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Mobilizing the co-benefits of climate change mitigation

Connecting opportunities with interests in the new energy world of renewables

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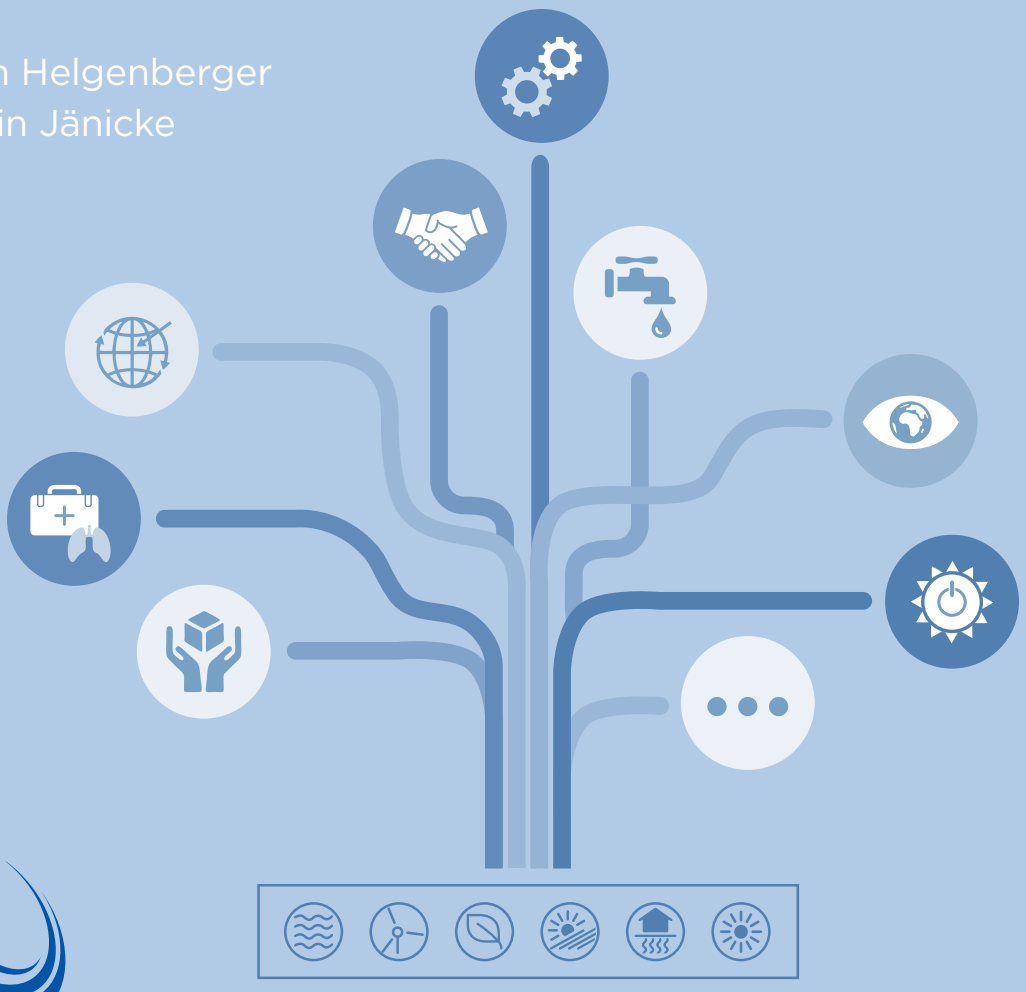

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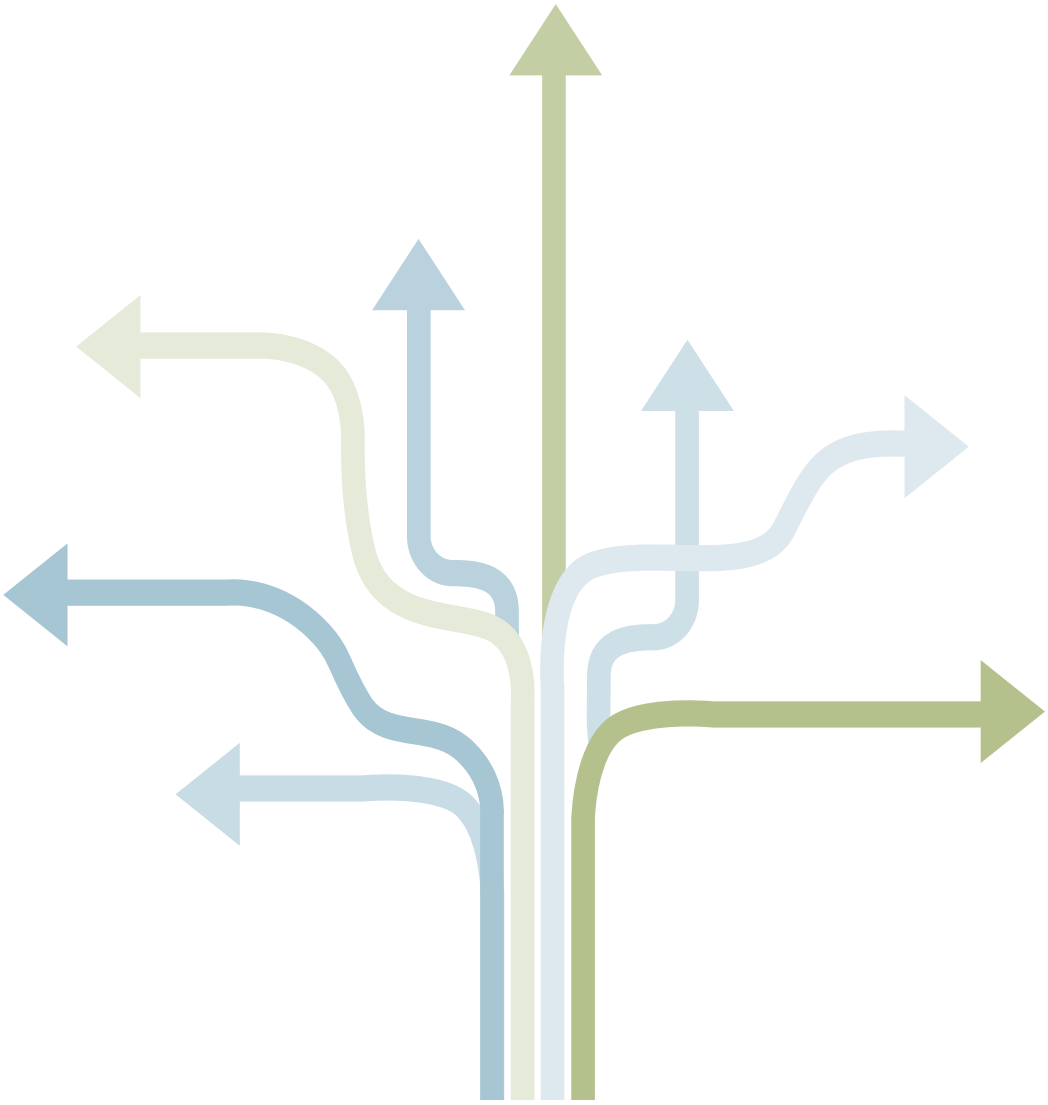

This paper has been developed in the context of the project **"Mobilizing the Co-Benefits of Climate Change Mitigation through Capacity Building among Public Policy Institutions" (COBENEFITS)**. This project is part of the **International Climate Initiative (IKI)**. The Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) supports this initiative on the basis of a decision adopted by the German Bundestag.

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renac renewables academy

UfU Independent Institute for Environmental Issues

IET International Energy Transition

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Executive Summary:

Building New Alliances – Seizing Opportunities – Raising Climate Ambitions

in the new energy world of renewables

The energy sector, as a key action area for climate change mitigation, is moving rapidly towards renewable and climate-friendly energy sources, with investments in renewable energies continuing to skyrocket on a global scale for many reasons other than climate change.

The social and economic co-benefits of climate change mitigation have become key drivers of the global transition towards the new renewable energy world. These developments correspond to an observable **paradigm shift – from 'burden sharing' to an increasing degree of 'opportunity sharing'** – a shift that was reflected in the 2015 Paris Climate Agreement.

The social and economic **co-benefits of climate change mitigation and renewable energies have moved from the sidelines to the centre of climate- and energy-related debates** on (i) secure and affordable power for all; (ii) mitigating conflicts over scarce resources such as water; (iii) promoting the national economy, local businesses, and jobs; (iv) increasing people's health and wellbeing; (v) unburdening governments and freeing resources; and (vi) empowering local communities and citizens (figure 1).

Despite the fact that the global transformation toward renewable energies is likely to be irreversible in the long run, **investments in fossil fuel-based energy systems still present a serious threat to the global climate.** A number of countries are experiencing sharply increasing demand for energy and will make important and far-reaching decisions in the energy sector. The expansions of coal-fired power plants currently planned in these countries entail path dependencies that could persist for decades. Given the already identified climatic tipping points and the **need to accelerate the global transformation of energy systems**, such path dependencies should be avoided by all means.

We argue that the urgency of bold and timely climate action coupled with the social and economic opportunities of renewable energies mean that the **co-benefits of climate change mitigation will have to be mobilised further to accelerate the global transition towards renewable energies** and help limit the dangerous consequences of global warming. We understand the co-benefit approach in climate policy as the extension of norm-driven action by interest-oriented action and of legal requirements by other forms of action based on voluntary participation. With this in mind, we elaborate an interest-oriented approach to mobilising co-benefits and argue that co-benefit assessments can be important drivers of ambitious and effective climate policy.

We argue that focusing on tangible, near-term benefits for specific actors and interest groups contributes to building **strong alliances for ambitious and progressive climate and renewable energy policy and action**; and helps to overcome long-lasting political deadlocks – particularly between environmental, economic, and industrial policies.

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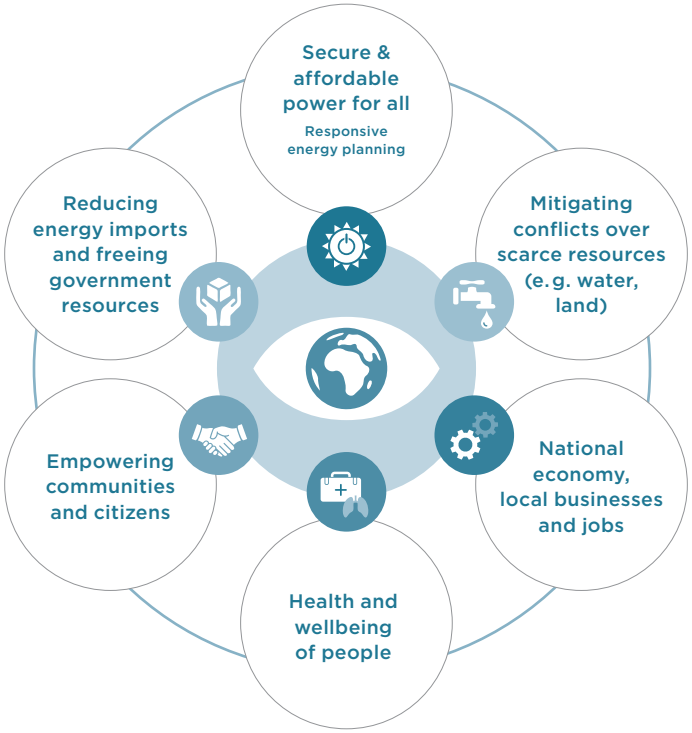


Figure 1: Mobilising interest-oriented co-benefits of climate change mitigation: key performance categories

Source: own figure

The interest-oriented co-benefits of climate change mitigation represent the positive net effects of policies and actions beyond those directly related to climate change and global warming processes (such as greenhouse gas emissions reduction) with the following five key attributes: they are identifiable, timely, attributable, opportunity-oriented, and defined from the perspective of specific interest groups. A strategic and impact-oriented approach to co-benefits to support ambitious, effective, and timely climate action should be guided along these lines.

In this paper we propose ways forward to mobilise the social and economic co-benefits of climate change mitigation and renewable energies in particular, through an explicit, strategic use of the interest-oriented co-benefits approach to climate policy. We conclude that interest-oriented co-benefit assessments are essential to the effective **implementation and ambitious reformulation of the nationally determined contributions (NDC)** to climate change mitigation outlined in the Paris Climate Agreement. In order to seize the identified opportunities, potential social and economic **co-benefits need to be considered in tandem with enabling political environments,** such as investment incentives or social policy. The reference to specific interests is what makes the multiple-benefit approach attractive not only for climate policy but also for sustainable development in general. We conclude by arguing that co-benefit assessments related to climate and energy also contribute to **further activating the United Nations' Sustainable Development Goals (SDG)**.

1. Shifting paradigms in the new renewable energy world: from burden-sharing to opportunity-sharing

The energy sector, as a key action area for climate change mitigation, is moving rapidly towards renewable and climate-friendly energy sources, including for many reasons other than climate policy. Global annual investment in renewable energies, particularly wind and solar power, skyrocketed from USD62 billion to USD287 billion between 2004 and 2016, with record investment of almost USD350 billion in 2015 (BNEF, 2017). The multiple benefits of renewable energies, such as public health, accelerating access to electricity, improved investment opportunities and local value-creation resulting from plummeting costs and increasing competitiveness of the renewable electricity sector, have become important drivers of this climate-friendly transition in the energy sector (cf. New Climate Economy, 2014).

Seen from the perspective of climate policy, these co-benefits of climate change mitigation measures are increasingly gaining political and economic momentum and, we argue here, should be mobilised further to help limit the dangerous consequences of global warming. The global transition to renewable energies for the above-mentioned reasons is picking up speed and is increasingly considered to be irreversible (cf. Obama, 2017: "The irreversible momentum of clean energy"); however, timing remains the critical variable. Investments in fossil fuel-based energy systems still present a serious threat to the global climate. The planned massive expansion of coal-fired power plants in countries like India, Vietnam, South Africa, and Turkey, intended to cover increasing energy demand, entails path dependencies that could persist for decades. Given the alarming pace of observed global warming and the limited time to act (Schellnhuber et al., 2016), the social and economic co-benefits of climate change mitigation, and renewable energies in particular, can be mobilised through a strategic and interest-oriented approach to support ambitious, effective, and timely climate action. Climate and environmental policies, nonetheless, continue to be of strategic importance for constructing the necessary enabling environment, such as de-risking investment in renewable energies, as well as social policies to cushion the social challenges of decarbonising energy systems, to seize these co-benefits and unlock investment in the sector.

It is standard procedure in policy evaluation to assess the positive and negative impacts of policy measures across their full potential scope. However, within climate policy, the predominant approach has long involved a simple cost–benefit analysis in view of mitigated greenhouse gas emissions. By contrast, it was a progressive step when the focus was expanded to include economic advantages in addition to the primary intended benefit of climate change mitigation. Early on, this became a "no-regret" argument, according to which the positive economic side-effects should suffice for legitimising the respective climate change mitigation measure (Adler, 2000). Over time, in addition to positive side-effects, *multiple* benefits were increasingly addressed. In 2014, the International Energy Agency (IEA) published a list of 15 such co-benefits, which can occur alone through greater energy efficiency (IEA, 2014). The 4th Assessment Report issued by the Intergovernmental Panel on Climate Change (IPCC, 2014) arrived at 18 economic, ecological, and social co-benefits of climate change mitigation. The World Bank (2015) calculated positive co-benefits in the areas of health, energy savings, and agriculture, which in these three areas alone accrue unusually high monetary benefits that far surpass the costs of climate change mitigation measures.

In this paper we will show that the "multiple benefit approach" (IEA, 2014) to climate change mitigation and renewable energies comes with strategic advantages stemming from the close interconnection of climate and sustainability policies, which has been the focus of recent publications. Based on the social and economic benefits associated with climate change mitigation efforts, we elaborate on the possibility of more effectively anchoring sustainable energy policy within the *interest structure* of society. In particular, we see herein an additional possibility to *integrate the goal of sustainable energy in various sectors of the economy and government administration*, thereby overcoming long-lasting political deadlocks – particularly between environment, economy, and industry policy – and building new and strong coalitions among these players for ambitious and effective climate action.

We understand the multi-benefit approach in climate policy as an expression of a paradigm shift, from "burden sharing" to an increasing degree of "opportunity sharing", and thus to an extension of norm-driven action by interest-oriented action (cf. van Schaik & Schunz, 2012); and of legal requirements by additional forms of action based on voluntary participation (Jänicke, 2016). This paradigm shift was well reflected in the Paris Climate Agreement (UNFCCC, 2015).

However, the topic of co-benefits should not be treated too casually. The strategic and embracing power of the co-benefit argument is easily overwhelmed by the considerable heterogeneity of potential co-benefits and the lack of target-group orientation. In many cases, selection criteria are necessary to match specific benefits to beneficiaries. In other cases, the benefit itself is rather general or else consists only of an avoided risk, not the opportunity involved. In this paper, we argue that an *interest-oriented co-benefit approach* to climate policy evaluations and related impact assessments[1] will contribute to building a strong alliance for ambitious and progressive climate and renewable energy policy and action, by depicting the multiple benefits of climate mitigation policies and by identifying tangible, near-term benefits for specific actors and interest groups.tangible, near-term benefits for specific actors and interest groups.

2. Co-benefits – from the sidelines toward the centre of debate

Emerging from public and political debates on win–win solutions and *no-regrets* strategies since the beginning of the 2000s, the co-benefit approach has emerged within climate policy. Increasing attention has been given to the energy sector, beyond climate policy, as focus area for describing, conceptualising, and systematising possible co-benefits. In recent years, we have also noticed intensified efforts towards operationalising this approach for systematic co-benefit assessments within this sector. In this section, we share our observations on how the notion of co-benefit has been continuously moving from the sidelines toward the centre of debate on climate and energy policy and action.

The co-benefit or multiple-benefit approach in climate change mitigation policy was initially expressed as a "win–win solution" or a "no regrets strategy" (Adler, 2000). At first, the OECD spoke of "ancillary benefits" (OECD, 2000; Krupnick et al., 2000; c.f. O'Connor & Dessus, 1999). Early studies on this topic – often using synonyms such as "collateral benefits", "side effects", or "associated benefits" – frequently related to developing countries and often focused on the advantages of climate change mitigation measures for controlling air pollution. The IPCC first used the term "co-benefit" in its 3rd Assessment Report (IPCC, 2001).

[1] Such as the *'Measuring, Reporting, Verification'* (MRV) approach outlined in the Paris Accord.

The multiple benefits of climate change mitigation were already sectorally anchored within the IPCC's 4th Assessment Report (2007), addressing the following sectors: energy, industry, transportation, housing, agriculture and forestry, as well as health, air quality, waste, and environmental systems.

The OECD and the U.S. Environmental Protection Agency (EPA) contributed to further developing and defining the co-benefits approach in the field of climate policy. In 2009, the OECD published a literature study entitled "Co-benefits of Climate Change Mitigation Policies" (Bollen et al., 2009). The study viewed co-benefits as the "potentially large and diverse range of collateral benefits that can be associated with climate change mitigation policies in addition to the direct avoided climate impact benefits".

Based on the conceptual work of the EPA, in 2009 the Japanese Ministry of the Environment proposed a first co-benefit assessment framework in the field of climate policy, which was specifically directed to the Clean Development Mechanism (CDM) of the United Nations Framework Convention on Climate Change (UNFCCC) with reference to the EPA's definition of co-benefits (Ministry of the Environment, Japan, 2009: Manual for Quantitative Evaluation of the Co-Benefits Approach to Climate Change Projects):

"Co-benefits" refer to multiple benefits in different fields resulting from one policy, strategy, or action plan. Co-beneficial approaches to climate change mitigation are those that also promote positive outcomes in other areas such as concerns relating to the environment (e.g., air quality management, health, agriculture, forestry, and biodiversity), energy (e.g., renewable energy, alternative fuels, and energy efficiency) and economics (e.g., long-term economic sustainability, industrial competitiveness, income distribution).

The Global Energy Assessment (GEA, 2012) prominently emphasises the multiple-benefit approach to the energy sector, presenting many important social and economic co-benefits of a transition to sustainable energy. Furthermore, the International Energy Agency's application (IEA, 2014) – depicting 15 co-benefits in the area of energy efficiency – received a great deal of attention. It addresses positive economic co-benefits (job creation, energy security, industrial productivity, etc.) as well as social co-benefits (health benefits, poverty alleviation, consumer surplus, etc.). The publication calls for a "multiple benefits approach" in the promotion of energy efficiency. In the same year, the IPCC further spelled out the co-benefits of climate change mitigation, listing overall 18 economic, environmental, and social co-benefits resulting from climate change mitigation (cf. IPCC 2014, Jänicke et al., 2015). Further expansions and compilations of potential co-benefits have been suggested by several authors (see e.g., Ürge-Vorsatz et al., 2014; Kraemer, 2016; Mayrhofer & Gupta, 2016; Figure 2).

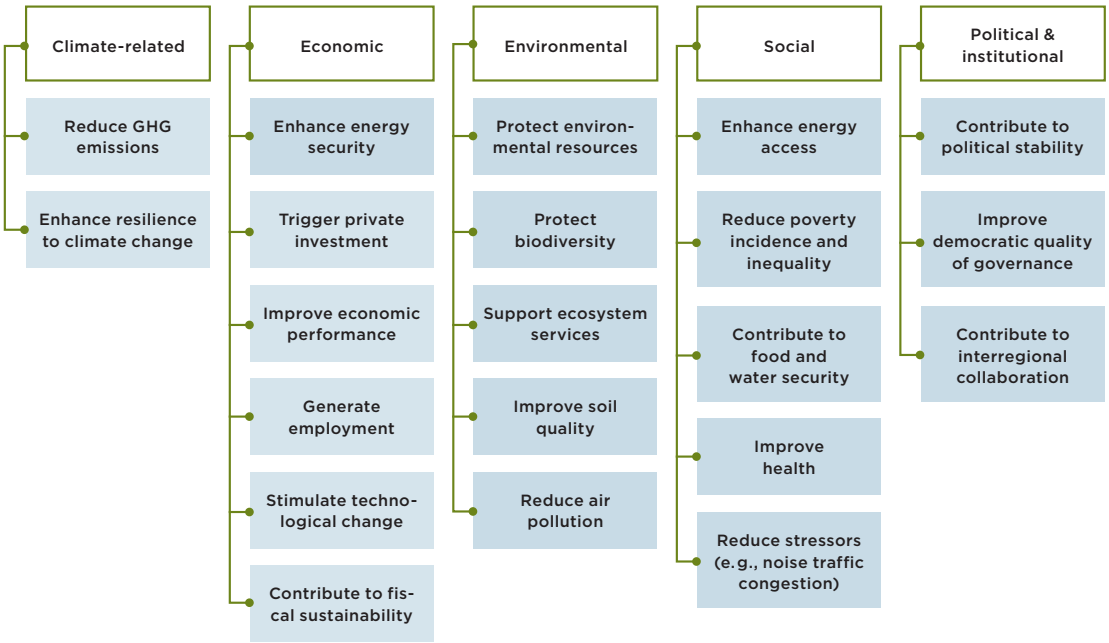


Figure 2: Categories of co-benefits

Source: Mayrhofer & Gupta, 2016

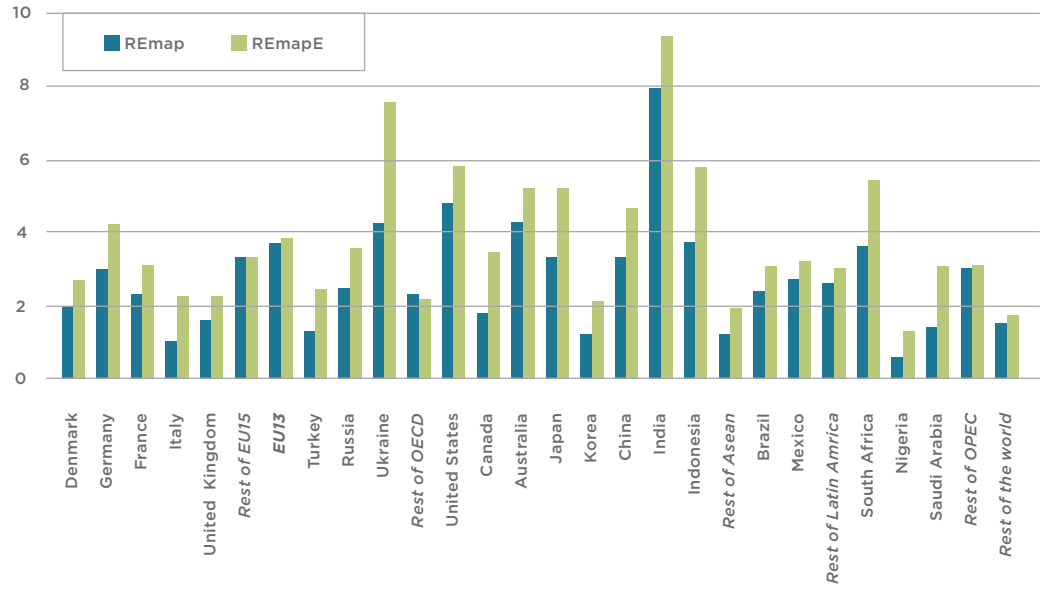


Figure 3: National welfare impacts of doubling renewable energies by 2030, with and without increased power generation (IRENA, 2016)

Source: IRENA, 2016

Reference case: a business-as-usual case that reflects the most up-to-date official country plans under existing legislation.

REmap case: the global share of renewables doubles by 2030 compared to 2010, reaching 36 % in total final energy consumption. The global doubling does not imply a doubling for each country.

REmap Electrification case (REmapE): the global share of renewables also doubles by 2030 but greater emphasis is placed on electrification of heating and transport, requiring a greater deployment of renewables for power generation

The country grouping presented in the results is determined by the geographical resolution and aggregations in the utilized E3ME tool.

Source: IRENA, 2016

The New Climate Economy (2014) report presented a multiple-benefit assessment of low-carbon policies across economic systems (cities, land-use and energy), including an "exploratory quantification" of co-benefits. The International Renewable Energy Agency (IRENA) took the next step toward operationalising co-benefits within the renewable energy sector and contributing to co-benefit assessments. In a study of the co-benefits of renewable energies, IRENA (2016) presented a combined benefit indicator termed "Total Welfare Impact" that entails seven co-benefits within three categories: (a) *Economic* – consumption and investment; (b) *Social* – employment, health, and education; (c) *Environmental* – greenhouse gases and materials consumption. This combined benefit indicator has been applied to many countries (see Figure 3) and embedded in a broader macro-economic analysis, also including domestic economic performance (GDP), employment, and trade (see also Borbonus, 2017). Besides air-quality- and pollution-oriented co-benefit assessments (e.g., Ma et al., 2013; Xue et al., 2015), particularly in the field of socio-economic assessments, a variety of approaches and methods are being elaborated which can serve as valuable inputs to co-benefit assessments in the field of climate and energy policy (Borbonus, 2017).

The broadly accepted co-benefit categories seek to establish a common denominator that is advantageous for the political discourse. The listings of co-benefits, however, remain too heterogeneous and general to address specific interest groups. Even if the aspect of climate change mitigation serves as the central point of reference in the discussion on "co-benefits", the term is used to evaluate very different qualities of climate- and energy policy measures: For example, it is applied equally to long-term macro-economic effects and to short-term business earnings. As this example shows, the mixing of assessment systems means that the co-benefits are not directed towards defined target groups. Against this background, it is not surprising that clear definitions and demarcations are yet to be established in the developing discourse on co-benefits, in view of specific strategic usages.

The existing listings of potential co-benefits could easily be expanded, for instance by addressing foreign trade balances, which in the cases of China and India are negatively impacted by massive increases in imported fossil fuels. In terms of avoided costs and avoided productivity losses through environmental protection, the EU, United States, China, India, and Brazil/Mexico could experience an overall benefit of USD1.23 trillion within the areas of health and energy savings alone by the year 2030 (World Bank, 2014). The value of such calculations lies not least in the fact that they go far beyond conventional cost–benefit analyses. The problems of such calculations – particularly if they extend to additional co-benefits – relate to their omni-directional use and lack of strategic orientation of the argument, which will be further addressed in detail below.

3. Beyond climate impact: co-benefit assessments as drivers of ambitious and effective climate policy

In the area of policy analysis, a distinction is made not only between the measures taken (policy outputs) and the intended consequences of action (policy outcomes), but also among additional repercussions (policy impacts) (Easton, 1965). These additional impacts of a policy may be positive or negative. This is the approach taken by the EU's impact assessment, providing comprehensive, ex-ante evaluation of policy measures across sectors. By now, impact assessment has also gained significance in sustainability assessment (Morrison-Saunders et al., 2015). An examination of its role in OECD countries and in the EU Commission concludes that: "the consideration of environmental and social aspects is considered as good practice of IA [Impact Assessment] in most countries" (Jacob et al., 2012. For elaboration on the German political context, cf. Jänicke & Helgenberger, 2016).

Co-benefit assessments, based on the multiple-benefit approach to climate change mitigation and renewable energies in particular, represent a recent strategic variation of policy-oriented impact assessment (for recent methodological contributions see, e.g., Ürge-Vorsatz et al., 2014; Khosla et al., 2015; Jacob & Steckel, 2016). Importantly, the negative impacts and co-risks should not be excluded from this approach, but should be incorporated in the net benefit estimation. The 5th IPCC Assessment Report (2014), for example, takes into account both sides – the positive and negative side effects – of climate action. This lends plausibility and scientific rigour to the approach, which is particularly important given the central role that legitimacy and persuasiveness play here. Accordingly, the assessment of energy savings would take into account the loss of jobs in traditional forms of energy supply, while the assessment of the growth of renewables would take into account potential accompanying declines in the area of fossil fuels. Such detailed calculations of potential negative effects remain relevant for evaluation purposes even in cases where the overall net effect is positive.

We point out the opportunities for co-benefit assessment to connect the multiple (net) benefits of climate action and renewable energies to the interests of specific economic and administrative sectors, which we term *interest-oriented policy integration* in climate policy. This sets it apart from norm-driven approaches, which range from ethical justifications to mandatory norms of action (see van Schaik & Schunz, 2012). We define interests as fundamental orientations for action based on specific advantages that can, with a high degree of probability, be assumed for the respective actors. In this view, the EPA study (2015) expressly calls for a sectoral approach and anchors company interests primarily in the cost of avoided sectoral losses.

Co-benefit assessments can offer key reference points for avoiding negative social, economic, or environmental impacts of global warming. For an interest-based anchoring of climate policy, however, the possible positive impacts are likely to have a greater motivating effect, both for making and advertising related decisions. Such motivating effects can be particularly expected in terms of economic co-benefits that address specific interest groups. This applies to such key areas as technology innovation, new business areas, gains in productivity, or employment (cf. Borbonus, 2017). However, in areas such as support for rural regions, access to electricity and local value-creation, but also the avoidance of high cooling-water consumption connected to energy security, or high environmental impacts through coal-fired power plants (cf. Röhrkasten et al., 2016) are not only a matter of norms and values, but have to do with calculable interests. This reference to interests makes the multiple-benefit approach attractive not only for climate policy but also for sustainable development in general.

Yet, in order to have sufficiently positive impacts, climate policies need to look beyond climate impacts. With expected large negative impacts and the limited time available to address the alarming pace of observed global warming (Schellnhuber et al., 2016), the social and economic co-benefits of climate change mitigation – and renewable energies in particular – offer an important opportunity to mobilise a strategic and interest-oriented approach to support ambitious, effective, and timely climate action. Focusing co-benefit assessments towards tangible, near-term benefits for known actors and interest groups contributes to building strong alliances for ambitious and progressive climate and renewable energy policy and action (cf. Helgenberger & Russbild 2017); and to overcoming long-lasting political deadlocks – particularly between environment, economy, and industry policies.climate and renewable energy policy and action; and to overcoming long-lasting political deadlocks – particularly between environment, economy, and industry policies.

4. Applying the co-benefits approach strategically: Which benefit, when, where, and for whom?

Building on the work of the Ministry of the Environment, Japan's (2009) co-benefit assessment framework referenced earlier, we propose the following set of guiding questions to narrow-down and strategically apply the co-benefit argument for mobilising specific interests.

What kind of benefit? Are we talking about tangible opportunities, improvements, or achievable financial gains that appeal to the self-interest of certain actors (e.g., increased employment in the construction industry or improved levels of air quality and related positive impacts on health system performance)? Or are we rather dealing with risks, losses, or costs that are avoided in the longer term (e.g., in agriculture or in areas of vulnerable coastal cities), but which initially have limited visibility?

- *Who* are the potential beneficiaries and interests that profit from the co-benefits – are they economic sectors, societal groups, and sectors of the governmental apparatus, or (merely) the public at large and the general wellbeing?
- *Where* do the advantages come to bear – at national, regional, local level or organisational/company level; in Europe or in Africa? Gender-specific advantages of clean energy in households, for example, apply only to certain regions.
- *When* do tangible benefits or avoided losses come into effect – in the near term or in the distant future? The chronological disparity between cause and effect plays an important role in the area of climate change and related mitigation efforts.

In order to address and mobilise interests associated with particular socio-economic co-benefits, to build coalitions across sectors for ambitious, effective, and timely climate policy and action, we have argued that co-benefit assessments need to focus on specific, near-term (net) benefits for relevant actors on the ground. Accordingly, we specifically define the co-benefits of climate change mitigation in view of the political mobilisation of designated interests:

Interest-oriented Co-Benefits of climate change mitigation represent positive net effects of policies and actions beyond those directly related to climate change and global warming processes (such as greenhouse gas emission reduction) that pertain to the following five key attributes:

Interest-oriented:	**Benefit can be defined in view of specific interests/interest groups**
Identifiable:	**Benefit can be distinctly described, delimited from other factors, measured, and evaluated**
Timely:	**Benefit unfolds in a timeframe crucial for the addressed interest group (usually <10 years)**
Attributable:	**Benefit can be connected to a specific intervention and allocated to a specific interest group and reconstructed by members of this group**
Opportunity-oriented:	**Benefit can be defined through a resulting opportunity or profit, and not merely through avoided burdens, risks, or losses**

Definition: Own figure

The large and growing number of lists concerning the co-benefits of climate change mitigation and renewable energies (cf. section 2 of this paper) document the increasing interest in opportunity-oriented climate policy. While these general overviews provide important entry points to this new perspective, we have argued that these listings mostly remain too heterogeneous. They are omnidirectional and too diffuse in their usage to address specific interest groups, and frequently lack strategic orientation in their argument. In Box 1 we illustrate our interest-oriented perspective on co-benefits through a selection of recent studies.

Box 1: Illustrative examples of interest-oriented co-benefit studies

Net job benefits through clean energy policy in China

Combined policies in the Chinese 11th five-year planning period 2006–2010 to (1) substitute small, inefficient coal-power plants with larger, more efficient plants, and (2) to actively promote renewable energy resulted in 472000 net job gains in China – a large number of direct job losses in small coal-power plants was overcompensated by a large increase of indirect jobs in the renewable energy sector, particularly solar PV (Cai et al., 2011).

Increased personal income through New York's Energy $mart Program

The Energy $mart Program (E$P) was funded by the State of New York with around USD1 billion for advancing energy efficiency, renewable energies, and energy services to low-income residents during the funding period 1999–2008. It resulted in increases of USD293 million in personal income and USD644 million in gross state product within that period. Without additional incentives, the figures are estimated to increase to USD5.74 billion and USD13.37 billion respectively by the year 2020 (EPA, 2011).

Net savings in fossil fuel imports through Tunisia's renewable energy programme

The roll-out of the planned renewable energy programme in Tunisia, with a feed-in tariff scheme for small- and medium-sized generation facilities at its centre, is estimated to lead to net savings of about EUR 4.6 billion between 2015 and 2030 (Quitzow et al., 2016; Meister Consultants Group, 2013).

Private surplus through healthcare and energy cost savings in US 100% renewable energy roadmap

A 2015 Stanford study on a 100% renewable energy roadmap calculated for the United States concluded that it would leave the average consumer with a surplus of USD1760 in their pockets, resulting from reductions in annual healthcare costs of USD1500 and annual reductions in energy costs of USD260 (Jacobsen et al., 2015).

The above key attributes of co-benefits also prove useful for depicting the evolving discourse on the co-benefits of climate change mitigation, as described in section 2. The discourse can be structured firstly in actor-based terms, along the axis "long-term, distant public interests" to "specific individual interests in spatial and temporal proximity"; secondly, in issue-related terms, along the axis "specific benefit or profit" to "avoided burdens/ avoided risk" (cf. Figure 4).

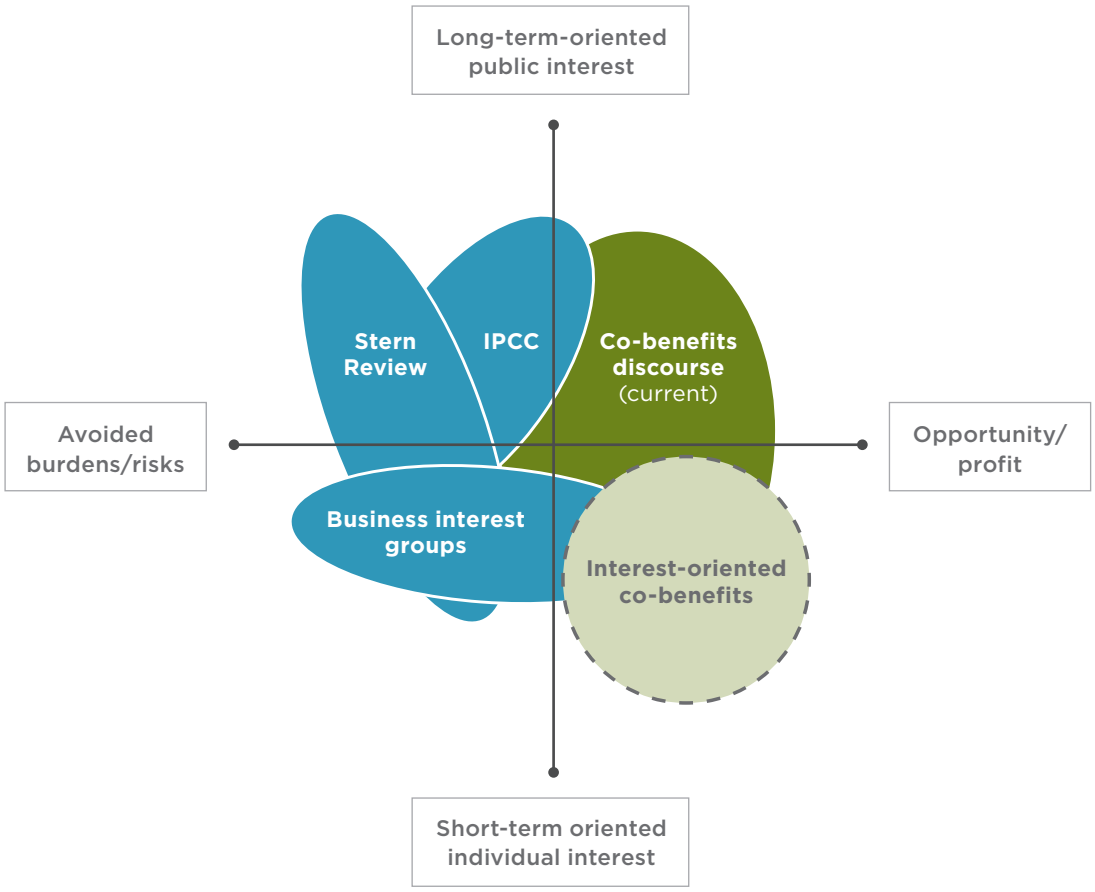


Figure 4: Dimensions of the co-benefit discourse

Source: own figure

The highlighted field in Figure 4 of interest-oriented co-benefit shows the area of discourse with the greatest significance for mobilising specific interests. This stands in contrast to traditional climate policy discourses of affected businesses, which have long been focused on the avoidance of short-term cost burdens through climate change mitigation efforts, but which are now increasingly responding to the new economic opportunities presented by the renewable energy sector (cf. New Climate Economy, 2014). The Stern Review (2007, completed 2006) on the economics of climate change expanded the spectrum of economic interests to be addressed, particularly with regard to long-term avoidance interests. The IPCC, when referring to the 18 multiple benefits in its 4th Assessment Report, did not focus explicitly on the area of near-term, specific benefits with immediate relevance. While current listings of climate- and energy-related co-benefits are increasingly based on an opportunity-oriented narrative, they remain rather heterogeneous in terms of addressing different interests, impact levels, and time scales.

5. Mobilising interest-oriented co-benefits of climate change mitigation: 10 steps forward

Despite the fact that the global transformation toward renewable energies seems to be irreversible in the long run, given its many advantages and increasingly competitive outlook, investments in fossil fuel-based energy systems still present a serious threat to the global climate.

This applies to a number of countries such as India, Vietnam, South Africa, and Turkey, which are experiencing sharply increasing demand for energy and will thus have to make important and far-reaching decisions in the energy sector. The planned expansion of coal-fired power plants, intended to cover increasing energy demand, entails path dependencies that could persist for decades. Given the already identified climatic tipping points and the need to accelerate the global transformation of energy systems, such path dependencies should be avoided by all means.

In face of the increasing economic advantages of renewable energies, the same interestingly also holds true from an investor's perspective with regard to containing the risk of stranded assets resulting from early – market or policy driven – suspensions of fossil fuel-based energy infrastructures.[2]

Besides regulatory options in support of the general wellbeing and with a longer-term perspective, the interest-oriented co-benefits of climate change mitigation – and renewable energies in particular – serve as important drivers for accelerated transformation and for overcoming long-lasting political deadlocks in order to prevent environmentally harmful path dependencies.

In order to mobilise these co-benefits, we have suggested expanding the view of traditional climate policy evaluation by specifically addressing the net effects of climate policy measures and actions, beyond those directly related to climate change and global warming processes. We have emphasised the strategic value of those co-benefits that can be attributed to specific interests and that unfold within a timeframe relevant to the specific interest groups. Furthermore, we have proposed defining co-benefits such that they can be described, measured, and distinguished from other factors as tangible positive benefits.

This is not to say that longer-term orientation and public interest in climate-related politics are dispensable – quite the contrary: we understand the multi-benefit approach in climate policy as the expansion of norm-driven action by interest-oriented action, and from legal requirements to additional forms of action based on voluntary participation. Our notion corresponds to an observable paradigm shift – from 'burden sharing' to an increasing degree of 'opportunity sharing' – a shift that was well reflected in the 2015 Paris Climate Agreement.

In this paper we have argued for the explicit, strategic use of the multiple-benefits approach to climate policy. We conclude by offering ten guidelines for mobilising the interest-oriented co-benefits of climate change mitigation:

(1) **Interest-oriented co-benefit assessments are essential to the effective implementation and ambitious reformulation of the nationally determined contributions (NDC)** to climate change mitigation as outlined in the Paris Climate Agreement, and to activating the UNFCCC ambition mechanism (facilitative dialogue[3]) by rallying cross-sectoral support for increasing the level of NDC ambition.

[2] For a recent case in China see cleantechnica (January 18th, 2017). China Suspends 104 Under-Construction & Planned Coal Power Projects, https://cleantechnica.com/

[3] UNFCCC: Facilitative Dialogue on Enhancing Ambition and Support.

(2) **Integrating and mainstreaming co-benefit assessments in national and international MRV** (Measuring, Reporting, Verification) mechanisms represent an obvious and effective step towards institutionalising opportunity-oriented climate poli-cy and action.

(3) **From impact assessment to impact design:** Understanding co-benefit assessments as strategic planning instruments for progressive climate and renewable energy policies to pro-actively seize the social and economic opportunities.

(4) **Developing and applying scientifically sound, systematic, and reproducible methods for assessing co-benefits,** which also take into account the negative repercussions, represent the basis for validity and credibility of performed assessments. This is crucial in order for the identified benefits and their underlying methods to be considered and incorporated in planning and decision-making.

(5) **Fostering the science-based but interest-oriented co-benefits narrative,** by structuring the discourse along (policy) performance categories (cf. figure 1 on page 2), rather than analytic research categories.

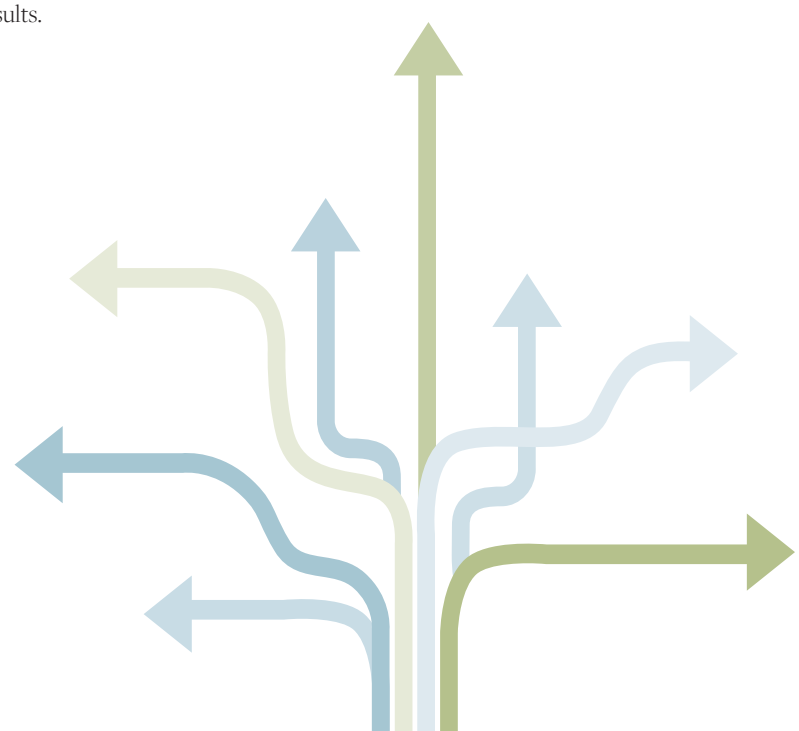
(6) **Specifying relevant sectors and impact levels for potential co-benefits, together with target groups and decision-makers,** as well as addressing their specific informational and data needs, are essential components of co-benefit assessments to ensure the suitability and applicability of their results.

(7) **Considering potential social and economic co-benefits together with enabling political environments,** such as investment incentives or social policy to seize the identified opportunities.

(8) **Capacity-building activities in terms of sharing and elaborating multiple benefits of climate change mitigation** and renewable energies among policymakers, public administrations, research institutes, and multipliers contribute to further institutionalising opportunity-oriented climate policy and action.

(9) **Addressing interest-oriented, near-term benefits does not exclude the use of more comprehensive checklists** of possible additional co-benefits (and co-risks). After all, the multiple-benefits approach draws its appeal from the broad spectrum of additional advantages of climate change mitigation.

(10) **Co-benefit assessments related to climate and energy importantly contribute to further activating the United Nations Sustainable Development Goals (SDG),** given their cross-sectoral character and inherent rationale for policy integration, by identifying mutual opportunities and eliminating trade-offs between the targets of the 2030 Agenda for Sustainable Development.



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