

How could Finland's climate leadership benefit us and others?

Oras Tynkkynen

Senior Advisor, Sustainability solutions

Mari Pantsar

Director, Sustainability solutions

Antonios Sfakiotakis

Leading specialist, Global collaboration, Sustainability solutions

Rasmus Sihvonen

Project coordinator, Climate and nature solutions

Finland is a small country, but we have often been able to punch above our weight in many respects. This is also true when it comes to solving the climate crisis.

We have many important reasons to take a proactive role in working for the climate. Climate leadership is not a form of charity, but rather a matter of defending our long-term national interests.

Finland has an extensive set of tools for climate leadership. For example, we can inspire larger countries to take action through international climate initiatives and influence a large group of countries through the EU. Solutions developed by Finnish companies can substantially reduce emissions around the world while also generating export revenue for our country.

Sitra working papers

© Sitra 2021

Punching above our weight

How could Finland's climate leadership benefit us and others?

Authors: Oras Tynkkynen, Mari Pantsar, Antonios Sfakiotakis och Rasmus Sihvonen

Layout: PunaMusta Oy

ISBN 978-952-347-235-8 (PDF) www.sitra.fi ISSN 2737-1042 (PDF) www.sitra.fi

Sitra working papers provide multidisciplinary information about developments affecting societal change. Working papers are part of Sitra's future-oriented work conducted by means of forecasting, research, projects, experiments, and education.

Contents

Summary	4
Tiivistelmä	5
Sammanfattning	6
Introduction	7
Punching above our weight	8
2. Finland's 12 strengths	10
3. Why climate leadership?	12
4. Finland's tools: impact across borders	13
5. Finland's tools: working together for the climate	15
6. Suggested next steps	18
Sources	20

Summary

It is generally known that Finland is quite a small nation. However, we have repeatedly succeeded in punching above our weight in many respects – also when it comes to solving the climate crisis.

On a global scale, we perhaps don't always acknowledge our own strengths, but were we to harness our strong suits we could become a leader in the fight against climate change.

Finland has many good reasons to act proactively to solve the climate crisis. Being a pioneer in climate action is not a form of charity but largely a way to defend national interests.

We have two main approaches to exercising influence. First, the choices we make in Finland may help combat the climate crisis outside our borders. Second, we can act as a part of a larger international community.

Finland has many good reasons to act proactively to solve the climate crisis.

We propose 12 actions for consideration:

- **1.** Making international climate leadership a priority goal
- 2. Setting bold climate targets
- **3.** Creating feasible plans
- 4. Investing generously in skills and competence
- **5.** Turning Finland into a living lab for climate solutions
- **6.** Accelerating climate exports
- **7.** Sharing experiences with the world
- **8.** Increasing carbon handprints
- **9.** Strengthening climate diplomacy
- **10.** Solidifying the foundation of climate co-operation
- **11.** Defending the defenders of the climate
- **12.** Involving everyone

It is possible for Finland to play a much larger role than its relative size might warrant in the fight against the climate crisis, while simultaneously seeking other benefits related to climate leadership. We hope that our proposals inspire many others to find more solutions.

Tiivistelmä

Suomi on tunnetusti varsin pieni maa. Olemme kuitenkin toistuvasti onnistuneet olemaan kokoamme suurempia monessa suhteessa – myös ilmastokriisin ratkaisemisessa.

Meillä on maailman mitassa enemmän vahvuuksia kuin aina muistammekaan. Ne antavat niin halutessamme hyvän lähtökohdan ilmastojohtajuudelle.

Suomella on monta painavaa syytä toimia ilmastokriisin ratkaisemisessa etukenossa. Edelläkävijyys ilmastotyössä ei ole hyväntekeväisyyttä, vaan pitkän päälle kansallisen edun puolustamista.

Meillä on mahdollisuus vaikuttaa kahdella pääasiallisella tavalla. Ensinnäkin Suomessa tekemämme valinnat voivat auttaa torjumaan ilmastokriisiä rajojemme ulkopuolella. Toiseksi pystymme toimimaan osana laajempaa kansainvälistä yhteisöä.

Suomella on monta painavaa syytä toimia ilmastokriisin ratkaisemisessa etukenossa. Esitämme harkittavaksi tusinaa toimenpidettä:

- **1.** Nostetaan kansainvälinen ilmastojohtajuus kärkitavoitteeksi
- 2. Asetetaan rohkeat ilmastotavoitteet
- **3.** Laaditaan toteuttamiskelpoiset suunnitelmat
- 4. Satsataan reilusti osaamiseen
- **5.** Tehdään Suomesta ilmastoratkaisujen elävä laboratorio
- 6. Vauhditetaan ilmastovientiä
- 7. Jaetaan kokemukset maailmalle
- **8.** Kasvatetaan kädenjälkeä
- **9.** Vahvistetaan ilmastodiplomatiaa
- **10.** Tuetaan ilmastoyhteistyön perustaa
- 11. Puolustetaan ilmaston puolustajia
- 12. Pidetään kaikki mukana

Suomen on mahdollista jättää huomattavasti kokoaan suurempi jälki ilmastokriisin ratkaisemisessa – ja samalla tavoitella muita ilmastojohtajuuteen liittyviä hyötyjä. Toivomme, että ehdotukset innostavat monia muita miettimään lisää ratkaisuja.

Sammanfattning

Finland är som känt ett relativt litet land. Vi har dock om och om igen lyckats vara större än vår storlek torde göra gällande – också när det gäller att lösa klimatkrisen.

Globalt sett har vi nu fler styrkor än någonsin. De skapar en god utgångspunkt för klimatledarskap, om vi vill det.

Finland har flera betydande skäl att ligga i framkant när det gäller att lösa klimatkrisen. Att vara banbrytande i klimatarbetet innebär inte välgörenhet, utan i det långa loppet ett försvar av nationella intressen.

Vi har möjlighet att påverka på två huvudsakliga sätt. För det första kan de val som vi gör i Finland bidra till att bekämpa klimatkrisen även utanför våra gränser. För det andra kan vi verka som en del i en större internationell gemenskap.

Finland had flera betydande skäl att ligga i framkant när det gäller att lösa klimatkrisen. Vi lägger fram ett dussin åtgärder för diskussion:

- **1.** Vi ställer som föregångare upp ett internationellt ledarskap som det viktigaste målet
- 2. Vi uppvisar mod när vi sätter klimatmål
- **3.** Vi tar fram genomförbara planer
- **4.** Vi satsar på kompetens på ett rättvist sätt
- **5.** Vi gör Finland till ett levande laboratorium för klimatlösningar
- **6.** Vi ger fart åt den del av exporten som stöder klimatomställnigen
- 7. Vi delar med oss av våra erfarenheter i världen
- Vi ökar vår positiva påverkan genom vårt handavtryck
- **9.** Vi stärker klimatdiplomatin
- **10.** Vi stöder grunden för klimatsamarbete
- **11.** Vi försvarar klimatarbetets beskyddare
- **12.** Vi involverar alla

Det är möjligt för Finland att lämna ett betydligt större avtryck i lösningen av klimatkrisen än vad landets storlek föranleder – och samtidigt försöka nå de fördelar som förknippas med klimatledarskap. Vi hoppas att förslagen ska inspirera många andra att fundera över fler lösningar.

Introduction

Humankind is in the midst of a sustainability crisis whose core symptoms include biodiversity loss, the depletion of natural resources, pollution and global heating. If action had been taken early enough in response to these problems, the transition to a sustainable society could have been achieved gradually. As things stand, solving the sustainability crisis calls for immediate and sweeping changes at the systemic level (IPCC 2018, IPBES 2019, International Resource Panel 2019).

The climate crisis is a prime example of a wicked problem – one that is complex and has many underlying causes. At the same time, it is a textbook case of the tragedy of the commons, and solving it requires broad co-operation. Nevertheless, after decades of procrastination, international politics, the financial markets and public opinion finally all point in the same direction: towards carbon neutrality.

Those who have kept an eye on the discussion around this topic in our country cannot have avoided seeing arguments suggesting that Finland should not get overly enthusiastic about climate efforts. That view is based on the idea that a small and remote country cannot solve a global problem, especially if larger countries are dragging their feet. Some also suggest that pursuing leadership in the climate effort could be costly for Finnish employment and the Finnish economy.

These concerns are understandable and should be taken seriously. This working paper examines the role of

a country like Finland in solving the climate crisis. We discuss topics including how small our country actually is, what our strengths might be and how small countries have, in the past, been able to leave their mark on the history of mankind. We also address the reasons why it could be beneficial for Finland to pursue climate leadership.

Perhaps even more important than the question "why?" is the question "how?": what kinds of tools can Finland use to influence the global climate crisis – if we want to? To stimulate discussion, we conclude the paper with suggestions on what Finland might do next.

To support our work on this paper, we had the opportunity to talk to a number of experienced decision-makers and experts who, through their work in various positions, have thought about the opportunities a small country has to exercise influence internationally. Thank you to everyone who shared their time and thoughts! We learned a lot from the discussions we had. Naturally, the content of this paper and any mistakes in it are the sole responsibility of the authors.

Finland needs to make a strategic choice: in the face of the inevitable changes that are coming, do we want to be a victim, an adapter or a provider of solutions (<u>Järvinen et al. 2017</u>)? Our opinion on this is clear. We believe that our country can – and should – punch above its weight when it comes to solving the climate crisis.

Solving the sustainability crisis calls for immediate and sweeping changes at the systemic level.

Punching above our weight

Here in Finland, we recognise that we are a very small country in many respects. Finland's share of the world's population is less than 0.1 per cent. We account for just over 0.3 per cent of the global economy and slightly over 0.1 per cent of the world's climate emissions.

These figures are undeniably small. Finland alone cannot solve global problems no matter what we do.

At the same time, Finland's role in many areas is much greater than average. It is not only a question of having the highest number of medals in the Summer Olympics per capita (<u>Statista 2021</u>). Finnish people and companies have also developed many solutions that influence the lives of millions of people around the world. For example:

- Neste is the world's largest producer of renewable diesel (Neste);
- Kone has grown to become the world's second-largest lift and escalator company (<u>Talouselämä 2021</u>);
- Finnish companies led the world in initial patent filings per capita for technologies related to the fourth industrial revolution (<u>Good News from</u> <u>Finland 2020</u>);
- about 10 per cent of the world's cobalt is refined in Finland (<u>Kriittiset Materiaalit</u>);
- UPM Kymmene and Stora Enso are the world's second-largest and fourth-largest companies in the forestry and paper industry (<u>Financial Times</u>).

Finland's ability to punch above its weight is also evidenced by a number of qualitative factors. For example, Finland has been ranked as the world's freest country (Freedom House), most stable country (The Fund for Peace) and the world's most literate nation (Central Connecticut State University). According to some estimates, we also have the world's best governance (The Legatum Institute), which may partly explain why Finland has been ranked the happiest country in the world for the fourth consecutive year (Helliwell et al. 2021).

In fact, the history of independent Finland is full of examples of achievements at the global level. For instance:

- for 14 years, Nokia was the world's largest manufacturer of mobile phones (<u>IndustryWeek 2012</u>), selling nearly half a billion handsets per year at the peak of its success (<u>Gartner 2009</u>) and reaching a market share of nearly 50 per cent in smartphones (<u>BBC 2013</u>);
- many education professionals from around the world come to Finland to learn about how the Finnish school system produces such excellent results (<u>Business Finland 2018</u>);
- women in Finland were the first in the world to be granted the universal right to vote and stand for election, in 1906, with the first female members of parliament being elected the following year (<u>Erkkilä</u> and Krekola 2019);
- the Linux operating system developed in Finland is used on SpaceX flights (<u>ZDNet 2020</u>) and in all Android phones, accounting for nearly three quarters of the global mobile phone market (<u>StatCounter 2021</u>);
- Finnish mediators such as Martti Ahtisaari, Elisabeth Rehn and Harri Holkeri have been instrumental in peace talks concerning difficult conflicts around the world.

At times, we have also blazed a trail in climate-related developments. For example, Finland was the first country to introduce a carbon tax (Vehmas 2002) and, under Sitra's leadership, create a road map to a circular economy (Sitra 2016). Finland also came up with the initiative to establish the Coalition of Finance Ministers for Climate Action (Ministry of Finance 2019) and the World Circular Economy Forum WCEF (Sitra 2020a). Finland's target of carbon neutrality by 2035 is also clearly one of the most ambitious among industrialised nations.

As these examples indicate, Finland has already been a climate leader on occasion. This gives us reason to believe that we can also be climate leaders in the future.

Small size has not been an obstacle to leadership for many other countries and regions either. For example (population size given in brackets):

- Denmark (5.8 million) is home to Vestas, the world's largest wind turbine manufacturer (<u>Bloomberg</u> 2021);
- Estonia (1.3 million) is where the Skype software was developed, which enabled remote meetings for millions of people (<u>Emerging Europe 2020</u>);
- Washington state (7.6 million) in the United States is home to the giant companies Amazon, Boeing, Microsoft and Starbucks;
- Singapore (5.7 million) has the world's second-busiest container port (World Shipping Council) and the country has been ranked as the world's fifth-most significant financial hub (Wardle and Mainelli 2021).

The above examples prove that even small countries can leave a mark – especially if they take action in the right place at the right time. Opportunities often present themselves particularly in turning points in history, such as the recent Covid-19 crisis.

Of course, a small country cannot solve the climate crisis alone. But it cannot be solved by a large country alone either. Even China, with a population of 1.4 billion, accounts for "only" one quarter of the world's climate emissions. This means that three quarters of global emissions arise in countries other than China.

We are all small in the face of the climate crisis. At the same time, no action that benefits the climate is too small. For the world to eventually achieve carbon neutrality, countries of all sizes need to work together.

Opportunities often present themselves particularly in turning points in history, such as the recent Covid-19 crisis.

2. Finland's 12 strengths

We Finns are often quite good at recognising deficiencies and problems – and of course there is always room for improvement. However, we sometimes forget that Finland also has many strengths. In fact, we rank very highly in international comparisons in many regards.

- 1. A tradition of co-operation. Finland has a strong tradition of dialogue and co-operation across administrative and ideological boundaries. Having business leaders and the representatives of civil movements seek solutions together at the same table is not something that can be taken for granted in every country.
- **2. Sustainability as a paradigm.** Often, regardless of which parties are in government, decisions have been guided by the perspective of sustainable development, which aims to reconcile environmental, social and economic sustainability. This is the right approach. It just needs to be put into practice more effectively.
- **3. Public support for climate efforts.** While the public debate is often characterised by polarisation and differences in opinion, the majority of Finns systematically support the country's climate leadership (Ministry of the Environment 2019). This broad consensus has also been reflected in the main aspects of climate policy, which have been supported by nearly all of the parliamentary parties (Government of Finland 2018).
- **4.** The ability to take action. A small vessel can make quick turns. Finnish society is relatively efficient and agile compared to, for example, large federal structures where power is decentralised on multiple levels. Our ability to make and implement decisions is one of our strengths, even if it did get tested and come under fire during the Covid-19 crisis (Sitra 2021)
- **5. High competence.** Competence in Finland is both broad (extending to a large proportion of the population) and deep (ranking among the best in the world in many fields). In the words of former President Tarja Halonen, education and competence are Finland's oil.

- **6. Technology and innovation.** Finland produces a lot of innovation relative to its size (<u>Insead 2020</u>). We are particularly resourceful when it comes to various low-emission and digital solutions. Finland's per capita research and development investments in renewable energy and energy efficiency have even been among the highest in the world (<u>Kuusi et al. 2021</u>).
- **7. Equality.** Whether with regard to equal political rights for women or equal education regardless of family income, we have traditionally been quite good at ensuring that everyone has the opportunity to move ahead in life. This has enabled our small country to make more effective use of everyone's competences and resources.
- **8.** Welfare state. Solving the climate crisis requires a fast and deep transition that may give the Nordic welfare state model newfound importance. Social security and public services help people find new beginnings when old structures are transformed.
- **9. Open economy.** Finland's growth has been based on a relatively free economy that has been closely linked to international trade. This has enabled us to quickly adopt solutions from other countries as well as offer solutions to other countries.
- **10. Directness.** The stereotype of Finnish people being so honest that it is almost awkward is at least half true. A communication style that is respectful but direct is appreciated around the world, as is keeping one's word. In tumultuous times, there is always demand for a no-nonsense approach.
- **11. Good reputation.** Finland has no aspirations to be a world power, nor do we have a dark colonial past. A small country is often a trusted mediator in international discussions. We also have experience of maintaining relations in high-tension situations even with difficult partners.
- **12. Trust.** Finland is a country of flat hierarchies and the people who work in a given field tend to know each other. We have relatively strong trust in our institutions and one another.

Looking from the outside, Finland indeed has a fairly enviable list of strengths. If we want them to, these strengths provide a good starting point for climate leadership.

Of course, Finland also has challenges. For example, reducing the use of peat has been a painful process and the debate around the use of forests is highly polarised. Difficulties and setbacks should be openly recognised so that they can be solved and learned from.

3. Why climate leadership?

As we discussed above, it is not unheard of for small countries to have an impact on the world. Finland also has many strengths that stand up well to international comparison. But why exactly should Finland be a climate leader? There are many reasons.

- **1. Making necessity a virtue.** The transition to carbon neutrality is inevitable, so it is better to do it in a proactive and controlled manner rather than at the last minute and when it is forced upon us. The peat industry is an example of the predicament that businesses can find themselves in when major changes take them by surprise (Sitra 2020).
 - 2. Growing markets. As a leader, we can seize a larger share of the rapidly growing global market for climate solutions (Government of Finland 2021). For example, venture capital investments in climate technology have grown five times faster than the general rate of increase (Herweijer et al. 2020). However, as competition intensifies, the window of opportunity is often very narrow.
- **3. Risk management.** Climate leadership would help us manage economic, political and climate-related risks possibly even legal risks. By being an early mover, we would likely be better positioned than our competitors to respond to the obligations stipulated by EU regulations and international agreements as well as to shape those obligations.
- **4.** Attracting investment and talent. Provided they play their cards right, the most attractive environments with regard to climate action can more easily attract investment, financing and talent. This has been reflected in the competition for data centres and clean steel production, for example.
- 5. International standing. Climate leadership would give Finland positive visibility and boost the country's image, which in turn would help strengthen Finland's international standing. Climate co-operation can also help improve relations with countries with which Finland otherwise encounters friction.

- **6. Productivity and innovation.** Reducing emissions often helps reduce waste and inefficiencies. Done right, climate action can also improve productivity and innovation in the Finnish economy.
- 7. The security of supply. Finland imports all fossil fuels and a large proportion of high-emission consumer products. For example, the transition to a climate-positive energy economy will improve energy efficiency and increase the share of domestic energy, which will improve the current account and reduce dependence on imports.
- **8. Benefits for well-being.** Climate action has many positive co-benefits for the environment, health and well-being. For example, cycling and eating plant-based diets prevent many health problems.
- **9.** A dire need. Solving a massive problem such as the climate crisis requires every country to get involved. Even small wealthy nations cannot afford to drag their feet. Otherwise, it would be difficult to explain to emerging economies why they need to take action
- **10. Responsibility.** Responsibility for the climate weighs especially heavily on developed countries such as Finland. It is only fair that we repair the damage we have caused to our shared climate. If there is any country that can develop effective climate solutions, it must be Finland.

Understandably, different justifications appeal to different audiences. Most of us also take several perspectives into consideration at the same time. For example, having the opportunity to do the right thing while also gaining economic benefits is an attractive proposition.

Sometimes in the public discussion, Finland's national interests and the shared interests of humankind are pitted against each other. As indicated by the reasons discussed above, taking a proactive approach to solving the climate crisis is ultimately a question of protecting Finland's national interests.

4. Finland's tools: impact across borders

If a country decides to pursue climate leadership, the next question is how to achieve that goal in practice. So, what kinds of tools are available to a country like Finland?

The occasional feeling of powerlessness in the face of the climate crisis may be partly due to a narrow understanding of the tools available. When you recognise the full extent of the toolbox, you realise that there are a lot of opportunities to make an impact.

The toolbox can be seen as having two main sections. One consists of the tools by which the choices we make in Finland also help combat the climate crisis beyond our borders. The other consists of the tools by which we exercise influence as part of the broader international community. We will start with a look at decisions at the national level with which we can leave a mark outside Finland's borders.

Setting an example. The climate crisis is a shared challenge that practically all of the world's countries must tackle one way or another. This is why there is a lot of international demand for solutions and good examples.

If Finland were to achieve carbon neutrality by 2035 in a fair manner and if we manage to make our country the first fossil-free welfare state, it would be a significant achievement on the global scale. Other countries would want to learn from our experiences.

For Finland to set an example to the rest of the world, our success must be built on a sustainable long-term foundation. With this in mind, it is essential that the transition to a climate-positive Finland is achieved in a manner that is fair to all groups of people and with a conscious focus on reducing polarisation.

When the mission of climate action is widely seen as meaningful, it is easier to engage the involvement of people throughout society. Finland needs flagships that make the benefits of climate action visible to everyone.

We Finns often see ourselves as taciturn people whose actions speak louder than their words and who bear their responsibility without making it a big deal. But climate action is something that needs to be made a big deal. Cold hard facts do not always capture people's attention; instead, the benefits and results of action need

to be communicated in an inspiring way by people proud of the contribution they have made.

This is why it is vital to create a bright, inspiring and human story of Finland as a climate-positive country with a high level of well-being. Crisis awareness needs to be complemented by a shared understanding that, in many respects, we can make things better rather than worse. It is also important to tell this story around the world – with pride but without being condescending.

Social innovation. Technology is not the only realm of innovation. Sometimes it is ideas concerning society that are the most effective at expediting climate action.

For example, the UK implemented the world's first legal framework concerning climate change in 2008 (Grantham Research Institute 2020). The positive experiences gained from that legislative initiative subsequently served as an example for many countries around the world – including Finland (Fankhauser et al. 2018).

Being the first in the world to accomplish something is not always essential. Sometimes the ideal approach is to take a solution that was developed by a different country and refine it to make it even more effective – much like Finland has done with the sector-specific carbon-neutrality road maps first developed in Sweden (Fossilfritt Sverige, Ministry of Economic Affairs and Employment).

At other times, it is good to be close to the leading edge of new developments, contributing to a broader movement. Finland was not the first country to prohibit the energy use of coal by law, but we were part of creating the larger wave around that decision.

Increasing our handprint. No matter how successfully we in Finland reduce our emissions, our impact on the climate can only be as large as our footprint, which measures the amount of emissions we generate. However, our handprint – which refers to the emission reduction benefits outside our borders achieved through solutions produced in Finland – can be many times, or even tens of times, larger than our footprint (<u>Paloneva and Takamäki 2020</u>).

For example, Finnish Forest Industries estimates that products made from wood in Finland replace fossil

emissions in other countries to the amount of 16 million tonnes of carbon dioxide (<u>Finnish Forest Industries</u> 2020). The Chemical Industry Federation of Finland, in turn, estimates that its carbon handprint can grow in the near future from the current level of 21 million tonnes by five million tonnes – coinciding with export revenue increasing by $\mathfrak{e}5$ billion (<u>Vasara et al. 2020</u>).

It makes sense for Finland to develop and sell climate solutions also because it helps us create jobs and income in our country. It also makes sense for us to sell solutions because that way we help other countries reduce their emissions. For example, the solutions developed in Finland for non-combustion-based district heating could help reduce emissions for hundreds of millions of people living in the cold regions of China.

A small country may not be able to establish a dominant position in mass markets worth hundreds of billions of euros, such as wind power. However, through specialisation, we can find success with more targeted solutions such as the de-icing of wind turbines or offshore wind power solutions for challenging and icy conditions.

Addressing consumption-related emissions. We are also indirectly responsible for the emissions we cause through consumption and enable through financing. By taking action against consumption-related emissions with the same level of commitment as with emissions generated within Finland's borders, we can also reduce

Through specialisation, we can find success with more targeted solutions.

emissions in countries such as China that produce a large proportion of the goods we buy. In Sweden, a parliamentary working group is already preparing a target for the country's consumption-related emissions (Naturvårdsverket 2021).

Before the Covid-19 crisis, Finnish people ranked second globally in terms of flying per capita, only behind Singaporeans (Zheng 2019). However, international air and sea traffic is not included in national statistics, so their impact is not reflected in Finland's emission figures.

Approximately 30 to 40 per cent of the emissions associated with deforestation in the tropics are caused by production to serve the needs of other countries – especially in the case of beef, soy and palm oil (Pendrill et al. 2019). This means that the consumption of the average inhabitant of a wealthy country causes deforestation amounting to approximately four trees per year (Hoang and Kanemoto 2021). Applying this rough estimate to Finland, our total consumption could cause deforestation abroad amounting to an area approximately equal in size to Malta (Ter Steege et al. 2003).

Currently, a significant proportion of our savings in pension funds and equity funds also ends up financing the fossil economy (<u>WWF 2018</u>). In many cases, even funds that are marketed as climate-friendly may invest in energy companies who still use fossil fuels for a significant share of their production (<u>Hiilivapaa Suomi</u>).

5. Finland's tools: working together for the climate

As stated above, decisions made at the national level can enable Finland to have an impact beyond its borders in many ways. Often, an even greater impact can be achieved by working together with others.

"We must never remain alone again," said Prime Minister Kaja Kallas to describe Estonia's approach after the country's difficult experiences in the 1940s (interview with Kallas on 23 April 2021). This is the reason why the small nation of Estonia has proactively sought to participate in international co-operation.

Kallas also has a suggestion for small nations. In international discussions, no one will listen to you if you shout all the time. Conversely, if you stay quiet, you will not be seen. So, you need to make your voice heard, but at the right volume.

Exercising influence in the EU. Researcher Anu Bradford has coined the term the "Brussels Effect" to describe how regulations implemented in the EU are externalised beyond its borders (<u>Bradford 2020</u>). For example, the EU's General Data Protection Regulation (GDPR) is estimated to have influenced similar legislation in approximately 100 countries (<u>Microsoft 2020</u>).

The EU is the world's largest internal market, which means that practically all international companies want to operate in it. If a large quantity of refrigerators needs to be manufactured in accordance with the EU's energy-efficiency regulations, it may make sense to sell the same products in other markets as well. Similarly, some countries outside the EU may decide that it is easier to apply the EU's regulations than to develop their own regulations and potentially create unnecessary market

The EU's impact extends beyond its internal market. The EU is the world's largest trading block (European Commission 2020) and when countries within it export products internationally, they also export solutions that are in line with EU rules. The authority over trade policy lies at the EU level, and the EU can use it to influence other countries such as Brazil, which has come under fire for the destruction of its rainforests. The EU is also the world's largest provider of development funding, for example (European Parliament 2020).

By taking the initiative and working in a knowledgeable and purposeful manner, even a small member state can change the direction of the EU and, consequently, the world. Finns are involved in decision-making at all levels: the European Council, the European Parliament and the European Commission. The EU's legislation is based on drafting in expert committees that value the expertise of member states.

In many cases, the roots of decisions at the EU level can also be traced back to individual member states. The GDPR, for instance, was influenced by corresponding national legislation in Germany, France and Sweden. The EU Emissions Trading System, in turn, was inspired by the systems implemented in the UK and Denmark (Bradford 2020, IETA 2015).

Regional co-operation. Nordic co-operation is particularly natural for Finland. While the Nordic countries are fairly small, together they constitute the world's 11th largest economy. The Nordic countries also have a shared desire to take climate action as well as a long history of co-operation.

The Nordic nations could learn a lot from each other when it comes to climate solutions. Together, they could also accelerate the dissemination of Nordic solutions around the world. For example, if comparable countries were to adopt 15 solutions at the scale at which they are already applied in at least one Nordic country, global emissions could be reduced by an amount roughly corresponding to the EU's annual emissions (<u>Tynkkynen</u> 2016).

To date, the most significant climate achievement of the Nordic countries has been the creation of a common market for electricity. In the future, the Nordic countries could agree on climate action in areas where co-operation can create added value, such as carbon-neutral marine transport or promoting the use of electric vehicles.

Regional climate co-operation can also be promoted in other forums. For example, the members of the Arctic Council include the great world powers of the United States and Russia as well as China and India as observers. In spite of geopolitical tensions, the council has been able

to engage in constructive discussion on climate co-operation.

International agreements and organisations. At the heart of international climate co-operation are climate negotiations under the UN and the agreements they result in. Finns have repeatedly played a significant role in the history of these negotiations and our country has shown particular initiative when it comes to promoting gender equality. Indeed, a small country can maximise its influence by focusing on carefully selected topics.

More broadly in the UN, Finland can highlight the climate topic in the UN General Assembly and the UN Human Rights Council as well as within various organisations under the UN, such as the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO). Finland can even introduce climate-related topics to the UN Security Council through partner nations such as Estonia (term ends in 2021) and Norway (term ends in 2022).

Economic co-operation organisations also play a significant role. From the climate perspective, the kinds of projects supported by international financial institutions such as the World Bank make a big difference. The World Trade Organization, in turn, influences carbon tariffs, for example, while the OECD influences the sustainability of economic policy.

International climate initiatives. International climate co-operation also takes place outside intergovernmental organisations. International climate initiatives include a diverse range of coalitions in which national governments, the business sector, local governments, NGOs and other organisations work together across national boundaries on a climate-related topic (<u>Tynkky-nen 2018</u>).

For example, Finland has – for several years – supported an initiative aimed at promoting the reduction of fossil fuel subsidies (<u>Friends of Fossil Fuel Subsidy Reform</u>). The Coalition of Finance Ministers for Climate Action was even established at Finland's initiative and Finnish finance ministers have served as co-chairs of the coalition since its inception. The coalition is also a good example of how an initiative driven by a small country can be successful there are now 60 countries involved, representing approximately two thirds of the global economy (<u>Coalition of Finance Ministers for Climate</u> Action).

International co-operation does not always need to be state-driven. Finnish municipalities and companies can also exercise influence within their networks. For example, the Mayors of Turku and Helsinki have promoted their municipalities' international climate co-operation, while the Climate Leadership Coalition has spoken for the climate in business sector networks.

Bilateral climate diplomacy. Representatives of the Finnish state frequently meet with their foreign counterparts. Every meeting is an opportunity to emphasise climate action and seek co-operative solutions.

The Finnish action plan for foreign policy on climate change clearly recognises the significance of bilateral relations (Ministry for Foreign Affairs), but the practical side of things is a different issue. Finnish President Sauli Niinistö has consistently advocated the reduction of black carbon emissions, which have a particularly adverse impact on the climate, in meetings with Donald Trump and

Vladimir Putin, for example (<u>Yle 2018</u>). However, in meetings between foreign ministers, the climate does not appear to be a frequent topic of discussion.

The United Kingdom is a good example of consistent climate diplomacy. Climate is a key focus area in the country's foreign policy and security policy (<u>Cabinet Office 2021</u>). As the country with the presidency of November's forthcoming COP26 Climate Change Conference, the UK has harnessed its entire diplomatic machinery to promote climate consensus. The UK has also appointed regional special ambassadors to support the conference (<u>COP26</u>).

It also makes sense to look for partners beyond the predictable candidates. In addition to the familiar countries of Northern and Western Europe, it may pay off to work together with countries in Southern Europe, the Balkans or Africa, for example.

Climate finance and development co-operation. As part of the Paris Agreement, wealthy nations have made a commitment to support climate action by developing nations. Finland has provided funding to the Global Environment Facility (GEF) and the Green Climate Fund (GCF), among others.

Climate action can also be promoted through development co-operation. Finland is involved in climate projects through various forms of development co-operation: bilateral, multilateral and channelled through the EU. The climate is also a significant factor in the activities of Finnfund, which invests in businesses in developing countries.

Nevertheless, we are clearly behind our Nordic peers with regard to both climate finance and development co-operation. Sweden and Norway have financed the Green Climate Fund by about four times more than Finland on a per capita basis (Green Climate Fund 2020).

Finland allocates 0.4 per cent of GDP to development co-operation,

while the corresponding allocation in Sweden and Norway is one per cent (OECD 2020).

The keys to successful influence

Exercising influence is a skill that can be learned. The following tips may be helpful.

Do your homework.

When you engage in advocacy efforts, you need to be familiar with your subject matter and you need to know your audience. When you are well prepared, you can take action when the opportunity presents itself.

Think long-term.

Quick wins are rarely available. Consistent and systematic action with a long-term approach produces good results.

Seek allies.

Find like-minded partners, even in unexpected directions. Give space – and part of the plaudits – to your partners.

Speak the same language.

You should tune your message to your audience's frequency and listen closely to your partners. Start the discussion from the things that the parties involved have in common.

Foster personal relationships.

People are behind all decisions both big and small. Trust-based relationships can only be built through long-term effort.

Leave a mark.

Believe in your issue. Commitment shows and you should display your passion in addition to your knowledge and skills.

Be brave.

It is important to get out of your comfort zone sometimes. Making big leaps often calls for courage and the willingness to take risks.

Suggested next steps

As we have discussed above, there are many tools for climate leadership. A strong foundation is easy to build on

Next, we present a number of suggestions on what the next steps could be. By taking the action outlined below, it is possible for Finland to punch above its weight in solving the climate crisis – and simultaneously pursue other benefits related to climate leadership. These suggestions should be viewed as discussion openers that will hopefully inspire many others to think about more solutions.

- tional climate leadership a priority goal. International climate leadership should be set as a strategic objective for Finland one that guides decision-making at all levels and in all areas. Structures and resources must be harnessed to support climate action on a long-term basis. Much depends on attitude: seizing the opportunities that emerge from the inevitable change and benefiting from them. It is also justified to feel a sense of healthy pride and enthusiasm about climate leadership, even if that is a feeling that does not come naturally to us Finns.
- 2. Set ambitious climate targets... The commitment to carbon neutrality by 2035 can be specified further by setting ambitious targets regarding, for example, the reduction of consumption-related emissions and increasing carbon sinks. When setting targets, you do not always know whether you will accomplish them fully. Nevertheless, an ambitious and proactive approach pushes you to try harder and achieve more.
- 3. ...and create feasible plans. Targets can only be achieved by having feasible and cost-effective plans. Instead of being naive about climate action, you need to recognise competitiveness risks and other risks. Plans must be based on systems-level assessments, anticipating changes and a framework of sustainable development. Resources such as the competence of businesses and the views and opinions of the public should be broadly used in preparing plans.

- 4. Invest heavily in skills and competence. The development and application of climate solutions requires significant investments in competence and innovation. According to the Government Programme, spending on research, development and innovation should be increased to 4% of GDP by 2030. Funding should be focused on disruptive innovation and solutions to the climate crisis. Strategic choices are also necessary; for example, making considerable investments in a battery ecosystem that relies on a circular economy. Basic funding for universities and research institutions has to be ensured at the same time.
- **5.** Turn Finland into a living lab. Climate solutions need to be moved from the drawing board to practice as quickly as possible. To this end, the state and local governments must provide testbeds and local markets for new solutions. One example is the Smart & Clean Foundation in the Helsinki region (Smart & Clean Foundation). One tool that is severely underused is public procurement. The billions of euros spent on public purchases annually could give a flying start to many climate solutions.
- 6. Boost climate exports. The excellent climate solutions developed by Finnish companies need to be exported more effectively to other countries to reduce emissions there. One key player in this respect is Business Finland, whose activities should be enhanced further (Eaton et al. 2021). Comparisons can be drawn with Denmark, where significant investments have been made in promoting the export of climate solutions (Danish Ministry of Energy, Utilities and Climate 2018).
- 7. Share Finland's experiences. Our small northern nation is easily overlooked if we fail to draw attention to ourselves internationally. Indeed, Finland should work hard to spread the word of our experiences both our accomplishments and our difficulties. The Helsinki Energy Challenge (City of Helsinki) and the Finnish road map to a circular economy (Sitra 2020b) are examples of models whose lessons are intended to be widely shared around the world.

- 8. Focus on the handprint. Finnish climate policy should have a stated objective of not only reducing our national emissions but also increasing our positive international climate impact, i.e. our carbon handprint. This means prioritising climate action that helps create new solutions that have particularly significant global potential.
- **9. Strengthen climate diplomacy.** The Finnish action plan for foreign policy on climate change provides a framework for the development of climate diplomacy perhaps signalling the need for a government-level report. Solving the climate crisis must be at the top of the agenda in all bilateral and multilateral relations. Climate diplomacy competences and resources also need to be increased across Finland's network of diplomatic missions abroad, for example.
- **10. Solidify the foundation for climate co-operation.** Much of international climate policy takes place outside the spotlight and often with quite meagre resources. Even a small country can play a big role by, for instance, supporting the UN Framework Convention on Climate Change secretariat and

- promoting its renewal. Finland can also make
 Finnish specialists available for international duties,
 both to support international efforts and to learn
 lessons that can then be put into action domestically.
 This would also support the education and development of new international climate decision-makers.
- tries, being a prominent defender of the climate can expose a person or organisation to harassment, persecution or even violence. Finland could launch an international initiative to support the defenders of the climate. The <u>Digital Defenders Partnership</u>, which supports those who fight for digital freedom, could serve as an example.
- **12. Get everyone involved.** While the commitment of the highest levels of the Finnish administration is crucial, it is also important to broadly engage Finnish society in climate action. The transition must be fair and no one should be left behind. Critical voices also need to be heard. Climate action must always be approached from the perspective of how it can benefit ordinary Finns today.

Sources

Interviews

Bradford, Anu, author and law professor, 15 March 2021

Halonen, Tarja, former President of Finland, 9 March 2021

Herlin, Antti, Chairman of the Board of Directors of Kone Corporation, 1 March 2021

Honkatukia, Outi, Head of Climate Unit, Ministry of the Environment of Finland, former Chief Negotiator for Climate Change for Finland, 4 June 2021

Kallas, Kaja, Prime Minister of Estonia, 23 April 2021

Katainen, Jyrki, President of Sitra, former Prime Minister of Finland, former Vice-President of the European Commission, 4 March 2021

Kosonen, Kaisa, Climate and Energy Campaigner at Greenpeace Finland, 11 May 2021

Kosonen, Mikko, former Senior Vice President, Strategy and Business Infrastructure at Nokia and former President of Sitra, 1 March 2021

Kulovesi, Kati, Professor of International Environmental Law, University of Eastern Finland, 4 May 2021

Lehtomäki, Paula, Secretary General of the Nordic Council of Ministers, former Minister of Foreign Trade and Development of Finland, former Minister of the Environment of Finland, 21 May 2021

Liikanen, Erkki, former Governor of the Bank of Finland and former member of the European Commission, 5 March 2021

Morén, Pekka, Special Representative of the Minister of Finance of Finland, 12 March 2021

Myllyvirta, Lauri, Lead Analyst at the Centre for Research on Energy and Clean Air, 17 March 2021

Ollila, Jorma, Chairman of the Board of Directors of Alma Media, former CEO of Nokia, former Chairman of the Board of Directors of Royal Dutch Shell, 25 March 2021

Potočnik, Janez, Co-Chair of the UNEP International Resource Panel and former member of the European Commission, 1 March 2021

Soini, Timo, former Minister for Foreign Affairs of Finland and former member of the European Parliament, 20 April 2021

Wijkman, Anders, Co-President of the Club of Rome and former member of the European Parliament, 8 March 2021

Literature

BBC 2013. Nokia: The rise and fall of a mobile giant, retrieved 9 June 2021.

Bloomberg 2021. GE Topples Vestas as World's Biggest Wind Turbine Maker, retrieved 9 June 2021.

Bradford A. 2020. The Brussels Effect: How the European Union Rules the World, Oxford University Press, New York. See The Brussels Effect: How the European Union Rules the World, retrieved 10 June 2021.

Business Finland 2018. Suomesta halutaan oppia – koulutusmatkailu kasvaa, retrieved 9 June 2021.

Cabinet Office 2021. Global Britain in a Competitive Age: the Integrated Review of Security, Defence, Development and Foreign Policy: The national security and international environment to 2030, published 16 March 2021, retrieved 10 June 2021.

Central Connecticut State University. World's Most Literate Nations, retrieved 9 June 2021.

City of Helsinki. Helsinki Energy Challenge: About, retrieved 10 June 2021.

Coalition of Finance Ministers for Climate Action. Member Countries, retrieved 10 June 2021.

COP26. Our Team, retrieved 10 June 2021.

Danish Ministry of Energy, Utilities and Climate 2018. <u>Denmark: energy and climate pioneer — Status of the green transition (PDF),</u> retrieved 10 June 2021.

Digital Defenders Partnership. Digital Defenders Partnership website, retrieved 10 June 2021.

Eaton D., Tynkkynen O., Berninger K., Perrels A., Romanainen J., Vingre A., Tiusanen M. and Beckers D. 2021. <u>Business Finland Advancing Cleantech and Bioeconomy (PDF)</u>, retrieved 10 June 2021.

Emerging Europe 2020. Why Skype remains key to Estonia's digital success, retrieved 9 June 2021.

Erkkilä P. and Krekola J. 2019. <u>Naisten äänioikeus 110 vuotta -tietopaketti – Naiset kansanedustajina</u>, updated 5 July 2019, retrieved 9 June 2021.

European Commission 2020. DG Trade Statistical Guide – August 2020, retrieved 10 June 2021.

European Parliament 2020. A general survey of development policy, retrieved 10 June 2021.

Fankhauser S., Averchenkova A. and Finnegan J. 2018. 10 years of the UK Climate Change Act, retrieved 9 June 2021.

Financial Times. Equities — Basic Materials — Forestry and Paper, retrieved 9 June 2021.

Finnish Forest Industries 2020. Vihreä ja vireä talous - metsäteollisuuden ilmastotiekartta (PDF), retrieved 10 June 2021.

Fossilfritt Sverige. Roadmaps for fossil free competitiveness, retrieved 10 June 2021.

Freedom House. Freedom in the World, retrieved 9 June 2021.

Friends of Fossil Fuel Subsidy Reform. Friends of Fossil Fuel Subsidy Reform website, retrieved 10 June 2021.

Fund for Peace, The. Fragile States Index, retrieved 9 June 2021.

Gartner 2 March 2009. <u>Gartner Says Worldwide Mobile Phone Sales Grew 6 Per Cent in 2008, But Sales Declined 5 Per Cent in the Fourth Quarter, retrieved 9 June 2021.</u>

Good News from Finland 2020. Finland leads world in new technology patents per capita in 2000s, retrieved 9 June 2021.

Government of Finland 2018. <u>Kahdeksan eduskuntapuoluetta päätti yhteisistä ilmastopolitiikan tavoitteista,</u> retrieved 9 June 2021.

Government of Finland 2021. <u>Tutkimus: Ilmastopolitiikan työllisyysvaikutuksia voidaan edistää työvoimapolitiikalla, koulutuksella ja TKI-panostuksilla, retrieved 10 June 2021.</u>

Grantham Research Institute 2020. What is the 2008 Climate Change Act?, published 30 April 2020, retrieved 9 June 2021

Green Climate Fund 2020. Resource mobilisation, retrieved 10 June 2021.

Helliwell J. F., Layard R., Sachs J. and De Neve J.-E. (eds) 2021. World Happiness Report 2021, retrieved 9 June 2021.

Herweijer C., Combes B., Moussa T., Wark J., Wrigley J. and Donnelly M. 2020. The State of Climate Tech 2020, retrieved 10 June 2021.

Hiilivapaa Suomi. <u>Suursijoittajien hiilipolitiikkamittari</u>, retrieved 21 April 2021.

Hoang N. T. and Kanemoto K. 2021. Mapping the deforestation footprint of nations reveals growing threat to tropical forests. In Nature Ecology & Evolution 5: 845-853, retrieved 9 June 2021.

IETA 2015. United Kingdom: An Emissions Trading Case Study (PDF), retrieved 10 June 2021.

IndustryWeek 2012. Samsung Overtakes Nokia to Become the World's Biggest Mobile Seller, retrieved 9 June 2021.

Insead 2 September 2020. The World's Most Innovative Countries, 2020, retrieved 10 June 2021.

International Resource Panel 2019. Global Resources Outlook, retrieved 11 June 2021.

IPBES 2019. Global Assessment Report on Biodiversity and Ecosystem Services, retrieved 11 June 2021.

IPCC 2018. Global Warming of 1.5 °C, retrieved 11 June 2021.

Järvinen L., Kahra M., Kaufmann D., Laine S., Mattila H., Mänty A., Pantsar M., Peljo J. and Sorasahi H. 2017. Victim, adapter or solution provider?, retrieved 9 June 2021.

Kriittiset Materiaalit. Koboltti, retrieved 9 June 2021.

Kuusi T., Pohjola J., Kaskinen T., Kaitila V., Karhinen S., Kauhanen A., Lintunen J., Reinikainen T., Savolainen H., Sillanaukee O. and Suikkanen H. 2021. The effects of climate policy on employment: A Finnish perspective, retrieved 10 June 2021

Legatum Institute. The Legatum Prosperity Index 2020, retrieved 9 June 2021.

Microsoft 2020. What is the Brussels Effect, and what does it mean for global regulation?, published 26 October 2020, retrieved 10 June 2021.

Ministry for Foreign Affairs of Finland. Ulkoministeriön ilmastoulkopolitiikan toimintaohjelma, retrieved 10 June 2021.

Ministry of Economic Affairs and Employment. Low-carbon roadmaps 2035, retrieved 10 June 2021.

Ministry of Finance 2019. <u>Valtiovarainministerit torjuvat ilmastonmuutosta – yhteistyö käynnistyy Washingtonissa</u>, retrieved 9 June 2021.

Ministry of the Environment 18 March 2019. <u>Climate Barometer 2019: Finns wish to have solutions to climate crisis at the heart of policy-making</u>, retrieved 9 June 2021.

Naturvårdsverket 2021. Konsumtionsbaserade utsläpp av växthusgaser, updated 19 April 2021, retrieved 10 June 2021.

Neste. <u>Vastuulliset ratkaisut – Uusiutuvat polttoaineet</u>, retrieved 9 June 2021.

OECD 2020. Aid by DAC members increases in 2019 with more aid to the poorest countries (PDF), retrieved 9 June 2021.

Paloneva M. and Takamäki S. 2020. Summary of sectoral low-carbon road maps, retrieved 11 June 2021.

Pendrill F., Persson U. M., Godar J., Kastner T., Moran D., Schmidt S. and Wood R. 2019. Agricultural and forestry trade drives large share of tropical deforestation emissions. In Global Environmental Change 56: 1-10, retrieved 10 June 2021.

Sitra 2016. Finland's road map to a circular economy 2016-2025, retrieved 9 June 2021.

Sitra 2020a. Faith in a solution - the story behind the World Circular Economy Forum, retrieved 9 June 2021.

Sitra 2020b. A guide to help any country create a national circular economy road map, retrieved 10 June 2021.

Sitra 2020c. <u>Turvealalla työskentelevät kokevat sopeutumisen alan muutosvauhtiin lähes mahdottomaksi</u>, retrieved 10 June 2021.

Sitra 2021. Korona paljasti Suomen päätöksenteon kehittämistarpeita, retrieved 10 June 2021.

Smart & Clean Foundation. Smart & Clean Foundation website, retrieved 10 June 2021.

StatCounter 2021. Mobile Operating System Market Share Worldwide, retrieved 11 June 2021.

Statista 2021. Average number of medals won per capita at the Summer Olympics from 1896 to 2016, retrieved 9 June 2021.

Talouselämä 2021. Kone on jo maailman toiseksi suurin hissiyhtiö, mutta onko Kiina-riski jo liiankin suuri? "Mielestäni olisi suurempi riski olla pieni Kiinassa", sanoo Henrik Ehrnrooth, retrieved 9 June 2021.

Ter Steege H., Pitman N., Sabatier D., Castellanos H., Van Der Hout P., Daly D. C., Silveira M., Phillips O., Vasquez R., Van Andel T., Duivenvoorden J., Adalardo De Oliveira A., Ek R., Lilwah R., Thomas R., Van Essen J., Baider C., Maas P., Mori S., Terborgh J., Núñez Vargas R., Mogollón H. and Morawetz W. 2003. A spatial model of tree alpha-diversity and tree density for the Amazon, in Biodiversity and Conservation 12: 2255-2277, retrieved 10 June 2021.

Tynkkynen O. (ed.) 2016. Nordic Green to Scale: Nordic climate solutions can help other countries cut emissions, retrieved 10 June 2021.

Tynkkynen 0. 2018. <u>Ilmastoaloitteet haltuun – Suomen strateginen asemointi maailmanlaajuisessa toimintaohjelmassa,</u> retrieved 10 June 2021.

Vasara, Nyman, Lehtinen, Aktüre and Laukkanen 2020. <u>Tiivistelmä kemianteollisuuden tiekartasta hiilineutraalisuuteen</u> (PDF), retrieved 10 June 2021.

Vehmas J. 2002. "Money for Sweden and CO2 emissions to Denmark": Reconstitution of the Finnish environment-based energy taxation in 1993-96, p. 92, doctoral dissertation, University of Tampere, retrieved 9 June 2021.

Wardle W. and Mainelli M. 2021. Global Financial Centres Index 29, retrieved 9 June 2021.

World Shipping Council. Top 50 World Container Ports, retrieved 9 June 2021.

WWF 2018. <u>WWF:n tutkimus: Euroopan suurimmat sijoittajat eivät torju ilmastonmuutosta Pariisin ilmastosopimuksen mukaisesti, retrieved 10 June 2021.</u>

Yle 2016. Suomi on kuminan mahtimaa – yli neljännes maailman kuminasta on suomalaista, retrieved 9 June 2021.

Yle 2018. <u>President Niinistö calls for Arctic Summit – including Russia and US – to tackle black carbon</u>, retrieved 10 June 2021.

ZDNet 3 June 2020. From Earth to orbit with Linux and SpaceX, retrieved 11 June 2021.

Zheng S. 2019. Not every tonne of aviation CO2 is created equal, published 16 October 2019, retrieved 10 June 2021.



SITRA WORKING PAPER 6.9.2021 Sitra working papers provide multidisciplinary information about developments affecting societal change. Working papers are part of Sitra's futureoriented work conducted by means of forecasting, research, projects, experiments, and education.

ISBN 978-952-347-235-8 (PDF) www.sitra.fi

SITRA.FI

Itämerenkatu 11–13 PO Box 160 FI-00181 Helsinki, Finland Tel: +358 294 618 991 **ૐ** @SitraFund