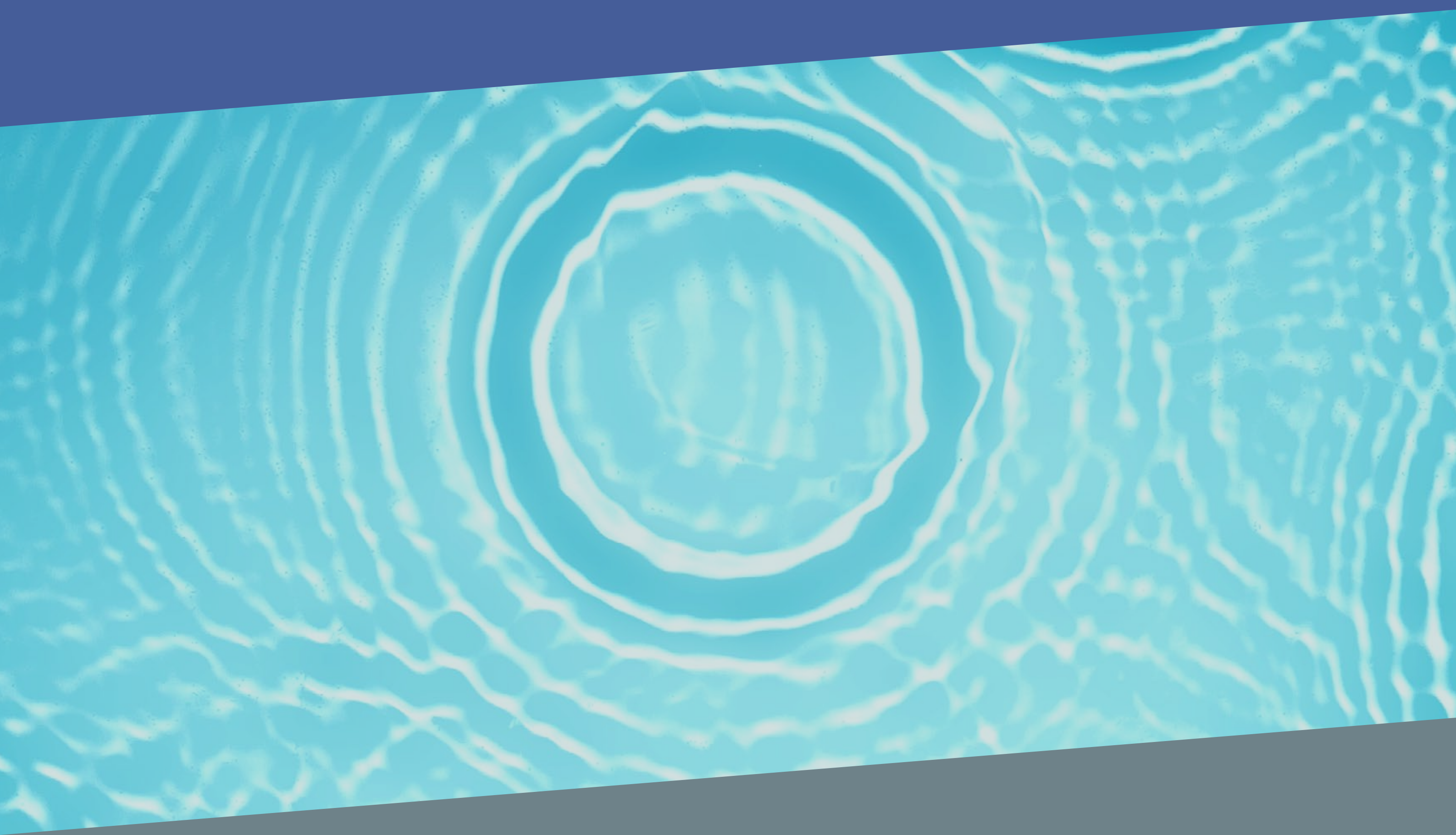
CLIMATE ANALYTICS

BEYOND BORDERS

HOW TO STRENGTHEN THE EXTERNAL IMPACT OF DOMESTIC CLIMATE ACTION

September 2020



Climate Analytics
Ritterstraße 3
10969 Berlin
www.climateanalytics.org

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HOW TO STRENGTHEN THE EXTERNAL IMPACT OF DOMESTIC CLIMATE ACTION

Authors: Andrzej Ancygier, Climate Analytics
Critical review: Damon Jones, Climate Analytics

The contents of this report are based on research conducted in the framework of the project "Implikationen des Pariser Klimaschutzabkommens auf nationale Klimaschutzanstrengungen", conducted on behalf of the German Federal Environment Agency, FKZ 3717 41 102 0
The views expressed in this paper are strictly those of the authors and do not necessarily represent the opinion of the German Federal Environment Agency, nor of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety.

Beyond borders: How to strengthen the external impact of domestic climate action

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The spillover effect of domestic action.

No single country will be able to fix the issue of climate change on its own. However, every country has an important role to play in increasing the ambition of domestic climate action in response to our collective climate crisis.

The Paris Agreement, with its 1.5°C temperature limit and the obligation for countries to submit and implement successively more ambitious Nationally Determined Contributions (NDCs) every five years as part of achieving this goal, forms the basis for international cooperation in solving this crisis. However, the level of ambition in NDC targets submitted to date by different countries, and the transposition of these targets into national laws and policies, varies significantly and in most cases is not consistent with 1.5ºC pathways (Climate Action Tracker, 2020).

This inadequacy in ambition in many countries is used by some governments as an excuse not to increase their own level of climate action. This is often stated under the premise that their *comparatively* small contribution to climate change does not justify radical changes to their economy and the transformational action which is needed to address climate change (BiznesAlert, 2019; Climate Analytics, 2017; Focus, 2019; Wirtschaftsvereinigung Stahl, 2020).

Apart from ignoring the significant co-benefits of climate action, such as improved air quality, decreasing energy dependence, and job creation, waiting until other countries take action ignores the spillover effect one's action can have on the policies of other countries. This spillover effect of policies and measures can result in overall emissions reductions that are much higher than those initially targeted by the domestic actions of that country. A good example of this effect is the adoption of the feed-in tariffs by many countries following the success of this policy in decreasing the costs of wind and solar energy in Germany in the early 2000s.

Drawing upon existing scientific literature, this study presents how different drivers of the spillover effect can be strengthened, resulting in a significant acceleration in emissions reductions and increased climate ambition in the NDCs. Literature that has examined the impact of domestic action or inaction on other countries has identified that the spillover effect can be facilitated via three main **mechanisms**: policy diffusion, economies of scale, and complementarity of action resulting in fusion of different technologies. Each of these mechanisms can be divided into specific **drivers** that can increase the impact of the mechanism, such as: learning or emulation that accelerates policy diffusion; scaling up and export of domestic standards, increasing the benefits of the economies of scale; and contributing niche solutions to a challenge that cannot be solved solely by one country.

These mechanisms and drivers have contributed to a spillover effect of domestic action many times in the past. When faced with new challenges, countries have tended to adopt **modes of governance** or **policies** already adopted in other countries. Similarly, driven by the forces of globalisation, companies in different countries have **complemented** each other with their own contributions to final products consisting of elements designed and manufactured in different parts of the world. International **economies of scale** have resulted in a significant decrease in manufacturing costs, a trend that has accelerated as more countries have joined the market for a given product.

However, the uptake of policies has often taken place on an ad hoc basis, sometimes without learning from the successes and mistakes of the countries in which similar measures were introduced earlier. Additionally, the benefits of the economies of scale have not been fully utilised due to a lack of predictability of domestic laws, especially important for products for which the market is strongly influenced by policy measures. In such cases, a threat of an unexpected change in the size of the market may discourage investors from upscaling their manufacturing capacities. Finally, while global trade allows for technological complementarity between different countries, the complexity of future challenges on the path to zero emissions, such as heavy reliance on variable sources of energy or decarbonisation of the steel and cement sectors, requires more coordinated approaches to avoid duplication and technological gaps.

Ambitious and creative domestic action plays an important role, especially in times of crisis, in which policy-makers are looking for examples of policies that are already working in other countries. The current COVID-19 induced crisis is no exception. As some parts of the world move from the initial shock of the health impacts of the pandemic to designing their recovery packages, the trajectory they will follow– or fail to follow– will influence what other countries will do. Many governments are being forced to move beyond established solutions and patterns of decision-making to address the crisis. This creates an excellent opportunity for the other countries to lead by example to instigate radical change.

SPILLOVER EFFECT

Three reasons why domestic climate action of countries can make significant impact well beyond their borders

A. Policy diffusion

Policy has a tendency of spilling over through mutual learning, diffusion, selection

Example
- German Renewable Energy Act
- EU Emissions Trading Scheme
- Green New Deal

Main actors
- Governments - shape policy
- NGOs - compare climate action
- International organizations - exchange experiences

B. Economies of scale

An uptake of a technology in different countries accelerates an overall reduction in prices

Example
- PV and wind
- Batteries
- Electrolysers

Main actors
- Governments - set goals
- Industry - cooperate to take advantage of the economies of scale

C. Technology fusion

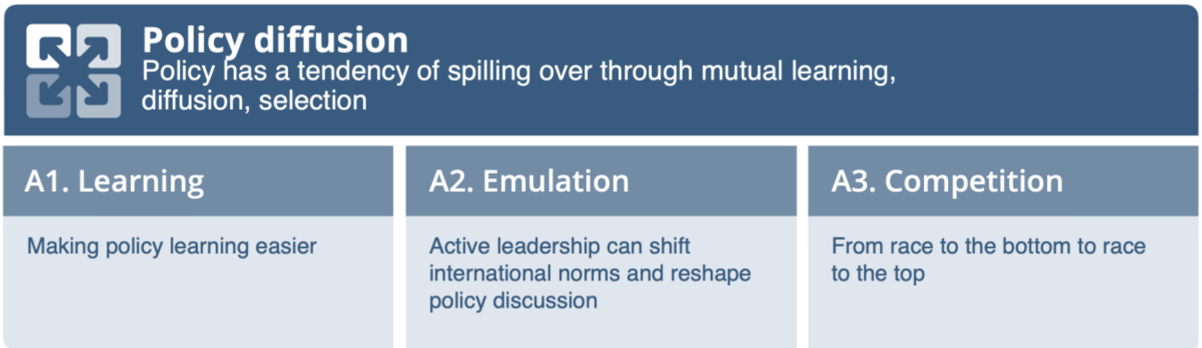
Different pieces of the technology puzzle come together to bring new benefits and shape overall trends

Example
- Electrification of transport
- Integration of renewables
- Low-carbon steel

Main actors
- Governments - set goals
- Research institutes and Industry - develop and implement solutions

Mechanism 1: Policy diffusion

Adoption of policies by one government can have flow effects in other countries, even if the primary target of those policies is the domestic audience. Evidence of this can be seen in different elements and stages of policy development, including goal-setting, governance and implementation. Despite the domestic character of such policy processes, their impact can extend to them being followed or replicated by other governments. One of the most common examples of this phenomenon is policy diffusion, whereby a policy adopted by one country is implemented in other countries via emulation, learning, competition, and coercion (Gilardi & Wasserfallen, 2019).



An example of policy diffusion is the German Renewable Energy Act. The cornerstone of the law, the feed-in tariffs, was subsequently adopted by over 100 countries and has been referred to as Germany's most successful export product (Steinbacher, 2016). On the other hand, emissions trading (the EU ETS), introduced at the European level in 2005, has exemplified what mistakes to avoid (Jørgen Wettestad, 2017). Some of these experiences with the EU ETS have already been incorporated in the EU-China cooperation framework (European Commission, 2018b). Additionally the idea of a coal phase out in the electricity sector driven not by market forces, but by regulatory decision, was relatively new for policy makers in the early 2010s, discussed only in Ontario, Denmark and Finland (IISD, 2015). However, after the adoption of the Paris Agreement in 2015, and the creation of the Powering Past Coal Alliance in 2017, the popularity of this measure increased significantly, with 111 member, including 34 national and 33 sub-national governments already having adopted this measure in September 2020 (Powering Past Coal Alliance, 2020).

Learning from or emulating the experiences of other countries goes beyond a *single policy* or *goal*. In response to the financial crisis of 2008/2009, all advanced, democratic economies adopted a *mix of measures* – which also can be explained by similarities in macroeconomic governance (Mandelkern, 2016). More recently, the adoption of green deals gained momentum with South Korea following the examples set by the European Union and the U.S. Democratic Party (Climate Home News, 2020). It can be assumed that policy diffusion will play a decisive role in shaping the economic stimulus packages in response to the COVID-19 crisis. Including policies for a green recovery in national recovery packages will influence other countries to do the same, thus leveraging the impact of domestic action.

The literature on this topic identifies four main drivers of policy diffusion, three of which play an important role in facilitating the spillover effect of domestic climate action. Policy **learning** is the most common and takes places when national or local governments adopt policies based on already existing experiences (Butler, Volden, Dynes, & Shor, 2017). Another driver of policy diffusion is **emulation,** which takes place when certain policies are perceived as appropriate and legitimate. It is driven by the desire of domestic policy makers to conform to internationally recognized norms (Heinze, 2011). Policy makers may also adopt certain policies to **compete** with other national or subnational governments, e.g. for tax revenues from individuals or companies (Baybeck, Berry, & Siegel, 2011).

So far, policy learning and emulation have been the most common drivers of policy diffusion in the area of energy and climate. However, there is significant space to increase the impact of these two drivers to influence mitigation action in other countries even further and complement it with competition as the co-benefits of low carbon development become visible.

Driver 1. Making policy learning easier

To increase the role of policy learning, the policies need to be perceived as successful. Only in this case will governments and stakeholders advocate for their implementation in the receiving country (Aklin&Urpeleinen, 2018: 47). However, the definition of success needs to go beyond the financial aspects. For example, the assessment of the German *Energiewende* focused mostly on the costs of electricity and mostly ignored such aspects as rapidly decreasing costs of renewables, democratisation of energy generation, and increasing energy independence (Deutschland Funk, 2012; FAZ, 2012; Frankfurter Rundschau, 2013). Despite the aforementioned overall popularity of the feed-in tariffs, some other countries decided against it due to perceived high costs – an aspect especially intensively discussed in Germany (Unnerstall, 2017). Thus, **policy diffusion of climate measures could be strengthened by a more balanced overview of their costs and benefits, which not only integrates the environmental impacts, but also economic, industrial, and social co-benefits**.

Furthermore, the policies also need to be perceived as adaptable to specific circumstances. Part of the reason for the popularity of German *Energiewende* was the perception of Germany as a leader in other areas besides climate, e.g. industrial strength and economic stability (Steinbacher, 2016). However, the case studies of Morocco, South Africa, and California indicate that many jurisdictions do not have the spare resources to find out how certain policies can be best integrated in the specific circumstances (Steinbacher, 2016). This applies especially to the power sector in which path dependencies – both mental and infrastructural – provide an additional limit on the willingness to instigate change.

Thus, the **provision of easily accessible, first-hand information, combined with their adaptation to the local circumstances, proves essential to facilitating policy diffusion**. A broader presentation of the policy impacts described above will increase the policy adaptability by focusing on the goals prioritised by the recipient governments. Of great importance, in this case, are the **transfer agents**, who mediate these experiences and define how certain policies fit specific national goals in a particular country. This indicates the decisive role of **active leadership**, where the adoption of a policy is accompanied by easily available knowledge about the impact of the policy from mediating actors, who present how certain policy can be adapted to fit specific national goals (Steinbacher, 2016). The role of the mediating actors can be played by governmental agencies (e.g. GIZ) or non-governmental organisations. The EU's rich experiences in the area of climate policies can be transferred with the help of a strengthened European External Action Service.

Driver 2: Facilitating emulation by shifting international norms

Policy diffusion can also be driven by emulation. Similar to policy learning, emulation can be strengthened by taking advantage of active leadership. This is especially the case at the backdrop of the current COVID-19 crisis, which has the potential to strengthen recognition of the critical role of science in the policy-making process and the synergy between more ambitious climate action and recovery from the COVID-19 induced economic crisis.

Despite numerous differences, the COVID-19 pandemic and climate change both demonstrate the importance of the latest available science in crafting an effective response to both crises. This message applies even if the nature of the COVID-19 pandemic made the consequences of ignoring scientific advice felt almost immediately, whereas for climate change most of the repercussions will occur more gradually over space and time. Nonetheless, the responses of many countries have shown that, despite short term challenges, reliance on scientific advice in policy-making does pay off in the longer term.

Increasing the role of science-based policy making can be facilitated by some countries creating a clear connection **between the established science and their emissions reduction targets** that respond to the latest science and corresponding goals in the Paris Agreement. This shift in narrative towards science-based emissions pathways can build on the current system of climate governance established under the Paris Agreement. The obligation to submit updated NDCs in 2020 offers an opportunity to link countries' contributions with the latest science on emission reduction pathways needed to meet the Paris Agreement 1.5ºC temperature limit. Each country submitting a science-based NDC increases pressure for other countries to do the same.

In the current circumstances of the COVID-19 pandemic, this pressure can be strengthened by creating a connection between increasing climate ambition and the post-COVID-19 recovery. With all countries affected by the economic crisis, recovery policy frameworks that focus on transformation to a zero-carbon economy could generate the political momentum needed for similar approaches to be adopted across different global regions. This has the potential to result in trillions of dollars to flow into renewable sources of energy, energy efficiency, and innovation in the first half of this decade. This would be just in time to instigate the transformative change across all sectors necessary to half the emissions in the 2020s that the science is telling us needs to happen to reach the 1.5°C temperature limit (IPCC, 2018).

Driver 3: From race to the bottom to race to the top

Another driver of policy diffusion is competition. The negative examples of this driver is the race between countries to lower corporate taxes or relax social and environmental standards to encourage foreign investment (Abbas & Klemm, 2013; Rudra, 2008). As climate policy has in the past been perceived as an additional burden for potential investors, the impact of this driver on the level of climate ambition was negative and the introduction of emissions reduction measures was a potential driver of carbon leakage (Arroyo-Currás et al., 2015; Bréchet & Tulkens, 2013).

This has changed with the significant decrease in the costs of renewable sources of energy and the economic potential offered by energy efficiency measures. **As a result, policies aimed at increasing renewable energy development and making economies more energy efficient may in fact accelerate economic growth.** According to a 2017 study, resource efficient growth would result in global benefits of USD $2.4 trillion in 2050 and faster economic growth (Hatfield-Dodds et al., 2017). The European Commission's assessment of the emissions neutrality goal for the EU in 2050 shows that it could result in an additional 2.1% of economic growth by the middle of the century in comparison to the baseline scenario in which emissions decrease by only 62% in comparison to 1990 (European Commission, 2018a). This potential for economic acceleration has gained importance during the COVID-19 induced economic crisis. According to a recent assessment by IRENA, an economic recovery driven by an uptake of renewables, energy efficiency and related energy measures would result in additional 5.5 million jobs created by 2023 (IRENA, 2020b).

These economic benefits can be strengthened by the **first-mover advantage**. This advantage can be beneficial at country and company levels. For a country, developing new, low carbon branches of industry would broaden its array of exported products, create new jobs and generate additional tax income. At a company level, first movers could strengthen their brand. Those who have done so are already proven to enjoy higher market shares than later entrants (Kerin, Varadarajan, & Peterson, 1992). For both levels, however, existence of a market for a given product is essential. Domestic goals such as increasing the share of renewables in the power sector or electric vehicles, complemented with adequate policy measures, can create such a market, thus **resulting in a competition for higher climate goals perceived as an opportunity, not a burden.**

The theory of first-mover advantage applies especially for rapidly growing markets, which allows the first mover to garner enough resources to improve its products and gain advantage by placing its products in the new markets first (Suarez & Lanzolla, 2005). Such a market can be created by national policies as was the case of wind turbines and photovoltaic (PV) panels. However, the stability of the market also plays an important role: the relatively continuous development of wind energy in Denmark provided Vestas, the second largest manufacturer of wind turbines, with a market big enough to grow and access other markets. The opposite can be observed in the case of solar energy: the boom and bust for the solar energy market failed to generate a similarly large player in countries in which such stability was missing. **Thus, it can be expected that in the future, countries who would like to benefit from the first-mover advantage will not only compete in the levels of emissions reductions they set in their targets, but also in terms of the predictability of their policy measures introduced to achieve them.**

As climate policy is increasingly perceived as an opportunity for economic growth instead of a burden, and the first mover advantage offers additional benefits, **competition may become a driver of climate ambition instead of a hindrance.** The complexity of the transition to a zero emissions economy creates the potential for numerous “races to the top”. In the area of electric mobility, Tesla has been dominating the market, but many countries are creating a market for electric vehicles that could create space for new players, building upon their experience and recognition. Whereas the race towards the hydrogen economy seems to be starting now, in the buildings sector it has not yet begun, despite numerous areas of competition and comparatively low entry barriers, e.g. for standardised components for zero-carbon buildings, or even complete buildings. As each country joins the race, this accelerates its speed, creating ground for a transformative change.

Mechanism 2: Utilising the benefits of the economies of scale

In addition to the political drivers resulting in policy diffusion, domestic climate action influences climate change mitigation in other countries due to the benefits of economies of scale. This can happen in two main ways, both of which take advantage of the fact **that upscaling the production of a product decreases its costs, due to the decreasing share of constant costs and automatisation** (European Commission, 1997). Firstly, creating a domestic market for a product essential for decarbonisation increases the overall size of the market for the product, facilitating a decrease in its costs. Decreasing costs is an important factor in increasing climate ambition and instigating race to the top. Secondly, setting domestic emissions standards for an existing, mass produced product, creates the incentive for manufacturers to adopt these standards even if they are not required in all markets in which the product is sold.

Economies of scale
An uptake of a technology in different countries accelerates an overall reduction in prices

B1. Scaling up	B2. Standards
Leveraging the power of large-scale production	Internationalization of strong domestic standards

Driver 1: When more means cheaper

Increasing the market for wind and solar PV has been the major driver for decreasing their costs at a speed much faster than expected. This has already happened for wind and solar energy installations. Between 2005 and 2019 the number of countries with policy targets for renewable energy increased from 45 to 166 (REN21 2005, 2020). At the same time, the price of PV fell from $4.51 to $0.38 for each installed Watt, a decrease by 92% (Our World in Data 2020). For wind energy the Levelized Cost of Electricity (LCOE) almost halved in the same period from $104/MWh to $53/MWh (IRENA 2020).

These results indicate the importance of the learning curve - decrease in costs of the technology corresponding to doubling installed capacity. For solar PV the learning curve was estimated to have increased from 23% between 1955-1976, to 30% between 1977-1988 and decreased to 17% in the following two decades (Kersten et al., 2011). The most recent data indicates an increase in the learning curve for utility PV to 36% between 2010 and 2019 (IRENA, 2020a). For onshore wind energy the learning curve was estimated at 12% between 1979 and 2010 (Rubin, Azevedo, Jaramillo, & Yeh, 2015) and almost twice as much in the subsequent decade (IRENA, 2020a).

This increase in the learning curve runs contrary to the assumption that significant improvements can be made **only** at an early stage of technology development. This can be explained by an increasing number of countries moving from an almost exclusive focus on pilot projects towards creating markets for the investments in renewables by introducing support schemes, e.g. feed-in tariffs. The entry of China in the early 2010s accelerated this development, which corresponded to an acceleration in the decreasing costs of renewables.

Each new country creating conditions favorable for the development of renewables contributes to increasing the market for renewable energy installations and a corresponding decrease in their costs for other countries. By ensuring stable investment conditions and a growing market reflecting an increasing share of renewables, governments can also increase the probability that the renewable energy installations will be manufactured in a respective country. This allows them to reap the economic co-benefits in the form of job creation and economic growth.

The opportunities offered by economies of scale go beyond PV panels and wind turbines to other scalable products essential for decarbonisation of the economy. The learning curve, understood as a decrease in the costs for each doubling of production, for batteries since 2010 has been calculated at 18% (Rocky Mountain Institute, 2019), but numerous new approaches currently pursued may accelerate that rate (Langridge & Edwards, 2020). Possibly, economies of scale could also be utilised for electrolysers for hydrogen generation (IRENA, 2018; PV-Magazine, 2020) or any other product essential of decarbonisation. Domestic policies aiming at creating a market for such products could initiate a rapid decrease in their costs similar to that which occurred in the case of solar PV. This would accelerate the process of decarbonisation well beyond the country adopting such a policy.

Driver 2: Exporting domestic standards

Economies of scale not only significantly reduce the costs of products needed for decarbonisation but have also resulted in ratcheting environmental standards for already existing products. This results from the fact that due to the economies of scale manufacturing smaller series of different products for markets with different environmental standards is less profitable than simply fulfilling the stricter standards for all products.

This trend has already been recognised. In the 1990s, Vogel showed that liberalisation of trade also internationalised domestic or even regional standards, especially if those standards affected a large enough market. **This resulted in a surprising call by the German car manufacturers in the 1980s for stricter emissions standards to match those in California** – at that time among the strictest in the world – to make it easier to sell their vehicles in the U.S.A. and Japan and create a level playing field for all car manufacturers (Vogel, 1997). This effect, also referred to as the *California effect* was later replaced by the *EU effect* resulting in the globalisation of the EURO standards (Crippa, Janssens-Maenhout, Guizzardi, & Galmarini, 2016).

The tendency for emissions standards to spread beyond the borders of the country that adopts them can be replicated with many other products. Introducing standards for low carbon steel or cement could trigger investment in corresponding manufacturing capabilities. Requirements to use low carbon materials for electric vehicles could result in a mainstreaming of such products and the taking into consideration of these requirements at the design stage. Standardised building materials could be required to fulfill requirements needed for zero-emissions buildings.

Mechanism 3: Technological complementarity

The transformational change needed to meet the Paris Agreement temperature goal requires numerous technological solutions. The significant decrease in the costs of wind and solar over the last two decades gave rise to studies focusing on the feasibility of the energy system relying to a significant degree or almost exclusively on renewables. An assessment of recently published scenarios resulting in emissions reductions in the EU of at least 90% by 2050 shows that 13 out of 16 of them assume that at least 80% of energy will come from renewables by the middle of the century (JRC, 2020). Those aiming for 100% reliance on renewables assume that the share of wind and solar energy will reach up to 95% by 2050 (DIW, 2017; Jacobson et al., 2019; LUT University & Energy Watch Group, 2019).

However, to fully decarbonise the economy additional technologies are needed – starting from energy storage, through electrification of other sectors, and ending with decarbonisation of sectors in which even a complete switch to renewables will not fully exclude CO_2 emissions due to some of the resulting process emissions. **Also in this regard domestic action may drive decarbonisation either by contributing new technologies or showing how different stages on the path to full decarbonisation may look.**

Technology fusion
Different pieces of the technology puzzle come together to bring new benefits and shape overall trends

C1. Compound effects	C2. Advancement
Cross sectoral technological advances complement each other	Showing what works – and what can be done better

Driver 1: Contributing to the zero-carbon puzzle

The complexity and scale of the transformation to a zero-carbon economy makes it impossible for one country to develop all the elements needed for full decarbonisation. At the same time, by increasing climate action and facilitating development of new solutions, each country is making it easier for the other countries to accelerate their decarbonisation efforts and increasing the innovativeness of their respective economies.

There are many past example of multiple countries joining forces to solve a major challenge beyond the capacity of any individual state. What is noticeable, however, is that this cooperation involved seeking to solve increasingly larger challenges. In the 1960s, France, Germany, the UK, the Netherlands, and Spain made a joint effort to build Airbus planes, with each country contributing different components (Airbus, 2011). International cooperation between 15 countries launched in 1998 made the construction of the International Space Station possible (NASA, 2020). Finally, the financial and scientific contribution of each additional country to the ongoing efforts to find a vaccine against the COVID-19 virus can help to save lives and accelerate a post-COVID-19 economic recovery (European Commission, 2020b).

National contributions to the global effort in solving the climate crisis can build on these experiences, whereby **each country adds its specific expertise and accelerates progress towards a zero emissions world**. As we move forward, the technological gaps and opportunities can be roughly identified: for example, increasing electricity storage, developing grid interconnections, especially between regions with complementary generation and consumption patterns, accelerating sector coupling, and IT solutions will be part of the picture. However, many of these elements - and many additional ones -

still need to be improved and see their costs decrease. This presents countries with numerous opportunities to develop the specific technologies or decrease the costs of already existing ones and in this way to contribute niche solutions and accelerate global mitigation efforts.

Driver 2: Clarifying the picture

As mentioned above, the challenge of contributing solutions to a fully decarbonised economy is deepened by the fact that it is not fully clear how this economy will look. **However, there will also be numerous *intermediary stages* that will clarify the picture and which will be met by different countries at different points in time.** These may include a country or region powered solely from renewables for a specific period, one fossil fuel after the other being phased out completely from the power sector, or emissions from energy generation temporarily reaching zero.

While the socially and cost-optimal mix of solutions will look different for different countries, these ***intermediary stages*** will offer space for technological learning on how to operate a low and eventually zero carbon energy system. These experiences will also push the limits of what is deemed possible thus emboldening others to follow in their footsteps to not only increase climate ambition but follow with a deployment of practical climate mitigation measures. This will facilitate the spillover effect of domestic action well beyond the borders of a single country.

Conclusions

There are numerous ways in which the policies of a single country influence emissions well beyond their respective national borders. It may result in adoption of similar policies in other countries due to the shaping of international norms, policy learning, or increasing the costs of inaction by other players. Increasing the size of the market for products necessary for decarbonisation may reduce their costs. Setting up standards for products contributing to emissions may result in the internationalisation of those standards and thus much bigger impacts on emissions reductions than could be expected from the size of the domestic market. Finally, by contributing solutions to the decarbonisation puzzle and showcasing their experiences with the deployment of an emissions neutral energy system, countries may accelerate the transformation at the global level.

The impact of domestic action can be strengthened by **active leadership** which requires the sharing of that country's experiences – good and bad – with other governments. There is no doubt that these experiences will be made visible to other countries in any case, but a lack of government action in this regard may mean that they receive an incomplete picture. **Transfer agents** supporting countries in understanding the policies and figuring out how they may be adapted to their specific circumstances may increase the policy uptake. Jointly with research institutes, they may also support countries in designing an optimal mix of solutions for a decarbonised energy sector. A country may also specialise in a technology or solution that is underdeveloped or still missing to complete the picture of a fully decarbonised energy sector.

The impact of domestic action is strengthened with the backdrop of the current COVID-19 induced health and economic crisis. While unusual times call for unusual measures, political leaders may be prone to adopt measures that have already been adopted in other countries. Greening the recovery packages in one country will significantly increase the probability that other countries will also focus on climate mitigation in their own stimulus packages. The opposite can also be the case: repeating the mistakes of the recovery measures introduced after the economic crisis in 2008/2009, which in most cases focused on reinstating the pre-crisis status quo, would weaken the efforts of other countries to use their recovery packages to also mitigate climate change.

Countries may leverage the spillover effect of their green recovery packages with a corresponding increase in their level of climate ambition and timely submission in 2020 of new and updated NDCs. The timing presents an opportunity: focusing on climate change mitigation in the recovery packages will help to achieve the more ambitious emissions reduction goals by 2030 and the initiate transformative change needed to reach the Paris Agreement's temperature limit. The recovery packages should also trigger the development of new solutions, essential for reaching the net zero goal by 2050. This could be reflected in the Long-term Strategies that should also be submitted to the UNFCCC by the end of the year.

The good news for national governments is that they have much greater power to instigate a reduction in emissions than could be assumed based on their share of global emissions. The unusual conditions created by the COVID-19 induced crisis mean that there is an opportunity for active leaders to amplify even further their emissions reductions, well beyond the borders of their countries. But with this additional power comes the responsibility to use it to instigate a transformative change in emissions trends.

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