



These artificial intelligence solutions can save mankind

The green aspect

Part 1 of 2

OCTOBER 2020

For fund distributors and professional investors only

In the US, 34% of Americans believe artificial intelligence (AI) will have a negative impact on humanity¹. Yet, this could not be further from the truth.

In this series of two papers, with the first one focusing on the 'green' aspect and the second one - on the 'social' aspect - we will uncover how quietly, behind the curtain, AI not only is proving essential in promoting sustainability of our global economy, but could even ensure our human survival.

Our global population continues to grow. Emerging markets are developing at breakneck speed. With our increasingly ageing population expected to grow by 2 billion by 2050², access to better and cheaper healthcare will be crucial.

AGEING & GROWING POPULATION



The world's population is expected to increase by **2 billion** in the next 30 years*



The number of older persons is projected to double to **1.5 billion** in 2050**

BETTER HEALTHCARE AND RESOURCES WILL BE REQUIRED

*Source: United Nations, Global Issues, Population.
**Source: "World Population Ageing 2019: Highlights", United Nations 2019.

There is a huge strain on global resources and sustainability has become a major issue. We will need more energy and food to alleviate these pressures, plus we need to recycle more to preserve the world's natural resources.

President Franklin D. Roosevelt once famously said:
"The only thing we have to fear, is fear itself."

The world faces an energy crisis - Ramesh's story

From his office in Gurgaon, India, Ramesh was preparing to go home. He was working late that evening on an IT project. The lights went out momentarily and the backup generator kicked in. This was nothing unusual, except that this time half the country had been plunged into darkness.

India had suffered the world's biggest ever power outage. Two severe blackouts in July 2012 plunged both the northern and eastern parts of India into darkness, affecting more than 630 million people.

Since then remarkable progress has been made to improve India's energy infrastructure. As of August 2020, 36% of India's installed electricity generation comes from renewable sources³. However, this pivot towards renewable energy is not just about the environment. It is also a tactic to help tackle India's expanding energy deficit, plus tackle energy security issues with a richer energy mix.

Value. Shared.



AI SOLUTIONS

Oil and gas

AI algorithms are used to cut operational costs, predict equipment failure and increase oil and gas output.



Wind farms and solar power plants

AI interprets historic data on voltage, temperatures and wind speeds to maximise the energy output.⁵

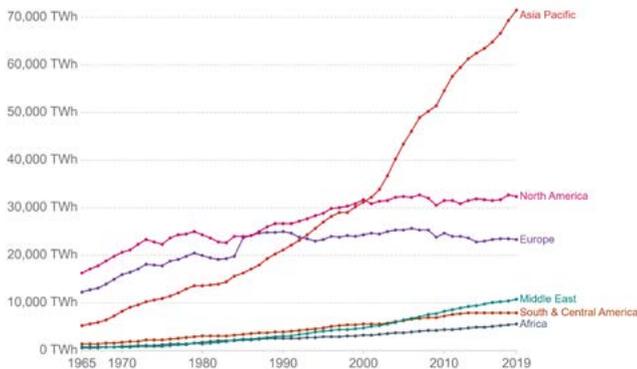
AI predicts and manage fluctuations in energy demand, which is a huge issue for oversized economies such as India and China.

AI could help improve our global energy supply

India isn't the only country that needed to address its pressing energy issues. The world is consuming more energy than ever. Most of this increase is coming from emerging markets and in particular, from Asia where sustainability is an issue.

Primary energy consumption by world region

Primary energy consumption is measured in terawatt-hours (TWh). Note that this data includes only commercially-traded fuels (coal, oil, gas), nuclear and modern renewables used in electricity production. As such, it does not include traditional biomass sources.



Source: BP Statistical Review of World Energy (2019).

AI could help increase the supply of energy across the entire energy mix

Last year Exxon Mobil partnered with Microsoft to use AI algorithms to interpret huge amounts of data created by millions of sensors that monitor their refineries all over the globe. By improving the quality of analysis and the enhancements that can be made to achieve greater operational efficiencies, Exxon Mobil expects to generate billions in net cash flow over the decade from this partnership. Overall, these types of AI applications could help the industry operate more efficiently and with fewer carbon emissions and ensure sustainability.⁴

An Indian company, Climate-Connect, is using AI to provide energy-load forecasts of the grid to energy companies. It is also using algorithms to predict maintenance costs and provide analysis that can ensure fewer outages and breakdowns.

Planning a holiday - Markus' story

Markus frequently charges his Tesla 3 model. Living on the outskirts of Zürich, he travels to his office every day. His only gripe is the range of the vehicle. He cannot comfortably drive it to his favourite holiday spot in the south of France without significant amount of planning.

Better battery technology will be crucial to ensure the electrification of our global road network. We are currently too slow to innovate and need better solutions for energy storage which supports sustainability. Part of the problem is that it takes time to test new battery chemistries. However, AI could speed up the testing process. For instance, Stanford University, in collaboration with researchers from Toyota, have developed AI algorithms that can slash these testing times by up to 98%.⁶

AI will also help electric vehicles become self-driving cars. This would reduce the number of accidents and save lives. Moreover, electric vehicles like Tesla are already considered to be partially autonomous cars.



The other development we could see is the rise of smart grids. When electricity is distributed centrally, it has to be carried over long distances which results in transmission loss. The smart grid allows energy to be produced in many places, which creates a more resilient, secure and cheaper electricity grid. However, it also becomes a lot more complex to manage. This is where AI can help. It could ensure a more sustainable, highly digitalised and dynamic energy system. In emerging markets like India, smart grids could make a huge difference in ensuring energy security and reliability.

AI will feed a growing and wasteful world

Rising incomes in emerging markets and growing urbanisation means the world is eating more and wasting more. Fortunately, agricultural companies like John Deere* have transformed themselves into artificial intelligence data-driven businesses that are dedicated to sustainability. Their goal is to protect crop yields from climate change, offer solutions that provide for population growth and help tackle security issues. Irrigation, weeding and spraying with the aid of sensors have been vastly improved. Plus, the excess use of water, pesticides and herbicides are being drastically reduced to protect the fertility of the soil and damage to ecosystems.⁸

“1.6 billion tonnes of food is wasted annually, which equals to one-third of the total amount of food produced globally”.⁷

By 2050, the average farm is expected to generate 4.1 million data points every day from a variety of sensors attached to farm equipment and drones, which are connected to a 5G network. This data rich environment is exactly what AI needs to add value. For instance, John Deere has already developed a cloud-based platform to collect data from these sensors so it can process AI algorithms. Models can then be built using data provided, which can optimise water distribution using automated irrigation systems.

Data collected by both drones and embedded sensors could also enhance weeding and reduce the use of herbicides and pesticides. Data collected on the amount of sun, shade and irrigation that weeds like, could help farmers create an inhospitable environment for weeds, yet an environment where crops can thrive.

This would decrease the need of herbicides, which are expensive, pollute the environment and risk contaminating the food supply. It would also reduce the amount of waste the agricultural industry produces. Consequently, AI could save farmers money as well as protect the environment and support sustainability.

AI will help humanity recycle the right way

AI is a disruptive force that will likely transform the global economy. It could also provide the technological progress we need in developed markets to boost productivity, improve sustainability and restore robust levels of economic growth. The difference between past technological innovations, however, is that **AI facilitates sustainability**.

It could for instance, improve how we recycle and manage resources. Smart robots, sensors and vision systems are providing huge amounts of data that AI algorithms can use to improve recycling. These technologies will help speed up the rate and accuracy of sorting:



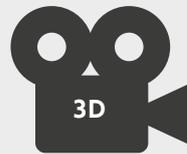
The newest robots can sort up to 60 to 80 items per minute – far quicker than a human.



Robotic arms are already being used to sort specific types of plastic or items contaminated with food from moving conveyor belts.⁹



Pincers, suction cups and strong light are used to sort and pick the right materials.



One of the most interesting developments is the use of 3D cameras that can identify types of material and distinguish between colours, shapes, sizes and textures by sight.¹⁰

From human resources perspective, AI solutions remove the challenges of recruiting and retaining labourers for this unpopular task. It also helps improve safety as workers often come into contact with hazardous materials.

AI could help feed and clothe humanity in the future by providing greater access to healthier food and energy to meet our living needs. It could also help us reduce the cost of recycling and further contribute to achieving a sustainable economy. Effectively, it plays a major role in saving humanity.

In our next article, we will look at how AI is fast-tracking progress in healthcare, education and driving the development of medical wearables.

Thematic strategies focusing on areas of structural change and growth, under competent management, have proven to be resilient to market downturns. The disruption from AI has only just started - annual investment into AI has grown 6x globally between 2015 and 2019¹¹ as it's modernising industries, driving economic growth and even sustainability.

Artificial Intelligence offers plenty of diverse investment opportunities. Please contact us by visiting allianzgi.com, choosing your country and searching for 'artificial intelligence'.

For more information, please visit our website: www.allianzgi.com



- 1 B. Zhang and D. Allan, "Artificial intelligence: American attitudes and trends," Centre of Governance of AI, future of humanity Institute, University of Oxford, Oxford, 2019.
- 2 United Nations – Sustainable Development Goals, Hunger, 2020
- 3 The Government of India – Central Electricity Authority, "Installed capacity," Central Electricity Authority, Dehli, 2020.
- 4 AI Trends Staff, "Oil & gas industry transforming itself with the help of AI," AI trends, 18 June 2020. [Online]. Available: aitrends.com/ai-and-business-strategy/oil-gas-industry-transforming-itself-with-the-help-of-ai/. [Accessed 05 September 2020].
- 5 M. Frank, "Can artificial intelligence in the energy sector help solve the climate crisis?," DW, 14 May 2019. [Online]. Available: <https://www.dw.com/en/can-artificial-intelligence-in-the-energy-sector-help-solve-the-climate-crisis/a-48669209>. [Accessed 05 September 2020].
- 6 Stanford University, "Artificial intelligence used to the supercharged battery development for electric vehicles," SciTechDaily, 22 every 2020. [Online]. Available: scitechdaily.com/artificial-intelligence-used-to-supercharge-battery-development-for-electric-vehicles/#:~:text=Artificial%20Intelligence%20Used%20to%20Supercharge%20Battery%20Development%20for%20Electric%20Vehicles,-TOPICS%3AArtificial%20Intelligence&text. [Accessed 5 September 2020].
- 7 Food and Agriculture Organization of the United Nations, Global Food Losses and Food Waste, 2011; FAOSTAT database; BCG FLOW model. 2015 findings, in 2015 dollars.
- 8 T. Talaviya, D. Shah, N. Patel, H. Yagnik and M. Shah, "Implementation of artificial intelligence in agriculture for optimisation of irrigation and application of pesticides and herbicides," Artificial Intelligence in Agriculture, vol. 4, pp. 58-73, 2020.
- 9 J. Kite-Powell, "This Recycling Robot Uses Artificial Intelligence To Sort Your Recyclables," Forbes, 04 April 2017. [Online]. Available: <https://www.forbes.com/sites/jenniferhicks/2017/04/04/this-recycling-robot-uses-artificial-intelligence-to-sort-your-recyclables/#36f317802d35>. [Accessed 16 September 2020].
- 10 H. Britt, "AI Could Improve Sustainability Through Smart Recycling Sorting," Thomas Net, 2013 March 2020. [Online]. Available: <https://www.thomasnet.com/insights/ai-could-improve-sustainability-through-smart-recycling-sorting/#register>. [Accessed 16 September 2020].
- 11 <https://www.venturescanner.com/2020/03/12/ai-2019-funding-achieved-banner-year/>

***This is no recommendation or solicitation to buy or sell any particular security. A security mentioned as example above will not necessarily be comprised in the portfolio by the time this document is disclosed or at any other subsequent date.**

Investing involves risk. The value of an investment and the income from it may fall as well as rise and investors might not get back the full amount invested. Allianz Global Artificial Intelligence is a sub-fund of Allianz Global Investors Fund SICAV, an open-ended investment company with variable share capital organised under the laws of Luxembourg. The value of the units/shares which belong to the Unit/Share Classes of the Sub-Fund that are not denominated in the base currency may be subject to a strongly increased volatility. The volatility of other Unit/Share Classes may be different. Past performance is not a reliable indicator of future results. Investment funds may not be available for sale in all jurisdictions or to certain categories of investors.

For professional investors in Europe (excluding Switzerland). For a free copy of the sales prospectus, incorporation documents, daily fund prices, key investor information, latest annual and semi-annual financial reports, contact the issuer at the address indicated below or www.allianzgi-regulatory.eu. Austrian investors may also contact the Austrian information agent Allianz Investmentbank AG, Hietzinger Kai 101-105, A-1130 Vienna. Please read these documents, which are solely binding, carefully before investing. This is a marketing communication issued by Allianz Global Investors GmbH, www.allianzgi.com, an investment company with limited liability, incorporated in Germany, with its registered office at Bockenheimer Landstrasse 42-44, 60323 Frankfurt/M, registered with the local court Frankfurt/M under HRB 9340, authorised by Bundesanstalt für Finanzdienstleistungsaufsicht (www.bafin.de). Allianz Global Investors GmbH has established branches in the United Kingdom, France, Italy, Spain, Luxembourg, Sweden, Belgium and the Netherlands. Contact details and information on the local regulation are available here (www.allianzgi.com/Info).

For qualified investors in Switzerland. For a free copy of the sales prospectus, incorporation documents, daily fund prices, key investor information, latest annual and semi-annual financial reports, contact the Swiss funds' representative and paying agent BNP Paribas Securities Services, Paris, Zurich branch, Selnaustrasse 16, CH-8002 Zürich or the issuer either electronically or by mail at the given address. Please read these documents, which are solely binding, carefully before investing. This is a marketing communication issued by Allianz Global Investors (Schweiz) AG, a 100% subsidiary of Allianz Global Investors GmbH. AdMaster: 1341370 | 20-2228