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# The World in 2030: Trends, Estimates, Forecasts



## The World in 2030: Trends, Estimates, Forecasts

The world is undergoing rapid transformation. The desire for a new international monetary system, the increasing role of “digital” and automation, new life-prolonging biotechnologies, attempts at a “green” transition, the struggle for food security, cultural shifts are already forming a picture of the future world, although these trends are somewhat “barred” by the opened turn of a new geopolitical confrontation.

Nevertheless, how humanity sees itself in 2030 depends primarily on the potential to implement trends in these key topics for the economic and social agenda.

We tried to assess the trends in each of the areas, the possible consequences and options for the development of each of them in three basic scenarios of "confrontation", "bad peace" and "thaw".

### 1. Currency unions, payment systems

The established system of predominantly settlements in reserve currencies is, of course, going through another test of strength. It cannot be said that the idea of the emergence of alternative currencies or settlement systems did not appear earlier, but now it is much closer to being realized than before.

Several factors contribute to this.

1. The emergence of new technologies that can be quickly deployed and scaled. This applies both to the emergence of new digital currencies and settlement systems with traditional currencies. Unlike the past, the creation of its own technology is now within the power of the smallest country, while earlier it required the most complex settlement systems at that time, and the majority of the project itself was not strong enough.

2. New players - the most growing or ambitious economies (China, Brazil, Russia, Turkey, India) have accumulated both their own competencies, scientific potential, and the desire to be more independent in terms of their position in the world system. That is, with the growth of the weight of the economy, the economy itself seeks to reach a new level of both independence and self-sufficiency in financial infrastructure. To a large extent, the mechanisms of developed countries played a role in this, which were first mastered, and then in some ways the new players surpassed them. Played the classic law of competition and the market - you can't be the sole leader all the time, competitors appear and they can get around you - the law of the market economy, which in developed countries has actually been forgotten.

By the way, this happened earlier with South Korea and Israel, as soon as their economies reached a high level of GDP, immediately their currencies were made partially convertible.

3. Sanctions have become today's realities for an increasing number of parties. New payment systems and currency unions are needed to insure. If you "shut off" oxygen in one place, then you can always turn to the backup system.

4. Finally, advantages in world trade. By trading in the national or conditional reserve international currency, to which the country has access, it avoids the "dollar" hunger, when due to a low credit rating or a deficit nature of the trade balance, it is simply not possible to get funds to buy certain goods abroad, technology or equipment.

5. For the same reason, the simplification of mutual investment.

6. Cryptocurrency example. The most effective player that has been able to break the dominance of reserve currencies is cryptocurrencies. Breaking into the traditional financial world, cryptocurrencies have become not only a means of exchanging one currency for another, in some



cases they have also become a means of payment. Realizing that independent players have done it, the big countries are more than confident that they can do it themselves.

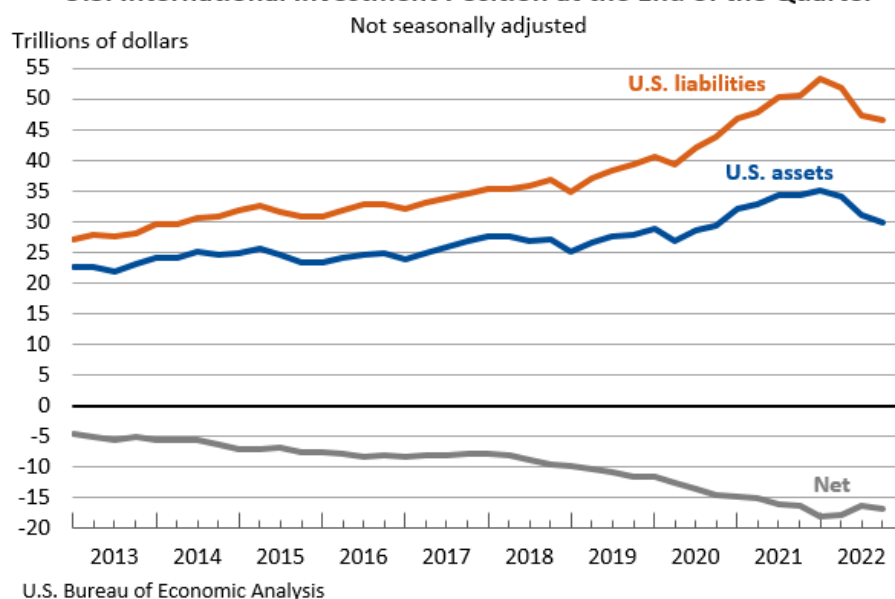
All these overdue reasons predetermine the inevitable attempts to form a new settlement infrastructure with a composition of powerful players that are gaining weight.

However, success, in order for it to be predetermined, requires consent and remarkable efforts.

The shortcomings of the dollar are exaggerated. It is a convenient and widely used well-known currency, access to which is not so difficult for many, and the provided liquidity is even redundant.

Also, the degree of “robbery” by the dollar of other countries trading in it is “exaggerated”. The fact is that, getting to your country, the dollar at the same time becomes the issuer's debt to you. That is, this does not mean that you gave away the goods for "paper", it means that you received the right to consume in return. Given that the world will always strive to reduce the number of currency units, simply because the fewer settlement tools, the easier and lower the transaction costs, the emergence of an alternative to the dollar should be accompanied by the same degree of universality as the North American currency. At one time, other countries began to exchange dollars among themselves, simply because it is convenient, and not because “Uncle Sam” decided to heat everyone up and cash in on his right to issue a monopoly. He was just the first. Undoubtedly,

#### U.S. International Investment Position at the End of the Quarter

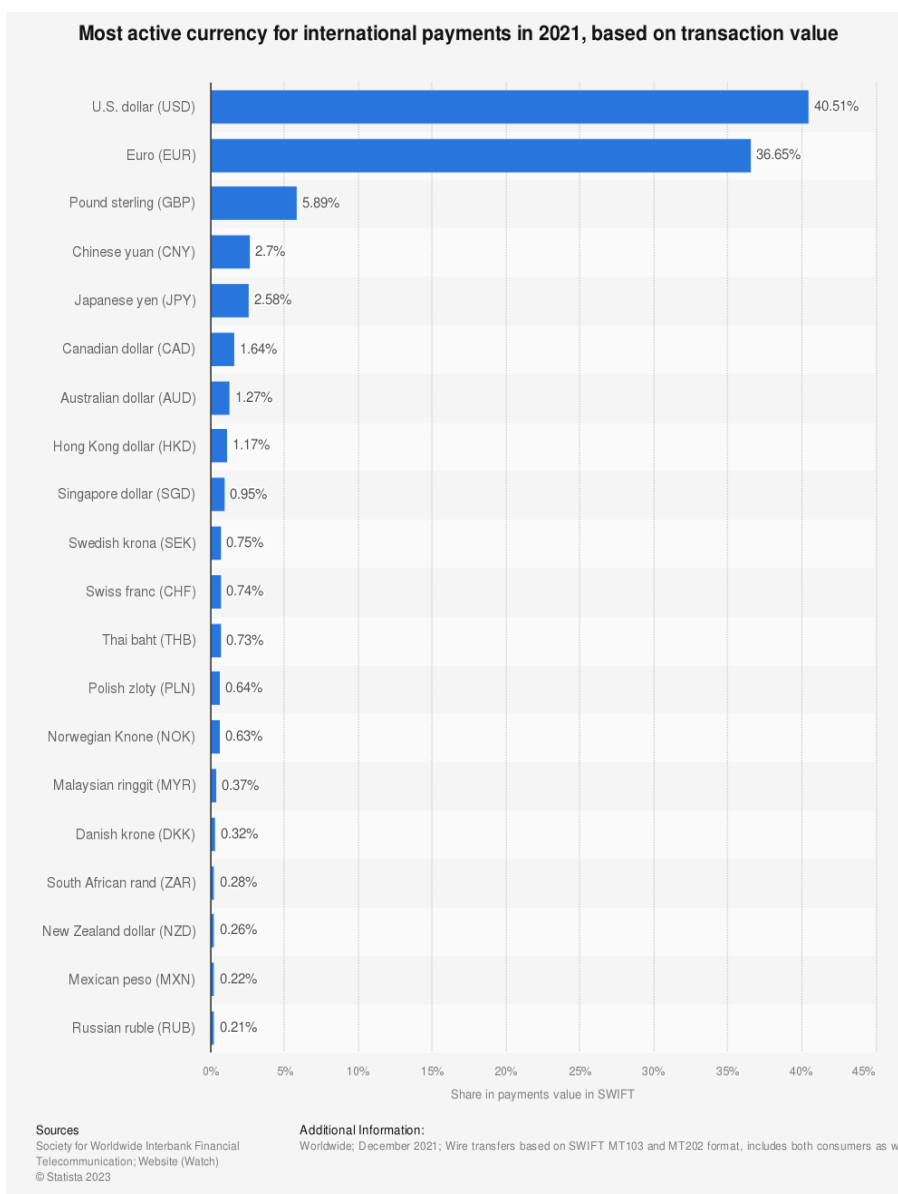


Moreover, the US foreign debt is significantly less than the domestic one, and it is the latter that is the main problem for America.

In addition, the bulk of foreign exchange reserves are still held in US dollars.



Also, according to international data, the dollar still retains its leadership in international settlements.



It accounts for 40-43% of settlements in recent years.

At the same time, not everything is so clear. Thus, the volume of international trade in 2021 amounted to [28.5 trillion Doll.](#), but the total volume of cross-border receipts and payments in the Chinese national currency renminbi / yuan / between China and countries along the "Belt and Road" amounted to [5.42 trillion yuan / 763.4 billion US dollars](#), and this is 14.8 percent. of the total use of the yuan in cross-border settlement transactions made by China in 2021. That is, the volume of cross-border transactions in yuan is 5.2 trillion. dollars, and this is already 18% of world trade, and not at all the 2.7% indicated in many sources, and most likely related to data on settlements through the SWIFT system.

Moreover, China has entered into swap agreements with all the key economies of the world, the process of internationalization of the yuan is very active, setting an example for other "new" currencies.

The nearest period until 2030 can be characterized as the time of attempts to establish new settlement systems and currency unions.

The most recent most striking statements on this topic:

[-Brazil and Argentina decide to create a common currency](#)



- [Russian Foreign Minister Sergei Lavrov reported that the initiative to create BRICS currencies discussed at the summit in South Africa in August](#)
- [Russia plans to increase trade in rubles from 20% to 40% by 2025](#)
- [Russia and China increase trade in national currencies](#)
- [Turkish lira set a record on the Russian stock exchange](#)

When analyzing this process, attention should be paid to the following.

The world has accumulated a lot of experience of not the most successful currency unions, which, since few people on the European continent know that the currency union has existed in Latin America since 2004, is supervised by the organization ALBA (Alianza Bolivariana para los Pueblos de Nuestra América). The monetary unit, the sucre, was supposed to replace the dollar in the settlements of countries lacking a dollar-based settlement infrastructure. Sucre, however, was and is only accepted within this union of 10 countries and it was the small volume of possible trade transactions that led to the fact that the system was discontinued in 2018, the infrastructure of the payment system was subsequently used by banks to conduct operations of state systems to combat poverty. The largest volume of transactions amounted to about 1 billion dollars in 2012, and this is disproportionately small compared to the total foreign trade of the participating countries. Accordingly, the formation and alignment of trade balances was an exorbitantly expensive and difficult task compared with the effect that the operation of the system gave.

The transferable ruble system, which supported the commercial exchange of the SEF countries, was longer, but instead of progress, the system began to gradually degrade over the decades, which was also recognized in the Soviet Union. The main reason was the insufficiency of the range of goods that could be bought with a transferable ruble only in the CMEA countries. The participants in the system asked the Soviet side to allow the exchange of the transferable ruble for dollars, which was refused, which actually signed the verdict on the system. Perhaps greater flexibility would extend the existence of the then high-tech system to the present day.

At the same time, the European monetary union before the introduction of the euro can be attributed to the number of successful currency unions. Its success was predetermined by broad convertibility, including convertibility into US dollars, a large number of participants, effective mechanisms for the formation of reserves in the ECU, and the achievement of the use of currencies in foreign trade transactions.

The rest of the monetary unions are perhaps too small or regional to be taken seriously as historical examples.

The main issue to be resolved by the creators of new currency unions or international currencies, digital or conventional, is the principles of its exchange for national currencies, where the main issue will not even be the exchange rate, but the principles of accumulation and implementation of national currency received in exchange for a new single reserve or settlement currency.

In fact, the introduction of a new currency means the creation of a "mirror" for the national currency, which is backed by the obligations of the issuing country. That is, for the national currency entering the system, the new currency system issues, as it were, a certificate (a new currency unit - NVE), temporarily blocking the circulation of the incoming volume of the national currency. Subsequently, however, the issue becomes more complicated. In order for the NVE to be able to use it for its goods, very flexible conditions are necessary. Thus, the main issues will be the possibility of free circulation of NVE in the countries participating in the monetary union, the principles of exchange for national currencies, the issues of avoiding duplication of the new international currency of the money supply of national states, and the synchronization of monetary policies.

**Consequences:**



- growing economic players by the end of the decade will try to create new currency unions, alternative to the existing system of the dollar area, the euro area and the system of international reserves of the IMF;
- the success of this initiative depends on how countries manage to agree on maintaining long-term trade imbalances and on the conditions for exchanging national currencies for new reserve ones;
- Refusal of the dollar zone and the euro zone from participating in this project in case of success of various financial settlement systems. This can generally result in both a reduction in world trade and a global reformatting of trade and investment flows on a global scale;
- in order to avoid these effects for the countries of the dollar and euro area, it would be advisable to join this discussion right now;
- Potentially, the creation of a new reserve currency could also lead to an increase in investment in developing countries, when the volume of foreign investment will be decoupled from the dollar supply.

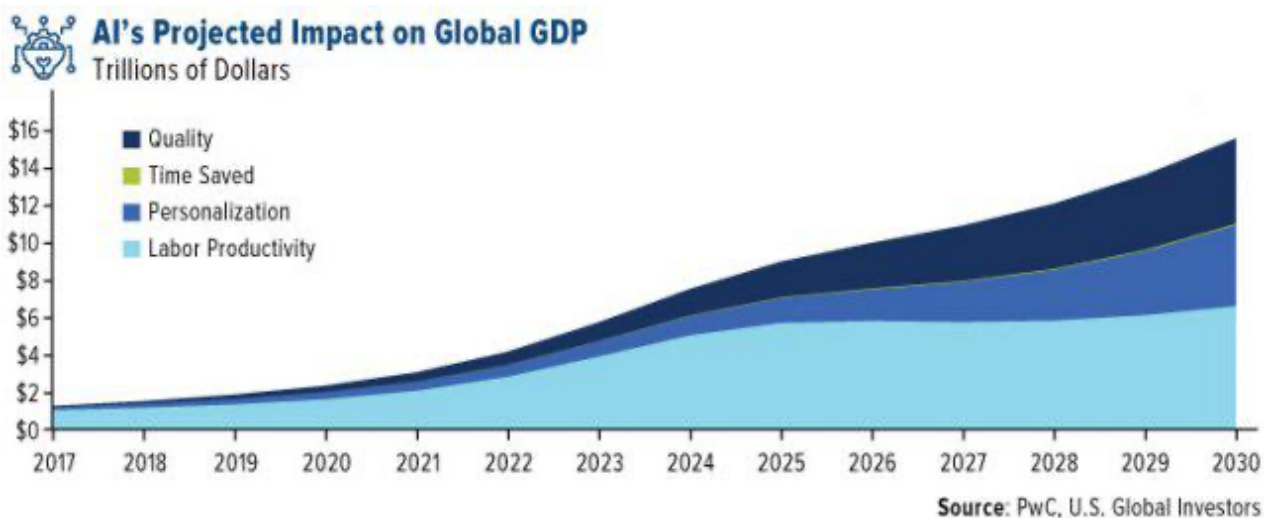
## 2. Artificial intelligence and robotization

Artificial intelligence technologies and robotics are actively developing: we can expect that by 2030 they will be integrated into many different sectors of the economy, which will lead to major changes in people's lives. In particular, the following changes can be predicted:

- Reshaping the labor market: AI is replacing workers who perform monotonous functions and functions that AI already does well, but at the same time, there is a growing demand for highly skilled employees who can configure, maintain and control (perhaps even contain) AI. According to McKinsey<sup>1</sup>, by 2030, AI could generate an additional economic effect of about 13 trillion US dollars, increasing global GDP by about 1.2% per year. This will happen mainly due to the replacement of labor by automation and the growth of innovation in products and services.
- Redefining privacy: Improving facial recognition is leading to its adoption in more areas, which raises concerns about loss of privacy, as well as the need to sometimes prove that AI is wrong.
- Transferring transactions to the blockchain and processing them by AI systems.
- Active use of AI in industry 4.0: smart sensors and tracking systems allow preventive maintenance of mechanisms and reduce the number of unforeseen breakdowns and downtime.
- Further development of the sharing economy using AI tools.
- There will be a need in the labor market for people with several specializations (doctor + roboticist, farmer + big data specialist, biologist + programmer).
- Even more algorithms will penetrate into life than now: people will be less likely to choose what to eat, where to go, what films to watch, and so on.
- Personalization of education: with the help of AI, curricula will adapt to each individual; fundamentally new teaching technologies will be used in the classrooms.
- In healthcare, the use of robots for operations and various medical procedures will increase significantly.

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<sup>1</sup> [https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/637967/EPRS\\_BRI\(2019\)637967\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/637967/EPRS_BRI(2019)637967_EN.pdf)



The widespread use of artificial intelligence and robotics in various sectors of the economy can have both positive and negative consequences.

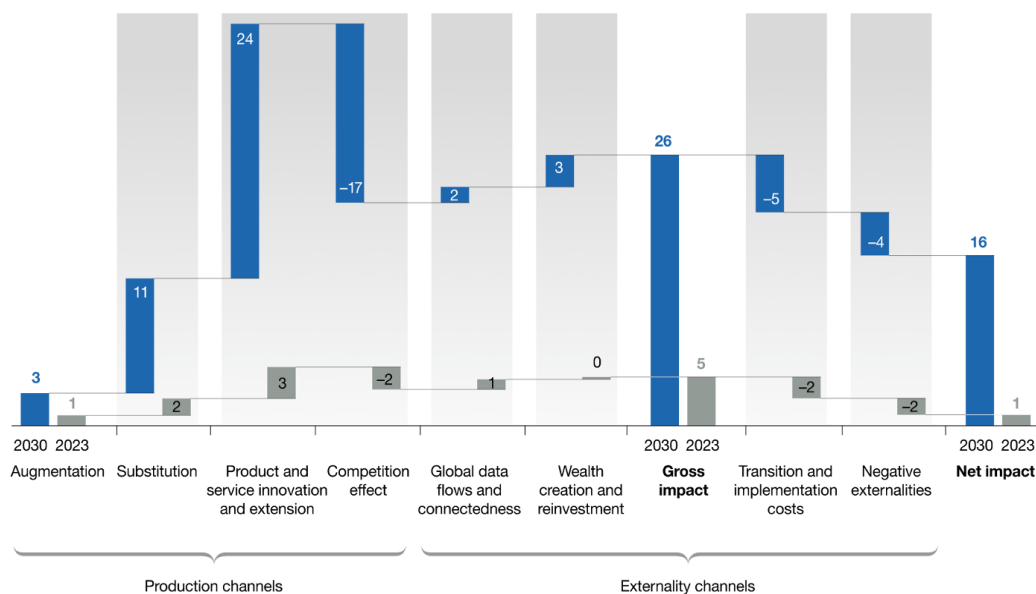
Positive consequences:

1. Increase in productivity and efficiency: Robotization can greatly increase labor productivity and reduce production time, while artificial intelligence can improve process control and improve system efficiency.
2. Reduce labor costs: Robots can replace humans in labor-intensive processes, reducing labor costs and reducing human errors.
3. Improving the quality of products and services: Artificial intelligence can improve the quality of products and services through more precise control and faster error detection.
4. Reducing risks to humans: Robots can perform dangerous and heavy work, which will reduce the risks to humans.





## Breakdown Of The Economic Impact of Artificial Intelligence, Cumulative Boost vs Today, %



Note: Numbers are simulated figures to provide directional perspectives rather than forecasts. Figures may not sum to 100%, because of rounding.

McKinsey&Company | Source: McKinsey Global Institute analysis

### Negative Consequences:

1. Increase in unemployment: robotization can lead to the dismissal of people replaced by robots, and, as a result, to an increase in unemployment in some industries.
2. Growing inequality: If robots replace workers in certain industries, this could lead to increased income inequality between different population groups.
3. Threat to data privacy and security: Artificial intelligence can be used to hack systems and leak data.
4. Responsibility: with the advent of artificial intelligence, questions of responsibility for its actions and mistakes arise. This can lead to legal disputes and lawsuits.
5. Decrease in demand for work skills: the advent of robots may lead to the fact that some skills will become less in demand in the labor market, which may make it difficult for people to adapt to new conditions.
6. AI can be used both for the good purposes of increasing the economic, technological and scientific potential, and for the purposes of confrontation, improving military technologies, which we are actually seeing now.
7. The most fantastic assumption from scientific books is the attempts of AI to take control of world processes, or the insufficiently qualified use of AI for decision making.

### General consequences:

1. In general, the widespread use of artificial intelligence and robotization can lead to significant changes in society, economy and culture. In order to reduce the negative effects and maximize the positive ones, it is necessary to take measures to adapt the society to the new conditions.

It is likely that with the exclusion of man from a number of economic spheres, systems of unconditional basic income will become inevitable and widely practiced. Only in this way will it be possible to prevent a drop in demand due to a drop in income due to the replacement of human



intelligence and labor by automated ones. This is also beneficial for corporations, which, for an uninterrupted existence, must have a constant demand for products.

2. Systems of unconditional basic income, at the same time, can be assisted by artificial intelligence itself - the task of distribution in the economy is no less difficult than production, and the administrative assignment of income will raise the question of how much and to whom the right to consume will be granted. For example, China has been testing a system of “social ratings” for a decade, which in the future may become the basis for assigning an unconditional basic income.

3. It is already necessary to lay down programs for the retraining of workers so that they can engage in other types of work, more highly skilled and associated with automation.

4. The introduction of taxes on the use of robots can also be discussed, which can be used to compensate for job losses and to support the retraining of workers.

5. It is necessary to pay attention to the ethical and legal aspects of the use of artificial intelligence and robotics. It is important to develop standards and norms for the behavior of artificial intelligence, as well as establish legal mechanisms for liability for errors and violations related to the use of robots and artificial intelligence.

6. Finally, keep in mind that technological change is inevitable and unstoppable. Therefore, it is important to correctly plan and implement the use of artificial intelligence and robotics in order to minimize negative consequences and maximize potential benefits.

### **3. Biotechnology and high-tech medicine**

Global (bio)pharmaceutical market for the first time in history in 2020-21 exceeded \$1 trillion in value, with prescription drugs accounting for the majority of sales, with two-thirds of the market coming from the US and the EU. The innovation processes of the advanced pharmaceutical and biotech industries are dominated by two dozen largest TNCs, mainly the United States and several European countries, including the United Kingdom and Switzerland. At the same time, raw materials and active pharmaceutical ingredients are in fact completely concentrated in a group of suppliers from China and, to a lesser extent, India. This disposition has persisted in the industry for many decades.

An important place in modern pharmaceuticals is occupied by orphan (ie, directed against rare, usually genetic, diseases) and biotechnological medicines. Orphan medicines are distinguished by their exceptionally high cost and narrow scope, and their sales are an important component of the financial stability of the largest companies in the industry. Thus, the average cost of treating a patient with an orphan drug in the United States is \$140,000, while with conventional drugs it is \$27,000. influence on the growth of the company's financial performance.

The leaders of the pharmaceutical industry are actively switching to the development and production of orphan and biotech medicines, this trend will continue in the coming years.

Already, biotechnology-based medicines provide more health benefits than their conventional counterparts. As recently as 2015, virtually all new medicines, about half of the global production of major crops, and an increasing number of everyday products (such as food additives, plastics, fuels and detergents) were produced using biotechnology. New crop varieties under development could increase global food production while requiring less water, pesticides and fertilizers.

If today biotechnologies account for less than 1%, then by 2030 their share in the GDP of OECD countries may reach 2.7%. However, many obstacles stand in the way of the development and commercialization of biotechnologies. These include technological challenges, as well as regulations, adequate investment, human resources, public acceptance, and market structures.



At the same time, the giants of the pharmaceutical industry continue to produce traditional chemical medicines, but control over these technologies does not seem to be as significant as it was 20 years ago: leading companies from developed countries are increasingly focusing on the production of generics (analogues of drugs with expired or close patents), share licenses and technologies, as well as create subsidiaries that produce generics for a specific region or country. At the same time, companies are increasingly focusing on specific therapeutic areas.

On the horizon of 2030, the following main areas of development can be distinguished:

1. **Genomic medicine:** Genomic medicine is a field in which researchers study the genes of patients in order to identify genetic mutations associated with various diseases. This knowledge can help develop personalized therapies and prevent diseases before they occur.
2. **Immunotherapy:** Immunotherapy is a treatment that uses the patient's immune system to fight cancer and other diseases. It includes the use of antibodies, vaccines, and other drugs that help boost the immune system and direct it to fight the disease.
3. **Genome Editing Technologies:** Genome editing technologies are a new direction in biotechnology that allows you to change genes in living organisms. This may be useful in the treatment of genetic diseases and in the development of new drugs.
4. **Artificial Intelligence:** Artificial intelligence is becoming more and more popular in medicine and biotechnology. It can be used to analyze large amounts of data, develop new treatments and diagnoses for diseases, and automate certain procedures.
5. **New materials:** New materials can be used to create new implants, prostheses, and other medical devices. For example, the development of biodegradable materials can help in faster recovery after surgeries.
6. **Neurotechnology:** Neurotechnology is a field in which researchers study how the brain and nervous system work. This could lead to the development of new treatments for brain-related diseases such as Alzheimer's.
7. **3D printing technologies:** 3D printing technologies can be used to create organs and tissues, which can eliminate the shortage of organ donors and help patients in need of transplants.
8. **New drug therapies:** New drug therapies, such as gene therapy and RNA-based drugs, can help fight previously untreatable diseases.
9. **Biosensors:** Biosensors are devices that can measure various biological parameters such as blood glucose levels. This may help patients with diabetes and other conditions that require regular monitoring.
10. **New diagnostic methods:** New diagnostic methods such as magnetic resonance imaging (MRI) and positron emission tomography (PET) can help diagnose diseases more accurately and quickly.

By 2030, a broad development of medical technologies is also expected. Listed below are a few areas where significant progress is expected.

1. **Genomics:** Due to the decreasing cost of genome sequencing, genomics will become more accessible and applicable in clinical practice. This will allow developing an individual medical strategy for each patient based on their genetic profile.
2. **Neurotechnology:** Neurotechnology will become more widespread and will help in the treatment of neurological diseases such as Alzheimer's, Parkinson's and depression.
3. **Artificial Intelligence:** The automation and analysis of big data enabled by artificial intelligence will help doctors and scientific researchers diagnose diseases more accurately and develop effective treatments.



4. Nanotechnology: The use of nanoparticles will enable more accurate diagnostic tools and improve medicines while reducing their side effects.
5. Telemedicine: The development of telemedicine will improve the availability and efficiency of medical services, especially for people living in remote areas or suffering from chronic diseases.
6. 3D printing: 3D printing can become an important tool in the creation of biological tissues and organs, which will improve the possibilities of transplantation and disease treatment.
7. Biotechnology: Biotechnology will enable the creation of more effective drugs and treatments for diseases, as well as improve the production of medical products.
8. Robotics can become an important tool in medicine to automate certain procedures and operations. For example, there are already surgical robots that can help perform complex surgeries with high precision and minimal risk to the patient.
9. Mobile apps and devices: Mobile apps and devices can help people follow doctors' recommendations and manage their health. This may be useful in the prevention and treatment of chronic diseases such as diabetes or cardiovascular disease.
10. Big data: Big data and data analysis can help doctors better understand diseases and develop new treatments. For example, the analysis of genetic data can help in the search for new molecules to treat certain diseases. The bioinformatics applications segment is expected to grow at the fastest pace from 2021 to 2028 due to the growing adoption of these tools for analyzing complex sequencing data. Nanobiotechnology is expected to develop at a growth rate of 16.8% per year due to the growing focus on nanotechnology for efficient drug delivery and an increase in research using this technology.

In addition, all these technologies are expected to interact with each other and create new opportunities for the treatment and prevention of diseases. For example, a patient's individual genetic profile can be used to develop personalized drugs that can be 3D printed and further optimized using big data analysis and artificial intelligence.

The shift in economic and scientific activity towards biotech drugs can be explained by the fact that they seem to be more promising in terms of clinical benefits - the effects of traditional medicines are already close to the maximum, it is becoming increasingly difficult to create a breakthrough innovation in this area. Drugs for the treatment of most common diseases are already quite effective and widespread, and competition in their production has been continuously growing for many decades, which means that the added value in this area is less than in the field of little-studied therapeutic areas and new types of medicines.

Developed countries are also suffering from an aging population, which affects the focus of pharmaceutical research (chronic diseases, neurodegenerative diseases, cancer) and the public demand for lower prices for the latest medicines. Most EU countries have already implemented mechanisms to control selling prices for medicines, according to which the state regulator must first approve the price of the drug and only then give permission for its sale. In this mechanism, as a rule, the so-called "reference price" rule is used, when prices for a certain drug in different countries are compared, and prices for its analogues and possible substitutes are also studied. All this gives regulators a wide range of options for regulating drug prices, and the debate in this area will continue.

Healthcare can get a new impetus for development not only from biotech developments, but also from the introduction of the rapidly developing field of telemedicine. If the entire world healthcare is growing at a rate of 5.2% per year, then telemedicine shows a growth rate of 11.8%. By 2030, the global telemedicine market may exceed \$3 trillion.



The development of new business models will allow pharmaceutical companies to find new sources of profit. A number of transformation processes have already taken place or are in the active stage.

Key ones:

- a) more focused R&D;
- b) the desire of TNCs to bring specialized drugs to the market (development of the biotech direction);
- c) the transition from the development model of everything "in house" (with fully enclosed within one company cycle "discovery-development-testing-marketing") to partnerships and alliances;
- d) mergers and acquisitions;
- e) a shift in the focus of TNCs towards emerging markets.

Due to the high capital intensity and organizational and managerial complexity of the pharmaceutical industry, one of the important issues of the innovation process remains the place of "production" of innovations in the creation of new drugs. It seems that it will be very difficult for the largest TNCs to abandon the localization of key industry processes. Research centers are unlikely to be completely withdrawn from pharmaceutical companies; most likely, TNCs will develop cooperation with other research centers in parallel, as well as join forces in priority medical areas. Against the backdrop of portfolio consolidation, TNCs are no longer conglomerates conducting research in all major areas - in the near future, TNCs will change precisely in terms of the specialization of each of them for a certain range of IR and diseases. At the same time, geopolitics and technological sanctions affect pharmaceuticals and healthcare to a much lesser extent than other high-tech areas.

### **Conclusions and consequences:**

1. The main result of the development of biotechnologies will be an even greater increase in the life expectancy of the population, especially in countries with a high level of development of biotechnologies. This will inevitably affect the growth of the burden on the able-bodied population and increase the importance of pension systems.

2. Another consequence could be a further reduction in the birth rate. A more "healthy" and predictable cycle of life, as practice has already shown, leads to an individual's concentration on a more complete satisfaction of his material needs, greater independence from family relationships, and individualization of consciousness. In addition, this will be facilitated by birth planning with the use of genetic technologies, which will become more widely available.

3. Thus, the widespread development of biotechnologies inevitably causes the need to revise both pension systems and programs to increase the birth rate. It can be predicted that against the background of rising life expectancy and robotization, the base for collecting social payments will decrease. This is already clearly visible in the recent protests in France and other countries in connection with the increase in the retirement age. In this case, the unconditional basic income programs, aimed primarily at pension groups of the population, as well as families with two or more children, can serve as an instrument. In addition, in order to increase the birth rate in populations where it will decrease, it will be necessary to "lengthen" maternity leave and preferential conditions for the birth of children, as well as improve housing conditions, which predetermines the continued importance of the real estate sector,

4. Genome editing also carries the risk of creating populations with unpredictable genetic abnormalities.



#### 4. New energy balance and green transition

According to UN forecasts, by 2030 the population of the Earth will increase by 1 billion people and will reach the mark [8.6 billion people](#). As the population grows, so does the need for energy sources. From 2021 to 2040, global electricity consumption is expected to [will grow by 50%](#).

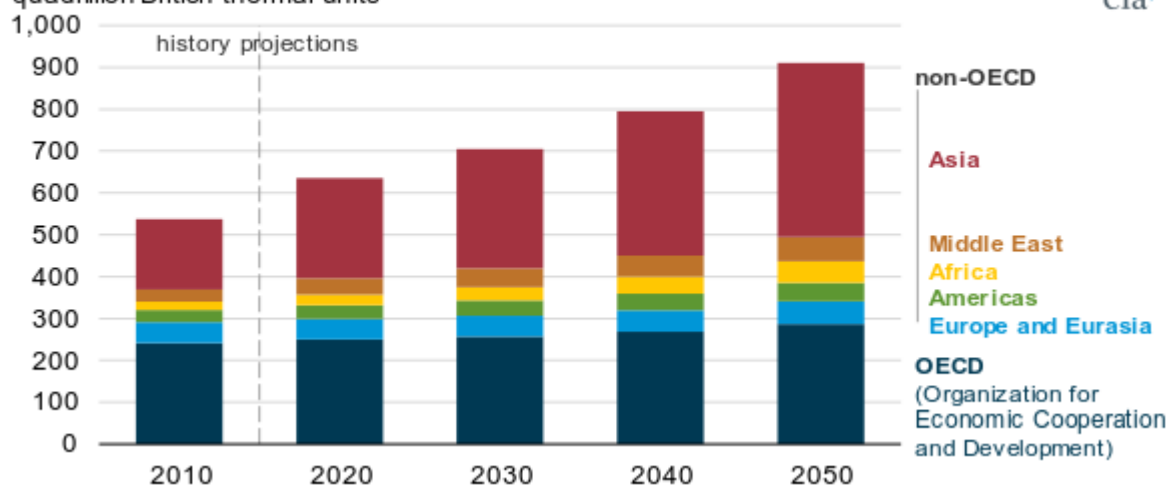
The consistent increase in demand for electricity is accompanied by the current foreign policy crisis, which largely affects the energy sector. Considering that Russia is one of the world leaders in oil and gas production and that it was it that was the main supplier of energy resources to Europe, its involvement in the conflict inevitably led to an energy crisis, an increase in energy prices and an actualization of the discourse on the need to switch to “green” energy .

In general, the future of energy by 2030 will be determined by the following factors:

1. Increasing electricity consumption As mentioned above, the growing population of the Earth requires more and more electricity. In addition, widespread urbanization, growth in manufacturing, and the spread of digital devices contribute to the increase in demand for electricity - again, all these trends are directly related to population growth.

**Global primary energy consumption by region (2010-2050)**

quadrillion British thermal units



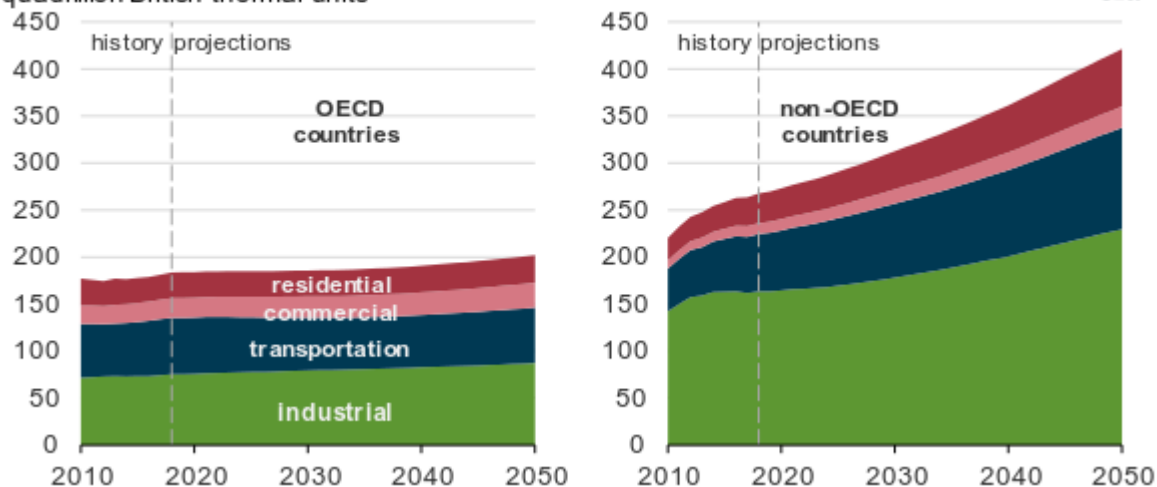
Source: International Energy Outlook 2019.

Industry dominates the consumption of electricity, followed by transport. The largest growth in electricity consumption in the next decade will be in the industry.



### Global energy consumption by sector (2010-2050)

quadrillion British thermal units

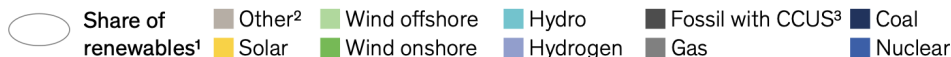


Source: International Energy Outlook 2019.

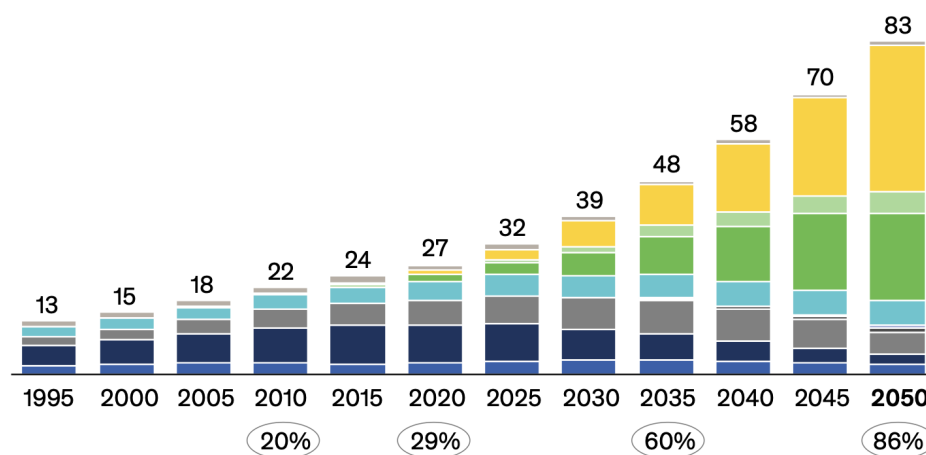
2. Increasing role of renewable energy sources The share of renewable energy sources (RES) in electricity generation will continue to grow. This is due to increased investment in the sector, lower equipment costs and improved technology efficiency. In addition, the development of renewable energy is facilitated by the global energy crisis, as a result of which hydrocarbon supply chains were disrupted. Due to the high volatility of oil and gas prices, many countries (in particular, the EU countries) have revised their plans to support renewable energy. Thus, the European Commission in May 2022 released a plan [REPower EU](#), according to which the countries of the political bloc should cease to depend on Russian fossil energy sources. Among the goals specified in the plan is to increase the share of RES in final energy consumption in the EU to 45% by 2030. In addition to the EU, regulatory measures to support RES have been adopted in China (14th Five-Year Plan) and in the USA (Inflation Reduction Law). According to the estimates of the International Energy Agency, as a result of the implementation of these state support measures, by 2027 the share of renewable energy sources in global electricity generation [will grow up to 38%](#) compared to 25% in 2021. Thus, RES can become the main source of electricity, overtaking coal-fired power plants. According to [McKinsey forecasts](#), by 2035 renewable energy will account for 60% of global electricity generation, and by 2050 this figure will be from 79 to 89%.



Further Acceleration



Global power generation  
Thousand TWh



Other scenarios



Source:

McKinsey

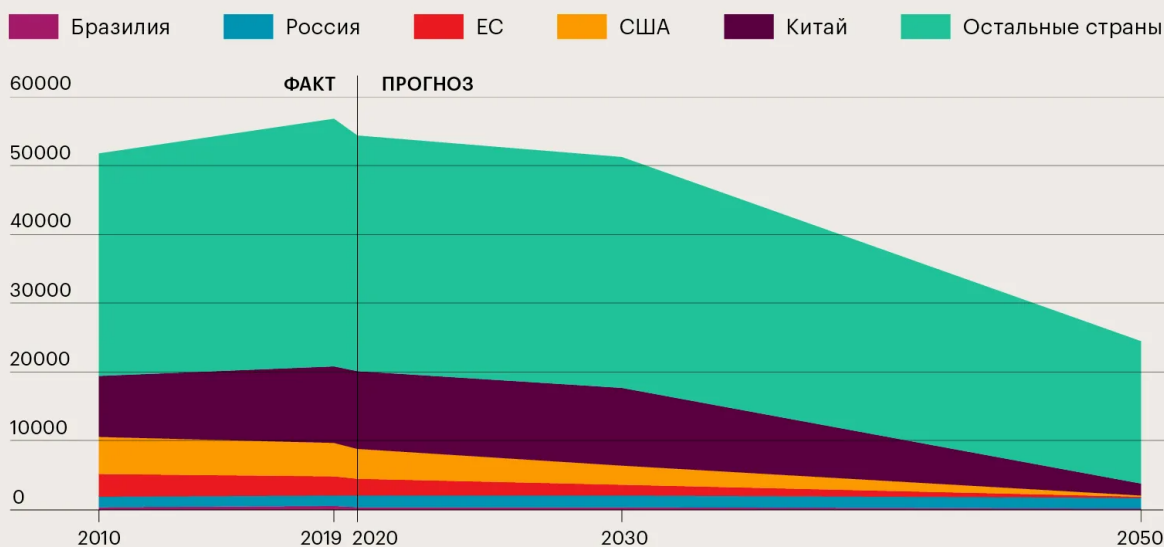
Such impressive changes in the global balance of energy consumption will lead to a significant change in the role of resource-producing countries. In any case, oil and gas will not completely leave the energy market, but countries with an economy focused primarily on the export of hydrocarbons will have to reconsider the structure of their economy and look for new sources of income. In addition, there is a possibility of losing the political influence of such countries on a global scale.

- Actualization of the climate discourse The importance of the climate factor in the energy sector remains extremely high. Many international companies, as well as entire countries and political blocs, have set themselves the task of implementing a "green" transition - a set of measures aimed at significantly reducing CO2 emissions. Global CO2 emissions are expected to be halved by 2050, according to commitments made by countries around the world. For example, in China, the low-carbon transition program is implemented, among other things, at the level of the central bank, which provides preferential terms for lending to projects aimed at reducing CO2 emissions and more environmentally friendly use of coal. In addition, China has launched a pilot carbon trading program.





## Прогноз глобальных выбросов CO<sub>2</sub> на основе принятых странами обязательств, МЛН ТОНН



IECONS

Источник: Международное энергетическое агентство

Other countries have similar programs - with their successful implementation, governments hope to slow down global warming. However, it should be taken into account that plans for the decarbonization of national economies can have a real impact on global climate processes only if all countries of the world begin to take measures. Otherwise, there will only be a massive transfer of production capacities to third world countries, while the leading economies will “save face”, announcing the decarbonization of the world economy. In such a scenario, all the benefits from the implementation of emission reduction measures by some countries will be offset by an increase in emissions in other regions.

4. Search for new energy technologies Scientists are currently working on the creation of new energy technologies that would allow inventing fundamentally new approaches to energy generation, including, for example, obtaining ethanol from air molecules, etc. Some technologies already exist, and the task of science is to develop them sufficiently to be able to scale them globally and put them on a commercial footing. This includes electric transport: electric cars already exist and are on sale, but for their further distribution, firstly, a sufficient number of charging stations (which, of course, also need to be somehow powered by electricity), and secondly, a significant increase in capacity car batteries, as well as their resistance to temperature changes. As for thermonuclear fusion, which scientists have been trying to use since the 1930s of the last century, to date, researchers have not yet managed to create conditions for a stable reaction. Although research is being carried out [more than 50 countries](#), it is unlikely that in the coming years the efforts of scientists will be crowned with success. The development of AI opens up many prospects for the development of new energy technologies. Self-learning models help you better predict wind and solar energy or optimize manufacturing processes for photovoltaic modules, batteries and fuel cells. Thus, it can be expected that the further introduction of renewable energy depends largely on AI.



## Conclusions and consequences:

1. One can expect a decrease in the gradual consumption of oil in the balance of energy consumption. But the main thing is not even a decrease in consumption (OPEC does not expect a physical reduction in production by 2030, estimating it at 106-18 million barrels), but a decrease in its role in the energy balance with a growing population, which will put pressure on the price level. This can radically change the balance of power in the entire economic field. Hotspots of superprofits, which also influence the political agenda in the world, may lose their influence, and then the role of centers of influence will be transferred to new economic players, whose image is still difficult to imagine.

2. Unfortunately, we can also expect attempts by the world's oil and gas concerns to reverse the situation through "undercover" influence on curtailing the processes of energy transition and decarbonization. Who knows how many such "undercover" attacks have already been.

3. At the same time, players will appear in new RES markets at the same time, trying to take a quasi-monopoly position and extract super-profits, so the markets should initially be designed in such a way as to prevent the formation of "quasi-monopolies".

4. Decarbonization will only have an effect if it is supported by all key CO2 emitters. If stringent requirements are implemented, the simple removal of "harmful" enterprises beyond physical boundaries is not ruled out, as already happened in 1970 in the case of Southeast Asia.

5. At the same time, the transition to renewable energy, taking into account its high cost, will not create the effect of a "big push", as it would be in the case of the emergence of thermonuclear technologies due to a sharp drop in the cost of energy resources and the ability to transfer the released money masses to other promising development projects.

## 5. Food and resources

According to the World Bank, there are currently [domestic food price inflation persists](#). From October 2022 to February 2023, food price inflation exceeds 5% in 94.1% of low-income countries, 86% of lower-middle-income countries, and 87.0% of upper-middle-income countries. The countries most affected by this are Africa, North America, Latin America, South Asia, Europe and Central Asia.

According to [World Food Program](#) 345.2 million people will be food insecure in 2023, more than double the number in 2020. More than 900,000 people around the world live in conditions that can be called hunger - this is ten times more than five years ago.

Given the current conditions, it is unlikely that humanity will be able to cope with the food crisis in the coming years, despite the development of technologies, many of which can contribute to the development of agriculture and supply chain management.

As mentioned above, by 2030 the world population will exceed 8.5 billion people, which will lead to an increase in the demand for food and resources. However, climate change and environmental issues can have a major impact on food production and resource availability.

Among the main prospects for the food industry by 2030 are increased production and more efficient use of resources. This can be achieved through new technologies and methods, such as the application of genetic engineering, the development of artificial intelligence and digital agriculture. It is also necessary to improve infrastructure and transport networks to ensure that products are quickly delivered to the right regions.

Another important aspect is to improve the availability of food for all segments of the population. To do this, it is necessary to improve the systems of distribution and sale of products, as well as to develop social support programs aimed at low-income and vulnerable groups of the population.



On the other hand, since most of the resources used in agriculture are limited, their efficient use is becoming increasingly important. By 2030, we can expect the development of technologies to reduce the consumption of water and energy in food production. Attention should also be paid to the use of cleaner and more sustainable energy sources in agriculture.

Despite all these prospects, there are still a number of challenges and obstacles that need to be overcome. For example, climate change could lead to reduced crop yields and increased levels of poverty and food insecurity. It is also necessary to provide economic support for rural residents and provide land to small and medium-sized farmers who play an important role in food production. In addition, product handling and storage systems need to be improved to reduce waste and improve product quality.

Another challenge is the need for a balanced approach to the use of resources in agriculture and the conservation of ecosystems. For example, the use of pesticides and fertilizers can increase crop yields, but can also have negative impacts on the environment and human health. Therefore, it is important to develop and promote sustainable agriculture practices that increase yields and food quality, but do not harm the environment and human health.

These risks look even more ominous against the backdrop of global political instability. For example, since the outbreak of the conflict in Ukraine, more than a third of world trade in wheat and almost 75% of world trade in sunflowers have been threatened, which [led to a sharp rise in prices](#). Prices were stabilized only after the conclusion of the grain deal, but the situation on the world food market is still far from stable - many export bans, which in recent years have become one of the main instruments of economic confrontation, have an impact here. Various kinds of export restrictions, according to the World Trade Organization, affected 11% of world food trade.

In addition to food, the well-being of mankind depends on functioning ecosystems that can provide vital resources (primarily water, but also mineral resources: sand, metals, rocks used in industry and construction). At present, mankind has reached the point where the limited resources of the Earth can hardly meet the growing demand. 75% of the land (75%) and 66% of the sea on Earth has been heavily modified by man. Only 3% of the world's oceans are currently considered "free from anthropogenic pressure". Of course, these are extremely worrying signals, given that [two-thirds of the world's population suffers from water shortages for at least one month of the year](#).

However, modern digital technologies that make it possible to control the consumption of resources and redistribute them depending on the need can help to avoid global depletion of resources. In fact, what already exists in the form of "smart home" systems could be scaled to the entire planet. To do this, the governments of countries will need to change the very paradigm of international relations. If now everyone is guided by the approach according to which resources are considered the property of the country in which they are located, then an approach in which resources are the property of all mankind may turn out to be more promising. In the current environment, developed countries are practicing a predatory approach and are trying to encroach on the sovereignty of other states in order to gain access to their resources.

Despite ongoing challenges, the overall food industry and resource use can be expected to continue to adjust to changing conditions. However, in order to achieve sustainable development and ensure food security for all people in the world, it is necessary to strengthen cooperation between states, scientific institutions, the private sector and the public at large.

### **Conclusions and consequences:**

1. Food supply systems will be saturated with high technology to expand the return on agricultural resources and counter climate change. It is predicted that food stability will be maintained in those countries that will be able to provide an increase in manufacturability and



degradation in countries with a low level of development of the material and technical base of the agro-industrial complex.

2. The imposed export restrictions will have an additional impact, which may lead to the emergence of "food" deserts, where, against the background of ultra-high food prices, there will be a shortage of food up to the introduction of strict distribution.

3. The struggle for both agricultural and other resources will intensify, which, without an international approach to the problem, can result in an expansion of "resource" wars. One of the approaches to the problem can be considered a more inclusive attitude to resources, when in exchange for a more even distribution of resources and the actual "rationing" of resource consumption at the global level, strong military-political players will abandon the policy of pressure in order to simplify access to resources and extract super profits.

To do this, the asymmetries of resource markets must be leveled, while principles somewhat similar to those of the WTO.

## **6. cultural shift**

Back in 2012, the US Census Bureau predicted that in 2043 the white population would no longer be the majority in this country (then the white population was 63%). In 2020, the share of the white population was already about 59%. In 10 years, the median age in the US will be more than 50% "non-white" (US stat. terminology).

A similar picture, only on a smaller scale, is observed in Europe, for example, in France, the geographical equator in terms of fertility will be passed in 2024. And this does not mean anything negative, but it will inevitably lead to a change in the cultural agenda and the cultural code of entire societies.

In fact, the economic and political struggle of the old great powers, which is at the center, has no significance for the growing share of new cultures and should, in the future, leave the center of the public agenda.

The main issue should be finding a new cultural balance in the context of increasing adaptation to each other of different ethnic groups involved in a single community.

The mixing of different cultures, religions and traditions on the same territory will provoke the convergence of cultural paradigms within the framework of certain common values that are simultaneously acceptable for representatives of different races, religions, and social groups.

In general, this will require, in order to reduce the level of cultural conflicts, a person to learn aspects of several cultures at once, for example, to simultaneously know both the foundations of their religion, for example, Christianity, and other religions and teachings, such as Confucianism, Hinduism, Islam and others. In the same way, you will have to learn and accept part of the traditions of other cultures.

At the same time, the role of a single "virtual" culture will grow, where the rules of behavior are not the rules of behavior in a living community, but are the rules of behavior in a virtual world, which can differ significantly from the physical dimension.

### **Possible consequences:**

1. The need to introduce elements of the study of the most common cultures and a friendly attitude towards each other on a cultural basis into the basic education programs.

2. The need to have significant information about several cultural codes at once in order to carry out a successful social and career movement and, as a result, increased requirements for the study of cultural aspects in educational programs.



3. The emergence of a universal cultural code that accumulates values that are generally common to all cultures.
4. Decrease in the role of the old "cultural" lines of confrontation and the emergence of new ones.



Scenarios for the implementation of trends for each of the tracks, depending on the three basic scenarios "Confrontation", "Bad World" and "Thaw".

	<b>Confrontation</b>	<b>"Bad World"</b>	<b>"Thaw"</b>
Currency unions, payment systems	<ul style="list-style-type: none"> <li>- segmentation of currency systems</li> <li>- refusal to accept the dollar and the euro in a number of countries</li> <li>- unwillingness in Europe and the USA to accept other currencies</li> <li>- loss of freedom of settlements by independent small players, commodity and investment deficits and, as a result, joining one of the blocks</li> <li>- the emergence of excess volumes of illiquid foreign trade currencies</li> <li>- concentration on commodity and investment exchange within alternative blocks</li> <li>- growth in the volume of formally illegal and non-transparent financial transactions</li> <li>- non-cooperation in the fight against money laundering</li> </ul>	<ul style="list-style-type: none"> <li>- return to the old order - several established convertible currencies with a subordinate function of small players</li> <li>- maintaining trade exchange and investment growth rate at the current level</li> <li>- maintaining separation in currency processes - center / periphery</li> </ul>	<ul style="list-style-type: none"> <li>- recognition of a wide range of currencies as convertible key financial blocks</li> <li>- flourishing world trade and investment</li> <li>- leadership and high profits of the most technologically advanced countries due to the adoption of the currency of the countries - recipients of technologies</li> <li>- transparency of financial markets and reduction of the volume of illegal transactions</li> <li>- an effective global system to combat money laundering</li> </ul>



	<ul style="list-style-type: none"> <li>- increasing role of unregulated cryptocurrencies</li> <li>- accelerated growth of investment flows within the blocks and its narrowing between them</li> <li>- as a result of the formation of independent technological and production systems, forks in science and technology</li> <li>- loss of advantages for both the West and the East</li> <li>- loss by Western countries of the benefits of a high level of technological development</li> <li>- development of independent technologies in each of the blocks</li> </ul>		<ul style="list-style-type: none"> <li>- adoption of a single world reserve currency</li> <li>- reducing the possibility of maneuver in the financial sphere by nation states</li> <li>- synchronization of currency policies</li> <li>- convergence of technological, industrial and scientific systems</li> </ul>
Energy transition	<ul style="list-style-type: none"> <li>- protective duties on goods from non-environmentally friendly countries - significant trade barriers</li> <li>- polarization in terms of greenhouse emissions and environmental pollution</li> <li>- dropping out of small countries from the new energy cycle - energy imbalance</li> </ul>	<ul style="list-style-type: none"> <li>- partial, but insufficient, integration of environmental impact accounting systems</li> <li>- average rates of energy transition</li> <li>- lack of global energy transition efficiency. The progress of the leaders will be offset by the lag behind the outsiders</li> </ul>	<ul style="list-style-type: none"> <li>- real CO2 reduction</li> <li>- decline in oil prices, changes in the energy balance</li> <li>- attempts to create "new resource kings"</li> <li>- improving the ecology of the planet, slowing down</li> </ul>



	<ul style="list-style-type: none"> <li>- lack of technology in countries unable to carry out the energy transition on their own</li> <li>- lack of global energy transition efficiency. The progress of the leaders will be offset by the lag behind the outsiders</li> <li>- advantage of large countries based on economies of scale</li> <li>- polarization of energy standards</li> <li>- the risk of failure of the energy transition due to the fact that some projects can be implemented only in the coordination of all major players (for example, the ITER project)</li> <li>- maintaining demand for oil and gas and its growth by 2030</li> <li>- moderate demand for materials for new energy sources (lithium, hydrogen and others)</li> <li>- lack of "world-changing" energy technologies</li> </ul>	<ul style="list-style-type: none"> <li>- slow removal of oil from the energy balance</li> <li>- still high CO2 emissions</li> </ul>	<p>global warming and the consequences</p>
<p>Biotechnology and high-tech medicine</p>	<ul style="list-style-type: none"> <li>- polarization of life expectancy and quality between bloc leaders and smaller economic players</li> </ul>	<ul style="list-style-type: none"> <li>- maintaining uneven access to biotechnologies and high-tech medicine</li> </ul>	<ul style="list-style-type: none"> <li>- biotechnology sharing</li> <li>- the effect of increasing the quality of life expectancy for the whole world</li> </ul>





	<ul style="list-style-type: none"> <li>- the movement of residents of the countries of the "second" technological echelon to the countries leaders in the field of biotechnology and high-tech medicine</li> <li>- weak research synergy effect</li> <li>- basic income systems in the leading countries</li> </ul>		
Artificial intelligence	<ul style="list-style-type: none"> <li>- threatening targeting of artificial intelligence capabilities to destroy each other (inter-bloc confrontation, given the wide capabilities of artificial intelligence, the consequences can be more tragic than in ordinary conflicts)</li> <li>- unavailability of AI services to "intermediate" players and, as a result, their backlog</li> <li>- uneven world development</li> <li>- the prevalence of basic income programs in the leading countries in artificial intelligence and potential migration to them from "intermediate" players</li> </ul>	<ul style="list-style-type: none"> <li>- the average level of access to artificial intelligence of "intermediate" players</li> <li>- their moderate lagging behind the leaders</li> <li>- strong penetration of basic income programs in the leading countries and moderate in countries with a lower level of development of artificial intelligence technologies</li> <li>- uneven world development, but less in the confrontation scenario</li> </ul>	<ul style="list-style-type: none"> <li>- equal access to artificial intelligence technologies</li> <li>- synergy of research in this direction</li> <li>- the direction of artificial intelligence to the goals of world development and its greater uniformity</li> <li>- the ubiquity of basic unconditional income programs and the emergence of international programs</li> <li>- global improvement in the quality of life and inclusive development</li> </ul>
Food and resources	<ul style="list-style-type: none"> <li>- a significant decrease in the food security of "intermediate" players</li> <li>- resource wars</li> </ul>	<ul style="list-style-type: none"> <li>- preservation of the situation of uneven access to resources and food, but its</li> </ul>	<ul style="list-style-type: none"> <li>- inclusive access to resources and food</li> </ul>



	<ul style="list-style-type: none"> <li>- lack of resources within the blocks</li> <li>- the emergence of new world "resource" monopolies in new resource areas</li> </ul>	<ul style="list-style-type: none"> <li>weakening in the context of general crises</li> <li>- continued attempts to gain exclusive access to the resources of individual players</li> <li>- no acute shortage of resources, but its very high relative cost for "laggards"</li> </ul>	<ul style="list-style-type: none"> <li>- reducing the role of the resource and food monopoly of countries, reducing prices for resources and food</li> </ul>
cultural shift	<ul style="list-style-type: none"> <li>- risks of discrimination of cultures of different blocs</li> <li>- deterioration of interpenetration of cultures</li> <li>- serious cultural and value conflicts</li> <li>- change in cultural and political approaches of the "big powers"</li> </ul>	<ul style="list-style-type: none"> <li>- average level of interpenetration of cultures</li> <li>- lack of a common code of cultural values</li> <li>- periodic conflicts within communities on cultural grounds</li> <li>- change in the cultural and political approaches of the "big powers"</li> </ul>	<ul style="list-style-type: none"> <li>- formation of a common code of cultural values accepted all over the world</li> <li>- mitigation of conflicts on cultural and value grounds</li> <li>- change in the cultural and political approaches of the "big powers"</li> </ul>

Summarizing, we can say that in the context of confrontation, the forecast for the implementation of scenarios in the mentioned key areas of change will lead to greater uneven development, a possible increase in the intensity of conflicts, the degradation of international trade and its radical fragmentation with the consequences of commodity shortages both for the leaders of the established blocs and for dependent countries. players, the complexity of calculations will reduce mutual investments between blocks and increase their share within the blocks, 2 technological circuits will be born, which does not mean a decrease in their effectiveness. Countries that are not economic leaders and have not been able to finally decide on which bloc to rely on will find themselves in the most vulnerable position. At the same time, super-competition for a technological breakthrough will be provoked, similar to the race in space in the 60s.



At the same time, under such conditions, the achievement of global carbon neutrality seems unlikely, and the efforts of countries to slow down global warming will not allow overcoming its negative consequences in the form of reduced crop yields and an increase in the number of natural disasters. Under these conditions, the problem of food insufficiency and its shortage in countries with low self-sufficiency will be exacerbated.

Given the flow of population to countries with a high level of biotechnology and high-tech medicine, this will mean an increase in the burden on their social systems and the inevitability of basic income programs.

At the same time, the use of artificial intelligence for conflict will only exacerbate the consequences. At the same time, technological breakthroughs are not ruled out, which are essential for the leaders of the blocs to provide advantages in the face of confrontation.

In this case, it seems unlikely that by 2030 the achievement of the UN Sustainable Development Goals will be approached, and a revision of this project is likely with the formation of an independent agenda in each of the blocks.

In the scenario of a complete “thaw”, on the contrary, it is possible to predict greater inclusiveness of world development, equalization of incomes in different countries, the widespread use of artificial intelligence achievements for humanistic purposes, equal access to resources, the growth of cultural identity, the formation of the foundations for a better future in the long term, the restoration of the role of the "global west" as a pole and economic leader (due to the advantage in technology) with the simultaneous "flourishing" of the world east due to the number of industrial labor, coordination of economic processes, freedom of calculations, and an increasing level of competencies. Through the energy transition, global warming will be slowed down, hunger problems will be solved to a greater extent, and at the same time, basic income programs will be distributed around the world, which will make population migration from the countries of the center to the countries of the periphery less critical. At the same time, countries will have to face the opposition of the world resource monopolies to this process and win it. The role of the UN will continue and even increase, actual progress will be felt in achieving sustainable development goals.

However, it seems unrealistic to expect the full implementation of the “thaw” scenario.

To do this, it will be necessary to completely abandon the dominance of individual currencies, now called reserve ones, to exclude the processes of political interference of some countries in the activities of others, to ensure the principle of equal access to resources, depriving the supergiants of the market of profits, to force stronger countries to share technology and finance for free, to agree to income equalization all over the world, in particular in the countries of the "West" and in the countries of the rest of the world.

In the “bad” world scenario, everything will remain approximately as it is at the time of 2019, if we consider the Covid pandemic as a kind of turning point in world development. Uneven economic growth, periodic crises, fading and erupting conflicts will leave the acute problem of global warming and global inequality. This situation will again provoke the world to move towards one of the polar scenarios.

Therefore, in general, it would be in the interests of the world to provide a certain scenario between a “bad world” and a “thaw”, but this requires an inclusive understanding of the consequences of confrontation and consistent scientific and public promotion of the “thaw” agenda in all world players without exception.