and OECD national accounts data files

While empirical evidence is not definite regarding anti-cyclical effects of infrastructure investment due to time-intensive preparation, approval and legislative processes, decreasing public investment for nearly a decade in times of stagnation is at least odd (McKinsey 2016). The Eurozone's Fiscal Compact and the consequential austerity practice for the last years is a living example of this.

The Juncker Plan, therefore, aims to stimulate further investment, even though there are indications that this initiative's scope and timing is "too little and too late" as a study by Le Moigne et al. (2016) states, especially compared to the US response to the crisis (see figure above) (Sol 2017, Rinaldi and Núñez Ferrer 2017, Rubio, Rinaldi & Pellerin-Carlin 2016, Le Moigne et al. 2016). However, this circumstance is also due to limited jurisdiction of the EU commission since many responsibilities are still located on the national levels. The "infrastructure and innovation" sector, as one window of the Juncker Plan (see figure 3) is actually one of the few areas where the EU could intervene with a fiscal stimulus, e.g. investment or tax cuts are a prerogative of member states (Rinaldi and Núñez Ferrer 2017, Rubio, Rinaldi & Pellerin-Carlin 2016).

Since the EU member states were reluctant to increase the EU budget, more emphasis was put on the role of the European Investment Bank. This institution experienced two major capital increases within the last years. The EIB is one of the central pillars of the investment plan (Sol 2017). The European Fund for Strategic Investment (EFSI), initiated by the European Commission and the EIB, is the major financing facility that aims to mobilize capital within the two "windows" of the investment plan – "infrastructure and innovation" and "SMEs and mid-caps" (see figure below).



Figure 3: Structure of EFSI. Source: European Commission - State of the Union FAQs 2016

The three-year pilot phase of the investment plan (2015-2017) aimed at a mobilization of  $\in$ 315 billion in capital, corresponds to a leverage ratio of 1:15 (EFSI capital to capital provided by other sources, private in particular (see figure 3)). Also, guarantees from the EU budget are provided to support EIB loans. The total cost of the plan is meanwhile being increased to  $\in$  500 billion until 2020 (although it is expected that the plan will be continued after 2020). The same financing leverage ratio is targeted (EC 2016 FAQ, Sol 2017).

The EFSI is market-oriented and demand driven, consequentially, the specific allocation of resources does not follow geographical or sectoral criteria. Nevertheless, there are certain sectors that are targeted by the EFSI (EC 2016 (evaluation). The following figure shows the portions of respective sectoral investments as of 2016.

The Juncker Plan follows the new "grants to loans" paradigm. Increasing shares of the EU budget are allocated to financial instruments, rather than via the classical grant system which is typical of the European Structural and Investment Funds. Furthermore, the share of the EIB loans in each project is reduced from about 50% (conventional EIB lending) to 20-30%. The rationale is that through the EU guarantees, the EIB can leverage increased private

sector participation in riskier projects without affecting Its triple-A rating (Rinaldi and Núñez Ferrer 2017, Rubio, Rinaldi & Pellerin-Carlin 2016, EC 2016 (Fact Sheet)).



Figure 4: EFSI investments by sector. Source: European Commission 2016: Investment Plan for Europe

#### 3.2. Sustainability

#### 3.2.1. Environment

Officially, a third of the EFSI investments support environmentally-friendly projects with the goal to expand this portion to 40% by 2020. This, however, applies only to the "Infrastructure and innovation window" (see figure 3), the SME window is not concerned with these goals. Moreover, to reach a low-carbon or even circular economy, these shares sound quite conservative. A first evaluation of approved projects and transactions, by CEE Bankwatch, Friends of the Earth, and others suggests that the previous projects, although some renewable energy (RE) investments are contained, do not contribute sufficiently to an environmentally compatible, low-carbon economy. Fossil fuels investments are still included (Roggenbuck & Trilling 2016).

"The Juncker plan should be used for climate action, not for climate destruction. There is no reason why it should support more investments in gas infrastructure while the EU gas consumption is going down."

- Sebastien Godinot, WWF economist

Regarding the EFSI investments in the energy sector, 15% is still allocated to fossil fuels of which 90% is allocated to gas infrastructure. This is inconsistent with the EU's long-term climate goals. Moreover, these investments become economically perverse with respect to

recent trends in the sense that, as indicated by the quote above, gas consumption within the EU is decreasing which may lead to lack of demand and consequently stranded assets (Roggenbuck & Trilling 2016). While the European Commission's 2050 Energy Roadmap (2012) also anticipates a decline in residential demand by 2030, it remains high in the power generation sector. Gas is identified as a transition technology. One must be aware, that energy security rather than low-carbon criteria is the dominant economic concern. Due to the fluctuating production of renewable energies and limited storage capacities, the EU is still reluctant to completely phase out fossil fuels in order to guarantee grid stability, although interconnected and smart grids are acknowledged to be the future solution to this problem (Rinaldi and Núñez Ferrer 2017, Rubio, Rinaldi & Pellerin-Carlin 2016, EC 2050 Energy Roadmap (2012), EC Energy Infrastructure Priorities for 2020 and Beyond 2011). However, this poses two problems. First, investments in gas infrastructure make this technology more competitive relative to other efficient and renewable energy (RE) projects. Second, the EC states that RE grids require double amount of investment by 2020 compared to gas, however, 15% of EFSI investment is allocated towards gas infrastructure and only 5% applies to respective grids (Roggenbuck & Trilling 2016). Hence, this allocation is inconsistent with what is required in the long-term.

Regarding the transport sector, there is also a worrying tendency towards conventional and carbon-intensive infrastructure, e.g., airports and highways most of which are implemented in form of public-private partnerships (Sol 2017). Within the transport sector, over two-thirds of EFSI investments are allocated to such brown infrastructure even though alternatives are available, for instance, enhanced urban (public) transport systems. To reduce energy-intensive transportation, it is crucial to research and implement electric- and low-carbon mobility. (Roggenbuck & Trilling 2016).

The previous aspects are part of the "infrastructure and innovations" window, the first of the two financing windows of EFSI (see figure 3). Decisions on these EFSI investments, for the I&I window projects, are made by the Investment Committee (Rinaldi and Núñez Ferrer 2017, Rubio, Rinaldi & Pellerin-Carlin 2016). This committee formulates its decisions based on the criterion of "additionality" (meaning that projects could not be realized without the backing of the EU guarantee), economic viability, reliability and credibility and their contribution to key growth-enhancing areas in line with EU policies" (EU Fact Sheet). It is not clear to what extent "low-carbon" or environmental sustainability constitute decisive criteria since the nature of this Independent Investment Committee lacks transparency. However, there are indications that the latter criteria (if existing) are ruled out when the expected contribution of a certain project to job creation, growth or energy security is substantial. In this regard, at least more transparency is required (Rinialdi 2017).

Concerning the "SME and mid-caps" window, the monitoring of environmental criteria is even more difficult. The EIB, as well as the European Investment Fund (EIF), which specializes in SMEs, lack direct contact with SME beneficiaries. Activities are financed through financial intermediaries such as commercial banks, venture capitalists, and financial intermediaries. Due to such indirect way of financing and to business confidentiality it is rather complex to have a full picture about where the money exactly goes and to which extent projects are promoting a circular and low-carbon economy. (Sol 2017, Rinaldi and Núñez Ferrer 2017, Rubio, Rinaldi & Pellerin-Carlin 2016).

#### **3.2.2. Social impact**

The major rationale behind the Juncker Plan is an economic response to low investment and low growth rates. In this respect, the only social dimension of this plan so far relates to employment. This deficit in addressing social issues within the "infrastructure and innovation" window was also subject to criticism by various civil society organizations (CSOs) (Rinaldi and Núñez Ferrer 2017, Rubio, Rinaldi & Pellerin-Carlin 2016, Sol 2017). Figure 2 indicates that only 3% of investments were allocated to social infrastructure at this point. Despite pressures to address issues like security and migration as well as challenges including housing, inequality and education, Europe needs to find an effective approach to these challenges – apparently, also "EFSI 2.0" (after 2020) remains insufficient in this respect (Zuleeg and Hugenot-Noel 2016).

The "grants to loans" approach, which uses public resources to leverage private sector participation puts an emphasis on public-private partnerships (PPPs) particularly in the transportation sector (Sol 2017, Zuleeg and Huguenot-Noel 2016). Private sector participation in infrastructure often has unfavorable consequences including cost overruns, limited democratic control and the exclusion of and adverse effects on already marginalized people, e.g., through user fees and insufficient access to services. This also applies to Europe, even though legal capacities should be provided and made available to negotiate contracts in a way that prevents the previous disadvantages and to create actual benefit for the public (Alexander 2017).

In general, it remains difficult to establish a clear evaluation and assessment of the investment plan in order to investigate these issues. This is predominantly due to two reasons. First, monitoring and evaluation of projects usually conclude after the disbursal of resources, which is years before the impacts of infrastructure projects become evident. Second, there is a significant lack of transparency that makes it complicated to identify the social and environmental outcomes of the Juncker Plan. This especially concerns the "SME

and mid-caps window" due to financial intermediaries and business confidentiality rules as well as the "Infrastructure and innovation window" for which little project information is disclosed by the Investment Committee (Rinaldi and Núñez Ferrer 2017, Rubio, Rinaldi & Pellerin-Carlin 2016, Sol 2017, Roggenbuck & Trilling 2016, Transparency International 2016).

#### 4. Program for Infrastructure Development in Africa (PIDA)

#### 4.1. Economics and political background

Initiated in 2012, PIDA is a follow-up of the NEPAD (New Partnership for Africa's Development) Medium to Long Term Strategic Framework with the prior goals of poverty reduction and economic development on the African continent. PIDA's objective is to promote infrastructure investments to increase business competitiveness by reducing transaction and production costs, provide access to markets and attract foreign direct investment (AfDB Website 2017, African Union Commission 2010). While the founding principle of PIDA is similar to the Juncker Plan – addressing the infrastructure investment gap to promote growth and employment - the current circumstances, for instance, in terms of economic performance, prospects in demography and poverty are certainly different than those in Europe and more severe. For instance, the World Bank estimates a financing need of \$93 billion required per year in the sub-Saharan region and a current financing gap of \$45 billion dollars (World Bank Group 2017).

The low level of infrastructure integration in Africa contributes to very modest levels of global but also intra-African trade (NEPAD 2017). Africa's population is expected to double by 2055 and its young population (15-25 years) is expected to grow by about 42% by 2030. If Africa wants to facilitate employment and economic opportunities for its rapidly increasing population, it needs to invest. PIDA's catalytic role in this respect is to directly create short-term and long-term employment and long-term growth (PIDA Progress Report 2016). The program, therefore, addresses four sectors – energy, transport, information and communication technology (ICT) and cross-border water infrastructure (African Union Commission 2010, Qobo 2014, Sanyanga 2015).

While PIDA will roll out until 2040, its Priority Action Plan (PAP) consists of projects that will promote regional integration within the short/medium term until 2020 to address the most immediate infrastructure short-comings. PIDA's total investment is expected to account for approximately \$360 billion by 2040, while the PAP requires around \$86 billion until 2020. As

the figure below shows, most investment is allocated to energy and transport projects (African Union Commission 2010, Qobo 2014, PIDA Progress Report 2016).



Figure 5: Estimated cost for PAP projects by sector. Source: African Union Commission 2010

PIDA is governed by three institutions – The African Union Commission whose steering committee is responsible for program direction and approval, NEPAD Agency that is the managing organ and the African Development Bank providing control, financing and technical assistance (PIDA Progress report 2016, Qobo 2014, PIDA Website 2017, Sanyanga 2015).

Although these institutions play a significant role in promoting PIDA, the eventual implementation on a project basis is placed within the jurisdiction of the African nation states. More-over, African ownership and the involvement of local stakeholders are stated as central criteria. Several mega-projects were already in consideration before PIDA was initiated and included afterwards (Luckscheiter 2017, African Union Commission 2010, Sanyanga 2015). It also combines previous initiatives that were in place before such as the AU Infrastructure Master Plans initiatives, NEPAD Short Term Action Plan, the NEPAD Medium to Long Term Strategic Framework and other regional initiatives (African Union Commission 2010). Hence, the major goal of PIDA is to create a coherent framework in which these regional approaches are integrated. PIDA projects take place on a regional scale and usually involve several nations that require coordinated frameworks (Luckscheiter 2017).



Figure 6: Governing Bodies of PIDA. Source: African Development Bank 2017

PIDA aims to attract foreign investment and leveraging private capital. To mobilize the required capital, PIDA needs to utilize all sources available, among them, conventional official development assistance (ODA) as well as other financing instruments such as infrastructure bonds. Nevertheless, a particular focus is placed on the leverage of private capital including long-term institutional investors such as pension, insurance, and sovereign wealth funds (African Union Commission 2010, PIDA Progress Report 2016).

#### 4.2. Sustainability

#### 4.2.1. Environment

Since most of PIDA's resources are allocated to the transport and energy sectors, factors such as the modality of financing, land and ecosystem location, needs of affected communities, design and the technology will affect social and environmental outcomes. It appears that PIDA in its current state does not sufficiently account for the substantial negative social and environmental externalities caused by the mega-projects it promotes. Geographically, priority transport routes and energy distribution lines are mostly concentrated in coastal areas and, therefore, correspond to the major settlement areas (see figure 7 and 8). The environmental impact of the transport sector is difficult to assess and must be set in relation to other factors. First, conventional infrastructure like roads, railways, and ports will certainly facilitate further carbon emissions, nevertheless, they are desperately needed. Second, through corridor projects, land-locked and remote regions shall be further integrated and connected to coastal economic centers and ports to gain access to international markets. The impacts of the extractive component of the transport sector remain to be seen, since this component may facilitate environmentally harmful activities such as mining, fossil fuel extraction or unsustainable forestry (Luckscheiter 2017).



Figure 7: PIDA transport routes. Source: African Union Commission 2010, BY-NC-ND

Yet, in the energy sector, oil and gas pipelines such as the Nigeria-Morocco Pipeline indicate the promotion and facilitation of further fossil fuel infrastructure – for instance, to benefit European markets (see figure 8).

Some of the strongest environmental criticism concerns mega-infrastructure in form of hydro-electric dams which are given particular focus within the PIDA Priority Action Plan (PAP) until 2020 (see figure 8). To address the profound imminent and energy of electricity, the PAP shortages promotes 13 large-scale dams to generate an additional 15 GW of power

supply by 2020 (Luckscheiter 2017, Sanyanga 2015). The individual production capacities are shown in figure 8. It is noticeable that the initial African Union Commission (2010) PIDA document is nearly identical to the NEPAD (2016) "PIDA Progress Report". Since so little was accomplished in 6 years, the 2020 PAP deadline appears quite unrealistic.

Hydropower is, by definition, considered а renewable energy, therefore. its connotation is often misleadingly positive. In fact, the environmental footprint of large hydropower dams is severe and substantial changing flood and flow patterns, water temperatures, sediments and chemical compositions, habitats, and ecosystems. Several case studies provide evidence of these consequences (Sanyanga 2015 Ziv et al.



Figure 8:PIDA Energy grids and hydropower generation. Source: African Union Commission 2010, BY-NC-ND

2012, Stone, 2011, Scrudder 2005, Nilsson et al. 2005).

Moreover, their environmental impacts are by no means limited to the immediate local surroundings. There is a myth that dams are carbon-neutral, but this is not the case. A study by Salisbury (2017) revealed that climate-effective emissions from dam reservoirs, namely carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O), still constitute 1.3 percent of global anthropogenic greenhouse gas emissions (Sanyanga 2017, Salisbury 2017). Ironically, the resilience of dams is profoundly affected by climate change. For instance, it is anticipated that the Nile, Zambezi, and Senegal rivers, where major dam projects are located, will be significantly impacted by climate change – causing substantial water supply fluctuation and shortages that threaten the operation of the installations (Sanyanga 2015, 2017).

Even though the AfDB has environmental and social safeguards in place (Aizawa 2017), their practical implementation tells another story. Social and Environmental Impact Assessments (SEIAs) are conducted to investigate the full impacts of megaprojects, formulate recommendations to enable good governance, transparency, and accountability. However, experiences at the project level show dysfunctional SEIAs with miserable results leading to violations of human rights, absence of local consultations and negative environmental consequences. In many cases, e.g., the Ethiopia's Gibe III and Renaissance dams, were implemented although the SEIAs were not yet completed. The construction of the Batoka George dam began even before the EIA was actually started (Sanyanga 2017). It appears that environmental impacts are not seriously considered in the overall economic calculations.

#### 4.2.2. Social impact

As mentioned above, primary goals of PIDA are stated as poverty reduction and economic development. It is, therefore, of particular interest to clarify whether these promises can be fulfilled. In fact, empirical evidence shows that growth on average reduces poverty (Dollar and Kraay 2002). However, "pro-poor" growth, or at least inclusive growth leading to poverty reduction requires more than solely supply-side oriented approaches to be effective.

For instance, the sheer abundance of natural capital in Africa such as minerals, fertile soils, forests, fossil fuels lead to a phenomenon referred to as the "resource curse" or the "paradox of the plenty". The paradox is that one would expect that the high revenues of resource extraction would foster economic growth and benefits development. However, evidence shows that resource-rich countries experience below average growth rates and development outcomes, especially in Africa (Sachs and Warner 2001, Venables 2016, Swilling 2014).

While institutions could promote good governance and a beneficial utilization of resources to contribute to broadly shared prosperity, this rarely occurs on the African continent (Halvor et al. 2002). Extractive activity is still a major contributor to Africa's industrial growth but its impact on poverty reduction is quite limited compared to other sectors like manufacturing or agriculture (Hogarth and Granoff 2013). An important question is: To what extent does PIDA facilitate an appropriate structural transition which would add value to raw materials.

The establishment of economic corridors (see figure 7) and interregional connections is aimed at fostering economic activity and development, especially through trade facilitation (PIDA Progress Report 2016, African Union Commission 2010). Such projects indeed may connect markets but not necessarily provide access to transport for people, due to the location of connections or prohibitively high user fees or tolls. For instance, connecting mines with ports rarely benefits the population in between. Hence, many of these corridor-related projects produce limited social benefits (Luckscheiter 2017). Access and affordability are crucial criteria to ensure inclusiveness of infrastructure. Yet, private sector participation, particularly in form of PPPs that are extensively promoted in PIDA, has a questionable track record (Loots 2017). Private investors and project developers seek to generate profit from their assets. Regarding the transportation sector, revenue is created by user fees or tolls (Alexander 2017). But, when the poor are not able to afford or to gain access, economic benefits of such infrastructure are exclusive and poverty reduction effects remain limited. Moreover, PPPs pose serious threats to the public sector including the inordinate risk borne in terms of fiscal commitments, contingent liabilities, such as minimum revenue guarantees (MRGs), among others (See section 6). In most cases, African countries lack the technical and legal capacity to negotiate PPP contracts in an appropriate way that leads to additionality and improved and inclusive provision of infrastructure services (Qobo 2014, Luckscheiter 2017).

This condition can be easily applied to the energy sector and the "energy access gap" to which World Bank's President Jim Kim even refers to as "energy apartheid". A study by Oxfam (2015) revealed that the expansion of centralized power generation and grids primarily benefits the industry and already supplied consumers, not the low-income parts of the population. Even in cases in which communities gain access to grids, user fees cause regressive effects (Hogarth and Granoff 2015). The framework below (figure 9) illustrates this.

It appears that "low-income households" (marked red, on right) are actively ignored, not only missing the opportunity of micro and small enterprises to contribute to overall growth but also the substantial effects on poverty reduction when electricity becomes accessible to them.



Figure 9: Energy pathways to poverty reduction. Source: Oxfam. Hogarth and Granoff 2015

The PIDA PAP's dam projects (see figure 8) are a classic example of such centralized power generation that is further facilitating extractive industries. In addition, as described in the section above, large dams have severe immediate and local impacts, threatening eco- and river systems upon which millions of people's livelihoods depend (Sanyanga 2015, 2017). As Ansar et al. (2014) concluded in a comprehensive study on hydropower dams:

"We find overwhelming evidence that budgets are systematically biased below actual costs of large hydropower dams—excluding inflation, substantial debt servicing, environmental, and social costs"

Especially in developing countries, the authors accordingly recommend smaller and flexible grid solutions for which implementation is faster, cheaper and more inclusive. Renewable, low-carbon and decentralized energy and (off-)grid solutions offer unique socially and environmentally aligned opportunities in this respect (Hogarth and Granoff 2015).

#### 5. One Belt One Road Initiative – China

#### 5.1. Economics and political background

"For thousands of years, the Silk Road Spirit – "peace and cooperation, openness and inclusiveness, mutual learning and mutual benefit" – has been passed from generation to generation, promoted the progress of human civilization, and contributed greatly to the prosperity and development of the countries along the Silk Road"

- Introduction to the official "Visions and Action" Plan by the Chinese Government

Besides this historical reference, the Belt and Road Initiative also has a more recent foundation as a continuation of the "going out policy" or *zou chuqu* that was initiated in 1999 – aiming to significantly expand foreign Chinese engagement all over the world (Shah 2016). Hence, in 2013, President Xi Jinping announced the Belt and Road Initiative which is the largest infrastructure master plan currently pursued, both in geography and financial commitments (Cai 2017). Geographically, the BRI covers 65 nations including China, 60% of the world's population and represents 30% of global GDP (Chin and He 2016). Nevertheless, the BRI is not limited to infrastructure but also includes the expansion of commercial, cultural, technological and political ties between its participating countries which illustrates the sheer complexity of this endeavor. The title is derived from the ancient "Silk Road" (see above), a trading route that connected East Asia with Europe leading to extensive exchanges of goods, knowledge, and ideas several hundred years ago. Counter-intuitively, the "Belt" represents the land routes, the "Road" on the other hand represents the new trading routes by sea (see figure 10)



Figure 10: Map of the Belt and Road Initiative network. Source: Mercator Institue for China Studies (Merics). Online: <u>https://www.merics.org/en/merics-analysis/china-mapping/china-mapping/</u>

The newer financial institutions behind BRI are the Asian Infrastructure Investment Bank (AIIB) and the New Silk Road Fund (SRF). In addition, various older financial institutions, such as the China Import-Export Bank, the China Development Bank and the China Investment Corporation, are contributing (Office of the Leading Group for the B&R Initiative 2017, Shah 2016).

Whereas the figure above and the language brought forward might suggest that the BRI is already a coherent and self-contained Initiative, this is far from the case. Several projects, for instance, roads or dams, were already in the implementation phase before BRI was announced, at the same time, maps and official announcements differ quite substantially depending on the context where they are presented. Simply put, at this time, no one knows exactly what the BRI is and what is part of it – creating the impression that the BRI is more of a brand than an unfolding infrastructure initiative (Hassan 2017, Grimsditch 2017). Accordingly, numbers on the estimated financial capital necessary differ widely. While Chipper (2017) speaks of about \$20 trillion in total, Shah (2016) states a value of \$92.6 billion already signed projects in 60 countries that are associated with this initiative. Given the practical lack of transparency of responsible Chinese institutions, serious financial estimations of the total financial extent of this endeavor are still not available and remain difficult to determine.

What is the motivation behind such an ambitious undertaking? The sheer geographical and sectoral scope of BRI allows for several closely related explanations. Economically, China's "Going out policy" of 1999 was created significantly due to an increasing balance of foreign reserves that in turn caused an increase in the value of the Chinese currency and, consequently, pressure on its competitiveness. In 2001, China became part of the World Trade Organization (WTO) that led to further competition, forcing Chinese companies to further expand beyond the domestic market, to access new demand markets and economies of scale. Moreover, high economic growth rates required access to natural resources. Accordingly, Chinese foreign direct investment accelerated from \$5.4 in 2004 billion to \$101 billion in 2013, illustrating that BRI is not a totally new economic approach. Nevertheless, recent developments created additional pressure to act. China's current gross savings rate accounts for 49% of disposable income and these savings need to be productively invested (Shah 2016, Grimsditch 2017). Also, Chinese companies built up massive excess capacities. Since these products - such as concrete, steel or glass -are difficult and costly to transport, (dirty) production capacity is being relocated overseas (Hassan 2017, Grimsditch 2017). The expansion and dispersal of Chinese standards, customs procedures, grid protocols, in other words, soft infrastructure is enormously lucrative in the long-term and provides Chinese companies easy access to new markets (as mentioned before) and early comparative

advantages over potential competitors, given that these standards are successfully and widely adopted.

The BRI's economics are closely related to the political sphere. Through economic development, facilitated by infrastructure financed by China, the nation increases influence in involved countries and regions, stabilizes and pacifies its periphery. The UN Security Council even acknowledged that BRI might create positive impacts on Afghanistan (UNEP 2017). This "Peace and Cooperation" approach (see above) is meant to create an alternative narrative to the US security approach often associated with military enforcement. Even though one cannot deny the military and strategic component of BRI, "Peace and Cooperation" sounds, at least rhetorically, more appealing and attractive to many countries which seek economic opportunity (Hassan 2017)

#### 5.2. Sustainability

#### 5.2.1. Environment

As mentioned, the scope of the BRI, including the number and type of projects in the pipeline is still unclear (see above). China's financial and governmental institutions withhold information and transparency is still regarded as a vulnerability. However, certain patterns occurred during the last years of Chinese expansion that appear to apply to the context of BRI.

Chinese foreign investments and private firms operate according to the host government's laws and regulations, in other words, they commonly apply the minimum standard necessary to comply - which is the case for most private entities. Simply put, it would be inaccurate to say that Chinese firms are in general worse than other investors. However, in the context of BRI and many of the countries involved, especially in central and south-eastern Asia (see map), environmental as well social regulation is often weak as are the institutional and financial capacities to enforce it (Grimsditch 2017). This pattern is similar to that of PIDA. In that sense, the terms of engagement are determined by the specific countries in which the Chinese companies operate. While Chinese state-owned enterprises (SOEs), that are also active internationally, are required to provide operational details, which is a modest incentive for Chinese SOEs to acknowledge social and environmental safeguards, this does not apply to SMEs. They, accordingly, show more problematic track records regarding social and environmental impacts. Africa is a prime example since oversight and governance mechanisms are insufficiently developed in many regions where Chinese firms operate (Si 2010). The trend of the recent 15 years shows that while investment by SOEs is still

dominant, the portion of Chinese private investment is constantly increasing – from 5-10% to about 50%. The SOEs are more likely to be involved in capital-intensive projects like oil and gas pipelines and electricity grids, which represent critical infrastructure for China as a whole (Grimsditch 2017).

Mechanisms to safeguard environmental and social concerns are in place but scattered. For instance, the AIIB, one major financier of this initiative (see above), has relatively ambitious safeguards on paper, yet, implementation is lacking. As the name indicates, it is regarded more as an investment bank in the first place, with development as a favorable side-effect, in best case scenarios (Hassan 2017).

As with the European Investment Plan, there is a problem with financial intermediaries. Since a lot of financing is channeled through intermediaries which fund sub-projects, these are difficult to track. Moreover, the private sector's social and environmental management systems are hidden under business confidentiality rules and rarely accessible to CSOs, hence, accountability and transparency often remain inadequate (Hassan 2017). The same applies to the policies of the China Development Bank which are not even public (Grimsditch 2017).

In the beginning of 2013, the Chinese Ministry of Commerce (MOFCOM) and the Ministry of Environment (MEP) introduced "Guidelines on Environmental Protection and Cooperation" that actually contain explicit and coherent norms for activities overseas. The problem here is two-fold, first, these guidelines are voluntary; second, they appear to address primarily SOEs rather than the more problematic private SME sector (Hu 2013). Commercial banks that are lending to these private entities are also encouraged to incorporate these rules. The Green Credit Directive, issued by the China Banking Regulatory Commission (CBRC) contains rigorous environmental checks and balances, but this regulation applies only to Chinese domestic investments (Hassan 2017, Hu 2013). Concerning the Silk Road Fund, conversations on its environmental and social safeguards are still on-going (Hassan 2017).

Hence, it appears that a coherent BRI framework on social and environmental protection is relatively discretionary and the isolated, non-transparent and insufficient policies of the involved institutions require ambitious improvement. Even if the AIIB has strong incentives to comply with the promises it has made to the international community at its founding, standards pursued by the SRF or CDB might differ substantially and these institutions provide most of Chinese overseas lending. On the ground, it is local law and regulation to which private firms need to adhere, consequentially environmental and social outcomes are highly contextual and depend on the capacities (and "country systems") of the respective host governments (see above).

As already mentioned, BRI can be regarded as the next stage of Chinese foreign investment. This continuation also holds true for its environmental performance which, at this point, doesn't differ from previous endeavors (Grimsditch 2017). There is a certain emphasis on mega-infrastructure, especially in the Southeast Asian energy sector such as dams – with known consequences (see section 4.2.).

On the other hand, as a market leader and having already spent \$400 billion on green energy, China intends to invest additional \$360 billion in domestic renewable energy such as wind and solar until 2020 (Zhu 2017). In this regard, there is potential to scale-up to such systems in environmentally compatible and economically sound ways.

#### 5.2.2. Social Impact

From a social perspective, China has been extraordinarily successful in lifting great portions of its population out of poverty in the last decades, but quite often at the expense of the environment. Hence, BRI's multilateral approach must contribute to the scaled-up implementation of the SDGs and the Paris Goals (UNEP 2017, Shah 2017).

However, the shortcomings in the social sphere of BRI due to absent frameworks and limited monitoring, reporting and enforcement capacities of involved countries, as mentioned in the previous section on environmental concerns, can be compared to PIDA. Also, the implementation of mega-projects like dams will likely develop similar social and environmental impacts that have been previously described (see section 4.2.1. and 4.2.2.). Yet, since concrete and reliable information on BRI projects and financing are rarely accessible, preliminary conclusions, either optimistic or pessimistic, have to be treated with caution. It appears at this point that the BRI will not substantially differ from previous Chinese foreign engagement, rather it will represent a more streamlined and better packaged version of the "going out" strategy, that defined China's first major phase of overseas investment (Grimsditch 2017).

## 6. Mega-infrastructure and private sector participation – Common features, common risks

This section will provide summarized considerations on the infrastructure master plans presented above. Again, the purpose of this paper is not to question these plans as a whole, but rather to examine whether they have positive potential if designed appropriately. Hence, by naming short-comings and risks involved, the foundation for constructive criticism is created. Their over-emphasis on mega-infrastructure and private sector participation, particularly in form of PPPs, cause the most significant impacts on their economic viability as well as their social and environmental sustainability – including the climate. To substantiate this claim, these approaches will be confronted with empirical evidence.

Compared to the Juncker Plan, the emphasis on mega-infrastructure is particularly noticeable in PIDA and the BRI. The infrastructure of the latter plans creates the risk of unfavorable consequences that were extensively researched and summarized by Flyvbjerg (2014) and his colleagues. The combination of cost overruns, schedule delays, eventual benefit short-falls and poor performance occurs on a regular basis. The empirical evidence is so strong that Flyvbjerg (2011) even speaks of the "iron law of mega-projects" – *over budget, over time, over and over again.* In 90 percent of all projects cost overruns of 50% and higher are a common pattern and this applies to both public and private projects. Neither has this improved over a 70 year period nor are there specific geographic correlations, hence, this is a widespread global phenomenon (Flyvbjerg, Holm and Buhl 2002, 2005). Moreover, we have seen in section 4.2. that the development impact as well as social and environmental performance of such infrastructure, including with respect to human rights, is quite poor.

From an economic viability perspective, increasing participation of the private sector in project financing, and accordingly in management, offers potential. Since private entities risk their own investments, they have an inherent incentive to make these projects a success measured in regard to costs, in-time implementation, and revenue (Flyvbjerg 2014). On the other, PSP involves substantial risks. We have seen before that private sector participation in infrastructure, particularly in form of public-private partnerships, is a common financing mechanism in all three: The Juncker plan, PIDA and the BRI. This congruency reflects the new "from billions to trillions" paradigm (more recently called the "Maximizing Finance for Development" (MFD) paradigm)- leveraging private finance through public money with the argument of mobilizing additional funding, technical expertise and superior efficiency (Alexander 2017, Aizawa 2017). However, problematic implications of PPPs are increasingly covered by academia and suggest different shortcomings than presented by megainfrastructure. According to Romero (2015), who conducted a comprehensive empirical study in that respect, PPPs are commonly the most expensive form of infrastructure financing due to (contractual) complexity, and higher transaction and construction costs including the fact that public entities can borrow more cheap conditions than private firms. Moreover, some PPP contracts (including the contractual provisions recommended by the World Bank Group) unfairly allocate excessive risks to the government (e.g., via contingent liabilities), which holds the responsibility for delivering basic infrastructure services to the public even if a private firm's performance falls short. This implicit risk can put the state in an untenable situation, as the collapse of the UK's Carillion has shown. Now in liquidation, Carillion managed some 450 contracts for public works and services.

In addition, the provisions of PPP contracts often limit the state's "right to regulate" since it may be required to compensate private firms for unfavorable new regulations that affect a firm's profits. Investment rules that limit the state's "right to regulate" in the public interest undermine sovereignty (Alexander 2017). While efficiency improvements by private firms are sometimes made, they have limited impact, as these gains are mostly skimmed off in form of profits. For the same reason, further private investment and passing on of lower prices to the consumers may or may not materialize (Gassner et al. 2009, Romero 2015).

Accordingly, one must examine the tension between the private sector's profit motive and the provision of public services (in terms of access and affordability including the marginalized). David Hall (2015), having published extensive and widely recognized research on PPPs and their economic, social and environmental impact, comes to a clear conclusion in this respect:

"PPPs are used to conceal public borrowing, while providing long-term state guarantees for profits to private companies. Private sector corporations must maximize profits if they are to survive. This is fundamentally incompatible with protecting the environment and ensuring universal access to quality public services."

– D. Hall 2015, p.3.

Within the last 30 years, increasing financialization is transforming infrastructure into an asset class. Institutional investors like pension funds, sovereign wealth funds and insurance companies that are suffering from current low interest rates seek higher yields in order to fulfill obligations to their customers and the infrastructure investment gap promises attractive returns. The role of the MDBs is, therefore, to "de-risk" such projects e.g. by providing guarantees but also by conducting due diligence. As we have seen before, the MDBs have environmental and social safeguards in place, however, they may not apply to or be implemented by involved institutional investors and private entities (Aizawa 2017) (see section 4. and 5.). Information disclosure is often inadequate. Complaints by local communities affected by megaprojects and PPPs are rising (Romero 2015).

Given this track record, how can infrastructure investments be aligned to the climate and the UN Sustainable Development Goals? In principle, there are two approaches to alignment. First, provide public financing for infrastructure, which requires that governments overcome the aversion to public spending and austerity. Or second, reform private sector participation in a way that balances public and private interests appropriately.

Regarding the first, Hall (2015) clearly promotes the public alternative. The cost of capital for the public sector is significantly below that of the private sector and offers the flexibility to adjust the composition of financing, through user fees or taxes according to varying circumstances. In addition, the state reaps the revenues from infrastructure services. In contrast to the efficiency argument of PPP proponents, the public alternative actually provides:

"greater flexibility, control, and comparative efficiency –because of reduced transaction costs, contractual uncertainty, as well as economies of scale- and also the efficiency gains of more democratic accountability."

- Hall 2015, p.147

Moreover, in some countries, the public sector employment created through construction and maintenance provides an alternative to the precarious working conditions and corruption that are common in the contracting business. Indeed, corruption can consume from 15% to 40% of project costs. Negative impacts on the environment can be avoided by selecting infrastructure projects that are identified by employing environmental and social benefit criteria as a priority and not only low-cost and profitability demands posed by the private sector (Hall 2015). This is a crucial "upstream" precaution that can help avoid adverse "downstream" impacts.

To address the shortcomings of megaprojects as well as PPPs, the following recommendations are basically applicable. One has to recognize that PPPs, at least for now, represent a relatively small portion of overall infrastructure investment. However, the crowding-in of private finance is featured as a goal in declarations of intent and actions by the MDBs, the G20, and national and regional planning. At this point, evidence shows that PPPs have not usually provided "value for money"; nor have they applied criteria that are crucial for development impact, such as access, coverage, and affordability (Jomo et al. 2016). As we have seen before, this applies also to mega-infrastructure. Hence, the following approaches need to be implemented to meet the needs of economic viability as well as social and environmental sustainability agreed upon in the UN Sustainable Development Goals and the Paris Agreement. The implementation of PPPs must no longer be motivated by creating shadow budgets in which debts ("contingent liabilities") can be hidden and official documents such as project appraisals, contracts, assessments, and cost-benefit analyses should be publicly disclosed. Transparency can advance development outcomes and the public good (Romero 2015). Laws, regulations as well as social and environmental standards have to be introduced that are authoritative also for private sector entities such as institutional investors and project contractors.

Several internationally agreed principles, frameworks and sources of guidance have already been developed such as the UN Guiding Principles on Business and Human Rights, the Open Contracting Global Principles, the UN Addis Ababa Action Agenda or, as already mentioned before, the World Bank and MDB safeguard policies, as well as the 2030 SDGs and Paris Goals to which future investments need to be aligned. In this respect, the International Conference on Financing for Development offers the opportunity to harmonize these initiatives with multiple stakeholders including business and civil society (Alexander 2017, Jomo et al. 2016, Romero 2015, Aizawa 2017). International guidelines on PPPs and the nature of infrastructure investments will not be effective if the relevant institutional capacities are not sufficient to monitor projects and to enforce regulation. For instance, the Economist Intelligence Unit's *Infrascope* developed a benchmarking tool to measure and eventually enhance the countries capacities in this matter. Accordingly, capacity building in the public sector is a crucial area of action (Jomo et al. 2016).

#### 7. Concluding remarks

The infrastructure master plans examined above are ambitious attempts to address the global infrastructure gap. Yet, the "business as usual" approach is a common feature that applies to PIDA, the European Investment Plan and the Belt and Road Initiative. This represents a serious threat regarding the evolving environmental crisis. Among others, the implementation of conventional infrastructure such as big dams in Africa; gas infrastructure in Europe that threatens and delays the market success of RE; and the business as usual expansion of fossil fuel infrastructure (e.g., pipelines) in BRI constitute the risk of further carbon-intensive and harmful technological lock-in. Empirically, finance mechanisms to crowd-in private capital, PPPs in particular, as well as the emphasis on mega-infrastructure are rarely appropriate to deliver the required value added in terms of sustainable development or even economic viability. Violation of human rights and missing alignment to environmental and social concerns apply particularly to countries with low capacities to ensure good governance such as those in Central and South-East Asian countries within BRI, and Africa within PIDA. In the nations and regions hosting these megaprojects, the future agenda for action and research needs to contain the analysis and development of coherent, ambitious and universal frameworks, regulation and standards as well as concrete indicators and measures to harmonize infrastructure investment with people and planet.

#### Sources

- African Development Bank (2017): Programme for Infrastructure Development in Africa (PIDA). Online: https://www.afdb.org/en/topics-and-sectors/initiatives-partnerships/programmefor-infrastructure-development-in-africa-pida/. Last visit: 20.9.2017
- African Union Commission (2010): Programme for infrastructure development in Africa (PIDA). Interconnecting, Integrating & transforming a continent, *2040*. Online: https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/PIDA%20note%20English%20for%20web%200208.pdf. Last visit: 20.9.2017
- Aizawa, M. (2017): Baseline Study on the Human Rights Impacts and Implications of Mega-Infrastructure Investment. United Nations Human Rights Office of the High Commissioner. 60 p.
- Alexander, N. (2017): Globalization and the State's Sovereign Right to Regulate in the Public Interest: The Case of Public-Private Partnerships (PPPs) in Infrastructure. Heinrich Böll Foundation North America. Online: https://us.boell.org/2017/05/15/globalization-andstates-sovereign-right-regulate-public-interest-case-public-private. Last visit: 20.9.2017
- Ansar, A., Flyvbjerg, B., Budzier, A., & Lunn, D. (2014): Should we build more large dams? The actual costs of hydropower megaproject development. *Energy Policy*, *69*, pp. 43-56.
- Cai, P. (2017). Understanding China's Belt and Road Initiative. Lowy Institute for international policy. 22 p. Online: https://thinkasia.org/bitstream/handle/11540/6810/Understanding\_Chinas\_Belt\_and\_Road\_Initiative\_ WEB\_1.pdf?sequence=1. Last visit: 20.9.2017
- Chhibber, A. (2015): China's One Belt One Road Strategy: The New Financial Institutions and India's Options. Institute for International Economic Policy. *Working Paper Series*, 2017 (7), 37 p.
- Chin, H., & He, W. (2016). The Belt and Road Initiative: 65 Countries and Beyond. Global Sourcing, Fung Group, Fung Business Intelligence Centre. 9 p. Online: https://www.fbicgroup.com/sites/default/files/B%26R\_Initiative\_65\_Countries\_and\_Beyon d.pdf. Last visit: 20.9.2017
- Dollar and Kraay 2002: Growth is Good for the Poor. *Journal of Economic Growth*, 7 (3), pp. 195–225.

European Commission (2012): Energy roadmap 2050. Online:

https://ec.europa.eu/energy/sites/ener/files/documents/2012\_energy\_roadmap\_2050\_en\_ 0.pdf. Last visit: 20.9.2017

European Commission (2016): Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee of the Regions. Investment Plan for Europe: Evaluations give evidence to support its reinforcement. Online: https://ec.europa.eu/commission/sites/beta-political/files/20161129-efsicommunication\_en.pdf. Last visit: 20.9.2017 European Commission 2010: Priorities for 2020 and beyond – A Blueprint for an integrated European energy network. Online:

http://www.europeanpowergeneration.eu/files/Energy\_Infrastructure\_Priorities\_for\_2020\_ and\_Beyond.pdf. Last visit: 20.9.2017

European Commission 2016: The investment plan for Europe. State of Play. Online: https://ec.europa.eu/commission/sites/beta-political/files/investment-plan-eu-wide-stateof-play-july2016\_en\_0.pdf. Last visit: 20.9.2017

European Commission 2016: The investment plan for Europe. https://ec.europa.eu/commission/sites/beta-political/files/2-years-on-investmentplan\_en\_2.pdf

- European Commission 2016: State of the Union 2016: The European Fund for Strategic Investments (EFSI) - Frequently Asked Questions. Online: http://europa.eu/rapid/pressrelease\_MEMO-16-2983\_en.htm. Last visit: 20.9.2017
- Fay, M. (2016): It's time to change the way we talk about the "Infrastructure Gap". Infrastructure and Public-Private Partnerships Blog. The World Bank. Online: http://blogs.worldbank.org/ppps/it-s-time-change-way-we-talk-about-infrastructure-gap. Last visit: 20.9.2017
- Flyvbjerg, B. (2014): Over budget, over time, over and over again: Managing major projects. In: Morris, P., Pinto, J., Söderlund (eds.): The Oxford handbook of project management, pp. 321-344.
- Flyvbjerg, B. (2014): What you should know about megaprojects and why: An overview. *Project Management Journal*, *45*(2), pp. 6-19.
- Flyvbjerg, B., Holm, M. S., and Buhl, S. L. (2005). "How (in)accurate are demand forecasts in public works projects? The case of transportation. *Journal of the American Planning Association*, 71(2): pp.131–46.
- Flyvbjerg, B., Holm, M., and Buhl, S. (2002). "Underestimating costs in public works projects: error or lie?" *Journal of the American Planning Association*, 68(3), pp. 279–95.
- G20 (2017): Annex to G20 Leaders Declaration G20 Hamburg Action Plan. Online: https://www.g20.org/Content/DE/\_Anlagen/G7\_G20/2017-g20-hamburg-action-planen.pdf?\_\_blob=publicationFile&v=4. Last visit: 20.9.2017
- G20 (2017): Annex to G20 Leaders Declaration G20 Hamburg Climate and Energy Action Plan for Growth. Online: https://www.g20.org/Content/DE/\_Anlagen/G7\_G20/2017-g20climate-and-energy-en.pdf?\_\_blob=publicationFile&v=6. Last visit: 20.9.2017
- G20 (2017): G20 Leaders' Declaration. Shaping an interconnected world. Online: https://www.g20.org/Content/EN/\_Anlagen/G20/G20-leadersdeclaration.pdf? blob=publicationFile&v=11. Last visit: 20.9.2017
- Gassner, K. Popov, A., Pushak, N. (2009). Does private sector participation improve performance in electricity and water distribution? The World Bank. *Trends and Policy Options*, 6, 98 p. Online:

http://documents.worldbank.org/curated/en/102161468160178940/pdf/461320PUB0Box3 101OFFICIAL0USE0ONLY1.pdf. Last visit: 20.9.2017

- Grimsditch, M. (2017): Inclusive Development International. Interview conducted by Robin Schmücker in July 2017.
- Hall, D. (2015). Why Public-private Partnerships Don't Work: The Many Advantages of the Public Alternative. Public Services International. 56 p.
- Hassan, R. (2017): NGO Forum on Asian Development Bank. Interview conducted by Robin Schmücker in July 2017.

Hogart and Granoff (2013): Speaking truth to power. Why energy distribution, more than generation, is Africa's poverty reduction challenge. Oxfam and Overseas Development Institute. *Working paper 418*, 31 p. Online:

http://www.issuelab.org/resource/speaking\_truth\_to\_power\_why\_energy\_distribution\_mor e\_than\_generation\_is\_africa\_s\_poverty\_reduction\_challenge. Last visit: 20.9.2017

- Hu, T. (2013): A Look at China's New Environmental Guidelines on Overseas Investments. World Resources Institute. Online: http://www.wri.org/blog/2013/07/look-chinas-newenvironmental-guidelines-overseas-investments. Last visit: 20.9.2017
- IMF and MDBs (2015): Joint Statement from MDBs and IMF Head on Financing for Development. Online: http://www.worldbank.org/en/news/press-release/2015/04/16/joint-statementmdbs-imf-head-financing-for-development. Last visit: 20.9.2017
- IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 p. Online: https://www.ipcc.ch/pdf/assessment-

report/ar5/syr/SYR\_AR5\_FINAL\_full\_wcover.pdf. Last visit: 20.9.2017

- Jomo, K. S., Chowdhury, A., Sharma, K., & Platz, D. (2016): Public-Private Partnerships and the 2030 Agenda for Sustainable Development: Fit for purpose? United Nations, Department of Economic and Social Affairs. *Working Paper, 148, 28 p.* Online: http://www.un.org/esa/desa/papers/2016/wp148\_2016.pdf. Last visit: 20.9.2017
- Le Moigne, M., Saraceno, F., & Villemot, S. (2016). Probably Too Little, Certainly Too Late. An Assessment of the Juncker Investment Plan. *Document de Travail de l'OFCE*, *10*, 31 p.
- Loots, J. (2017): Public-Private Partnerships for Infrastructure Development in Africa: The Need for Human Rights-Focused Regulation. In: Heinrich-Böll-Stiftung. *Perspectives. Africa. Putting people back into infrastructure*, 2, pp. 6-11. Online: https://www.boell.de/sites/default/files/perspectives-africa\_putting-people-back-intoinfrastructure\_heinrich-boell-foundation-7-2017\_1.pdf. Last visit: 20.9.2017
- Luckscheiter, J. (2017): Heinrich Böll Foundation South Africa. Interview conducted by Robin Schmücker in July 2017.

- McKinsey Global Institute (2016): Bridging global infrastructure gaps. 45 p. Online: http://www.mckinsey.com/industries/capital-projects-and-infrastructure/ourinsights/bridging-global-infrastructure-gaps. Last visit: 20.9.2017
- Mehlum, H., Moene, K., & Torvik, R. (2002). Institutions and the resource curse. *The economic journal*, 116 (508), pp. 1-20.
- NEPAD (2016): PIDA Progress Report 2016. 52 p. Online: http://www.nepad.org/resource/pidaprogress-report-2016. Last visit: 20.9.2017
- NEPAD (2017): Programme for Infrastructure Development in Africa (PIDA). Website. Online: http://www.nepad.org/programme/programme-infrastructure-development-africa-pida. Last visit: 20.9.2017
- Nilsson, C., Reidy, C.A., Dynesius, M., Revenga, C., 2005. Fragmentation and flow regulation of the world's large river systems. *Science*, 308, pp. 405–408.
- OECD (2017), Investing in Climate, Investing in Growth, OECD Publishing, Paris. 312 p. Online: http://dx.doi.org/10.1787/9789264273528-en. Last visit: 20.9.2017
- Office of the Leading Group for the Belt and Road Initiative (2017): Building the Belt and Road: Concept, Practice and China's Contribution. 59 p. Online: https://www.yidaiyilu.gov.cn/wcm.files/upload/CMSydylyw/201705/201705110537027.pdf. Last visit: 20.9.2017
- Qobo, M. 2014: High Ambitions and High Risks: Programme for Infrastructure Development in Africa (PIDA). Heinrich Böll Foundation North America. 28 p. Online: https://za.boell.org/sites/default/files/hbs\_qobo\_high-ambitions-high-risks.pdf. Last visit: 20.9.2017
- <u>Rinaldi and Núñez Ferrer (</u>2017): The European Fund for Strategic Investments as a New Type of Budgetary Instrument. CEPS Research Report No 2017/07. Online: https://www.ceps.eu/system/files/RRpt%20No%202017-07%20EFSI.pdf
- Rogelj, J., Den Elzen, M., Höhne, N., Fransen, T., Fekete, H., Winkler, H., ... & Meinshausen, M. (2016). Paris Agreement climate proposals need a boost to keep warming well below 2 C. *Nature*, 534(7609), pp. 631-639.
- Roggenbuck, A., Trilling, M. (2016): The best laid plans. Why the Investment Plan for Europe does not drive the sustainable energy transition. Counter Balance, FoE Europe, WWF, Climate Action Network Europe, CEE Bankwatch. 36 p. Online: http://www.foeeurope.org/sites/default/files/sustainable\_eu\_funds/2016/foee-best-laid-plans-280916.pdf. Last visit: 20.9.2017
- Romero, M. J. (2015). What lies beneath? A critical assessment of PPPs and their impact on sustainable development. EURODAD. 34 p. Online: http://eurodad.org/files/pdf/559e6c832c087.pdf. Last visit: 20.9.2017
- Ross, J. (2016). Bank Profitability in the Era of Low Interest Rates (JPM). Investopedia. Online: http://www.investopedia.com/articles/markets/080916/bank-profitability-era-low-interestrates-jpm.asp. Last visit: 20.9.2017

Rubio, Rinaldi & Pellerin-Carlin (2016): Investment in Europe: Making the best of the Juncker Plan with case studies on digital infrastructure and energy efficiency. Notre Europe – Jacques Delors Institute. Online:

http://www.institutdelors.eu/media/investmentjunckerplan-rubiorinaldipellerincarlin-jdimar16.pdf?pdf=ok

- Sachs, J.D. and A.M. Warner (2001): The curse of natural resources. *European Economic Review*, 45, pp. 827-838.
- Salisbury, C. (2017): Counterintuitive: Global hydropower boom will add to climate change. Mongabay. Online: https://news.mongabay.com/2017/02/counterintuitive-globalhydropower-boom-will-add-to-climate-change/. Last visit: 20.9.2017
- Sanyanga, R. (2015): Right Priorities for Africa's Power Sector. An evaluation of dams under the Program for Infrastructure Development in Africa (PIDA). International Rivers. 50 p.
   Online: https://www.internationalrivers.org/resources/right-priorities-for-africa-s-powersector-9150. Last visit: 20.9.2017
- Sanyanga, R. (2017): Large Hydropower Dams Are Not the Answer: Time to Rethink Africa's Energy Infrastructure. In: Heinrich-Böll-Stiftung. *Perspectives. Africa. Putting people back into infrastructure*, 2, pp- 36-42. Online: https://www.boell.de/sites/default/files/perspectives-africa\_putting-people-back-into-

infrastructure\_heinrich-boell-foundation-7-2017\_1.pdf. Last visit: 20.9.2017

- Scudder, T., 2005. The future of large dams: Dealing with social, environmental, institutional and political costs. Earthscan. 374 p.
- Shah, A. (2016). Building a Sustainable "Belt and Road". *Horizons*, 7, pp. 212-222. Online: http://www.cirsd.org/files/000/000/001/34/2cfc3d25258c340f9952807ed56f676c601716b3. pdf. Last visit: 20.9.2017

Si, M (2010): Following the money. Chinadialogue. Online: https://www.chinadialogue.net/article/show/single/en/3825-Following-the-money. Last visit: 20.9.2017

Sol, X. (2016): Counter Balance. Interview conducted by Robin Schmücker in July 2017 Stone, R. (2011): Hydropower. The legacy of the Three Gorges Dam. Science 333 (6044), pp. 817.

- Swilling, M. (2014): Greening African Economies Reflections on an Emerging Contested
   Discourse. In: Heinrich-Böll-Stiftung. *Perspectives. Africa. Greening the Continent.* Reflections on Low-Carbon Development Pathways. pp. 6-13. Online:
   https://ke.boell.org/sites/default/files/perspectives\_sept\_2014.pdf. Last visit: 20.9.2017
- Transparency International (2016): Investing in Integrity? Transparency and Accountability of the European Investment Bank. Online: https://transparency.eu/wp-content/uploads/2016/11/EIB report digital-version.pdf
- United Nations Development Program (UNDP) (2017): Sustainable Development Goals. Goal 9 Industry Innovations and Infrastructure. Online:

http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-9-

industry-innovation-and-infrastructure.html. Last visit: 20.9.2017

- United Nations Environmental Program (UNEP) (2017): A Green Belt and Road. Online: http://www.unep.org/newscentre/green-belt-and-road. Last visit: 20.9.2017
- Venables, A. J. (2016). Using natural resources for development: Why has it proven so difficult?. *The Journal of Economic Perspectives*, 30(1), pp. 161-183.
- WBGU (German Advisory Council on Global Change) (2011): A social contract for sustainability. 400 p. Online: http://www.wbgu.de/en/flagship-reports/fr-2011-a-social-contract/
- World Bank (2014): Regional Infrastructure in Sub-Saharan Africa: Challenges and Opportunities. 28 p. Online:

http://siteresources.worldbank.org/1818SOCIETY/Resources/1818AFRICApaperFINAL.p df. Last visit: 20.9.2017

- World Bank Group (2017): Africa's Pulse. An analysis of issues shaping Africa's economic future.
   No. 15. 115 p. Online: https://openknowledge.worldbank.org/handle/10986/26485. Last
   visit: 20.9.2017
- Zhu, S. (2017): 4 Ways China's Belt and Road Initiative Could Support Sustainable Infrastructure. World Resources Institute. Online; http://www.wri.org/blog/2017/05/4-wayschina%E2%80%99s-belt-and-road-initiative-could-support-sustainable-infrastructure. Last visit: 20.9.2017
- Ziv, G., Baran, E., Nam, S., Rodríguez-Iturbe, I., Levin, S.A. (2012): Trading-off fish biodiversity, food security, and hydropower in the Mekong River Basin. *Proceedings of the National Academy of Sciences*, 109, pp. 5609–5614.
- Zuleeg, F. and Huguenot-Noel, R. (2016): Rethinking the EU's investment strategy: EFSI 2.0 needs a Social Pillar to address economic insecurity. European Policy Center. Online: http://www.epc.eu/pub\_details.php?cat\_id=4&pub\_id=7175. Last visit: 20.9.2017