



20 ANNUAL 20 REPORT

European Academies



Science Advisory Council

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EASAC in 2020 **29** Member Academies
158 Contributing Scientists **7** Publications
9 Science Journal Articles **1** Briefing
Paper for the European Parliament **28**
Events **7** Press Releases **250** Media
Articles **282.000€** Budget **Invaluable**
Member Academies' In-kind Support



Serving Society during a Crisis

The year 2020 was certainly an unusual one. Like everyone else, the National Science Academies of Europe – and EASAC as their joint voice for science policy – had to change gear and adapt to the COVID-19 pandemic. The launch event of EASAC’s Report “Packaging Plastics in the Circular Economy” on 10 March was practically the last public presentation in Brussels before the heart of political Europe shut down for several months.

Fortunately, as we have worked via video call for many years, the transition to fully remote working was swift. However, the pandemic meant that for the first time in nearly 20 years there were no in-person meetings – and we thank everybody for their continued engagement and flexibility over this past year.

Despite all obstacles, EASAC’s output has been substantial during 2020, including the first Commentary produced jointly by our three core Programmes: “How can science help to guide the European Union’s green recovery after COVID-19?” published in May 2020. The other major EASAC publications are summarised in this Annual Report. We take this opportunity to thank our Programme Directors and Steering Panel Chairs for their outstanding commitment and exceptional quality of work.

The need for transformative change

Through the dissemination of these outputs, EASAC Programmes have made substantial contributions to important policy debates: on packaging plastics, genome-edited plants, regenerative medicine, hydrogen and synthetic fuels, and the need for transformative change in Europe



and worldwide. There were nine articles in high-impact journals directly derived from these and earlier EASAC science policy activities.

The year 2020 also saw the publication of a joint report with the Global Network of Science Academies IAP and the US Science Academies on global health security risks from microbial threats in the arctic, and the delivery of a briefing paper for the European Parliament on climate change and its impact on food and nutrition security.

There was substantial follow-up of several of EASAC's earlier publications, notably on forest bioenergy, food and nutrition security and agriculture, and climate change and health. As in previous years, EASAC was a particularly active regional network of IAP, collaborating with the regional

networks of the science Academies of Africa, Asia and the Americas.

The role of science

Aware of the important role of the Academies in serving society during the COVID-19 crisis, EASAC ran a series of webinars on science communication in the context of the pandemic; highlights of this work are also provided in this report.

In summary, 2020 was another highly productive year for EASAC. The pandemic has demonstrated to policy-makers and societies across Europe and worldwide the vital importance of science as the basis for rigorous policy-making on which the lives of people and well-being of societies depend.

Christina Moberg: EASAC President

Christiane Diehl: EASAC Executive Director



Packaging Plastics in the Circular Economy

Plastics are literally everywhere. Since the 1960's global plastic production has increased from 1.5 million to almost 400 million tons per year.

In the Report Packaging Plastics in the Circular Economy, released in March 2020, EASAC warns that current efforts to resolve the plastics crisis are ineffective and misleading. It was the first time ever that the leading scientists from the National Academies of Science of 28 European countries joined efforts in taking an in-depth look at the whole plastics value chain. The report shows that fundamental and systemic reforms are required from production to end of life, in order to slow and reverse damage to the environment, biodiversity and ultimately to human health.

EASAC makes clear that voluntary mechanisms and market mechanisms

“Macro and microplastics are widespread on land, in the seas and are even found in the air. In the history of mankind, the 21st century might actually be remembered as the plastics age.”

Michael Norton
EASAC Environment Programme
Director

“Europe should deal with its own waste and not offload it on others less able to deal with it. Processing plastic waste in Europe is better from both an environmental and ethical point of view, even if we had to incinerate some of it in waste-to-energy plants.”

Annemiek Verrips
The Royal Netherlands Academy of
Arts and Sciences (KNAW)

are insufficient to address the problem. We also show that banking on growth is not an option, not least because switching to many so-called “bio”-materials cannot be justified on resource or environmental grounds. The Report therefore calls on European legislators to adopt rules and incentives to speed up the move towards a Circular Plastic Waste Economy.

Widely echoed in leading European media, the recommendations in seven areas were welcomed by European lawmakers and NGOs as a timely contribution to put the debate on Europe's Circular Economy Strategy on solid scientific grounds.

Seven Recommendations to European Lawmakers

1 Ban exports of plastic waste

Europe should not offload its waste on others less able to deal with it. Today, huge amounts of contaminated and hard-to-recycle plastic is being shipped out of Europe, often ending up in illegal factories and/or being leaked into the local environment and ultimately the oceans.

2 Adopt a target of zero plastic consumption and one-way use

The EU should make the adoption of a target of zero plastic waste to landfill a priority. An important measure is to extend direct return schemes to a wider range of containers and single-use beverages.

3 Extend producer responsibility

Policy-makers should apply extended producer responsibility fees to large volume plastics packaging. Eco-modulated fees should take into account product design criteria relating to their end-of-life use and impacts such as toxicity, durability, reusability, repairability and recyclability/compostability.

4 End misleading consumers about bio-based alternatives

The EU should establish a mandatory and uniform labelling scheme based on actual rather than theoretical recyclability. Consumers are misled by the current diversity of labelling schemes. Only a limited number of “bio” products can meet biodegradation tests in the marine environment. Some maintain their integrity for months, during which means the risks of entanglement and ingestion remain.

5 Advance recycling and reprocessing technology

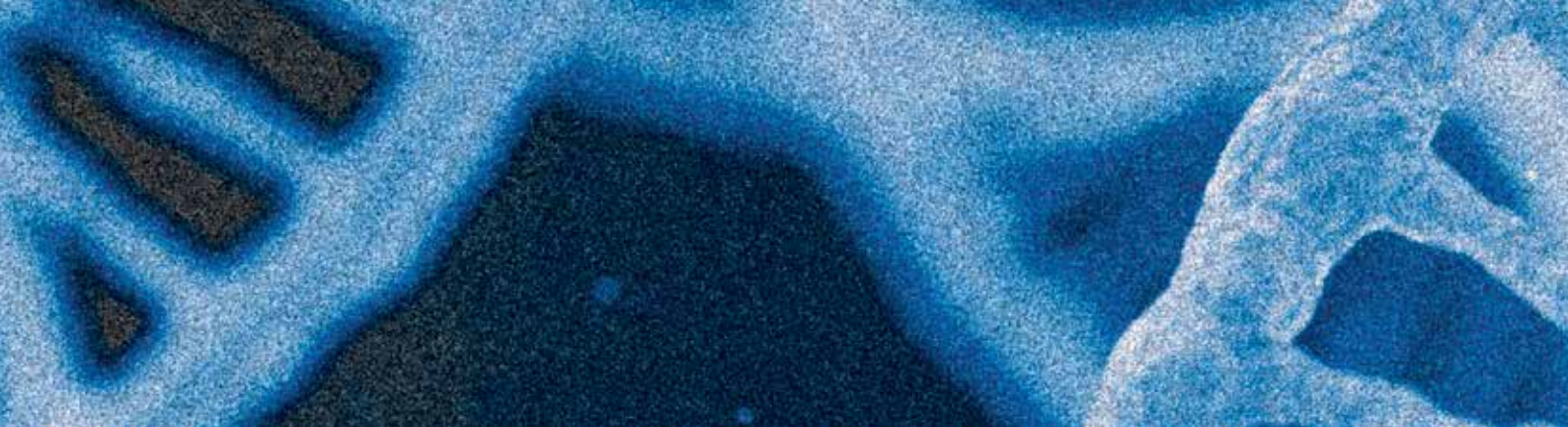
It is essential to develop integrated recycling systems. A range of options need to be developed to extract value from current low or negative value mixed plastic waste. Closed loop recycling, i.e. recycling for use in the same product, must come first, whereas energy recovery should be a last resort after better options such as open-loop recycling for use in another product and molecular recycling have been exhausted.

6 Limit additives and types of resin to improve recyclability

The viability of recycling would benefit from reducing the use of additives and simplifying the number of polymers that can be used for specific applications, i.e. in large volume applications to the easily recyclable polymers like PET and PE. Recent technological advances allow even multi-layer-packaging comprised of different materials to be replaced by multi-layer-packaging comprised of the same resin.

7 Adopt price regulations and quota for recycled content

Policy-makers must quickly adopt a consistent regulatory and financial framework, as the cost of plastics does not include the costs to the environment from the original oil or gas through to littering on land or the ocean.



European GMO Laws No Longer Fit

In 2018, the European Court of Justice ruled that the legal regulations for GMOs also apply to all organisms which have been altered using new genome-editing methods.

However, in the face of today's challenges to deliver food and nutrition security for all, to fight social inequity and climate change, the new genome-editing techniques have great potential to improve both public and planetary health.

Against this background, EASAC released a Commentary in march, warning that current EU rules on genetically modified organisms (GMO) are not fit for purpose anymore. A lot has happened since they were adopted 20 years ago. Our scientists therefore call for a radical reform of the legal framework. The Commentary underscores that there is a societal

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"Rethinking and reform to introduce an evidence-based, transparent, flexible and proportionate regulatory framework will help strengthen competitiveness and the bio-economy, underpin innovation in the Common Agricultural Policy, and help the European Union achieve its Green Deal goals."

Christina Moberg
EASAC President

.....
"Current GMO regulations make it difficult to study, develop and cultivate improved crops which are urgently needed for productive, climate-adapted and more sustainable agriculture."

Volker ter Meulen
Chair of EASAC's Biosciences Programme

cost of not using new genome-editing techniques or being slow in adoption, so that we have no time to lose in resolving our shared problems for food and nutrition security.

Current GMO classification lacks scientific foundation

The Commentary builds on two decades of independent scientific work and came in support for the recommendations made earlier by the German National Academy of Sciences Leopoldina, the Union of German Academies of Sciences and Humanities and the German Research Foundation (DFG).

Significant opportunities are described in the German statement, including genome-edited crops already marketable elsewhere with benefits for nutrition and productive, low-pesticide and resource-conserving agriculture.



Soybeans with healthier fatty acids, gluten-reduced wheat, potato tubers with a longer shelf life, bacteria-resistant rice, fungus-resistant varieties of grapes, wheat and cocoa, and

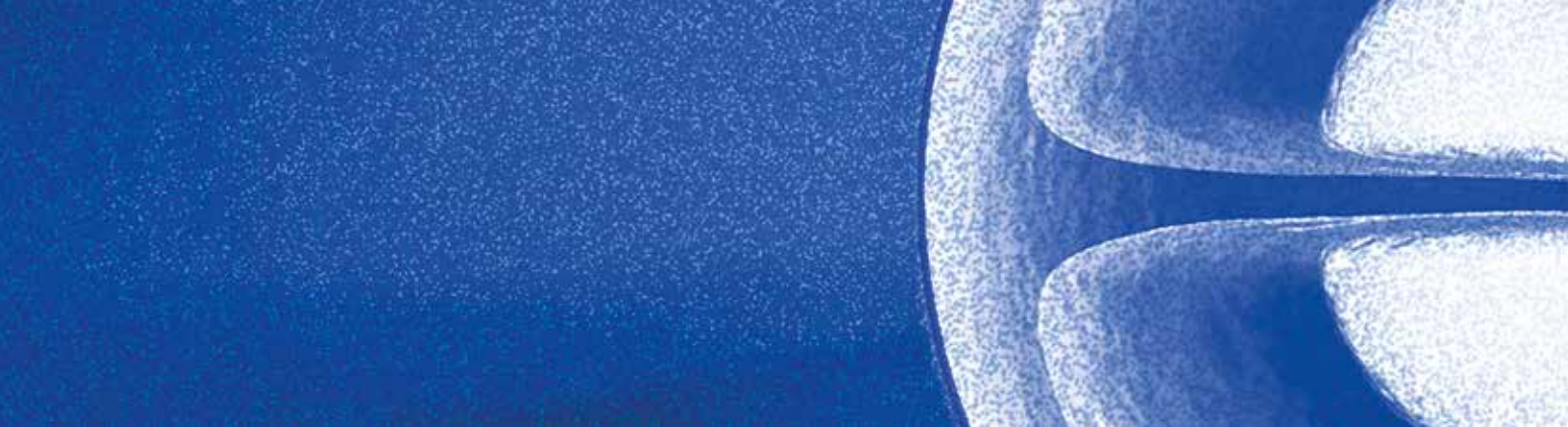
drought-tolerant varieties of corn and wheat are mentioned as examples. The European Council has already asked the European Commission to clarify regulatory options. EASAC

sees this as an opportunity not to be missed to call for a radical reform:

The EU should revise the GMO definition. Analogous to plants modified with conventional breeding methods, genome-edited organisms should not be considered GMOs unless they contain DNA from other species. Also, combinations of genetic information which could also occur in nature or via conventional breeding methods should not be included in the classification.

The EU should develop a new legal framework which regulates the plant trait and/or product rather than the technology used in generating that product. Evaluation must be informed by the worldwide scientific evidence base and, in particular, assessment of safety should examine whether the novel attributes of the plant might represent a risk to the environment or human health irrespective of the breeding technology used.

To provide the tools for future innovation in farming practices, the European Commission must reaffirm its support for fundamental science, field trials, and research on the health, economic, environmental, ethical and other societal consequences of products and application scenarios of new molecular breeding methods.



Regenerative Medicine: Booming Miracle Cures and Undue Pressure

In a first-time report, the European Academies of Science (EASAC) and Medicine (FEAM) called upon European lawmakers to protect biomedical science from false claims. Science and medical experts from all over Europe caution that enthusiasm on the broad potential of regenerative medicine applications has led to a gap between expectations and the realities of translating regenerative medicine technologies into clinical practice. In an era of stark competition on the global medicine and healthcare market, some regulators have become increasingly permissive.

Fast-track approvals put patients at risk

Analysts expect the market for regenerative medicine to grow fast over the next years. It is only natural that this raises high hopes both from desperate patients and the biotech industry. The report authors are con-

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“Stem cell and gene-based therapies hold great medical promises. But we are alarmed over a trend to lower requirements of evidence. Also, we see an increasing problem of commercial clinics offering unregulated products and services.”

Volker ter Meulen
Co-chair of the EASAC-FEAM Working Group on Regenerative Medicine

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“When countries lower regulatory standards in their eagerness to support national economic interests, it is even more important for the EU as a major global player to defend the principles of international cooperation in health regulation.”

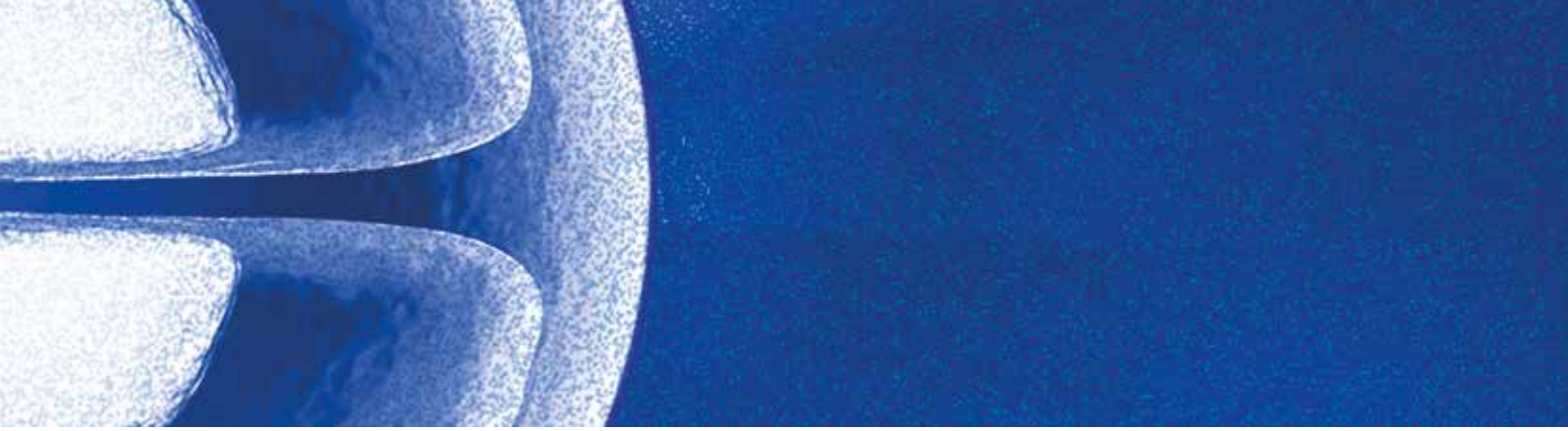
George Griffin
Co-chair of the Working Group and President of FEAM

cerned that as a result, regulators are pressured to accelerate authorisation procedures for stem cell and gene-based therapies- a trend which puts patients at risk.

While it is only understandable that everyone wants cures to be available in the shortest time frame possible, the Report explains that regenerative medicine is now at the threshold of being able to correct major genetic and other diseases. But it also makes clear that for many diseases, more evidence is needed, especially for the more complex polygenic and acquired degenerative disorders. The consequences of not addressing the critical scientific issues for evidence-based implementation would be to waste investment, research efforts and aspirations to cure.

Unethical offers of miracle cures

The Academies also point out that the



idea of regenerative medicine is to tackle diseases which up to now are incurable. According to the report, cosmetic applications, for example, are inappropriate for the time being.

Regenerative medicine has proven itself only in few specific clinical indications, for example for skin disorders. Yet, there is an increasing number of unregulated clinics promising a wide range of benefits on the basis of poorly characterised medicinal products

- Promote good biomedical science – from fundamental research and its translation to clinical trials. This has implications for EU commitment to well-planned first-in-human trials with reliable, shared and objective endpoints determined with input from supporting expert networks (that also consider engagement with the public and media);
- Base proportionate and consistent regulatory authorisation for marketing on robust and replicable science. The EU must deter unregulated provision of regenerative

with little evidence of effectiveness. They usually advertise their services via the internet with the primary intention of financial profit.

The scientists therefore urge the EU to resist the pressure and put patients first. They feel that when countries lower regulatory standards in their eagerness to support national economic interests, it is even more important for the EU as a major global player to defend the principles of

- medicine and rigorously address the ethical and regulatory issues discussed in the report;
- Make sure researchers must follow professional guidelines on responsible research, its translation and standard-setting, in pursuit of good practice;
- Include teaching on regenerative medicine in the medical curriculum;
- Put patient interests first and ensure a robust scientific basis for

international cooperation in health regulation.

The analysis and recommendations aim at ensuring that regulatory procedures are robust, transparent and evidence-based. Scientific research and proof are more important than ever. The EU and national regulators should be wary of not undermining public trust in science.

- the clinical intervention and for the endpoints selected for measurement. A crucial criterion for patients in deciding whether to consent to novel therapies is that they should not be expected to pay clinical research costs;
- Engage with the public and patients and debunk misinformation. Providing reliable sources of information, such as the International Society for Stem Cell Research (ISSCR) document “A closer look at stem cells”, is integral to this process.



Scientific knowledge of climate change and its drivers has been growing exponentially during the past decades. However, the degradation of nature and continued growth of greenhouse gases has not yet ceased, let alone started reversing. EASAC's "Perspective on Transformative Change", released in February, seeks to remind politicians that just trying to adjust 'business as usual' cannot safeguard our future on this planet. The publication lays out the scale of the problems that face humanity to match human development with the capacity of the Earth and examines the calls for a fundamental transformation of our current economic and social systems across technological, economic and social domains.

Bumping up against planetary boundaries

Demand for energy and resources has been growing as a result of population growth and increased consumption to the point where all the scientific evidence shows we are bumping

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 "We all have to accept the realities of our finite planet. Only if we push the reset button now and work with nature instead of against it, our children get the chance of having a future."

Louise Vet
 Netherlands Institute of Ecology

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 "Generation Greta gets it. Our focus should be on well-being and welfare, but our economic system puts all focus on growth and GDP which adds fuel to the climate and biodiversity crises."

Anders Wijkman
 Member of the Royal Swedish Academy of Sciences

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 "There is much talk of redirecting our values and reward systems towards a more sustainable economy whereby we can live well within our planet for more than just a few more years. But the inertia of the 'brown economy' should not be underestimated."

Michael Norton
 EASAC Environment Programme Director

up against fundamental planetary boundaries on which our civilizations depend. The Perspective summarises this evidence with a focus on climate and biodiversity, describing what many international scientists have been thinking since the 1970s: Current unsustainable trajectories are built into our economic theories and our political reward systems.

It also shows that short-term perspective of many vested interests in continuing the status quo (whether in fossil fuels, resources extraction, high consumption in the linear economy, overfishing, conversion of forests and so on) is a formidable barrier to change. While the science message has been consistent since the 1970s on the finite nature of the planet it has been ignored and incremental emissions reductions achieved to date are far from what is needed.

Emission gap is widening

Climate warming is proceeding too fast to meet the Paris Agreement objective

Transformative Change: “Generation Greta Gets It”

of avoiding dangerous climate change. Positive feedback effects that accelerate warming are already occurring. Even with the extreme effects of the COVID-19 pandemic, the gap between what is needed in terms of reducing emissions of greenhouse gases (GHG) and what is being achieved continues to widen.

At the same time, biodiversity is being lost at a rate that will weaken and degrade the services we rely on from nature and sabotage progress towards the UN Sustainable Development Goals (SDG) in poverty, hunger, health, water, cities, climate, oceans and land. That is what drives the conclusion that achieving sustainability may only be achieved through transformative changes.

Concrete change measures

The authors observe that even with the pandemic, fossil fuel interests have succeeded in capturing almost double the post-COVID-19 recovery funds in G20 countries allocated to renewable

energies. Food and agricultural interests are driving deforestation, land clearing and over-fishing but continue to be subsidised and escape paying for the environmental costs of their activities.

The scientists list some of the most urgent and transforming change measures:

- Replace GDP by measures of real well-being that don't rely on exploiting and destroying the planet's resources;
- Overcome the vested interests in the brown economy – starting with replacing perverse subsidies with positive incentives for environmental responsibility;
- Steer our economic system to think long-term ;
- Engage industry and finance sectors to drive the changes and engage the public through new approaches (examples provided in the publication);
- Grasp the opportunities now of

the post-COVID and Green Deal stimuli to start to fix the system which is no longer fit for purpose.

The conclusions found a wide echo in media and continue to be intensely debated in a great variety of fora. They might challenge political leaders and global elites who have campaigned for the traditional economy, expecting science and technology to allow economic growth to be indefinitely sustained. But the authors make it very clear: the fundamentals need to be reset and long-term sustainability must be built into decision-making at all levels rather than just left to altruism at the fringes.



Response to a Global Pandemic

For almost the whole year, 2020 was dominated by the COVID-19 pandemic. Worldwide, hundreds of millions of people have lived through lockdowns, millions lost their lives or jobs. Many experienced abrupt shifts in their work lives and worked from home. The Academies and their affiliates were no exception. At the time of writing this Report, we do not know when our lives and economies will fully return to normal.

What we do know is: the COVID-19 crisis which the world experienced can be seen as a symptom of a bigger ‘planetary’ crisis. This makes EASAC’s mission to give scientific guidance to policy-makers more important than ever. The COVID-19 pandemic has been a drastic reminder of the importance of science and of science communication.

With access to outstanding

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“Many people have understood that without science, we will be in much more trouble. That science has provided information on the virus, the disease, a little bit of therapy, and very much about vaccination. It’s probably good news for the future that citizens have realized that society needs science to take the right decisions.”

Volker Thiel
Institute for Virology and Immunology, University of Bern

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“That we have these high-efficacy vaccines only one year after the virus began to spread is nothing short of a miracle. It is an absolutely incredible achievement by researchers worldwide.”

Lone Simonsen
PandemiX Centre, Roskilde, Denmark

European scientists and a track record of evidence-based recommendations on infectious diseases, the European Academies of Science stood ready to support policy-makers, medical and public health practitioners, and civil society in any way they could in tackling the COVID-19 global pandemic. As the regional affiliated network for Europe of IAP- The Global Network of Science Academies, EASAC supported the IAP’s call for global solidarity on the COVID-19 pandemic.

COVID-19 has put science in the spotlight of media and the general public. In 2020, terms such as social distancing, aerosols, asymptomatic, and super-spreaders became common parlance. The general public began paying attention to news about testing and vaccine development. The vaccine development impressively demonstrated the importance of global research cooperation.



Most Academies have directly contributed to combating the pandemic and managing the response, not only from a medical point of view. People trust science and scientists more than they did before the COVID-19 era, as they see that it helps efficiently manage daunting challenges. There is an unprecedented momentum for reaching out with science-based messages, as the value of scientific advice to policy-makers has become very clear.

But there are also challenges.

The crisis has shown that a particular challenge is the number of alternative voices, facts and narratives spreading via a multiplicity of channels. After a year of sometimes contradictory stories about R-numbers, ventilators, and masks, the general public is, to some extent, also more confused about science.

Yet, we know that facts are an indispensable basis for making rational societal decisions. Our scientific voice must cut through the noise. Thereby it can contribute to reducing the breeding ground for science deniers, conspiracy theorists and anti-democratic populist movements.

We observe that these groups attempt to politicize and discredit science in certain media, channels and platforms. To avoid becoming “victims” of these tactics, the scientific community needs to increase awareness and knowledge about the underlying mechanics and develop own strategies to counter them.

Good communication and cooperation are vital.

The lessons we learn from the crisis will decide whether we succeed in building on the current positive trend of increased trust, or whether alter-

native voices get the upper hand in negatively affecting the views of the honesty and public-spiritedness of scientists.

With a number of workshops and meetings with both scientists and communication experts, EASAC provided a forum for the Academies to debate relevant strategies and support each other. The campaign to support the global vaccine roll-out was a very concrete outcome of this cooperation.

Last but not least, the sudden shift to remote work has provided EASAC with an opportunity to reimagine how we work as an organisation, and to accelerate knowledge and use of digital tools. Zoom calls and webinars have proven to be effective working tools that helped us discover new possibilities in working together.



Stop Perverse Impact of Biomass

Ever since the publication of EASAC's Report on "Multi-functionality and Sustainability in the European Union's Forests" in 2017 and the subsequent Commentary on Forest Bioenergy and Carbon Neutrality in 2018, the question under which conditions woody biomass should be classified as 'renewable' energy continues to make headlines.

Throughout 2020 and in the context of various EU consultations, EASAC highlighted the relevance of the topic for EU policy measures. EASAC's advice triggered intense debate in media and politics. The scientists also debated the topic in many public events, as well as with officials and the Vice-President of the European Commission.

Converting coal-fired plants to biomass is popular, because emissions at the power station can be rated as zero, creating the impression of an immedi-

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"Labelling forest biomass as renewable has a perverse impact on the climate. Much of the biomass employed in Europe is anything but carbon neutral. Current accounting rules under the emission trading scheme let certain power plants and countries shine as climate pioneers although they actually damage the climate."

"The focus today is on limiting global warming to 1.5-2°C. This requires urgent actions, not waiting for new trees to grow while pumping vast amounts of carbon into the atmosphere by burning trees for energy."

Michael Norton
EASAC Environment Programme
Director

ate emission reduction, even though they actually increase from a climate point of view. These conversions attract billions of euros of subsidies on the basis of assumed CO₂ reduction effects. Without that accounting artifact, there would be no real reason for switching. EASAC therefore calls for a more science-based set of rules and basis for subsidy – which is fiercely fought by the biomass industry.

In May, EASAC responded in the form of an open letter to the IEA Bioenergy group (IEAB), who had criticised the conclusions on the perverse climate effects of bioenergy from forest biomass as based on 'errors and half-truths'. The letter was endorsed by scientists from 18 countries on EASAC's Environment Steering Panel.

Agreement on the basic science

The letter clarified EASAC's focus on the net climate impacts of converting coal-fired power plants to forest



biomass. Science shows that when a power station switches from coal to wood pellets, a significant amount of additional CO₂ is released. Due to its relatively low energy content and a complex supply chain, biomass emits more CO₂ per kWh of electricity generated than coal.

Of course, when biomass is harvested, vegetation regrows so that this extra CO₂ will be reabsorbed from the atmosphere and there should be a net benefit from switching eventually.

The main points of difference between EASAC and the IEAB center around what carbon payback periods were acceptable and on what basis.

No time left for long carbon payback periods

Often it is likely to take decades until the carbon emitted is absorbed again. EASAC points out that such carbon payback periods are beyond the time

available to meet Paris Agreement targets to limit global warming to 1.5-2°C. Therefore, policies should not spend large shares of 'renewable energy' budgets on supporting a technology which fails to reduce atmospheric CO₂ levels quickly.

The differences between EASAC's and the IEA Bioenergy's positions reflect different priorities in policy-making. There are also debates on wider issues, as for example: what are the effects on forest management of the market for biomass pellets, what types of wood are harvested, how to mesh biodiversity goals with increased forest harvesting for biomass, as well as socioeconomic issues of energy supply and pressures to use the sunk assets of old coal stations.

EASAC believes that if biomass electricity is to be supported by governments, the balance of these issues must be discussed openly. Citizens

should know what they are getting for their money.

Radically reform CO₂ accounting rules

Consequently, and as the European Commission started work on a revision of its central climate policy tool in summer 2020, EASAC issued a Statement suggesting a radically new standard for carbon accounting under the Emissions Trading System (ETS) to link accounting to the real effects on CO₂ levels in the atmosphere. This will require calculating the 'carbon payback period' for each biomass facility and its supply chain.

Several European countries which are considered leaders in climate protection owe their apparently good emission reductions to biomass. These might turn out to look quite different in the future, if the carbon-accounting rules under the system were to be based on the real effects on the climate.



Hydrogen and Synthetic Fuels

Hydrogen is an important alternative for sectors that are stuck in the fossil fuel economy. As national governments and European parliamentarians started negotiating the EU's hydrogen strategy, EASAC issued a new commentary in September 2020.

Electricity is a great way to decarbonize our economy. But important sectors such as ships, trucks, planes and steel production cannot easily be powered by electricity. They need a fuel that can be transported like oil or gasoline, or that can convert iron ore to steel at high temperatures like coal.

The Commentary highlights that growing demand for hydrogen and synthetic fuels will require much more renewable electricity to be generated in the EU. In addition, Europe must

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"Hydrogen can help reduce our dependency on fossil fuels. But the climate benefits will be limited, if we use fossil fuels to produce it- even with carbon capture and storage. The EU must stop all subsidies to fossil fuels. The fast growing demand for hydrogen must be met by a massive increase of renewable electricity, together with certified imports from third countries."

William Gillett
EASAC Energy Programme Director

develop partnerships with third countries to drive global trade in renewable hydrogen and in technologies to produce it.

Carbon capture and storage does not make fossil-fuel based hydrogen climate neutral

EASAC calls on the EU to remove direct and indirect subsidies for fossil fuels. The EU should strengthen carbon pricing and revise the emissions trading directive to build investor confidence in future markets for renewable electricity and renewable hydrogen. Even in combination with carbon capture and storage, fossil-fuel based hydrogen has a significant carbon footprint. The EU should therefore take a leadership role in global markets for renewable hydrogen and in the manufacture of low-cost electrolysers.



Avoid expensive lock-ins to infrastructures

The authors also underscore the importance of avoiding premature and expensive lock-ins to new or renovated infrastructures that are subsequently made redundant by market developments. Instead, the EU should build on the experience in the electricity sector, where distributed generation is playing an ever-increasing role. It makes good sense to also think local for hydrogen: deploy distributed electrolyzers for local hydrogen production feeding into local market networks. EASAC reminds policy-makers that the synthetic fuels pathway is less efficient than using electricity together with a battery or using electricity directly, so hydrogen or synthetic fuels should predominantly be used only where electrification is not an option.

EASAC calls upon policy-makers to:

1. Urgently increase the generation of renewable electricity, which should be used directly where possible, and is indispensable for the production of renewable hydrogen.
2. Remove all subsidies and incentives for fossil fuels, which distort energy markets and limit the growth potential for renewable hydrogen and synthetic fuels.
3. Include independent experts beyond the Clean Hydrogen Alliance in the work to develop measures for removing market barriers.
4. Strengthen carbon pricing by revising the Emissions Trading Directive to stimulate markets for renewable hydrogen and derived synthetic fuels.
5. Introduce additional regulations to accelerate change from fossil to renewable hydrogen in chemical and other industries.
6. Build investor confidence by supporting stakeholders working together in local hydrogen networks.
7. Promote sustainable development of hydrogen markets, beginning with local or regional networks close to renewable electricity supplies, hydrogen production plants and hydrogen consumption centres.
8. Establish strong coordination of energy governance structures between EU, national, regional and local levels.
9. Secure supplies of renewable hydrogen from outside the EU by establishing international partnerships with interested third countries as well as with EU neighbors.
10. Promote investments in renewable hydrogen and hydrogen-derived synthetic fuels with a focus on minimizing the energy invested, as well as accounting for the overall life cycle costs, per unit of GHG emission reduction.
11. Encourage investment in renewable hydrogen by promoting the EU taxonomy with its disclosure obligations for environmentally sustainable economic activities.
12. Establish standards for hydrogen production based on lifecycle GHG performance and certification of low carbon hydrogen.
13. Support the rapid development of electrolyzers.
14. Prohibit the use of whole trees for producing renewable hydrogen by using sustainability criteria which limit carbon payback times to less than 10 years.
15. Support research, market studies and demand driven initiatives on hydrogen infrastructure as well as on certification and standards.



Green Recovery: The Critical Role of Science

How the European Union and its member states design recovery efforts will determine the quality of people's lives for decades to come. Lower carbon emissions, cleaner air, respect for the ecosystem, stronger focus on health: Drawing upon their previous work, leading European scientists reminded the European Union of its responsibility to take leadership and bolder action, as Heads of State and Government were readying their plans for a green recovery after COVID-19.

In their Commentary released in May 2020, the European Academies of Science urged policy-makers to recognise the critical role of science and to step up their efforts in three key areas for rebuilding economies to deliver benefits fairly for planetary and human health: energy, ecosystem and health.

More rapid reduction in generation and use of high-carbon energy

Even with the disruption of almost all societal activities over almost the

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"COVID-19 reminds us of the vulnerability of dependence on global food systems. The European Union should strengthen sustainability of local and regional food supplies while reducing agriculture's climate impact in the current revision of the Common Agriculture Policy."

Robin Fears
EASAC Biosciences Programme Director

.....
"Just as science has been central to efforts to manage the coronavirus pandemic, it must also be central to inform other policies."

Christina Moberg
EASAC President

entire year, the emission reduction in 2020 did not reach the level of annual reductions required to meet the Paris Agreement targets. This means energy systems have to be transformed completely to get away from reliance on combustion of carbon, be it in the form of fossil fuels or even large-scale uses of biomass.

During the pandemic, coal-fired power generation has been significantly reduced and there has been a dramatic fall in oil consumption for transport. For a few weeks, this has given millions of citizens a chance to experience living with good air quality in cities and urban areas. EASAC's Commentary made clear that now is the time for policy-makers and investors to focus on mitigating climate warming and delivering a similarly healthy environment on a sustainable basis.

Greater focus on agriculture, biodiversity and health

But the shift to a low-carbon energy



system is not the only concern of the scientists. COVID-19 reminds us of the vulnerability of dependence on global food systems. The European Union should strengthen sustainability of local and regional food supplies while reducing agriculture's climate impact in the current revision of the Common Agriculture Policy, argues the Commentary. In addition, the green recovery is a chance to achieve health improvements in the near term and to reduce the growing health risks from climate change.

According to EASAC, there is a disconnect between health policy – often decided at a Member State level – and policies on energy, agriculture and environment that are often better harmonised at EU level. However, the European institutions cannot be fully effective, unless Member States give them more science-based responsibility for health.

The next big crisis is already here

Efficient green recovery requires international coordination, and the EU should show leadership by inspiring ambitious action by other countries and in international programmes, based on independent science advice. COVID-19 has made the public acutely aware of the critical role of science in addressing a crisis. With climate change, the next big crisis is already here. EASAC hopes that science will be heard before it's too late to tackle the climate crisis.

Relevant EASAC reports and publications:

- Decarbonisation of buildings, project in progress, to be published 2021
- Packaging plastics in the circular economy, 2020
- The imperative of climate action to protect human health in Europe, 2019
- Decarbonisation of transport options and challenges, 2019

- Forest bioenergy, carbon capture and storage, and carbon dioxide removal: an update, 2019
- Extreme weather events in Europe: an update, 2018
- Opportunities for soil sustainability in Europe, 2018
- Negative emission technologies, 2018
- Opportunities and challenges for food and nutrition security and agriculture in Europe, 2017
- Valuing dedicated storage in electricity grids, 2017
- Multifunctionality and sustainability in the European Union's forests, 2017
- Circular economy: priorities for critical materials, 2017
- Circular economy: indicators, 2017
- Marine sustainability in an age of changing oceans and seas, 2016
- Ecosystem services, agriculture and neonicotinoids, 2015



Outlook to 2021

In June 2021, EASAC and its Member Academies celebrate the 20th anniversary of the network. It provides a timely opportunity for the European Academies of Science to reflect on EASAC's achievements since 2001, and to consider its future direction, as an authoritative and independent voice of science policy advice in the EU. The anniversary also provides an opportunity to thank Member Academies for their tremendous support of EASAC over the past two decades. In providing the scientific expertise of their fellows, Member Academies have helped EASAC to become the influential voice of science in Europe that it is today. Many members have also used EASAC publications to engage with their own national policy-makers and inform wide-ranging policy decisions

across Europe. Some Academies have contributed to EASAC substantially with in-kind and financial support, most notably the host Academy of the EASAC Secretariat, the German National Academy of Sciences Leopoldina.

Overcoming the crisis

Our anniversary year will see a number of new projects and challenges in the science-for-policy field. Most immediately, EASAC will continue to do its utmost to support Member Academies in helping to overcome the COVID-19 crisis in Europe. Through the work of the Press and Communications Group – a collaboration of our member's press and communications officers – EASAC will provide a wide range of resources that Academies can

draw on to assist vaccination roll-out in their countries and motivate everyone to get vaccinated, in particular younger audiences.

A prolific programme

EASAC's three core Programmes – Biosciences, Energy and Environment – have several substantial publications lined up for the first half of 2021. They cover a broad range of vital issues: decarbonisation of the health sector and – more generally – of buildings in Europe, the sharing of personal health data for research, and the impact of climate change on Atlantic ocean circulation and what it means for Europe. By the end of the year, we anticipate presenting the science-based analysis and recommendations on regenerative agriculture for Europe.



EASAC will also continue working on the issue of climate change and health, teaming up with the Global Network of Science Academies, IAP, to work on a global synthesis, and with EASAC's newest member – The Cyprus Academy – on a study of the issue in the Eastern Mediterranean and Middle Eastern region.

EASAC will follow up on previous Reports the recommendations of which remain highly relevant to current policy discussions in Europe. In particular, EASAC will continue to shape the debate on a sustainable food system in Europe and globally, and address the mismatch between science and policy in Europe on the use of woody biomass.

Dialogue and cooperation

All of EASAC's publications will continue to be accompanied by launch or discussion events, to present the science-based recommendations from the Academies to wide-ranging audiences, including policy-makers and the media. Peer-reviewed papers in scientific journals will support EASAC's publications and help engage the wider scientific community. EASAC will continue to build its social media presence, where a lot of the debate on science and policy is already taking place.

Two of EASAC's publications in 2021 are being prepared and communicated in partnership with other European Academy networks, ALLEA and FEAM.

The project SAPEA by the European Academies will come to an end in 2021 – with a possible prospect of continuation beyond. Thus, it is clear that 2021 will be another year of collaboration and lively exchange with partners and colleagues in Europe and across the globe.

Most important of all is EASAC's close collaboration with its Member Academies. We hope that the post-COVID-19 world of 2021 will give us many opportunities to strengthen and enliven the contact between the organisation and its constituent parts.

Member Academies



The Austrian Academy of Sciences



The Council of Finnish Academies



The Royal Academies for Science and Arts of Belgium



The Académie des Sciences, France



The Bulgarian Academy of Sciences



The German National Academy of Sciences Leopoldina



The Croatian Academy of Sciences and Arts



The Academy of Athens, Greece



The Cyprus Academy of Sciences, Letters and Arts



The Hungarian Academy of Sciences



The Czech Academy of Sciences



The Royal Irish Academy



The Royal Danish Academy of Sciences and Letters



The Accademia Nazionale dei Lincei, Italy



The Estonian Academy of Sciences



The Latvian Academy of Sciences



The Lithuanian Academy of Sciences



The Spanish Royal Academy of Sciences



The Royal Netherlands Academy of Arts and Sciences



The Swiss Academies of Arts and Sciences



The Norwegian Academy of Science and Letters



The Royal Swedish Academy of Sciences



The Polish Academy of Sciences



The Royal Society, United Kingdom



The Academy of Sciences of Lisbon, Portugal



Academia Europaea



The Romanian Academy



ALLEA - European Federation of Academies of Sciences and Humanities



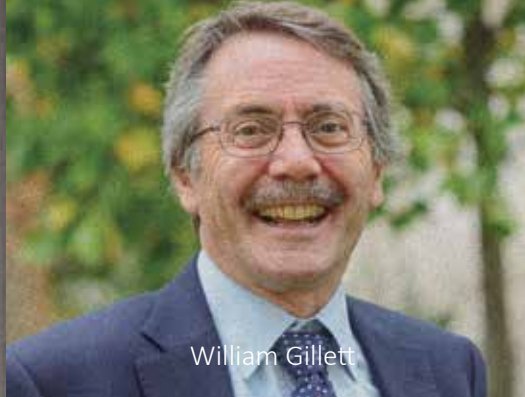
The Slovak Academy of Sciences



The Slovenian Academy of Sciences and Arts



Christiane Diehl



William Gillett



Olivier Pironneau



Wim van Saarloos



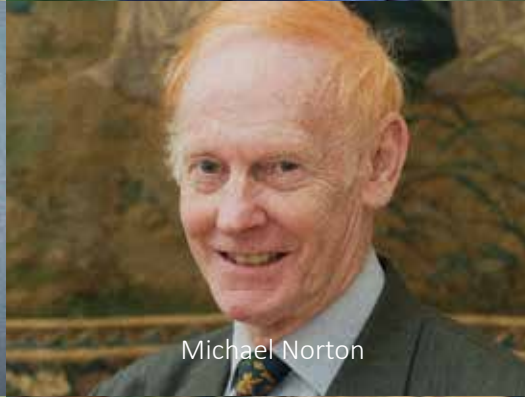
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Lars Walloe



Annika Ströfer

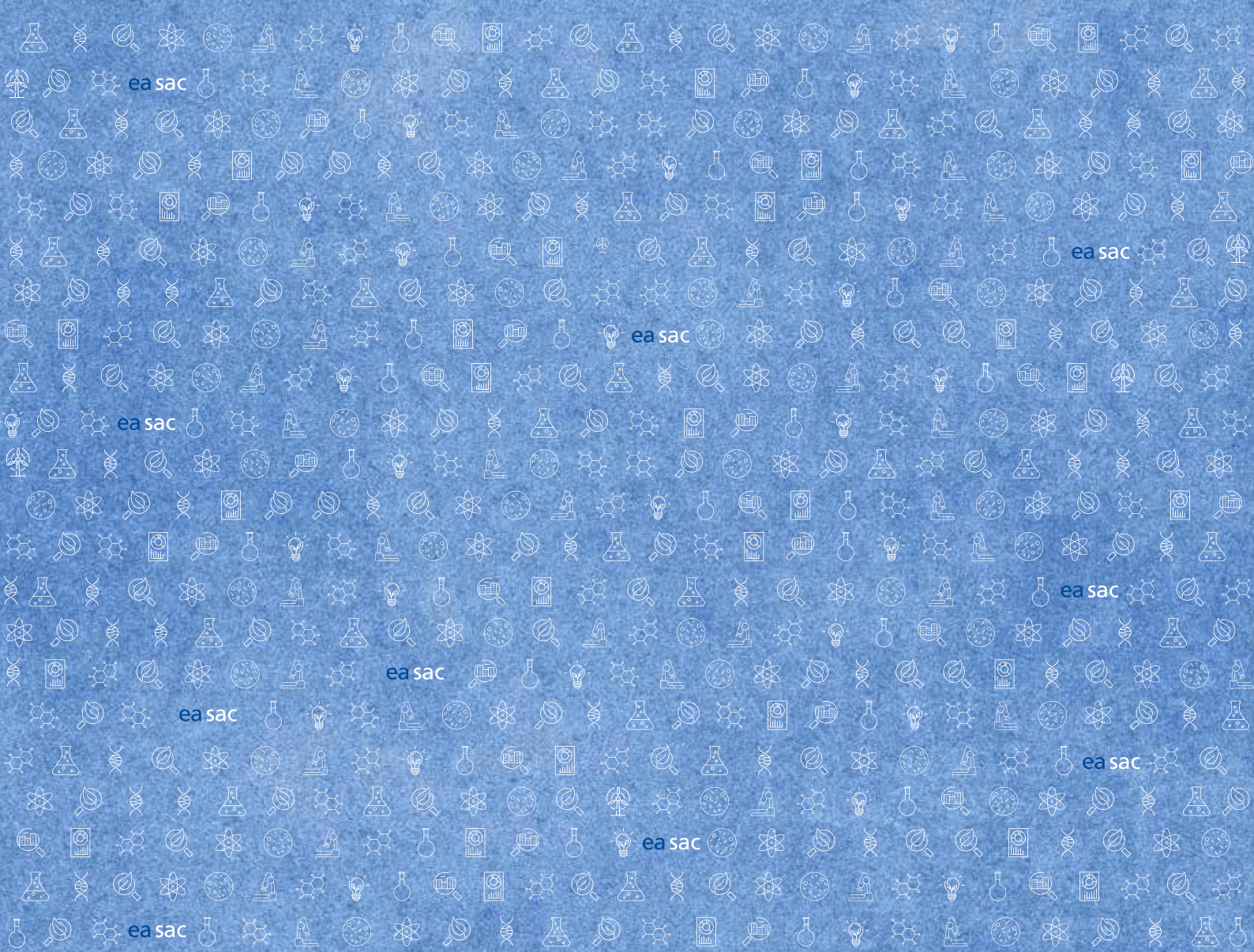
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