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"The Arctic - the first step towards the terraformation of Mars. Experiences from northern Europe."

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The Arctic is an area with unique climatic qualities on Earth. Located behind the Arctic Circle, the region is characterized by numerous phenomena such as polar day (in summer) and polar night (in winter), which affect the state of well-being of people living there. The numerous aurorae are examples of magnetic storms whose health effects are most pronounced in this region. Extreme temperatures can be recorded in these zones, especially in winter. At the same time, it is there that the environment shows great sensitivity to changing climatic conditions and human activities. A small increase in temperature can melt permafrost and methane clathrates. At this time, climate change affects the ecosystem of the plant and animal world. At the same time, it is in the Arctic that there are important deposits of energy resources, non-ferrous metals and others. In the Arctic regions there are trade routes connecting the continents (the so-called "Northern Road"). Growing interest in the Arctic contributes to its urbanization. This process is also important in a broader context. Many of the technologies that prove themselves in these harsh conditions will also be applicable in other climate zones. The Arctic is becoming a testing ground for human missions in harsh conditions, a way to survive in an unfavorable climate, and to test pro-environmental technologies. An important advantage of the Arctic is also its great similarity to the climatic conditions of the warmest zones on Mars. However, compared to Mars, planning engineering projects in the Arctic has many advantages. The presence of air at normal pressure, while not preventing the construction of airtight capsules, allows for easier evacuation of personnel in the event of a failure of life support systems. Working people at various stations in the Arctic can be just as tested for the vulnerability of long periods of being in a small confined space. Nevertheless, there are also numerous localities in the Arctic where people lead relatively normal lives, the best example being northern Scandinavia, which is currently the most urbanized area beyond the Arctic Circle. Their experience of living in the extreme conditions of the north, the problems of urban development and transportation, environmental protection and many other areas of life in this zone, can be an important source of information for other inhabitants of Earth and Mars. Issues related to the problems of environmental protection and the fight against pollution in this climate zone will be just as relevant in other zones, where there are many more opportunities to use, for example, renewable energy sources. In the long run, building stable urbanized human settlements in the Arctic will become an example of human activity in the region of Mars and (perhaps) other regions of the Solar System. The authors present numerical data and possible scenarios of sustainable urbanization development in the Arctic based on selected examples of Scandinavian experience. They analyze which of them have universal character and

are possible to apply also in other climatic conditions.