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NEWS ALERT

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[Making fuel from sunlight and air](#)

Scientists at ETH Zurich have built a plant that can produce carbon-neutral liquid fuels from sunlight and air. The next goal will be to take this technology to industrial scale and achieve competitiveness. The plant developed in Zurich can be used to produce synthetic liquid fuels that release as much CO₂ during their combustion as was previously extracted from the air for their production. CO₂ and water are extracted directly from ambient air and split using solar energy. This process yields syngas, a mixture of hydrogen and carbon monoxide, which is then processed into kerosene, methanol, or other hydrocarbons. This plant successfully demonstrates the technical feasibility of the entire thermochemical process for converting sunlight and ambient air into drop-in fuels. The system operates stably under real-world solar conditions and provides a unique platform for further research and development. The technology is now sufficiently mature for use in industrial applications. Analyses of the entire process show that the fuel would cost 1.20 to 2 euros per litre if it were produced on an industrial scale. Desert regions with high solar resources are particularly suitable as production sites. However, given the high initial investment costs, solar fuels will need political support to secure their market entry.

[CO₂ electrolysis can contribute to climate protection](#)

Researchers from the Paul Scherrer Institute (PSI) show that CO₂ electrolysis can not only be profitable, but can also contribute to climate protection. The study investigated whether the electrolysis of CO₂ to produce CO or HCOOH is commercially viable and whether it consumes more carbon dioxide than it generates itself through its energy needs. With this method, carbon dioxide is captured from the atmosphere or at the point of production, such as an industrial plant. An electrolysis cell then converts the gas for industrial use, such as in chemical production.

[Smart window material that blocks heat without blocking views](#)

An international research team led by scientists from Nanyang Technological University, Singapore (NTU Singapore) has invented a 'smart' window material that controls heat transmission without blocking views, which could help cut the energy required to cool and heat buildings. The new energy-saving material for electrochromic (EC) windows is designed to block infrared radiation -- which is the major component of sunlight that emits heat. The new material has a specifically designed nanostructure and comprises advanced materials like titanium dioxide (TiO₂), tungsten trioxide (WO₃), neodymium-Niobium (Nd-Nb), and tin (IV) oxide (SnO₂). The composite material is intended to be coated onto glass window panels, and when activated by electricity, users would be able to 'switch on and off' the infrared radiation transmission through the window. The invention, could block up to 70 per cent of infrared radiation according to experimental simulations without compromising views through the window since it allows up to 90 per cent of visible light to pass through. The material is more effective in regulating heat than commercially available electrochromic windows and is cheaper to make due to its durability. The NTU team, in a separate work also created a switch system that helps to control conducted heat, using magnetic carbon-based particles and thin films that are good conductors of heat. When the switch is turned off, conducted heat cannot transfer through the window. When switched on, the heat will be allowed to pass through the glass window. The team's smart window can control two types of heat transmission: infrared radiation and conduction heat.

[New Drug Reverses Paralysis in Mice With Spinal Cord Injury](#)

Scientists from Northwestern University, USA, have developed a new form of drug that promotes the regeneration of cells and reversed paralysis in mice with spinal injuries, allowing them to walk again within four weeks of treatment. The therapy was injected as a gel into tissue surrounding the spinal cords of lab mice 24 hours after an incision was made in their spines. Four weeks later, mice who received the treatment regained

their ability to walk almost as well as before the injury. Those left untreated did not. The team found dramatic improvements to the spinal cords.. with regeneration of severed extensions of neurons called axons with much lower scar tissue that can act as a physical barrier to regeneration. Besides, the insulating layer of myelin in the axons had reformed, blood vessels that deliver nutrients to injured cells had formed, and more motor neurons survived. The gel developed by the scientists could usher in a new generation of medicines known as "supramolecular drugs," because the therapy is an assembly of many molecules rather than a single molecule. According to the team, it is safe because the materials biodegrade within a matter of weeks and become nutrients for cells. Further work is ongoing, with the aim of bringing it to human trials soon.

[Nuclear radiation used to transmit digital data wirelessly](#)

Engineers from Lancaster University in the UK and the Jožef Stefan Institute in Slovenia transferred digitally encoded information wirelessly using nuclear radiation. They measured spontaneous emission of fast neutrons from californium-252, a radioactive isotope produced in nuclear reactors. Fast neutrons could also be incorporated into mixed-signal electronic systems to achieve signal mixing between electrons and neutrons. This could contribute to the requirement to ensure the integrity of information transfer. Fast neutrons have an advantage over conventional electromagnetic waves, which are significantly weakened by transmission through materials including metals.

[New tool can identify harmful blue-green algae](#)

A team led by the University of Birmingham has designed a new approach which uses mass spectrometry to identify key protein features within algae that are unique to each species, enabling them to be rapidly identified. Blue-green algae, or cyanobacteria, present huge environmental problems. As algae are a vital part of many water systems, it is only those species which become harmful that may need preventive measures. The technique is also successful in identifying combinations of different cyanobacteria at low pre-bloom concentrations. The technique can also be used to check the authenticity of cyanobacterial products, such as spirulina extracts, that are consumed as health and food supplements.

COVID-19

COVID-19 (WORLD)

[Scientists identify new antibody for COVID-19 and variants](#)

A research team from Duke University and the University of North Carolina at Chapel Hill has identified and tested an antibody that limits the severity of infections from a variety of coronaviruses, including those that cause COVID-19 as well as the original SARS illness. The team isolated the antibody by analyzing the blood from a patient who had been infected with the original SARS-CoV-1 virus and from a current COVID-19 patient. More than 1,700 antibodies were screened and 50 antibodies were found that had the ability to bind to both the SARS-CoV-1 virus as well as SARS-CoV-2. One of those cross-binding antibodies was especially potent - able to bind to a multitude of animal coronaviruses in addition to the two human-infecting pathogens. The team tested the antibody in mice and found it could effectively block infections, or minimize the infections that occurred. When given before the animals were infected, the antibody protected mice against developing SARS, COVID-19 and its variants such as Delta, and many animal coronaviruses that have the potential to cause human pandemics. When given after infections, the antibody reduced severe lung symptoms compared to animals that were not treated with the antibody. This work opens up the possibility of universal vaccine strategies that work against known and emerging coronaviruses.

Cuba reports 92.4 percent efficacy for 3 dose vaccine

Researchers in Cuba have conducted safety and efficacy phase trials of SOBERANA 02, a COVID-19 Conjugate Vaccine. The vaccine uses the recombinant receptor-binding domain (RBD) of the viral spike protein, chemically attached to the tetanus toxoid antigen in a molar ratio of 6:1 and adsorbed on 500 micrograms (µg) of alumina. SOBERANA Plus contains dimeric RBD 50 µg, adsorbed on 1,250 µg alumina, and has been developed as a “universal booster.” A Phase 3 trial was launched to assess the efficacy and safety profile of a two-dose regimen of SOBERANA 02, and with the third dose of SOBERANA Plus. The two-dose vaccine efficacy (VE) was 71% compared to placebo, while for the heterologous three-dose regimen, the VE was greater than 92%. Protection against severe COVID-19 was 63% and 100% respectively.

Emerging SARS-CoV-2 variant A.30 efficiently evades vaccine-induced immunity

Researchers in Germany have found that a new A.30 variant of SARS-CoV-2 can evade vaccine-induced antibodies and might spread outside the lungs extraordinarily well, with important implications for our public health response. The variant A.30 (also known as A.VOI.V2) was detected in spring 2021 in several patients in Angola and Sweden, with likely origins from Tanzania. The spike glycoprotein of the A.30 variant carries ten amino acid substitutions and five deletions. This study implies that the SARS-CoV-2 variant A.30 can successfully evade control by vaccine-induced antibodies and might have an increased capacity to enter cells outside the lungs. Therefore the A.30 variant warrants close monitoring and rapid installment of countermeasures.

Phage-like particle system provides a platform for vaccine generation

Researchers from the University of Colorado and the University of Maryland have developed a Phage-like particle (PLP)-based vaccine against SARS-CoV-2 or MERS-Cov using the spike receptor binding domains (RBD) proteins from either virus. They also engineered bivalent PLPs, which co-displayed spike RBD proteins to function as bivalent vaccine candidates. In tests on mice, the two dose administration (21 days apart) of the vaccine induced high levels of RBD SARS-specific IgG 174 days post-inoculation, which indicated that these PLPs elicit a durable immune response. The serum from the immunized mice could neutralize the SARS-CoV-2 infection. When the immunized mice were challenged with SARS-CoV-2 MA10 they had greatly reduced levels of genomic and sub-genomic viral RNA, indicating protection. This type of vaccine platform could expand the diversity of protein-based vaccine technologies available and assist in the prevention of infectious diseases worldwide.

COVID-19 (INDIA)

India ready to produce over 5 billion COVID vaccine doses next year

PM Modi told the G20 leaders that India is ready to produce over five billion COVID vaccine doses next year to help the world in the fight against the pandemic, and urged the World Health Organization (WHO) to approve Indian vaccines at the earliest. He also flagged the issue of facilitating international travel and talked about the mechanism of mutual recognition of vaccine certification as a means of achieving this. PM Modi also emphasised the importance of vaccine research and manufacturing and said India had sent medical supplies to over 150 countries and contributed to maintaining the global supply chain during the pandemic. He also spoke about the "One Earth, One Health" vision to fight the pandemic and future global health challenges through collaboration in research and development, and developing mechanisms that can cope with future pandemics and future global health issues.

Bharat Biotech BBV152 COVAXIN vaccine gets WHO approval for emergency use

On 3 November, the Technical Advisory Group for Emergency Use Listing listed the Bharat Biotech BBV152 COVAXIN vaccine against COVID-19 for emergency use. The WHO Strategic Advisory Group of Experts on Immunization (SAGE) has issued [interim policy recommendations for the use](#) of the Bharat Biotech BBV152 COVAXIN vaccine. SAGE recommends the use of BBV152 vaccine as 2 doses (0.5 ml) given intramuscularly. The vaccine can be administered with an interval of 4 weeks. It is recommended that all vaccinated individuals receive two doses. Vaccine efficacy against COVID-19 of any severity, 14 or more days post dose 2, was 78%. Vaccine efficacy against severe disease is 93%. In adults aged less than 60 years, efficacy was 79%; and in those aged 60 years and over it was 68%. Vaccine efficacy against all variant-related COVID-19 disease was 71% with an efficacy of 90% against Kappa, and 65% against Delta. Vaccine efficacy against asymptomatic SARS-CoV-2 infection was 64%. Soon after the WHO's approval, the US Center for Disease Control (CDC) too recognised the vaccine. The US gave green signal to travellers fully vaccinated with Covaxin to enter the country from November 8.

INDIA – SCIENCE & TECHNOLOGY

[India Launches First Manned Ocean Mission Matsya 6000](#)

India has launched its first manned ocean mission 'Samudrayan' to join the five nations (USA, Russia, Japan, France & China) exploring underwater vehicles for carrying out subsea activities. Under Samudrayan, the deep-sea vehicle known as Matsya 6000, is being developed by the National Institute of Ocean Technology (NIOT). The vehicle will be capable of carrying three human beings in a titanium alloy personnel sphere of 2.1-metre diameter enclosed space with an endurance of 12 hours and an additional 96 hours in case of an emergency situation. The niche technology facilitates carrying out deep ocean exploration and will be ready for qualification trials by December 2024. The deep-sea vehicle shall be maneuvered at the deep seafloor with six-degree freedom using battery-powered propulsion system for 4 hours at 6000-metre depth. It will carry any devices, sensors, etc. to the deep-sea for doing experiments/observations in the presence of a human being. It will help in augmenting India's capability with infrastructure facilities such as a high thickness welding facility and deep ocean simulator.

IN BRIEF

[TSMC and Sony create partnership to build \\$7 billion chip plant in Japan](#)

Taiwan Semiconductor Manufacturing Company (TSMC) and Sony announced a joint venture to build a new \$7 billion fab in Japan, with the goal of mass-producing chips in that facility by 2024. The new fab will primarily build chips with 22 and 28nm processes to help ease the current global chip shortage. The new joint venture called Japan Advanced Semiconductor Manufacturing (JASM), aims to start mass production by the end of 2024. TSMC also announced that it would invest over \$9 billion into more fab construction and upgrading technology capacity. Part of these funds will be put towards developing another chip making facility in Kaohsiung to make cutting-edge 7nm chips, as well as less advanced 22-28nm chips. The Japanese government will establish a legal framework for subsidizing new domestic plants for advanced semiconductors, including the TSMC-Sony planned facility. A subsidy fund under the New Energy and Industrial Technology Development Organization is planned .

[Polymer discovery gives 3D-printed sand super strength](#)

Researchers at the Department of Energy's Oak Ridge National Laboratory designed a novel polymer to bind and strengthen silica sand for binder jet additive manufacturing, a 3D-printing method used by industries for prototyping and part production. The printable polymer enables sand structures with intricate geometries and exceptional strength -- and is also water soluble. The team used polymer expertise to tailor a polyethyleneimine, or PEI, binder that doubled the strength of sand parts compared with

conventional binders. Parts printed via binder jetting are initially porous when removed from the print bed. They can be strengthened by infiltrating the design with an additional super-glue material called cyanoacrylate that fills in the gaps. This second step provided an eight-fold strength increase on top of the first step, making a polymer sand composite stronger than any other and any known building materials, including masonry. The unique molecular structure of the PEI binder makes it reactive with cyanoacrylate to achieve exceptional strength. One potential application for the super-strength sand is to advance tooling for composites manufacturing. The novel binder won a 2019 R&D 100 Award and has been licensed by industry partner ExOne for research.

RESOURCES AND EVENTS

[UNEP Publishes Scientific Assessment of Plastic Pollution](#)

The UN Environment Programme has released a global assessment of the marine pollution crisis which identifies several businesses and industries in which changes will be needed and calls on policymakers to “create the right mix of legislative and fiscal instruments”. The authors report that plastics are the largest, most harmful and most persistent component of marine litter, accounting for at least 85%. The report finds sharp growth in recent years of plastic waste emissions, or leakage, into aquatic ecosystems, which it says are on track to almost triple by 2040. The plastic pollution crisis has been accelerated by the low price of virgin fossil fuel feedstocks compared to recycled materials, disjointed efforts in informal and formal plastic waste management, and the lack of consensus on global solutions. Plastic pollution can adversely affect human health, wildlife and global carbon cycling. For the full report see [FROM POLLUTION TO SOLUTION](#)

[India calls for increased Climate finance](#)

Minister for Environment, Forest and Climate Change, Bhupender Yadav told a meeting of the like minded developing countries that climate finance should be at least USD 1 trillion to meet the challenges of addressing climate change. He added that the current challenges being faced by developing countries required intensified multilateral cooperation, not intensified global economic and geopolitical competition and trade wars. He said India is working on ambitious climate actions in line with sustainable development priorities and invited the LMDC members to join hands with India to support the global initiatives it has pioneered, including the International Solar Alliance (ISA), Coalition for Disaster Resilient Infrastructure (CDRI) and the Leadership Group for Industry Transition (LeadIT). The meeting stressed the need to respect the fundamental principles of the UN Convention, including equity and common but differentiated responsibilities and respective capabilities (CBDR-RC) and urged developed countries to provide means of implementation to developing countries in terms of climate finance, technology transfer and capacity building. They also called upon the speedy finalization of the Paris Rulebook

[Researchers analyze consequences of China hypersonic missile test](#)

Reports of China testing a new orbital launch vehicle, known as Fractional Orbital Bombardment System (FOBS), have fuelled concerns about China's advancing military capabilities and possible consequences. Flight tests conducted in July and August saw a rocket launched into orbital flight, which later re-entered the atmosphere and released a maneuverable glide vehicle traveling at hypersonic speeds, in excess of five times the speed of sound. A policy brief of the Asia-Pacific Leadership Network highlights the possible risk of FOBS, or FOBS-like technologies, circumventing the established Outer Space Treaty (OST) which bans placing nuclear or other 'weapons of mass destruction' into orbit. However, FOBS would not breach the treaty if it never completed an orbit and is technically 'in transit' in space. The report suggests that States within the Asia-Pacific such as India, Japan, South Korea, Indonesia, Vietnam, and the Philippines can

play an important role in promoting or even hosting multilateral dialogs on space security issues that are specific to the region, and could strengthen international agreements on outer space security, with the aim of eventually developing a transparent Space Traffic Management regime and encouraging more routine space situational awareness data between states and private companies. The brief can be found here <https://cms.apln.network/wp-content/uploads/2021/11/APLN-Policy-Brief-No.78-Bowen-and-Hunter.pdf>

[African Medicines Agency to start operations](#)

A treaty establishing the African Medicines Agency, finalized in 2018, enters into force on 5 November, after ratification by 15 countries - Algeria, Benin, Burkina Faso, Cameroon, Gabon, Ghana, Guinea, Mali, Mauritius, Namibia, Niger, Rwanda, Seychelles, Sierra Leone, and Zimbabwe. The agency seeks to transform the African regulatory system, which is fragmented and struggles to fight the flood of counterfeit medicines, and improve access to medicines and vaccines. African leaders should decide in February where the agency should be located after countries submit bids to host it. The funding would likely be a combination of fees from drug manufacturers and medical device makers and countries' contributions. The agency will work with national regulators in Africa.

[USA joins the International Solar Alliance](#)

John Kerry, U.S. Special Presidential Envoy for Climate announced at the UNFCCC COP26 that the United States of America (USA) has joined the International Solar Alliance (ISA) as a member country. U.S becomes the 101st country to sign the framework agreement of the ISA to catalyze global energy transition through a solar-led approach. This move will strengthen the ISA and propel future action on providing a clean source of energy to the world. The decision was widely welcomed, including by Prime Minister Modi. Kerry said that the US is happy to join the International Solar Alliance, which Prime Minister Narendra Modi took the lead in making. The US also joined the Steering Committee of the 'Green Grids Initiative – One Sun One World One Grid' (GGI-OSOWOG), and endorsed the One Sun Declaration along with 80 countries.

[India, Israel sign agreement to develop next generation drones, robotics](#)

India and Israel have signed a bilateral innovation agreement (BIA) to jointly develop next generation technologies and products. The Agreement (BIA) was signed between Defence Research and Development Organisation (DRDO) and Israel's Directorate of Defence Research and Development (DDR&D). Under the agreement, startups and industry of both countries will work together to bring out next-generation technologies and products in the areas such as drones, robotics, artificial intelligence, quantum technology, photonics, biosensing, brain-machine interface, energy storage, wearable devices, natural language processing, to meet the requirements of both countries.

[Strategy to Reduce Short-Lived Climate Pollutants by 2030](#)

46 countries members of the Climate and Clean Air Coalition to Reduce Short-lived Climate Pollutants (CCAC) adopted the 2030 strategy for stepping up ambition and action to address climate and clean air issues, with a particular focus on methane, on the sidelines of COP 26. The Strategy envisions scaled-up efforts to significantly reduce short-lived climate pollutants (SLCPs) by 2030, namely methane, hydrofluorocarbon (HFCs), black carbon, and tropospheric (ground level) ozone. The CCAC aims to act on SLCPs in order to slow near-term temperature change and deliver public health, food security, environmental, and economic benefits. The CCAC will support the Pledge's implementation and assist all participants achieve its goal to reduce methane emissions

by at least 30% by 2030. Specific actions on reducing methane emissions in the agriculture, fossil fuels, and waste sectors have been identified as well as efforts to reduce HFCs in the cooling sector. The US, Switzerland, Canada, Norway, Monaco, the Flemish region of Belgium, Monaco, Ireland, and Sweden all made pledges to the CCAC Trust Fund. In addition, philanthropies have raised USD 328 million to ramp up ambition on methane and support countries implement the Global Methane Pledge.

SCIENCE POLICY AND DIPLOMACY

[India strengthens climate targets and launches global energy grid initiative](#)

Prime Minister Narendra Modi has pledged that India will reach net zero emissions by 2070 as he announced five climate targets at COP 26 in Glasgow. The Other four were - (1) To reach 500 GW (from 450 GW) of installed renewable energy capacity by 2030 (2) India to get 50% of its energy from renewables by 2030. The previous target of 40% by 2030 set in 2016 =was nearly achieved in June 2021. (3) India would reduce carbon intensity of GDP by 45% by 2030, up from a previous target of 33% set in 2016. These targets are based on 2005 levels. (4) India would reduce its projected total carbon emissions by 1 billion tonnes by 2030. PM Modi said that this increase in ambition should be matched by increases in climate finance and the transfer of low-carbon technologies from developed countries to developing countries. He expected wealthy countries to make \$1 trillion available as soon as possible. PM Modi and prime minister Boris Johnson announced a green grids initiative to accelerate the integration of solar and wind power on international grids by connecting energy-rich locations such as sunny deserts and windy coastlines with urban centres. The initiative will be coordinated by a ministerial steering group including France, India, the United Kingdom and the United States.

[Major methane deal at Climate summit](#)

Nearly one hundred nations joined a United States and European Union initiative to cut emissions of methane—a potent greenhouse gas—by at least 30 percent this decade. The initiative could have a powerful short-term impact on global warming. Methane (CH₄) is over 80 times more potent than CO₂, and its sources, such as open-pit coal mines, natural gas leaks and livestock, have received relatively little attention until now. The fossil fuel industry emitted 120 million tonnes of methane in 2020, and much of it can be easily avoided. A UNEP report said that "available targeted methane measures" could reduce CH₄ levels by 45 percent by 2030 and reduce global warming by 0.3 C. China, India, Russia and Australia did not join in the pledge.

[UK-US set to cooperate in quantum information sciences and technologies](#)

The United Kingdom and the United States of America have signed a joint statement of intent to boost collaboration on quantum science and technologies which aims to realise the full potential of the technology and deepen ties between the two countries. The UK and US have been at the forefront of advancing this cutting edge area of science and technology. The Science Minister, George Freeman and the US Director of the White House Office of Science and Technology Policy and Science Advisor to the President, Dr Eric Lander signed the statement. It sets out shared priorities for continued cooperation between the two nations, including promoting joint research, building the global market and supply chain and training the next generation of scientists and engineers. They aim to broaden training opportunities, develop new applications for quantum technology, and maximize the benefits of these technologies globally.

[China-US announce deal at COP26 to accelerate climate action this decade](#)

China and the US have announced a deal to strengthen their cooperation on climate action and accelerate emissions cuts this decade. The world's two biggest emitters released a surprise joint statement on 9 November setting out their intentions. The

official version was published by the US state department and Chinese environment ministry websites. Under the deal, both sides promised to act in this “decisive decade” to reduce emissions and keep the goals of the Paris Agreement to limit temperature rise “well below 2C” and pursue efforts for 1.5C “within reach”. The two sides intend to cooperate on: (a) regulatory frameworks and environmental standards related to reducing emissions of greenhouse gases in the 2020s; (b) maximizing the societal benefits of the clean energy transition; (c) policies to encourage decarbonization and electrification of end-use sectors; (d) key areas related to the circular economy, such as green design and renewable resource utilization; and (e) deployment and application of technology such as Carbon capture use and sequestration (CCUS) and direct air capture. The two sides intend to develop additional measures to enhance methane emission control, at both the national and sub-national levels. The two sides intend to establish a “Working Group on Enhancing Climate Action in the 2020s,” which will meet regularly to address the climate crisis and advance the multilateral process, focusing on enhancing concrete actions in this decade.

Mission Innovation sets fresh objectives for international cooperation

An international body of the world’s 23 major research powers has turned its attention to coordinating the globe’s green innovation efforts. Mission Innovation, set up in 2015 has now defined specific climate missions, for example, sucking 100 million metric tons of carbon dioxide out of the atmosphere annually by 2030, some of which were newly unveiled at COP26. So far, there are seven identified missions: zero-emissions shipping; clean hydrogen; integrating green power into electricity grids; removing carbon dioxide from the atmosphere; creating demonstration projects for net-zero cities; green refurbishment of steel, cement, and chemicals plants; and replacing fossil fuels with biofuels. The latter four were launched at COP26. Members of Mission Innovation are working on through their national programmes. One of the next steps will be for each member to submit an “innovation pathway” describing their clean energy research plans over the next 4-5 years, creating a basis of information to better identify areas of collaboration in the future. There are differences in priorities of members. The mission members are the US, China, India, the EU, UK, Japan, South Korea, France, Germany, Italy, Brazil, Canada, Australia, Norway and Saudi Arabia.

Glasgow Summit and COP26 ends with compromises

The 196 Parties to the United Nations Framework Convention on Climate Change (UNFCCC) adopted a compromise [Glasgow Climate Pact](#) that mentions the need to phase down the unabated use of coal and the need to phase out inefficient subsidies for fossil fuels. The global South failed to obtain a clear plan and funding for loss and damage, an issue that was deferred to COP27 in Egypt. The summit focused on carbon market rules, climate finance of at least \$100 billion per year, gaps between emission reduction targets and needed reductions, strategies for carbon neutrality by 2050, adaptation plans, and the working platform for local communities and indigenous peoples. One breakthrough at COP26 was the approval of the rules of the Paris Agreement. By 2024, all countries will have to report detailed data on emissions, which will form a baseline to assess future greenhouse gas reductions. The agreement on the functioning of carbon markets creates a trading system between countries. Industrialized countries committed to doubling adaptation finance by 2025 based on 2019 amounts. In addition, COP26 approved a new work program to increase greenhouse gas cuts, with reports due in 2022. Apart from the Climate Pact, the summit produced voluntary commitments by groups of countries against deforestation, cutting down emissions of methane, and the phasing out of gasoline and diesel vehicles. At least 10 countries agreed to put an end to the issuing of new hydrocarbon exploration and exploitation licenses in their territories. Some thirty nations agreed to suspend public funding for coal, gas and oil by 2022. More than 100 stakeholders, including countries and companies, agreed to eliminate cars with internal combustion engines by 2030, and a hundred nations signed a pact to promote sustainable agriculture.

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