

# Climate Change and Environment in the Arab World

## Sustainable Transport Series

# “Sustainable Transportation and Mega Sporting Events in Arab Countries – the Case of Qatar”

Robert Wittkuhn and Danyel Reiche

# Climate Change and Environment in the Arab World

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## “Sustainable Transportation and Mega Sporting Events in Arab Countries – the Case of Qatar”

The Climate Change and Environment in the Arab World Program aims to understand the climate change and environment policy process in the region and define the most appropriate policy recommendations by linking development in applied sciences on issues related to climate change and environment to social sciences.

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# Contents

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<b>Abstract</b> .....	<b>4</b>
<b>Introduction</b> .....	<b>5</b>
History of Sporting Events in Qatar .....	6
<b>Methodology</b> .....	<b>7</b>
<b>Literature review</b> .....	<b>8</b>
<b>Sustainability</b> .....	<b>9</b>
Conceptualizing Sustainability .....	9
Ecological and Carbon Footprint, Carbon Neutrality, Carbon Offsetting .....	10
Sustainable Transport .....	12
<b>Qatar’s Approach to and Motives for Sustainability</b> .....	<b>14</b>
Qatar’s Approach to Sustainability and its Performance .....	14
Qatar’s Domestic Motives for Sustainability .....	17
<b>Sustainability of Qatar’s Transport Concepts</b> .....	<b>18</b>
Development and Mega Events .....	18
Influence of International Sport Governing Bodies .....	20
<b>Permanence of Concepts</b> .....	<b>24</b>
Progress of Transport Infrastructure Development .....	24
Influence of Qatar’s Form of Government .....	28
<b>Research Outcomes</b> .....	<b>30</b>
<b>Recommendations</b> .....	<b>32</b>
<b>Acknowledgements</b> .....	<b>33</b>
<b>References</b> .....	<b>34</b>

## Abstract

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Qatar has successfully developed into a hub for mega sporting events; the most prestigious of them will be the FIFA World Cup in 2022. Qatar promotes it as the “first completely carbon-neutral” and “most compact” World Cup. Such statements emphasize a very small impact of transport on the event’s carbon footprint; but they also raise questions about the understanding and applicability of carbon neutrality. As motive for hosting mega events, Qatar is highlighting their catalyst effect for planned infrastructure developments. The article assesses Qatar’s ambitious plans for building intra-city, inter-city and inter-state road and railway networks, taking into account Qatar’s standing as the biggest greenhouse gas emitter per capita in the world. The study has as its foundation an understanding of sustainability, which is based on definitions of key terms and concepts such as *ecological footprint*, *carbon footprint*, *carbon neutrality* and *carbon offsetting*. The study includes additional actors besides the Qatari government such as international NGOs and their general understanding of sustainability. In a comparative approach, the article asks: to what extent concepts for sustainable transport development were integrated in mega sporting events already hosted in Qatar, and whether they are part of the concepts for future events. Furthermore, it seeks to answer whether or not these concepts are aiming at short-term outcomes during an event or if they will be permanently integrated into the host city and country.

# Introduction

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Since *Fédération Internationale de Football Association* (FIFA) announced in December 2010 that Qatar will host the 2022 FIFA World Cup, international media outlets heavily criticized the decision. At the beginning, the international press coverage focused on accusations that members of the FIFA executive committee might have been bribed to vote in favor of the tiny Middle Eastern country rather than for competitors like the U.S., the U.K., and Australia. Then the media attention shifted to the issue of the climate in the desert state and debates to move the event, which is traditionally held in the summer, to the winter. Finally, the abuse of migrant workers in Qatar became a widely discussed issue in the global media. The international discussion on the 2022 FIFA World Cup in Qatar is dominated by a Western perspective but lacks –including the host’s motives to become a major player in the world of sport.

Qatar has hardly any unemployment and the largest per capita gross domestic product (GDP) in the world, mainly due to revenues derived from its abundant oil and gas reserves. Due to these revenues, Qatar will be able to keep its current levels of public spending for many decades to come. It holds the highest natural gas reserves among the Gulf Cooperation Council (GCC) members and possesses the third largest proven supply of natural gas in the world. Its technological advancements, especially in liquefied natural gas (LNG), make it the largest exporter of natural gas (Dargin 2007). However, one day Qatar will be confronted with the finiteness of fossil fuels: “Even for those GCC countries such as Qatar that still have plenty of reserves it makes sense to begin to make changes; costly adjustments could be avoided in the future if an incremental transformation process were initiated now, rather than radical change later” (Reiche 2011, 2396). Developing into a regional, continental and international sports hub is a major step in diversifying Qatar’s economy and gradually transforming into a post-hydrocarbon economy. Mega Sporting events have the potential of stimulating Qatar’s tourism industry and increasing the revenues of hotels, restaurants, and shopping malls; ticketing, merchandising and TV rights are other potential income sources. Apart from such direct revenues, sports might also help in attracting foreign investment in Qatar and help recruit foreigners for the Qatari labor market. With a Qatari population of only 225,000 people, among them approximately 100,000 people are able to work, the country heavily depends on a foreign workforce (Human Rights Watch 2012, 1), whereas blue collar workers are coming to Qatar, as long as the salaries are significantly higher than in their home countries, such as India, Sri Lanka and Nepal. Attracting white collar employees is more difficult and is not only a question of lucrative remuneration. Providing entertainment for these white-collar workers such as international sporting and other cultural events, and providing a modern infrastructure, is essential to attracting highly skilled employees from advanced industrialized countries to work in Qatar.

This work focuses on Qatar’s motives to organize mega sporting events and investigates one key aspect of the country’s motivation, which is to modernize its transportation sector based on the concept of sustainable development. Other motives for Qatar to host mega sporting events include development of a healthy society, and domestic as well as foreign policy tools, building relations with as many countries and people in the world as possible to gain soft power; and for national security reasons, these motives are only shortly touched on in this work (Reiche forthcoming). This paper explores the following: to what extent concepts of sustainable development were integrated in mega sporting events already hosted in Qatar (such as the 2006 Asian Games and 2011 Asian Football Cup in Doha) and whether they are part of the concepts for events that are still in the process of being organized (such as the Handball World Cup 2015 and the FIFA World Cup 2022 in Qatar). Furthermore, the paper pursues the question whether sustainable transportation at Qatari mega sporting events is only a short-term concept for the duration of an event or a long-term strategy, that seeks to create a permanent legacy for the host city and country beyond an event (such as improved public transport, electric charging stations infrastructure, encouragement of domestic biofuels production, etc.).

This research is not only relevant to Qatar and the Middle East. Mega sporting events are increasingly hosted in emerging countries, with the FIFA World Cup 2010 in South Africa, the Olympic Summer Games 2012 in China, the FIFA World Cup 2014 and the Olympic Summer Games 2016 in Brazil, as well as the FIFA World Cup 2022 in Qatar being recent examples. Contrary to advanced industrialized countries, mega sporting events are mainly a developmental tool for emerging countries to improve the country’s infrastructure, apart from other motives that are not discussed in this work (see above). This includes the infrastructure related to sports such as stadiums and other physical infrastructure such as roads, railways, airports, ports, telecommunication, hotels, and others that encourage foreign investment in the country and improve tourism (Cornelissen 2010, Tomlinson 2010).

## History of Sporting Events in Qatar

Qatar has successfully developed into a hub for sporting events. According to Rolim Silva (2014, 3), only five years after Qatar's independence, "the hosting of the Gulf Cup in 1976 marked Qatar's first attempt to express its national identity among the countries of the Gulf region". The Asian Football Cup, a continental football championship held every four years, was the first major Asian sport event in Qatar in 1988. Since then, several world and Asian championships in different sports such as athletics, table tennis and sailing took place in Qatar. Doha also became the host of several annual sport events with an Association of Tennis Professionals (ATP) tennis tournament being the first in 1993. Qatar announced that a record number of 57 international sporting events will be hosted by the country in 2014 (The Peninsula 2013).

The most prestigious sporting event hosted by Qatar will be the FIFA World Cup in 2022. The country also tried to host the Summer Olympic Games, but was neither successful in the bidding process for the 2016 nor for the 2020 Games. The International Olympic Committee (IOC) cut Doha out as a possible host for the 2020 Olympics, citing the heat, concerns over athletes' health and the effects rescheduling the games to October could have on the televised games. According to the IOC final evaluation report, "...in July/August, people have more leisure/vacation time. There is therefore a risk that an October Games would become a 'weekend Olympics Games' and with a reduced demographic reach, broadcasters would have difficulties in attracting the same audience levels in terms of working people and youth" (Doha News 2012b). Qatar has already announced to bid again for the 2024 Games (Doha News 2012a). However, after the 2020 Games were awarded to Japan, two Summer Olympics in a row in Asia might be unlikely. According to Horne and Whanell (2012, 9), "some cities may nowadays take the view that the best value to be obtained from the Olympic Games lies in bidding but not winning – thus gaining some promotional value without taking on the enormous costs of major developments".

Table 1 summarizes international sporting events taking place in Qatar, classified in past and future single events as well as events taking place on an annual basis in Doha. Failed bids are also listed in the table. The table might not be complete, but should cover the most important events that took place, or will take place in Qatar.

<b>Past events</b>	<b>Annual events</b>
1988 Asian Football Cup	ATP Tennis Tournament Doha (s.1993)
1995 FIFA U-20 World Cup	Qatar Masters Golf Tournament (s.2008)
1999 Handball World Junior C'ships	FIM Moto Racing World C'ships (s.2004)
2004 Asian Handball C'ships	FEI Global Champion Tour (s.2008)
2004 ITTF World Team T.Tennis C'ships	WTA Tour Tennis C'ships (s.2008)
2005 Asian Basketball C'ships	IAAF Diamond League (s.2010)
2005 World Weightlifting C'ships	IHF Handball Super Globe (s.2010)
2005 West Asian Games	FIVB Club World C'ships (s.2010)
2006 Asian Sailing C'ships	
2006 Asian Games	
2008 Asian Indoor Athletics C'ships	<b>Failed bids</b>
2008 Asian Youth Wrestling C'ships	2017 IAAF World Athletics C'ships
2008 Asian Optimist Sailing C'ships	2016 Olympic Games
2009 13th Qatar Table Tennis C'ship	2020 Olympic Games
2009 Asian Fencing C'ships	
2009 FIVB Club World C'ships	<b>Future events</b>
2009 ISF World Gymnasiade	2014 FINA Short Course World C'ships
2010 IAAF World Indoor C'ships	2015 IHF Handball World C'ships
2010 ISAF World Jr. 470 Sailing C'ships	2016 UCI Road Cycling World C'ships
2011 Asian Football Cup	2018 FIG Artistic World Gymnastics C'ships
2011 12th Arab Games	2022 FIFA World Cup
2012 Asian Shooting C'ships	
2012 FINA/ARENA Swimming World Cup	
2013 FINA/ARENA Swimming World Cup	

**Table 1: International sporting events in Qatar**

\*Sources: Qatar Olympic Committee (2011a), Qatar Olympic Committee (2011b), Top End Sports (undated).

# Methodology

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The aim of this study is to investigate the quality and permanence of Qatar's sustainability concepts. In particular, the focus is on the transport infrastructure as the United Nations (UN) has described transport as a key sector for sustainable development (UNCSD 2012, 4), and as Qatar has publicly announced ambitious plans for building intra-city, inter-city and inter-state road, railway and metro networks.

The paper will start with clarifications and definitions of key terms and concepts in relation to sustainability. By elaborating on how *sustainability* is understood, emphasis will be placed on the role of the *future* aspect in it – orienting on sustainability definitions by the UN (1972, 1987). Special focus will be placed on the concepts of ecological footprint, carbon footprint, as well as carbon neutrality and carbon offsetting, which are drawn from analyses done and strategies developed by the World Wide Fund for Nature (WWF). Particular attention is attributed to WWF's Living Planet Report and Index (WWF 2012). Based on this, an understanding of sustainable transport will be presented. The article will then relate these definitions to Qatar's understanding of and dealing with them.

Publicly, Qatar is placing great emphasis on striving for sustainability with regard to its development strategies. Besides being confronted with and obligated to international expectations and demands linked to mega sporting events, Qatar has national interests, which are a motivation for its development strategies. In that regard, Qatar is portraying its motivation for hosting mega sporting events as part of its long term National Development Strategy 2030 (NDS) (Qatar 2022 supreme committee "Qatar 2022: strategic plan 2012-2015", 38). As part of the development concepts, the goal of Qatar and FIFA is to host "the first completely carbon-neutral FIFA World Cup™" 2022 (FIFA 2010, 8). To be able to evaluate the transport infrastructure, a comparison with past mega sporting events will be made in this paper. This will include the understanding of the neutrality framework as well as an evaluation of the outcomes – reported and assumed respectively. Due to the availability of data – e.g. in the form of public sustainability concepts and legacy reports or carbon emission documentations – or lack thereof, the main focus on the 2022 FIFA World Cup will be complemented by data regarding the 15th Asian Games in 2006, the Asian Football Confederation (AFC) Asian Cup in 2011, the "18th Conference of the Parties to the 1992 UN Framework Convention on Climate Change/ the 8th session of the Meeting of the Parties to the 1997 Kyoto Protocol" (COP18/CMP8) in 2012, as well as regarding the World Cups 2006 in Germany, 2010 in South Africa and the recent World Cup 2014 in Brazil. This comparative approach will strengthen the evaluation of Qatar's strategy and development with regards to hosting mega sporting events and sustainable events in general. Due to the paper's focus on Qatar, and as it also was code of practice for past mega sporting events not to include international transport into the carbon footprint calculation, impacts from international transport related to such events will not be of major concern in this article.

After having assessed the sustainability of the 2022 World Cup, the results will be used for an evaluation of the permanence of sustainability concepts of Qatari mega sporting events, while looking at the potential legacy reaching beyond them. To get the necessary larger perspective, the analysis will contain references to Qatar's overall national approach to sustainability and to the fact that Qatar is the biggest Green House Gas (GHG)<sup>1</sup> emitter per capita in the world, as it acknowledges itself in its long-term development strategies aimed for 2030. Potential sources of conflict with sustainability, such as the already built and further planned overcapacity of road infrastructure, will be addressed in this study.

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1. The WWF ("Jargon buster and acronym decoder") is defining GHG as "any gas that traps heat in the atmosphere. The Kyoto Protocol covers human-induced emissions of six gases: carbon dioxide (CO<sub>2</sub>) (being the most important), methane, nitrous oxide, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6)".



## Literature review

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Social sciences research on sports in Qatar elaborated on the following four issues: Firstly, Amara (2005), Foley et al. (2012) and Khodr (2012) have conducted case studies on the Asian Games 2006 in Doha, so far the largest sporting event Qatar has ever hosted. Amara (2005) analyzed the significance and impact of the 2006 Asian Games on Qatari society. Foley et al. (2012) examined how Qatar used the Asian Games as a vehicle for securing global profile and to set itself apart from its neighbors. Khodr (2012) investigated the drivers behind Qatar's bid for the 15th Asian Games in 2006 in Doha. Secondly, Campbell (2010), Adjaye (2010) and Poli (2007) have investigated Qatar's policy of naturalization of foreign athletes. Whereas Campbell (2010) solely focused on Qatar, both other authors put the Gulf country in a wider context as one out of several examples. Thirdly, Rolim Silva (2014) examined the process of the establishment of the Qatar National Olympic Committee (QOC) in the late 1970's. Finally, Harkness (2012) discussed the barriers to female sport participation in Qatar. Investigating transportation policies at mega sporting events is a unique contribution to the academic literature on sports in Qatar.

Regarding the evaluation of sustainability concepts, environmental protection and potential legacy of mega sporting events and transport concepts, Preuss (2013) and Fitschen (2006) analyzed and compared different venues. Preuss, while comparing International Sport Governing Bodies (ISGB) and the respective bids for the 2018 and 2022 FIFA World Cups as well as the 2020 Olympic Games, developed a three-dimensional evaluation framework consisting of various indicators. His assessment of the permanence of sustainability concepts and their potential legacy included a focus on environmental matters and related infrastructure developments. Fitschen compared the 2000 and 2004 Olympic Games as well as the 2006 World Cup that was held in Germany, and asks whether the environmental programs and infrastructure developments related to these events, including their aim for carbon neutrality, represent environmentally friendly concepts or rather, cases of green-washing. This paper uniquely adds to the literature on Qatar by discussing how mega sporting events contribute to the modernization of countries' infrastructures, assessing the quality of developed and applied sustainable transport concepts, as well as their potential long-term legacy. This study is all the more exceptional considering Qatar's unique characteristics regarding its form of government, geographic location and state of infrastructure in comparison to Preuss and Fitschen's examples.

# Sustainability

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The term sustainability is of increasing importance when evaluating the responsibility of human activity and behavior vis-à-vis its environment. Its assessment is rather challenging as the terms *environment* and *sustainability* have wide interpretations and as the latter is increasingly used as a buzzword.<sup>2</sup> The term sustainability is applied in many fields, which are related to economy, nature, and societal issues, e.g. human development, labor market regulations, social inequality and human rights.

## Conceptualizing Sustainability

Due to the universal and normative nature of UN reports, we will use the Brundtland Commission's report "Our Common Future" as a point of reference regarding sustainable development definitions. This choice is further supported by the fact that organizations like FIFA and the IOC (2012, 12) as well as Qatar either directly refer to this UN report, or are reporting and assessing the sustainability of events and development strategies by following the Global Reporting Initiative (GRI) guidelines (Stadia Magazine 2012, Environmentalleader.com 2012), which are also based on this report (GRI 2011, 2). The latter document, from 1987, defined sustainable development as a "development that meets the needs of the present *without compromising the ability of future generations to meet their own needs*" (UN 1987, 1, emphasis added by authors). Already 15 years before the Brundtland Commission's report, the link between sustainable development on the one hand and the need for conservation of the natural environment on the other was recognized by the Declaration of the United Nations Conference on the Human Environment (UN, 1972), concluding in principle 4:

"Man has a special responsibility to safeguard and wisely manage the heritage of wildlife and its habitat, which are now gravely imperiled by a combination of adverse factors. Nature conservation, including wildlife, must therefore receive importance in planning for economic development".

These definitions show that the above-mentioned applications of the term *sustainability* in various fields related to development is justified and necessary, to do the term *sustainability* justice. Qatar's definition represents a broad understanding and could be read as coming close to the UN definition. Referring to Qatar's Second National Human Development Report from 2009, sustainable development is understood as consisting of the three dimensions of economic growth, social development, and environmental protection. Concerning sustainability, the report is specifying, rather vaguely, its stated understanding, mainly by describing the environmental development goal as environmental management, which ensures harmony between the three stated development dimensions (General Secretariat for Development Planning 2009, iii). Although the wide, or rather all-inclusive, consideration of sustainability in Qatar's development strategies could be seen as being supported by the above-mentioned UN definitions; this does not mean they are necessarily sincere.

The following analysis of Qatar's motivations aims to measure the seriousness behind the above-mentioned principles. The combination of this analysis with the assessment of past mega sporting events will facilitate a more detailed evaluation. Despite the available UN understanding of sustainability, more thorough definitions of key terms and parameters are needed. The in-depth sustainability concepts by the WWF ("Energy: Deserts and Oceans", "Offsetting or going carbon neutral", "Jargon buster and acronym decoder", "The Gold Standard", 2013, 2012, 2008, 2004) provide thorough, essential, and detailed descriptions and elaborations.

Specifically, orienting on the emphasized above-mentioned future considerations and current nature conservation aspects of sustainable development, this paper intends to focus on environmental impacts of Qatar's transport development strategy. In particular, this work seeks to assess the compatibility of Qatar's pursued transport

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<sup>2</sup> The Qatar National Development Strategy 2011-2016 refers to sustainability 176 times (General Secretariat for Development Planning 2011); the Feasibility Study For A Carbon Neutral 2010 FIFA World Cup In South Africa refers to it 30 times (Department of Environmental Affairs and Tourism, Republic of South Africa 2009); the IOC titled its Olympic Movement's Agenda 21 "Sustainability through Sport" (IOC 2012).

infrastructure developments with the minimization of carbon emissions, which are the main cause for global warming and the resulting negative consequences for future generations. In this regard, the WWF (2004) describes the need for a major energy paradigm shift as a basis for sustainability.

This argument is based on the fact that global warming is mainly caused by carbon dioxide (CO<sub>2</sub>) emissions, of which 80% is caused by the burning of fossil fuels (WWF 2004). The suggested paradigm shift aims for a drastic reduction of carbon emissions induced by humans by 80%, referring to the 1990 level, until 2050 (WWF 2013, 2). To realize this, the WWF states that the existing fossil fuel-based energy economy must be transformed into a clean and efficient one. Such a transition will have to consist of different strategies, amongst others: “the move to 100% clean and sustainable renewable energy” (WWF 2013, 1), such as wind, solar, biomass and geo-thermics; and where possible, a switch to de-centralized, on-site energy production in and at buildings and structures; as well as major improvements in the transport sector. As part of the transition to renewable energy, natural gas is considered a potential bridge source, as it is much cleaner than coal, when burned (WWF 2013, 6). Attributed to the alarming dimensions of the climate change challenge, the WWF and the International Energy Agency (IEA) are supporting the reduction of CO<sub>2</sub> emissions through Carbon Capture and Storage (CCS)<sup>3</sup> technology, despite its high costs and potential risks related to geological uncertainty (WWF 2013, 7).

## Ecological and Carbon Footprint, Carbon Neutrality, Carbon Offsetting

In its annual Living Planet Report (LPR) the WWF (2012) lays out its suggested and used approach for determining the “state of the planet”. It is based on the determination of humanity’s ecological footprint, which functions as an indicator of the Living Planet Index (LPI). This chosen approach places nature at the center of the concept of sustainability. The state of the planet is supposed to describe “the changing state of biodiversity, ecosystems and humanity’s demand on natural resources; and explores the implications of these changes for biodiversity and humanity” (WWF 2012, 2). It identifies the negative effects of global warming as the key reason for the biodiversity decline, constituting 28% between 1970 and 2008 (WWF 2012, 6). This causal linkage is important as it considers the potential of the biosphere to produce renewable resources and to absorb CO<sub>2</sub> emissions. “The Ecological Footprint tracks humanity’s demands on the biosphere by comparing the renewable resources people are consuming against the Earth’s regenerative capacity, or biocapacity” (WWF 2012, 6). The footprint represents the number of global hectares demanded per person per country and consists of the following components: cropland, forest, built-up land, grazing land, fishing grounds and carbon.<sup>4</sup> In that respect, the ecological footprint is representing the biocapacity of the biosphere, which is needed to reproduce the consumed biomass (WWF 2012, 6-7). The carbon footprint, constituting 55%, the biggest share of the global ecological footprint in 2008 (WWF 2012, 6), explains the major focus on its reduction within the described sustainability concepts and evaluations.

The LPI is based on an analysis within a specific area (the global ecosystem), which has not been defined subjectively by concerned stakeholders (as is the case with the carbon footprint determination during past FIFA World Cups; see below). Despite the state-centric determination of the index, it uses a global, all-inclusive framework, which takes solidarity among states, representing all humanity, as necessary prerequisite to ensure that earth as a “Living Planet” can sustain life (WWF 2012, 1). The LPR clearly shows the need for an international trade-off of earth’s resources and biocapacity. It concludes that countries must share the burden based on their predominantly geography-related characteristics. The latter fact is important concerning Qatar, with respect to the geographically different composition of the biosphere. Despite aiming at footprint reduction, the WWF conclusions acknowledge the need for growth, partially reflected by Qatar’s motivations for infrastructure development due to its past rapid population growth

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3 CCS is a technology that prevents CO<sub>2</sub> emissions, which are caused in industrial processes, from entering the atmosphere. One part of the technology is the process of capturing the CO<sub>2</sub> emissions, which for efficiency reasons should happen close to the place of their creation. The second part is the storage of these so-called waste CO<sub>2</sub> emissions away from the atmosphere. Also for efficiency reasons this step ideally happens close to the place of origin of the emissions, which often could mean a re-introduction of them into the ground where fossil fuel had been extracted before.

4 “Carbon represents the amount of forest land that could sequester CO<sub>2</sub> emissions from the burning of fossil fuels, excluding the fraction absorbed by the oceans which leads to acidification” (WWF 2012, 7).

(General Secretariat for Development Planning 2011, 5).<sup>5</sup> However, this support of development is linked with the crucial demand for a change of the (global) economic system(s) so that economic growth is no longer based on unsustainable consumption (WWF 2012, 20).

A reduction of the ecological footprint is to be realized by implementing the above-mentioned energy paradigm shift. In its Global Network Policy, the WWF explains their principles for “a fair and just transition to a society *fully* powered by renewable energy” (WWF 2013, 1, emphasis added by the authors). One goal is related to the use of fossil energy resources and is based on an analysis by the IEA. It states that two thirds of the present global fossil fuel reserves, with preference to coal, need to be left below ground to maintain a 50% chance for limiting global warming to two degrees Celsius (WWF 2013, 3, IEA 2012a). Furthermore, the policy explicitly describes “the role of gas in a transition period”, as well as the “potential role of Carbon Capture and Storage (CCS)” (WWF 2013, 1).

When burned, natural gas is much cleaner than other fossil fuels. For gas to credibly qualify as a transitional energy source, the WWF points out two challenges:

“However, if left to scale up together with the advent of new and large shale gas resources in many parts of the world, we [humanity] risk a long-term infrastructure lock-in of emissions intense gas, which will delay renewable deployment and make it impossible to stay within the permissible global cumulative carbon emissions budget to meet the climate challenge. Moreover, uncertainty about fugitive methane emissions associated with extraction and shipping of gas to point of use raises significant questions about whether natural gas provides any climate benefit, even in the short run” (2013, 6).

This assessment indirectly also brings up important questions about what country is supposed to carry the footprint burden resulting from gas extraction and production as well as its transport. In a production-based calculation, these factors are significantly responsible for the ecological footprints of producer states, with Qatar’s top ranking position in the LPI being a stark example.

Carbon Capture and Storage (CCS), despite its safety risks, is explicitly supported by the WWF, despite its own and the IEA’s warning that implementing CCS does not reduce the demand for leaving two thirds of the present global fossil fuel reserves untouched underground (WWF 2013, 3, IEA 2013). But referring to development needs, such as the infrastructure sector with its high-carbon and energy-intensive industrial processes such as steel and cement, the WWF (2013, 7) deems “environmentally safe CCS [as] needed as soon as possible”.

To make sure stakeholders of sustainable development are not just doing a cosmetic improvement of their carbon footprint, the WWF explicitly addresses the phenomena of “green washing” by defining more precisely the widely used term of carbon neutrality (WWF “Offsetting or going carbon neutral”). Green washing is understood as “disinformation disseminating by an organization as to present an environmentally responsible public image” (Pearsall, 1999, 624). The motive for achieving sustainable carbon neutrality has to be the prevention of net carbon emissions. Carbon offsetting can be part of a strategy leading to that goal, which is also represented by the inclusive, global approaches of the WWF.

Carbon offsetting is generally understood as a possibility for stakeholders “to compensate for their CO<sub>2</sub> emissions by purchasing carbon certificates generated by emission-reduction projects” (WWF “The Gold Standard”). In order to combat greenwashing, the WWF suggests five steps to stakeholders:

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<sup>5</sup> The Qatar National Development Strategy (NDS) might only “partially” reflect WWF’s acknowledged development need, due to Qatar’s development philosophy, which considers the possibility that “expected costs of inadequate capacity outweigh those of temporary oversizing” (General Secretariat for Development Planning 2011, 86)

“1. Assess the current emissions. 2. Avoid...[emissions]. 3. Improve efficiency of energy use to reduce CO<sub>2</sub> emissions further. 4. Offset - only the unavoidable emissions...through investment in Gold Standard projects. 5. Review [for constant improvement].... *The target should be to reduce offset to zero over time*” (“Offsetting or going carbon neutral”, emphasis added by authors).

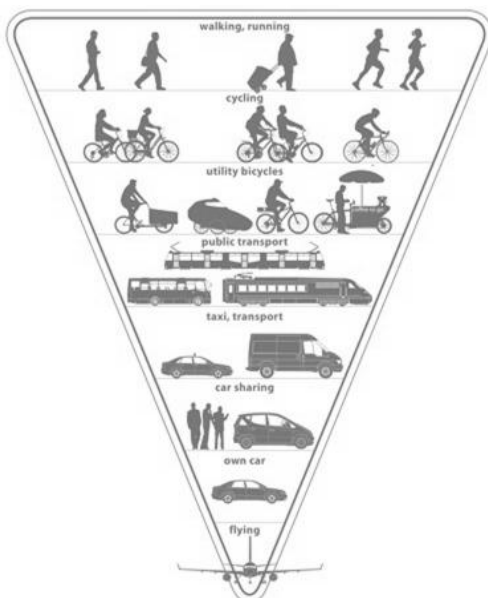
The Gold Standard, endorsed by the UN, demands that offset investments should be made, as also outlined under the Kyoto Protocol, in Clean Development Mechanisms (CDM), as well as in voluntary projects (WWF “The Gold Standard”). CCS technology is one of the major examples of CDM. “The Gold Standard is a globally recognised and trusted regulatory framework for the deployment of public and private capital into low carbon and development projects” (Fair trade International &The Gold Standard 2012). This ‘carbon for development’ philosophy enshrines carbon saving and sustainable development benefits for local communities (2012).

## Sustainable Transport

The above-mentioned major improvement in the transport sector as a part of the energy paradigm shift can be realized if “transport will become highly energy efficient, and over time use hydrogen and other clean fuels that are produced from clean sources” (WWF 2004). Concerning CO<sub>2</sub> emissions and sustainable transport development, the WWF (2008) suggested during its participation in the Abu Dhabi Masdar City<sup>6</sup> project:

“zero carbon emissions from transport within the city [as well as] implementation of measures to reduce the carbon cost of journeys to the city boundaries (through facilitating and encouraging the use of public transport, vehicle sharing, supporting low emissions vehicle initiatives)”.

In the envisioned understanding of sustainability, as previously stated, private vehicle use is considered as only the last and least favorable option within transport development strategies due to the greater energy efficiency of innovative public transport. The traffic pyramid in figure 1 describes the approach in which the least favorable form of transport – represented by air traffic, located at the small bottom of the pyramid – is the one with the lowest efficiency and the biggest GHG emissions (Bicycle innovation lab 2012). However, acknowledging the prevalence of private vehicle use, especially for inter-city traffic, sustainable concepts need to include incentive components in addition to the development of alternative transport types.



**Figure 1. Traffic pyramid**

*\*Source: Bicycle innovation lab (2012).*

6 For more information about Masdar City see also Reiche (2010b).

A sustainable transport concept should, besides choosing the most efficient transport type, be accompanied by a sustainable strategy for the energy supply. The use of electricity as the power source should be the favored choice, as it is the most efficient energy carrier (WWF 2013, 5). In turn, electricity needs to be produced from renewable energy sources, the particular type depending on the geographic conditions of the country. In the case of Qatar, this would mean wind and particularly solar power as “the conditions for solar energy potential in the GCC are among the most favorable in the world” (Reiche 2010a, 2396). The characteristics of decentralized, individual and private transport solutions make the preference for electricity as an energy carrier a challenging one. For that reason, the second most preferred energy carriers and sources should be liquid biofuels (WWF 2013, 5). As for the case of Qatar, some of the often-mentioned disadvantages of e-mobility, such as the short range, are less significant due to the small size of Qatar.

In its report about trends in sustainable development, the UN Department of Economic and Social Affairs points out that sustainable transport is not just determined by its energy use, but also by social and economic issues, like road safety and affordability. It suggests the development of comprehensive strategies consisting of short-term, medium-term and long-term policies. The guiding principles of such a strategy concerning the ecological footprint should be: “to avoid transport (e.g. shorter distances to work through better urban design), to shift towards cleaner modes of transport as well as to clean existing modes of transport through better technology (e.g. increased resource-efficiency and reduction of emissions)” (Department of Economic and Social Affairs 2010, 15). Concerning the second principle of this so-called Avoid-Shift-Improve (ASI) approach, the UN concluded at its RIO+20 Conference on Sustainable Development in 2012 that passenger transport ideally would shift to non-motorized or public transport, and freight to rail or water transport (UNCSD 2012, 1-3). Examples for “Shift”, which have been successfully implemented in various cities worldwide, are Bus Rapid Transit, public bike schemes, rail-based mass transit and pedestrianization. Successful examples for “Improve” are the promotion of electric bikes as well as electric cars and buses.

In his evaluation of sustainable transport concepts for mega sporting events, Fitschen emphasizes the need for a clear preference for public transport solutions, as it most effectively reduces car traffic and as it allows better strategies regarding the type of energy carrier in this sector. In his study Fitschen chooses the geographic concentration of event venues as an indicator for the sustainability of transport concepts. Furthermore, he highlights the need for promoting non-motorized transport as well as public transport, the latter for example through special tickets combining event access with free public transport usage to enable effective environmental protection (Fitschen 2006, 27-8). This is common, for example in the German professional football league Bundesliga (Reiche 2013, 8-9).

Holger Preuss concerns himself with the permanence of sustainability concepts by looking at the green legacy gained from a mega sporting event. Regarding public transport, he defines green legacy as “the measurement of the gained ‘knowledge’ on...how to increase public transport efficiency” (Preuss 2013, 3586). Concerning the infrastructure of transport systems, Preuss (2013, 3587) understands green legacy as causing a change towards construction that is based on high ecological standards.

# **Qatar's Approach to and Motives for Sustainability**

This section analyzes the motives behind Qatar's aim for sustainability, starting with a closer look at Qatar's dealing with its performance in this regard. Focusing on the characteristics of Qatar as a rentier state is important in understanding its national interests and approach to sustainability. Such comprehension can indicate whether the aim for sustainability is rather a means to the goal of securing Qatar's interests or if an earnest and serious understanding of sustainability is motivating it. As mentioned above, the paper will mostly exclude international motives behind Qatar's national interest.

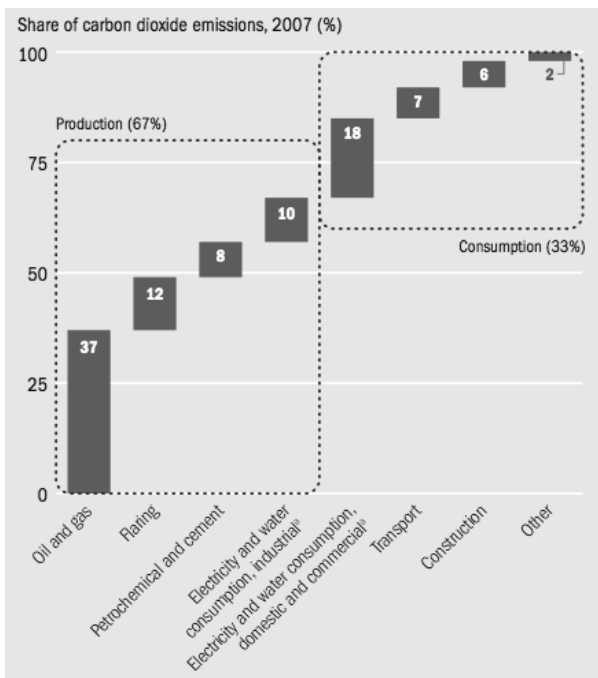
## **Qatar's Approach to Sustainability and its Performance**

Qatar is interested in achieving a positive and good international standing, which is an important feature of soft power. Regarding sustainability and combating global warming, this goal is challenging, as Qatar is the biggest CO<sub>2</sub> emitter per capita per year with 12.1 metric tonnes of carbon in 2006, as is shown in a report by the Qatari General Secretariat for Development Planning (2009, 104). In 2010, this number was smaller with 10.9 metric tonnes, yet still leaving Qatar in leading the world ranking (Cdiac.ornl.gov 2010). Part of Qatar's strategy in changing the international perception of the emirate is an emphasis on the way the carbon footprint is calculated, which currently is production-based. Were it consumption-based, Qatar would not be ranked number one due to its small population and the huge number of consumers of Qatari gas worldwide (General Secretariat for Development Planning 2009, 109-10). Rather questionable is Qatar's indication that it would be ranked in 60<sup>th</sup> position if CO<sub>2</sub> emissions would be determined in total amounts per country. If this were the case, Qatar's small population would have an unfair positive influence (Gulfbase.com 2009).

Essential for evaluating Qatar's strategy towards sustainability and its transport concepts is a detailed understanding of Qatar's footprints. As stated above, the global carbon footprint represents more than half of the global ecological footprint. In Qatar, the carbon share is around 75% (WWF 2012, 8), justifying an even greater focus on its drastic reduction.

However, so far, referring to its own development report by the General Secretariat for Development Planning (2009, 105), Qatar is expecting a growing carbon footprint over the following decade due to rapid industrial expansion and population growth. From 2001 till 2006, total GHG emissions increased by 47% with CO<sub>2</sub> representing the biggest share. Besides the significantly increased oil and gas sector (186 % from 2001 till 2006) the two other major sources of emissions were related to population growth, with electricity and water consumption, and an increase in construction and road-based vehicle use. The cement sector consumed just 0.5% of Qatar's energy, the transportation sector 8.4%, and the energy and water sector 21.6%. The latter two increased since 2001 by 133% and 86% respectively. Twenty-four percent of its own total energy production was consumed domestically during that same time period. Two thirds of Qatar's CO<sub>2</sub> emissions stemmed from production, compared to one third from consumption in 2007 (General Secretariat for Development Planning 2011, 223). Figure 2 shows a more detailed overview of the CO<sub>2</sub> emission shares.





**Figure 2. Share of CO<sub>2</sub> emissions in Qatar in 2007**

*\*Source: General Secretariat for Development Planning (2011, 223).*

A prerequisite for sustainable development is the assessment and documentation of the ecological footprint and an analysis of its causes. As shown by Qatar’s reports and strategies around its National Vision 2030 – such as the above quoted strategy paper, *Advancing Sustainable Development* (General Secretariat for Development Planning 2009), its comprehensive *National Development Strategy 2011-2016* (General Secretariat for Development Planning 2011), and the *Qatar 2022 Strategic Plan 2012-2015* (Qatar 2022 supreme committee “Qatar 2022: strategic plan 2012-2015”), Qatar is publicly facing and analyzing its own ecological footprint. The question is how Qatar intends to realize the drawn concepts and conclusions in a serious and satisfactory manner. Directly referring to environmental matters, Qatar’s three-year Strategic Plan 2012-2015 portrays the 2022 World Cup as “an opportunity to balance the requirements and needs of a growing country with that of its natural environment” (Qatar 2022 supreme committee “Qatar 2022: strategic plan 2012-2015”, 38). Concerning its overall footprint, Qatar effectively focused on the sector representing a large CO<sub>2</sub> emission source, which was flaring. The Qatari gas sector improved the efficiency of the concerned process of gas production through technological innovations, and thus reduced the related emissions by 25% from 2001 till 2006 (General Secretariat for Development Planning 2009, 107). In general, it is mandatory in Qatar for the entire oil and gas industry, and their contributing industries, to write external sustainability reports, as codified in the *Sustainable Development Industry Reporting* (Member of Supreme Committee for Delivery and Legacy 2014). Furthermore, Qatar, like its Gulf neighbor Abu Dhabi has shown for example in the Masdar City project (Reiche 2010b, 381), that it seeks to invest in and develop CCS technology.

Besides the incoming wealth, the huge natural gas reserves could be of help for Qatar’s sustainable development, instead of causing a huge carbon footprint. The WWF and the UN describe the use of natural gas as a potential transitional energy source for an energy paradigm shift, which could make Qatar one of the global suppliers of an essential energy form concerning global sustainability. Qatar is aware of this as shown in its approach of promoting gas-to-liquid (GTL) products as a cleaner alternative to other fossil fuels – e.g. the introduction of GTL as partial and “greener” kerosene substitute (Qatarairways.com).



Concerning Qatar's rather extreme geographical characteristics regarding location, climate, flora, fauna and societal make-up, the above-described WWF approach offers the tools for a fair assessment of Qatar's challenges and the resulting rights and duties. The inclusive logic behind the LPI highlights Qatar's dependence on, and right for, international support in becoming sustainable. A national approach for sustainable development in Qatar as a desert country is at the very least challenging, if not impossible. The LPR clearly references Qatar's very similar neighbor: "The residents of UAE are therefore dependent on the resources of other nations to meet their needs" (WWF 2012, 10). On the other hand, Qatar and its neighboring states like the UAE have very good conditions for a solar energy sector. Additionally, to harness Qatar's ideal solar energy potential, there is large capacity in development and production of solar technology. This is reflected by the required and prognosticated increasing demand for off-grid, mini-grid as well as concentrated solar power production, especially in the developing world (WWF 2013, 5). Qatar might have recognized that, as it is increasingly investing in this sector. The joint venture, Qatar Solar Technologies (QSTec), between the Qatar Foundation and the German company Solarworld, invested one billion US dollars in a polysilicium factory in the industrial city of RasLaffan, providing polysilicium for the solar panel production (Milz 2014, 70-1). Furthermore, Qatar inaugurated a large-scale solar test facility (STF) in December 2012, based on a collaboration between GreenGulf and Chevron Qatar – which was "launched in 2009 with support from the Qatar Foundation and the Qatar Science and Technology Park (QSTP)" – (James 2013).

"The 35,000sq m STF will test emerging solar technologies from across the world to identify which suits best for the Gulf region. The STF will also generate other key applications such as solar cooling and solar desalination, and provide training and internship programmes for local students" (2013).

Furthermore, the approach of the LPR highlights that Qatar, like the other Gulf states, has to take a serious role in its part to protect biocapacity, represented by the healthy fishing grounds off its coast. This challenge should be practically addressed in a regional approach. Alarmingly, the Gulf belongs to the ocean area where at least 30% of the primary production rate (PPR), meaning the capacity of the ocean to produce the amount of food a fish needs to grow in the concerned region, is extracted by the fishing industry (WWF 2012, 19).

Regarding an understanding of sustainability Qatar might not only be concerned by definitions such as the ones set out by the WWF. Actors such as the International Sport Governing Bodies (ISGB) like FIFA also directly influence Qatar's view of sustainability. The Qatar 2022 Supreme Committee ("Qatar 2022: strategic plan 2012-2015", 21) describes the emirate's significant engagement in hosting mega sporting events as part of its long-term development strategy that results in additional motivation. "The 2022 World Cup sets a timeline for the completion of Qatar's infrastructure development" (Ruiz 2014). Regarding sustainable development, the short-term goals of the events, as often emphasized by ISGBs like FIFA, do not necessarily have to coincide with Qatar's necessary long-term approach, which should especially focus on its industrial sector. Aiming at the lowest possible footprint during the 2022 World Cup requires a focus on housing due to carbon emissions from domestic and commercial electricity and water consumption. The transport component of the event's footprint, excluding international travel, will be almost insignificant, assuming footprint shares from past World Cups.

Besides the potential to improve its image with successful and/or publicity creating sustainability concepts, Qatar also needs to please and convince ISGBs like FIFA that it is addressing their demands. Preuss critically analyzes the development of environmental awareness in relation to mega sporting events and concretely among ISGBs. Concerning Qatar's approach to sustainability, his application of principal-agent theory, and in particular signaling theory, helps in understanding certain motives (Preuss 2013, 3591). In these theories, a better-informed agent (Qatar) influences a less-informed principal (the international public, represented among others by ISGBs and the media) by using attention-attracting signals. As so-called signaling effects, Qatar could use the developed and gained knowledge regarding sustainability to raise awareness and educate its population as well as the international audience of the events. It can change the way carbon emissions get attributed to states by becoming a leader in environmental technology, and by building solar and cooling technology (Preuss 2013, 3590-3). The theory furthermore illuminates how Qatar might offer environmental concepts based on the calculation where "the prize is a better position in the bid race, while the costs are the efforts to be made to deliver the program [requested by the ISGB]" (Preuss 2013, 3591).

Based on this theoretical approach, voluntary measures by bidders for events are appearing rather opportunistic. Bidders are basically forced to be environmentally friendly. Having no green program is a disadvantage in bidding processes, so despite potential high costs there is a “competition to offer the best possible environmental program” (Preuss 2013, 3593). At the same time, such competition and the resulting public attention and awareness, increase the pressure on the bidder to deliver its promises, which in turn – under the usual time pressure of mega sporting events – will lead to the bidder’s focus on the success of so-called signal projects. Taking this into account, the bidder, and the ISGB, as highlighted by Preuss, will invest in so-called green flagship projects, which especially attract public attention (Preuss 2013, 3593-4). In this regard, a closer look on the offered stadium technology is made below.

## **Qatar’s Domestic Motives for Sustainability**

Due to Qatar’s form of government, significant consequences for its prioritization of development goals have to be considered. The emirate is not an election-based democracy despite various political reforms since 1995, the time when Hamad bin Khalifa Al Thani deposed his father Khalifa bin Hamad Al Thani who ruled as absolute monarch since 1972. The royal family controls the political power of the country. The emir appoints the prime minister, the cabinet, as well as, theoretically, 15 of the 45 parliamentarians of the Advisory Council (Freedom House 2013). Practically however, the first parliamentary elections have been postponed continuously with the last extension of the term of the so far unelected Advisory Council till 2016 (Doha News 2013).

Besides authoritarian control mechanisms, the government’s legitimacy mostly depends on a “distributive societal contract”, which allows the classification of Qatar as “rentier state” (Reiche 2010a, 2397). Qatar, like other Arab monarchies, survives by exploiting the ‘rent’ revenues from the oil and natural gas industries. According to the rentier state theory, these revenues allow a regime to provide its people with substantial material benefits (such as free education, health, pension and plenty other support) without the need for heavy taxation and in the absence of democratic representation (Abdelkarim 1999). The state provides the Qatari nationals with almost everything they need. From the societal perspective, there is no dissatisfaction with the government in Qatar. According to a public opinion survey, people are quite pleased with their life in Qatar and do not request any change: “Qatar has seen no signs of the popular political mobilization witnessed elsewhere in the region” (Gengler 2011). “Very cheap and subsidized energy is an integral part of the wealth transfer to the population from oil and natural gas generated revenues” (Reiche 2010a, 2397). The very high living standard can be seen as being provided in exchange for compliance to the rule of the royal family.

Qatar’s natural gas resources will last for many decades to come. Combining this fact with the distributive societal contract, the Qatari economic goals thus are to secure a steady demand for and a steady supply of Qatari fossil energy resources. The former aim could be realized by safeguarding long-term customers and the development of additional, new products based on natural gas, while the latter can provide a modern natural gas extraction, production and transport infrastructure. Preuss assesses that for newly industrialized countries and the BRICS states,<sup>7</sup> often the economy is more important than the environment (Preuss 2013, 3595). Despite the vastness of Qatar’s fossil energy resources, the emirate is looking beyond the time of their depletion. The emirate is “in the process of establishing a diversified economy and providing the foundation for sustainable economic growth, improving its public services and infrastructure, and transitioning toward a knowledge-based society” (Khodr 2012, 86). The aim for permanence and sustainability could also be seen as underlining Qatar’s analysis of its environmental challenges. In its development strategy reports, it acknowledges and raises awareness for potentially major environmental problems it could face with regards to water security, carbon emissions, energy efficiency, and risks threatening the safety of the marine environment (General Secretariat for Development Planning 2009, iii).

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<sup>7</sup> Brazil, Russia, India, China, South Africa.

# Sustainability of Qatar's Transport Concepts

This section analyzes the mega sporting events hosted and going to be hosted by Qatar, concerning their transport concepts and sustainability strategies. In doing so, the applied understanding of carbon neutrality and sustainability by the different mega event stakeholders, the hosts as well as ISGBs, will be illuminated. The analysis will include a look at positive and negative trends and developments.

## Development and Mega Events

Before 2004, Qatar's transport infrastructure solely consisted of a road network and lacked a public transport system, except existing taxi services. In 2004, the state-owned Qatar Transport Company was founded, consisting of buses, taxis and a limousine service. The vehicles could be hailed from the side of the road or booked in advance (Doha2016.com 2007a). In 2006, a bus system comprising 17 city routes and four regional routes, mainly used by migrant workers, was introduced (PTV AG 2007c, 16).

At the 15th Asian Games in Doha in December 2006, this bus network was the only mode of public transport. The Asian Games included an environmental program, which focused on recycling and cleaning projects as well as environmental education. Related to transport, was a bio-diesel project emphasizing recycling possibilities and efforts. This rather small, educational project took place during the Asian Games and consisted of a branded Environment Bus, which was fueled with bio-diesel originating from waste vegetable cooking oil from Asian Games facilities (Doha2016.com 2007b).

In March 2006 the Qatari government, through the Urban Planning and Development Authority (UPDA), started the development of a comprehensive Transport Master Plan for Qatar (TMPQ) in cooperation with the German consulting company PTV AG (2007a). It is concerned with the "relationships between the development of the transportation system, the economic development, the land use development and the environmental impacts of these developments" (PTV AG 2007a). Some of the master plan's objectives related to environmental and sustainability issues are: the "development of an adequate public transport system for the next 20 years"; to "recognise the ongoing role that private vehicles have in contributing to accessibility, but minimizing the impacts of private vehicles on surrounding environments"; and to "integrate transport and land use actions to provide a seamless and sustainable system in the future" (PTV AG 2007b). The TMPQ contained "The Way Forward Vision of Public Transport System" consisting of five stages till 2026 (PTV AG 2007c, 47): 1) Short-term improvement of the existing public transport (road-based) till 2007; 2) Gradual prioritization of public transport and implementation of hierarchical structures (road-based) till 2011; 3) Hierarchical public transport system (road-based) till 2016; 4) Partly completed higher-order public transport system (rail-based) till 2021; and 5) Completed higher-order public transport system (rail-based) till 2026. Through its bid for the Olympics in 2016, Qatar emphasized its plan to build a rail-based public transport system, including underground and aboveground rail networks (Doha2016.com 2007a). Qatar publicly considers "public transport [of having] become a bare infrastructural necessity for any developed market, whereby metro networks have largely contributed to the reduction of carbon dioxide emissions, pollution and time-wasting traffic jams" (Menarailnews.com 2013).

Data about the performance of the transport systems during the Asian Games or about their ecological footprints is not available. Although, by looking at later mega sporting events in Qatar as well as Qatar's NDS, and by considering the already started and executed development projects regarding road and rail construction, the long-term character of the plans from 2006 can be observed. In October 2010, the then Qatar 2022 Bid Committee CEO Hassan Abdullah Al Thawadi acknowledged the existing challenges in terms of transportation and re-assured that they had been addressed (AlThawadi 2010, 13).

Additionally, in 2009 the UPDA announced a plan concerning development of non-motorized transport by stating the aim "to become the Gulf's first cycle-friendly country" (Arabianbusiness.com 2009). It described the development

of cycling infrastructure as part of the development of a “solid alternative transportation system”. Containing some of Preuss’ above-mentioned parameters of a green legacy in the transport sector, the announced 20-year plan includes: “The establishment of cycle circuits across Doha, the development of an infrastructure plan, will make provisions made for comfortable cycling in all major zones, launch an awareness programme to target the youth and will change traffic laws to ensure cyclists maximum safety” (Arabianbusiness.com 2009).

Addressing the sustainability of future transportation concepts in general, a stated goal of the plan is to create the possibilities to walk – as opposed to using a car – on the way to work or home (Arabianbusiness.com 2009).

It is rather difficult to track the Qatari transport system developments over time based on its performance during mega (sporting) events due to a lack of respective data. As with the 2006 Asian Games, there is also a gap concerning the AFC Asian Cup in January 2011 as well as concerning the UN climate conference COP18/CMP8 in late 2012. Despite the little available information, a look at some Qatari strategies regarding transport developments as well as carbon neutrality allows a selective qualitative assessment.

Concerning the transport concept for the 2012 COP18/CMP8, Qatar announced the allocation of 400 vehicles “to provide environmentally friendly transport for delegates and visitors” (COP18.qa 2012a). The term ‘environmentally friendly’ referred mainly to the reduction of car usage based on the argument that “each bus will replace up to 40 cars, so they will not only reduce congestion, but also carbon emissions” (COP18.qa 2012b). Furthermore, 100 out of the 400 buses were using “clean fuels”, which included the usage of GTL diesel as well as compressed natural gas (CNG) (Marhaba.com.qa 2012). Unfortunately, there is neither a possibility to evaluate the performance of the transport concept for COP18/CMP8 nor a chance to assess whether it was, as proclaimed, “a carbon neutral conference” (COP18.qa 2012b). Morales, when questioning the harmlessness of carbon footprints of UN climate treaty talks in general, points out that – despite being promised by COP18/CMP8 – a carbon footprint report has never been published (Morales 2013).

In March 2013, GreenGulf and Siemens initialized a new partnership with the aim to reduce energy consumption and dependence on fossil fuels, focusing on energy efficiency and urban transportation (James 2013). The partnership specifically seeks to pursue the development of “an electric bus (eBus) urban transport system, energy efficient district cooling technologies, and energy optimisation and supply management” (2013). Such partnership and projects, if realized, would represent the combination of economic diversification with sustainable development.

Although not part of the transport concept, it is worth to point out the significant influence of so-called green flagship projects in creating an image of being an ecologically aware host aiming for carbon neutrality (Preuss 2013, 3593). Regarding COP18/CMP8, Qatar emphasized – similar to its highlighting of eco-friendly green stadiums for the 2022 World Cup (Fahy 2014) – the progressive green character of the Qatar National Convention Centre (COP18.qa 2012b), despite it representing one of the smallest shares of the conference’s ecological footprint. This also confirms the need, that not only hosts, but also actors like the UN (and FIFA), should continue to study the seriousness and the success of their concepts, as partially done by Preuss (2013, 3586).

In general, the declaration of natural gas as “clean fuel” and its usage as an energy carrier in the transport sector, as exemplified by Qatar’s “clean fuel” busses, must be critically assessed. The above-developed sustainability definition in relation to an energy paradigm shift clearly recommends electricity and biofuels as preferred energy carriers for road-based public transport as well as warning of a “long-term infrastructure lock-in of emissions intense gas” (WWF 2013, 6). Qatar’s push for introducing natural gas products as an energy source for road-based traffic should be seen together with the introduction into the air traffic fuel market. Qatar Airways is stating on its website (Qatarairways.com) that it is going to use a GTL kerosene blend instead of standard fuels. Basically, with such GTL push, Qatar is creating additional demand for its gas resources, as also shown by the on-going construction of the world’s largest GTL production plant in Qatar. Some of the advantages are that GTL is free of sulfur and aromatics and that it weighs less (Qatarairways.com). On its home page the air carrier states, “this could potentially lead to better fuel economy, decreased aircraft weight, improved range performance, and decreased CO<sub>2</sub> emissions for specific aircraft/route combinations” (Qatarairways.com). But specialists are skeptical, as the extra processing needed for the GTL production

supposedly causes an even greater carbon footprint. Qatar Airways, referring to the New York Times (2012), instead highlights that sulfur, which is absent when burning GLT, “is a more potent global warming gas than CO<sub>2</sub> when emitted at low altitudes”. However, referring to the New York Times (2012), the latter statement has to be seen with caution at least, as sulfur dioxide emitted at high altitudes actually is combating global warming as it reflects sunlight away from earth. Furthermore, the creation of GTL production infrastructure potentially represents the mentioned negative “lock-in”. Together with the unclear emission characteristics of natural gas, it can be assumed that Qatar seeks to increase the demand for natural gas by widening the range of Qatari natural gas products. Although the particular case of Qatar Airways using the GTL kerosene blend could be seen as positive, since there is almost no carbon footprint from transporting the GTL from the Qatari gas fields to the home airport of Qatar Airways in Doha.

## Influence of International Sport Governing Bodies

Concerning the upcoming 2015 World Men’s Handball Championship in Qatar, there is a lack of information with regards to sustainability and transport strategies. For example, the official websites [www.q2015.com](http://www.q2015.com) and [www.qatarhandball2015.com](http://www.qatarhandball2015.com) do not contain any information about these topics. Therefore the 2022 FIFA World Cup will be analyzed and compared with experiences from former World Cups in Germany, South Africa and the upcoming Brazilian one. The 2006 World Cup in Germany is significant, as it is also considered a pioneer and standard setter regarding sustainable mega sporting events. Preuss(2013, 3585) states that FIFA started encouraging “environmental protection” since 2005 only, when the German [Local Organizing Committee] launched the Green Goal environmental program for the 2006 FIFA World Cup. Looking at FIFA mega events and their strategies will also allow an evaluation of sustainability approaches by ISGBs as well as their influence on Qatar as a host country. As shown by the sustainability study by Fitschen, there is more data available from the 2006 World Cup in Germany, but also regarding this event he points out a lack of retrospective environmental data (Fitschen 2006, 78).

To determine the carbon footprint of an event, boundaries have to be defined. The first time that such calculations were made was for the 2006 World Cup in Germany, as part of the Green Goal program (Reiche 2013, 1). Within this program “the system boundaries only included emissions sources within the control of the organizer or the host country... [including] following emission sources: energy use for accommodation, energy use at stadiums and stadium precincts; embodied emissions in stadium construction and materials; inter-city transport and intra-city transport” (Department of Environmental Affairs and Tourism, Republic of South Africa 2009, 16), as shown in table 2. Representing the most significant share, emissions from international transport to and from the event place were not and will not be included (Department of Environmental Affairs and Tourism, Republic of South Africa 2009, 5, Organization Committee “Green Goal: Legacy Report”, 110).

World Cup	2006 Germany		2010 South Africa			2014 Brazil		
	Emissions (tCO <sub>2</sub> e)	Share national	Emissions (tCO <sub>2</sub> e)	Share national	Share all	Emissions (tCO <sub>2</sub> e)	Share national	Share all
International transport	?	-	1,856,589	-	67%	1,379,189	-	51%
Inter-city transport	67,456	73%	484,961	54%	18%	802,397	61%	30%
Intra-city transport	5,544	6%	39,577	4%	1%	98,464	7%	4%
Stadia constructions and materials	4,140	5%	15,359	2%	1%	111,500	8%	4%
Stadia and precinct energy use	2,890	4%	16,637	2%	1%	151,259	11%	5%
Energy use in accommodation	11,640	12%	340,128	38%	12%	155,316	13%	6%
<b>Total excl. international transport</b>	<b>91,670</b>	<b>100%</b>	<b>896,662</b>	<b>100%</b>	<b>-</b>	<b>1,318,936</b>	<b>100%</b>	<b>-</b>
<b>Total incl. international transport</b>	<b>?</b>	<b>-</b>	<b>2,753,251</b>	<b>-</b>	<b>100%</b>	<b>2,723,756</b>	<b>-</b>	<b>100%</b>

**Table 2. Carbon footprint shares of the FIFA World Cups 2006, 2010 and 2014**

\*Sources: Organization Committee (“Green Goal: Legacy Report”, 117), Department of Environmental Affairs and Tourism, Republic of South Africa (2009,5), FIFA (2013b, 15, 18).



In South Africa, the “2010 World Cup’s total carbon footprint came to 2,753,250 tons of CO<sub>2</sub> equivalent, ...[representing] an eight-fold increase over the previous World Cup in Germany”, with international transport representing 67.4% and inter-city and intra-city transport only 17.6% and 1.4% respectively (Environmentalleader.com 2010, Department of Environmental Affairs and Tourism, Republic of South Africa 2009, 5). The share caused by building and operation of stadiums was with 1.1% even smaller, while the energy for accommodation caused 12.4% of the carbon footprint. FIFA’s predictions for the carbon footprint of the 2014 World Cup in Brazil assessed the generation of just over 2.7 million tons of CO<sub>2</sub> equivalent, very similar to the 2010 South Africa figures (FIFA 2013a, 1). International and inter-city transportation again are expected to be the two biggest contributors to the carbon footprint with 50.6% and 29.5% respectively (FIFA 2013a). As the methodologies for the determination of FIFA event carbon footprints are recent and still in the process of being significantly changed and improved, the different positions as shown in table 2, and the definitions of included and excluded CO<sub>2</sub> emitters, can only be compared cautiously for the purpose of assessing trends. Future events could have lower footprints, than in table 2, due to possible carbon offsetting.

Qatar is expecting a carbon footprint share from international travel during the 2022 World Cup of about 80% (Ruiz 2014). Qatar can most effectively decrease the footprint of an event like the World Cup and deliver the promised “most compact World Cup” (AlThawadi 2010, 12). This is obvious when comparing it with previous World Cups regarding transport components. FIFA in its evaluation acknowledges that “the bid proposes an overall transport strategy and concept based principally on the compactness of the Greater Doha conurbation” (FIFA 2010, 19).

Based on this data, when targeting the largest carbon footprint share of the 2022 World Cup in Qatar, attention should be directed at the accommodation sector, assuming that the carbon share of the international traffic is excluded. An inclusion of the international transport share would require a complex procedure of allocating responsibility for carbon emissions, which was also pointed out in Germany’s Green Goal Legacy Report (Organization Committee “Green Goal: Legacy Report”, 110), as it theoretically could concern almost every country. Furthermore, having a carbon-neutral mega event would become almost impossible with international traffic being part of the equation. It would importantly raise awareness for one of the biggest GHG emission sources (Organization Committee “Green Goal: Legacy Report”, 95), especially of the ecological footprints of the developed world. Concerning long-term effects of sustainability concepts, the transport sector weighs in more, as provided infrastructure is determining available options of transport for Qatar’s population in the future.

A critical look at the aims of ISGBs like FIFA and the IOC helps illuminate the different motives for focusing on short-term and long-term sustainability concepts as well as their respective success. FIFA and the IOC are also concerned about their reputation, raising the question of how serious their demands are and if they even represent the above-described greenwashing. Preuss points out in his study that “FIFA[’s] only focus is on reducing the footprint of the event” (Preuss 2013, 3586). Although it is obvious that demands, especially by the IOC, have resulted in improvements regarding environmental protection and sustainability. Preuss describes the historical development of the goal of the IOC allowing a commercialization of the Olympics in the late 1970s and 1980s, until it refocused on cultural and environmental matters again in the 1990s, culminating in the concept of “Green Games”. In 1996, the IOC introduced the environmental chapter to the Olympic Charter (Preuss 2013, 3584-5). But often, ISGBs and event hosts “are looking only at the event and their true interest in sustainability is limited” (Preuss 2013, 3594). For analyzing the strategies and motives of potential mega event hosts for environmental concerns in their bids, Preuss uses “costly-signaling” theory (Preuss 2013, 3593). It states that the host introduces very expensive ideas, which will get him big and ideally positive public relations. “The [host] has to invest significantly in these signals and the less useful they are to the sender, the more trustworthy they are” (Preuss 2013, 3593). Such strategy often is detrimental to the goal of achieving sustainability, as most of such signaling projects are part of the above-mentioned minimal carbon footprint of the stadium construction share of the overall footprint.

Emphasizing the signaling effect, Preuss describes eco-friendly stadiums as potential green flagships (Preuss 2013, 3593). Confirmation for such allegations could be seen by FIFA's approach to the Qatar World Cup stating: "In terms of legacy, there is a strong commitment to having a carbon-neutral FIFA World Cup™, especially through utilisation of environmentally friendly cooling technologies" (FIFA 2010, 4). The discussion of whether the 2022 World Cup should happen in the summer or winter partly reflects this influenced focus. The media repeatedly highlights the issue of cooling the stadiums and the suggested concepts for it and whether they enable carbon neutrality or not (Fahy 2014). Qatar is aware of the attention directed at such issues as shown during the interviews for this study with Qatari representatives, who highlighted that 15% of the required energy for the stadiums will be produced on site (Ruiz 2014).

A further example for signaling could be the effective communication by different stakeholders of mandatory and voluntary standards and certifications for hosting events and often in particular for stadium construction (FIFA 2013). For example, as mentioned above, various stakeholders are complying with standards like the GRI, the ISO 26000, or like Brazil voluntarily with the Leadership in Energy and Environmental Design (LEED) certification (FIFA 2012). In his study, Preuss notes that the educational impact of effective rather than efficient concepts on long-term sustainability should not be underestimated. However, it needs to be acknowledged that many standards are actually guidelines, leaving open room for interpretation. ISO 26000 is "provid[ing] guidance rather than requirements" on "how businesses and organizations can operate in a socially responsible way". This socially responsible way is defined as "acting in an ethical and transparent way that contributes to the health and welfare of society" (ISO 2011). Such description allows different conclusions, potentially enabling greenwashing. For example, these standards and guidelines do not prescribe a way in which carbon offsetting should be happening. But a realistic sustainability concept cannot ignore carbon offsetting when aiming at carbon neutrality. In his sustainability study of mega sporting events, Fitschen states that carbon neutrality could only be achieved by carbon offsetting and that this was acknowledged by hosts such as Germany at the World Cup in 2006 (Fitschen 2006, 77).

In a comparison with the 2000 and 2004 Olympics, Fitschen(2006) analyzes whether the 2006 World Cup was environmentally friendly or rather an example of greenwashing. His study is mainly based on the indicators of waste, energy, traffic, and water (2006, 12). Regarding carbon offsetting he assesses (2006, 77) that the Green Goal program developed by Germany explicitly points out that it would be realized through investments in CDM outside of Germany and that it would comply with the above-described Gold Standard developed by the WWF. Fitschen's argument concerning the 2006 German World Cup is that greenwashing was at least partially what was happening and explains it mostly with Germany's "unambitious quantitative goals"; he also points out Greenpeace's critique of Green Goal as "light version" of environmental protection (2006, 78-9). Fitschen explicitly mentions ineffective environmental protection in the field of transport, which according to him does not allow a clear categorization of the 2006 World Cup neither as environmentally friendly nor as greenwashing event (2006, 83). Referring to Germany's legacy report after the 2006 World Cup, Germany offset more than the caused 92,000 tonnes of unavoidable GHG emissions (Organizing Committee, 93). It did that by investing in projects in India and South Africa, which stretch over several years (Organizing Committee, 92). Probably also reflected in the mentioned allegations of greenwashing is a need – assuming legacy reports of future events will become available – to compare in detail the way of calculating footprints. For example, Germany could be accused of having advantageously determined the carbon footprint from stadium construction by spreading it over the theoretical lifespan of the stadiums. With this form of footprint calculation Germany lowered the footprint from 680,000 tonnes of GHG emissions to 4,140 tonnes(Organizing Committee, 88-9). The shares of different means of transport "in total transport-related greenhouse gas emissions" (aircraft 19%, car 43% and coach 10%) show significant potential for optimization, which is not obvious when looking only at the event footprint after the carbon offsetting (Organizing Committee, 81).

Concerning the Brazilian World Cup in 2014, FIFA announced that it and the LOC “will offset their emissions through verified carbon offset projects and reach out to their stakeholders by outlining ways of lowering their carbon footprint” (FIFA 2013a, 1). But neither in its Sustainability Strategy Concept for Brazil 2014 (FIFA “Sustainability Strategy - Concept”) nor in its “Update on the 2014 FIFA World Cup™ Sustainability Strategy” (FIFA 2013a) does FIFA further specify the procedure of carbon offsetting or at least mentions Green Goal. Also on its corporate social responsibility website, despite referring to Green Goal in relation to past events, FIFA does not state its implementation regarding the World Cups in 2014 in Brazil, 2018 in Russia or 2022 in Qatar (FIFA “FIFA and the environment”). In turn this raises suspicion about FIFA being a potential champion of sustainable development. Maybe this is a reason for rather questionable sustainability approaches by Qatar, as it for example plans to “accumulate carbon credits [through solar energy generation] in the run-up to the tournament” over a period of about six years (Fahy 2014). The use of different time frames for carbon credit earning and for carbon dioxide emitting is at the least questionable if not even greenwashing, especially when orienting on the above-described Gold Standard (WWF “The Gold Standard”).

Taking a closer look at transport concepts regarding the 2022 World Cup in Qatar, suspicion concerning FIFA’s potential to enable long-term sustainable development is further manifested. Although FIFA raises critical points in its 2022 World Cup bid evaluation report, the overall assessment of the transport concept focuses almost only on the short-term ability to manage logistical challenges. When assessing Qatar’s environmental protection plan Green Qatar 2022 FIFA mentions the lacking assignment of responsibility within the organizational structure for concerning activities and their way of implementation (FIFA 2010, 11). But generally, FIFA focuses more on the capacity of the transport system to be able to handle the mega event typical transport volumes, which are characterized by intense short-term peaks in traffic volume before and after the events, rather than on the type of transport or the long-term effect of the strategy. FIFA refers mainly to the above-mentioned Transport Master Plan when emphasizing the planned long-distance rail network, the metro-network system which is “projected to be 70% operational in 2020 and serve all tournament stadiums”, as well as the road system, mentioning positively “an extensive national expressway network... including several six-to-ten lane expressways” (FIFA 2010, 19-20). Related to the latter fact, the planned overcapacity of the road network, as well as the planned parking capacity at the stadiums, such as 6,000 spaces at Al-Wakrah (Ruiz 2014), might rather present a “lock-in” of road-based traffic, which in turn might weaken the attractiveness of rail-based transport in the future. FIFA is not mentioning a preference for public transport when highlighting that all stadiums are going to be linked to the expressway as well as to the metro system. Although it highlights that Qatar will provide public transport free of charge to match ticket holders (FIFA 2010, 20), something that was also done at the 2006 World Cup in Germany. Based on the above-described experience with lacking retrospective data of past events, FIFA’s demands for a “measurable objective in... transportation” appears less convincing (FIFA “FIFA and the environment”).



## Permanence of Concepts

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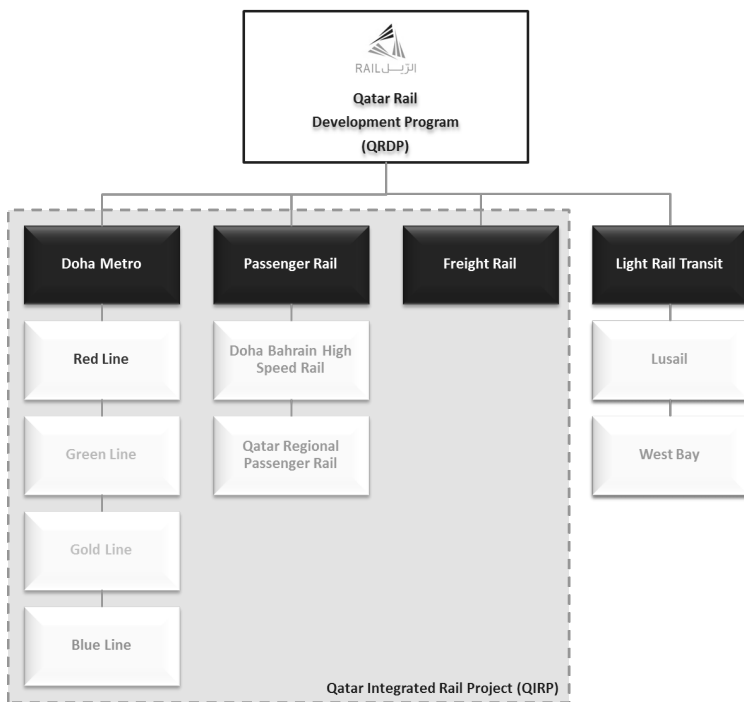
Assessing the permanence of transport concepts for a future event is rather difficult, especially if potentially comparable past events do not provide enough relevant data. For that reason, Qatar's transport development strategies should be compared with the above-described demands on sustainable transportation. A description of the status quo of the progress so far in realizing Qatar's ambitious and many-sided transport plans will allow an assessment of the probability of their actual complete realization. Furthermore, the indicators provided by Preuss and Fitschen allow a better evaluation of the permanence of sustainability concepts (Preuss 2013, Fitschen 2006). Preuss analyzes the potential legacy such concepts can have beyond the time of the actual event by looking at tangible and intangible structural changes of the event environment, for example infrastructure, knowledge build-up and policy changes (Preuss 2013, 3587-9). Last but not least, the sustainability assessment will take into account Qatar's undemocratic form of government.

### Progress of Transport Infrastructure Development

Qatar's emphasis on using the obligations of being a host for mega events as a catalyst for realizing its national development plans is underlined by the infrastructure construction being in progress. Based on Qatar's history as a mega sporting event host country, reaching back to the late 1980s and culminating by hosting the 2022 FIFA World Cup, credibility is added to Qatar's official emphasis of the permanence of its development strategies. Qatar's three-year Strategic Plan 2012-2015 explicitly states: "rather than being considered necessary for a 'standalone' event, the required investments and projects delivered for the 2022 FIFA World Cup Qatar™ are closely aligned to the QNV 2030 [Qatar National Vision 2030] and relevant NDS [National Development Strategy] priorities" (Qatar 2022 supreme committee "Qatar 2022: Strategic Plan 2012-2015", 21). A look at the status quo of the transport infrastructure projects and the set timetable for the future, as presented at the December 2013 press conference of the Qatar railway company Qatar Rail, underlines the seriousness of their realization and confirms the rail-based strategy, but also the continuing belief in road-based transport (Menarailnews.com 2013).

The road network and parking space enlargement seen in combination with Qatar's development approach, which considers the possibility that "expected costs of inadequate capacity outweigh those of temporary over sizing" (General Secretariat for Development Planning 2011, 86) is one of the possible significant threats to sustainability. Potentially, FIFA's demands concerning the manageability of the masses of event guests is actually supporting such overcapacity approaches, as seen in FIFA's above-described bid evaluation.

With regards to building time and project size, the ambitious development concept for the rail network is hierarchically organized. The resulting infrastructure optimizes the travel time for passengers, which is one of the most important components in making a transport type attractive for potential passengers. The optimization is realized through the use of different rail transport types, which vary in the closeness to passengers' points of departure and arrival, the distance between stops as well as in the average speed (PTV AG 2007c, 21). The Qatar Rail Development Program, which is a joint venture of the Qatari company Diar and the German company Deutsche Bahn, is overseeing the unification of all railway projects in Qatar including the links to Bahrain and Saudi Arabia. The Qatari rail system is organized as shown in figure 3: the Light Rail Transit (LRT), consisting of the Lusail and the West bay system, is supposed "to create an integrated transportation system to serve the visitors, employees and residents of [the respective areas]" and connect them to the metro network (Qr.com.qa 2014a); the metro, consisting of four lines, is connecting Doha's inner and outer commercial and residential areas including the Doha International Airport (see figure 4); and the Long Distance Passenger Rail, consisting of a high speed and a regional class, and Freight Rail, will link Qatar's various cities with each other as well as Qatar with its international neighbors, as shown in figure 5.



**Figure 3. Qatar Rail Development Program**

*\*Sources: Qr.com.qa (2014b).*

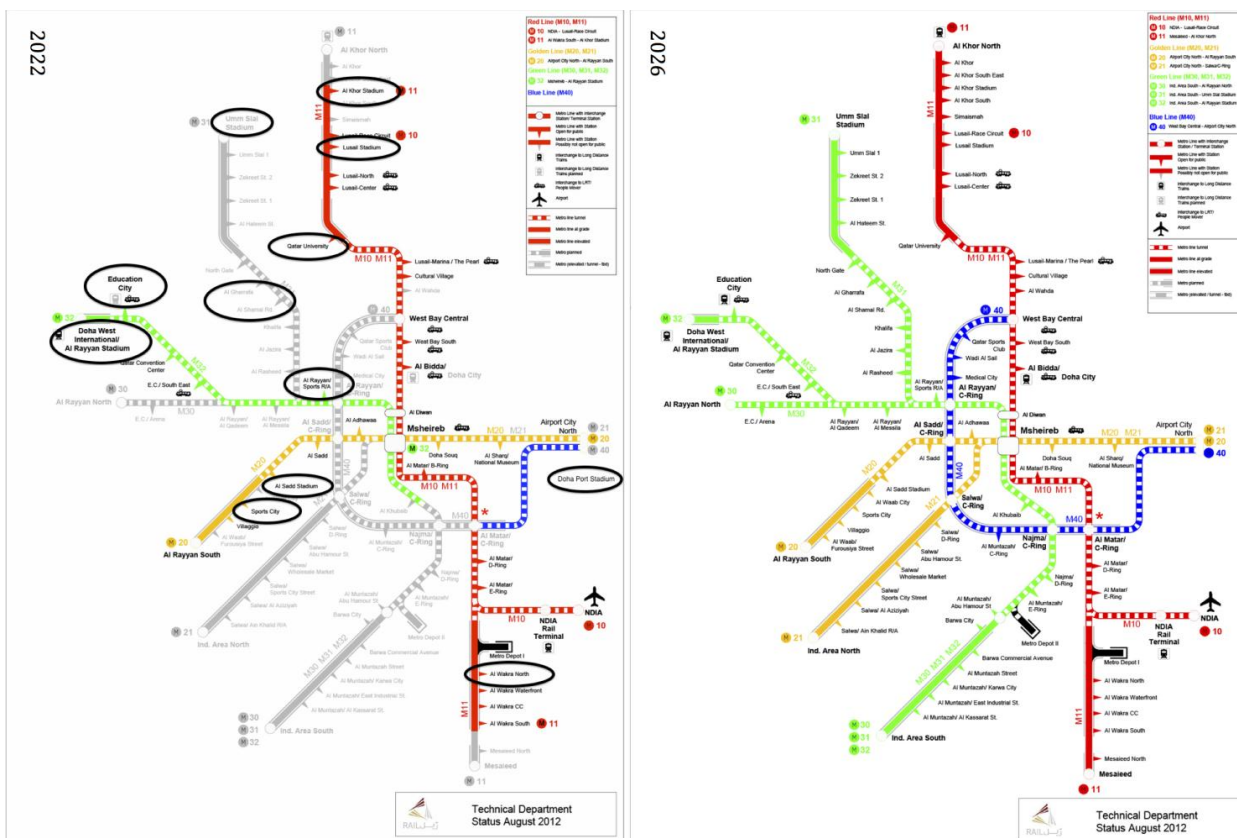
Absent from the chart but hierarchically similar to the LRT, is the tram, which is going to operate on the Qatar Foundation campus, and which is planned to become a car-free zone eventually. The 19 electric powered trams, running on 11.5 kilometers of track without any overhead contact lines, will enter service in autumn 2015 (Siemens 2012). Concerning the LRT so far Qatar Rail is only reporting on Lusail (Menarailnews.com 2013). It consists of four lines and 30.5 kilometers rail track (Qr.com.qa 2014a). The tunnel work for the 10 kilometers of underground track is already completed as well as over 60% of drilling works for the 37 stations. Thirty-four trains will represent the fleet. In 2012 the completion of the Lusail project was scheduled for 2016 (Steward 2012). Referring to Qatar Rail itself the company has already signed agreements in relation to preliminary works for Lusail LRT as well as the metro project worth over 32 billion US dollars in total (Menarailnews.com 2013). The second LRT, which is planned to be operational in the West Bay area in 2018, has not been mentioned by Qatar Rail so far (Steward 2012).

The Doha Metro network will eventually extend to 216 kilometers covering the Greater Doha area (Qr.com.qa 2014d). There will be more than 90 metro stations. Adjusted to the preparation schedule leading up to the 2022 World Cup, the metro is being built in two phases. The first, representing 135 kilometers, should be completed by 2019 (Ruiz 2014), and the second phase by 2026 (Qo2022.com 2011). As shown in figure 4 (Qr.com.qa 2014d) the first phase is focusing mainly on the Green and Red Line and in particular on their sections connecting the football stadiums (Qr.com.qa 2014d, Menarailnews.com 2013), as well as on the links with the airport and the Long Distance train station. All contracts regarding the construction work related to rail network sections that are planned to be operational during the 2022 World Cup, were awarded to various international companies in 2013 (Hansford 2013). The Blue Line construction is scheduled almost completely after 2022 (Hansford 2013). Once completed, the metro system is expected to reduce daily car traffic by 17,000 cars (Menarailnews.com 2013).

The Long Distance Passenger and Freight Rail transportation system network, as shown in figure 5, represents the highest level of the rail transport hierarchy. The Speed Rail class is intended as a shuttle service for GCC transit passengers and travelers, and the Passenger Rail class would be transportation services for locals (Menarailnews.com 2013). On its webpage, Qatar Rail mentions 510 kilometers of rail network (Qr.com.qa 2014c), while Mena Rail News in December 2013 reported the progress of the rail project construction and spoke of 350 kilometers (Menarailnews.com 2013).

com 2013). The long distance trains will travel at “a speed between 220 and 350 kilometers/hour for passenger trains, and nearing 120 kilometer/hours for freight trains” (Menarailnews.com 2013). Referring to Qatar Rail, the long distance rail project “is currently under technical and commercial evaluation by expert consultants” (Menarailnews.com 2013), and “has passed the initial study stage” (Steward 2012). It is supposed to be built in four phases starting in 2015 and being finalized in 2030. Promoting the Long Distance Passenger and Freight Rail, Qatar Rail states:

“They not only offer a quick and safe mode of public transport to communities and their citizens because of their segregated right-of-way; these also help in reducing Carbon and other Greenhouse Gas emissions. A single rail journey replaces several hundreds of private car trips, and uses efficient technology such as electricity. This produces less pollution and reduces fuel dependency” (Qr.com.qa 2014c).

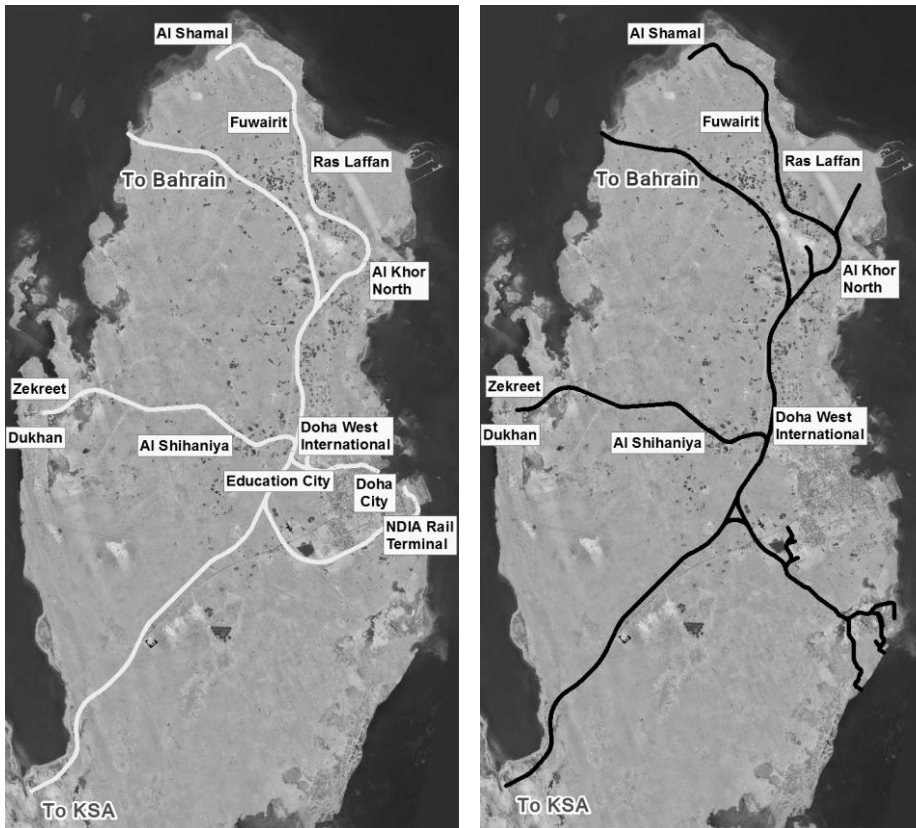


**Figure 4. Doha Metro network 2022 (emphasis of stadiums added by the authors) and 2026**

*\*Source: Qr.com.qa (2014d).*

Taking into consideration the already started and realized construction work as well as the awarding of project-planning and construction contracts, it is obvious that Qatar is actually planning beyond the 2022 World Cup. Furthermore, it is not unrealistic to assume the finalization of the rail projects promised for the World Cup, especially

as they are projected to be completed partially already in 2018 (Ruiz 2014). The rest of the rail network, especially the long distance share, is supposed to be completed between 2026 and 2030 (Steward 2012). The probability of delays mostlikely increases with the project size, especially when projects are part of regional GCC plans.



**Figure 5. Long Distance Passenger (left) and Freight Rail (right) network**

*\*Source: Qr.com.qa (2014c).*

Halabi in his critical 2010 article points to the various differences in opinions among GCC countries (Halabi 2010). One is the significant difference regarding the preference to utilize the network for freight or passenger transport, as well as the question what energy type should power the trains. In both regards, only Qatar and Oman place emphasis on passenger transport and electric engines respectively. These different approaches have a major influence on the demand and limits of the future network in terms of speed as well as structure gauge. The latter is critical as Halabi(2010) summarizes:

“The hitch is that ‘double stacking’ — the rail industry term for having two containers stacked on top of each other as opposed to one — is not possible on electric trains. Since the [inter-GCC railway network] was only deemed viable because of its economic advantages relating to freight, the use of electric trains throws the entire economic feasibility of the project into question”.

Such major and yet unresolved questions also threaten the economic feasibility of Qatar’s railway plans, at least regarding the long distance part of it.

Another potential source of project disruption or prevention are the political differences within the GCC that once in a while flare up, as recently shown by the retreat of the ambassadors of Saudi Arabia, Bahrain and the UAE from Doha due to serious disagreements over Qatar's foreign policy activities in the Middle East (Black 2014). Such a political climate is not contributing to confidence among potential investors as Halabi points out when highlighting the challenges in financing the 40-kilometer long and the expensive three billion US dollars marine causeway between Bahrain and Qatar (Halabi 2010).

Orientating on Fitschen's above-described indicators of sustainable transport, a preference for public transport during the 2022 World Cup is likely. Qatar's promised free public transport use for match ticket holders during the event will have a significant influence as almost all event guests will be coming from abroad without their own car (FIFA 2010, 20). The geographic concentration of the stadiums, also resulting in the fact that World Cup guests can stay in the same hotel in the same city during the whole event (as opposed to moving from city to city like during previous World Cups), will have the most significant influence on sustainability when comparing the 2022 World Cup to the other above-mentioned mega events and their share of transport footprints. For the long-term, assuming the long distance rail project will be realized; a preference for public transport can be considered likely. Due to the vast road infrastructure build-up, which is accompanying the described rail infrastructure development, it remains to be seen whether the mentioned reduction of car traffic is probable or not. The push by Qatar and Oman for electric powered rail transport has a very positive influence on sustainability, as the related infrastructure will define future decades. Furthermore, if Qatar can roughly stick to its announced schedules and actually realize its transport infrastructure plans, it can become a trendsetter regarding the envisioned inter-GCC railway network, potentially influencing the technical design of railway projects of other GCC countries, which most likely will be years if not decades behind Qatar in this regard.

Concerning Fitschen's aforementioned promotion of non-motorized transport, the above-described plan for Qatar "to become the Gulf's first cycle-friendly country" (Arabianbusiness.com 2009) represents such an approach, yet its realization is difficult to predict. Sheik Khalid Bin Ali Al Thani<sup>8</sup>, who is also the president of the Qatar Cycling Federation (QCF), said in February 2014, when promoting the 2016 Cycling World Championships in Qatar, that "the stadia for the football World Cup in 2022 will be linked by cycle paths and rental bikes" (Ryan 2014). But a similar ambitious plan like the 2006 announced cooled cycling infrastructure project has not been realized yet, despite the finalization of necessary reports in November 2006. The project was supposed to be realized in 2007 based on the concepts developed in a cooperation of the American consultancy firm Rand Corporation and the Dutch foundation VeloMondial. They developed a 30-kilometer outdoor cycle path, which over its entire length would be cooled by using cold ground water as well as a roof structure (Velomondial.net 2007). Supporting the promotion of cycling, and relating to Preuss' emphasis of knowledge creation and awareness raising as being influential for legacy building, is the establishment of the QCF in 2001 (Qatarfc.org 2013). It describes its own work as "consist[ing] of promotion of cycling by organizing events for children, recreational rides and major races of which the most important and very famous international stage race Tour of Qatar" (Qatarfc.org 2013). Furthermore, QCF seeks to build up its own national cycling competitors for the 2016 UCI Road Cycling World Championships. In March 2014, the QCF held the Qatar National Schools Road Cycling Champs, which had as some of its goals the encouragement of pupils to enroll in the QCF as well as in general to encourage children to learn cycling, exemplified by the offer of an extra prize for the school with the most enrolled children to the event (Qatarfc.org 2014).

## **Influence of Qatar's Form of Government**

As a condition for achieving a lasting legacy, Preuss described the need for regulation in the form of policy changes and the implementation of new policies. His study conclusions include the suggestion that "the government of host nations must take responsibility for controlling the long-term use of venues and also all green activities involved in the event" (Preuss 2013, 3594). The deep involvement of Qatar's authoritarian government actually provides these controlling mechanisms, as also shown by the all-encompassing and far-reaching national development strategies (General Secretariat for Development Planning 2011 and 2009).

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8 Khalid Bin Ali Al Thani is the son of Ali Bin Abdullah Al Thani who was the Emir of Qatar from 1949 till 1960.



This characteristic of Qatar has to be seen as critical, not only because of the obvious infringement on citizens and human rights. As emphasized above, the rentier state's typical aim for diversification of the economy rather leads to an understanding of sustainable development, which makes investments in environmental protection the smallest priority in comparison to societal but especially economic development goals. Therewith – also based on the continuous postponement of the parliamentary elections – the focus on hosting mega sporting events could be seen as based on national interest. The additional creation of motives and incentives for realizing Qatar's development goals would further safeguard the preservation of the high living standard of Qatari citizens and therewith their compliance to the rule of the royal family. This conclusion is reflected by a statement by a representative of the Qatar project management company QPM. He emphasizes the aim for long-term legacy by describing the goal of “now put[ting] in place the appropriate infrastructure to facilitate the economic growth and, more importantly, the economic diversification that will be so important in coming years” (Steward 2012).

Furthermore, the distributive societal contract of Qatar is making the consideration and acceptance of fossil fuels, like natural gas, as a transitional energy source unlikely. WWF and IEA suggest a quick transitional but complete energy paradigm shift from subsidizing fossil fuels towards “support schemes for clean energy [and] energy efficiency...” (WWF 2013, 3). It must be noted though, that through its National Development Strategy, Qatar is publicly and explicitly acknowledging these contradictions (General Secretariat for Development Planning 2011, 88). Also, focusing on the contradictions related to wealth distribution in rentier states are the assessments by the WWF and the UN, that “life-style changes by the globally better-off are...fundamental”, represented by a demanded “shrink and share” concept for the global middle class, which includes promotion of public transport (WWF 2013, 6). The RIO+20 conference described necessary changes in consumer behavior such as “abandoning the use of private cars in favor of public transport or non-motorized transport” (UNCSD 2012, 2). Changing the behavior of people can be a challenging task, especially when it is perceived as giving up the freedom of private independent movement, i.e. the use of a car. In this regard, Halabi quotes a senior economist in the Middle East North Africa (MENA) region at Standard Chartered Investment Bank: “There will definitely be a cultural reluctance from the local population to heavily use public transportation to make a long distance trip [of] more than two hours, because they have not been used to that” (2010). Furthermore, he notes the discouraging example of the Dubai Metro, which “is still eerily empty most of the day” (2010).

To be fair to Qatar, the worldwide inclusive solidarity approach to ecological footprint assessment, developed by the WWF, requires responsibility-sharing among states. This includes the significant question of what country is supposed to carry the burden of the footprint resulting from the gas extraction and production as well as from its transport. So far, these factors are significantly responsible for Qatar's striking negative performance in the footprint world ranking. Developing and realizing honest sustainability concepts and solutions would represent a large potential for sustainable economic diversification despite allowing Qatar to develop sustainably. Qatar could play a significant, global role in developing the needed technologies for transport as well as for solar energy, and it could enable other countries to reduce their footprint by providing them with natural gas. With its vast gas reserves, Qatar could be the international community's provider of the transitional energy source, as well as a leader in CCS technology development. As described above, the consideration by WWF and IEA of natural gas as a potential transitional energy source during the switch from fossil to renewable energies has to address the above-mentioned critical questions about its suitability.

Additionally, the concept of public transport has the potential to help Qatari society to become less determined by hierarchy, as favorably described by the Qatar Foundation, or less determined by “racism”, as described more generally (Milz 2014, 69). Public transport might help reduce the boundaries between Qatari citizens and the non-Qatari population in the country, the latter representing around 89% of the population of Qatar (Human Rights Watch 2012, 1). But at least a “stronger focus on public transport and non-motorized transport will strengthen access for low income groups” (UNCSD 2012, 2). Furthermore, an impact on gender (in)equality is likely, as a public transport system has the potential to increase the freedom of movement of (female) citizens.

## Research Outcomes

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Sustainable transportation is an important topic for the future, given the worldwide constant urbanization, and the increasing share that transport represents of the global carbon footprint. Hosting mega sporting events significantly supports Qatar's transport infrastructure developments and sets a time line for major infrastructure projects until 2022. The 2022 FIFA World Cup could be a sustainable mega sporting event, due to its historically unique compactness as well as due to Qatar's promoted sustainable development concepts.

The aim of mega sporting event bidders has become to host carbon neutral, sustainable events. It is thereby acknowledged that carbon offsetting is an essential tool for realizing that. Part of Qatar's development strategy in that regard is motivated by the requirements of ISGBs on mega sporting event hosts. Such requirements do not necessarily conform to the demands on long-term sustainability and permanence of concepts, but rather to short-term effectiveness. Endangering sustainability are the insincere motives of potential event hosts and ISGBs. Such motives are represented by strategies in which environmental awareness is perceived as a necessary basic feature for being competitive when bidding on hosting mega sporting events. The related opportunistic approach to carbon-neutrality, in the form of dissemination of disinformation, is used to present an environmentally responsible public image, and represents the phenomenon of greenwashing. Greenwashing does not contribute to a reduction of net carbon emissions and of global warming.

Despite the possibility of greenwashing, Qatar has a realistic chance, and probably the intent, to host mega sporting events with minimal carbon footprints. Qatar's public transport concept can be sustainable by 2022, pending the realization of the current infrastructure plans, as it is rail-based and will use electricity as an energy carrier, which will probably be produced from natural gas. Combined tickets for event access and free public transport usage will be an effective incentive to promote and support the use of public transport during mega sporting events. A possible reduction of mobility and individual freedom can be minimized by an optimization of transport concepts through a hierarchical combination of various types of public and non-motorized transport. The main features of attractiveness should be a shortest possible travel time and a minimum distance between public transport stops and the travelers' individual points of departure and arrival.

Ideally, a combination of public and non-motorized transport with incentive-based transport policy will make the former more attractive than car usage. But due to Qatar's openness towards the creation of infrastructure overcapacity, possible leverage of incentive tools is reduced. Provocatively formulated, it is possible that Qatar is building one of the most sustainable transport infrastructures for foreigners, while providing its citizens with an over-dimensioned road network and the respective freedom of movement and mobility.

Qatar, facilitated by its authoritarian form of government, created necessary administrative capacities to make its national development efficient and possibly sustainable, as shown by the complexity and inclusiveness of the Qatar National Development Strategy 2030 as well as its Transport Master Plan. Qatar aims for the sustainable development of its economy, which it mostly seeks to realize through diversification. Furthermore, Qatar is promoting various kinds of natural gas products, which could possibly lead to a fossil fuel usage lock-in. At the same time, Qatar has the chance to become the provider for the transitional energy resource necessary for a global energy paradigm shift towards renewable energy usage. Qatar is investing in solar technology, although it remains to be seen whether the quality and quantity of the concerning investments are sufficient enough or if they rather represent greenwashing.

Similar with past Qatari policies and initiatives, such as the establishment of the influential TV news station Al Jazeera or the permission to practice other religions than Islam, it remains to be seen if Qatar's transport concepts have the potential to also signify progress whilst facilitating the sustainable development of society. Public transport cannot only make transportation accessible and affordable for the whole population of Qatar. Given Qatar is often separated between blue and white collar workers and between locals and non-Qatari residents, sustainable public transport can be one way to bring people of different backgrounds together in one space and to create a sense of equality.

Only the recent past can provide data to evaluate sustainable development concepts. Thereby, correct and transparent reporting is of great importance to be able to assess the success and failure of the described development strategies. Many plans and concepts look promising, but their realization cannot be confirmed with certainty at this point. The more complex and inclusive a development strategy is, the more uncertainties are linked to it, due to interconnected construction schedules, the large scope of necessary investments, and the interdependence among the involved states.



## Recommendations

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Sustainability is not only a technological and economic issue that can be achieved by providing the necessary infrastructure, but also a political matter, by giving positive and negative incentives (carrot and stick). This is a crucial part as many different transport types will almost always be available to people, as shown in the traffic pyramid. Through incentives, a person can be motivated to give up mobility and individual freedom, while living more sustainably instead. Providing positive incentives characterizes the distributive societal contract of a rentier state society. However, “negative” incentives should also be exercised to achieve the most sustainable development. Examples can be the introduction of car-free zones, the reduction of parking space, a higher taxation of undesired forms of traffic usage, such as road tolls, as well as higher taxation of fossil energy usage. The latter is ideally accompanied by tax incentives for the use of renewable energy. Sustainable development, furthermore, should include social approaches, for example education, starting with raising awareness for concepts like the ecological footprint. Qatar’s development strategies are potentially causing the feared lock-in effect, represented by a maximum extraction of natural gas. This would slow down the energy paradigm shift towards renewable energy sources, thereby dangerously hindering the necessary slowdown of global warming. The lock-in of natural gas usage could be prevented by accompanying Qatar’s gas extraction with a full use of its solar and wind power potential. This should, as seemingly done by the planned polysilicium plant as well as the large-scale solar test facility, include the production of systems necessary for renewable energy production, as well as their development. Qatar has the potential to become a leader in utilizing CCS technology.

## Acknowledgements

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