

Shchelkunova Taisiia

Student

Ural Federal University

Russia, Yekaterinburg

Research advisor: Kovaleva Alexandra

A KEY TO SOLVING CLIMATE CHANGE ISSUE

***Abstract:** The article raises the global warming problem linked with significant emissions of a greenhouse gas – carbon dioxide. It considers contemporary options of mitigating carbon dioxide concentration in the atmosphere. In order to justify a new ecological way, there is an analysis of correlation between a carbon dioxide concentration and a whale population size. The article evaluates an opportunity to realise proposed method of carbon sequestration.*

***Keywords:** climate change; carbon dioxide emissions; carbon capturing; whale population size; cost.*

Щелкунова Таисия Алексеевна

Студент

Уральский федеральный университет

Россия, г. Екатеринбург

Научный руководитель: Ковалева Александра Георгиевна

КЛЮЧ К РЕШЕНИЮ ПРОБЛЕМЫ ИЗМЕНЕНИЯ КЛИМАТА

***Аннотация:** В статье поднимается проблема глобального потепления, связанного со значительными выбросами парникового газа – диоксида углерода. Рассматриваются существующие варианты снижения концентрации углекислого газа в атмосфере. Для обоснования эффективности нового экологического способа анализируется зависимость концентрации углекислого*

газа от размера популяции китов. Оценивается возможность реализации предложенного метода секвестрации CO₂.

Ключевые слова: *изменение климата; выбросы диоксида углерода; захват углерода; размер популяции китов; затраты.*

Nowadays, climate change is one of the world's most urgent challenges. As consequences of industrial boom, the carbon dioxide emissions trigger an increase on temperature worldwide. Statistics shows that global industry discharges over 36 billion tonnes of CO₂ per year with a level of concentration – 407.8 ppm in 2018 or 147 % of pre-industrial level in 1750. Judging by figures in 2018, a main roles in such dismal results play China (10065 billion tonnes of CO₂), USA (5416 billion tonnes of CO₂), India (2654 billion tonnes of CO₂) and Russia (1711 billion tonnes of CO₂) [1, 2].

As a metric of economic loss from carbon dioxide emission, the social cost of carbon (SCC) was estimates as U.S. \$417 per tonne of CO₂. Amongst countries that face with high expenses of the global cost is India (U.S. \$86 per tonne of CO₂), the United States (U.S. \$48 per tonne of CO₂), Saudi Arabia (U.S. \$47 per tonne of CO₂) and three countries with U.S. \$24 per tonnes of CO₂: Brazil, China and the United Arab Emirates. Post-Soviet states, Northern Europe and Canada have negative SCC values because of low temperatures that these countries have now [3].

Obviously, in order to decrease costs of global warming impact on the planet, we are recommended to settle the problem itself. A solution takes a form in an ingenious strategy of capturing carbon from the air: increase global whale populations.

Conducted researches represent whales as those who can provide a step forward towards enhancing climate change situation. Whales are renowned for their size and longevity what enable them to store great quantity of carbon inside them. After death their bodies sink to the seafloor, sequestering about 33 tonnes of CO₂. In other words, it redounds to exclusion carbon from nature circulation for centuries [4]. Moreover, being in gaseous state CO₂ quite successfully dissolves in water (0,88 volume of CO₂ in 1 litre of water) [5].

In their natural habitat whales are accompanied by wee creatures – phytoplankton. It happens for the reason that for their growth phytoplankton need

whales' waste products, rich in nitrogen, phosphorus and iron – necessary nutrient substances. The existence of phytoplankton is crucial by the virtue of their potential to accumulate 40 % of all CO₂ given off; that is 37 billion tonnes of CO₂ on average. Furthermore, phytoplankton produces about 50 % of all oxygen to our atmosphere [4].

In discovered causality whales tend to be drivers for nature processes, which might lead to profound positive changes of a quality of our environment. In accordance with recent International monetary fund research on a presumable value of an average whale, it was determined as U.S. \$2 million for one whale and U.S. \$1 trillion for the current stock. The value was calculated with regard to whales' importance in carbon sequestration process, in fishery enhancement (over U.S. \$150 billion), the market price of CO₂ and whale watching industry (over U.S. \$2 billion) [4].

But an obstacle to nature prosperity is limited abundance of whales so that many species are endangered. The effects of nearly a century of commercial and aboriginal whaling have caused population reduction from 4-5 million to about 1.3 million today [4, 6].

Due to it in 1946 International whaling commission has established catch limitations formalized in the Schedule to the International Convention for the Regulation of Whaling. As further measures in 1982 the International whaling commission has called a halt to commercial whaling species since the 1985/1986 season known as the commercial whaling moratorium. However, several countries (Iceland, Norway and Japan) ignore hunting bans and go on destroying whale population, selling their meat on an illegal black market [7].

To say more, there are others human-triggered menaces such as marine pollution, ship strikes, fisheries by-catch and noise pollution. So whilst some species of whales are reviving not rapidly – many are not.

Strengthening our protection of whales from anthropological dangers would yield improvements to the Earth in general. Without doubt, protecting whales has its cost. It was estimated that to return whales to their pre-whaling numbers, we need to provide this process with U.S. \$13 per person subsidy. Agreeing to pay this cost, international community will have to consider questions of compensation to each

individual, company, and country; coordinating actions and monitoring how everyone follows new rules. It was presumed that such organisations as Global Environment Facility, The World Bank, United Nations and International monetary fund may take responsibilities for some of the protection programme aspects [4].

If we compare short-term costs of known methods of mitigating carbon dioxide emissions with whale protection cost, we will come to conclusion that although the last is not the cheapest one (U.S. \$58 per tonnes), but this way is one of the most effective (Table 1) [8]. With 4-5 million ‘whale stocks’ 1.7 billion tonnes of CO₂ will be captured annually [4]; and being inartificial approach to carbon capturing, it also averts the risk of accidental damage because the nature has been developing her own flawless technology of sequestration for millions of years.

Table 1. Short-term costs of mitigating carbon dioxide emissions

<i>Technology</i>	<i>Cost estimate (\$2017/tonnes CO₂)</i>
Onshore wind	24
Natural gas combined cycle	24
Utility-scale solar photovoltaic	28
Natural gas with carbon capture and storage	42
Advanced nuclear	58
Coal retrofit with carbon capture and storage	84
New coal with carbon capture and storage	95
Offshore wind	105
Solar thermal	132

The global warming issue requires drastic actions and rapid decision implementation. A matter of whale protection must be a priority theme of the global community’s discussion. And although these gigantic creatures generate global climate benefits; it does not exclude their own value and the right to live.

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