WAY TO ENERGY ABUNDANCE CAN BE FOUND THROUGH 
THE MAISOTSENKO CYCLE

Valeriy Maisotsenko & Ilya Treyger*

4464 Raleigh Ave., Suite 403 Alexandria, Virginia 22304, USA

*Address all correspondence to Ilya Treger; E-mail: treyg19@ix.netcom.com

Back in 1892, the great Nikola Tesla concluded his lecture at the American Institute of Electrical Engineers with the words, "We are whirling through endless space with an inconceivable speed, all around us everything is spinning, everything is moving, and everywhere there is energy. There must be some way of availing ourselves of this energy more directly."

It took a hundred years for Tesla's prediction to come true, a hundred years — through hydrogeneration, wind mills, and, finally, solar panels — for humanity to reach this point. Yet it is not entirely through these means that this prediction can be realized. And finally, this is not a solar battery. This is a new thermodynamic cycle discovered by the American scientist of Soviet origin, doctor of technical sciences, Professor Valery Maisotsenko; it is officially registered as the Maisotsenko Cycle (M-Cycle).

The author of the M-Cycle has found a way to use another form of solar energy, which is less known, but it may serve as an effective source of renewable energy. This is the energy of the surrounding atmosphere.

There is a difference between air temperature and atmospheric air, which is in contact with the evaporating water. This difference is called the psychrometric temperature difference. Dr. Maisotsenko significantly increased this psychrometric temperature difference. It provides the opportunity to use this source of renewable energy for different sectors of industry and transport, significantly reducing energy consumption. At the same time, it increases not only the technical and economic characteristics but also improves environmental parameters.

As of today, the Maisotsenko Cycle has been granted all imaginable and unimaginable prizes and its author has been elected as a member of the International Tesla Society Presidium. However, according to the recent American President’s speech on the subject of clean energy and sustainable economy let us recall what is going on, and what the Maisotsenko thermodynamic cycle is about.
Transformation of the radiant heat, wind, and water movement, and small temperature differences between deep and superficial layers of the seas and oceans, are the main ways to use renewable solar energy today. But the author of the M-Cycle has found a way to use another form of solar energy, which is less known, but that may serve as an effective source of renewable energy. This is the energy of the surrounding atmosphere.

In general the atmosphere consists of moist air, which is a mixture of dry air with water vapor. When the water evaporates into the air the energy is expended. This leads to a decrease of the air temperature, so there is a difference between air temperature and atmospheric air which is in contact with the evaporating water. This difference is called the psychrometric temperature difference. Since any potential difference (including temperature) can be a source of energy, equilibrium of the atmosphere in terms of the psychrometric temperature difference is an energy resource as well. However, before the implementing of the M-Cycle the psychrometric temperature difference was so small that it was not possible to use it as an energy resource. Dr. Maisotsenko significantly increased the psychrometric temperature difference, and the use of this renewable energy resource for different sectors of industry and transport, reducing energy consumption and fuel at times and at the same time to increase not only the technical and economic but also environmental indicators became possible (see Fig. 1).

The Maisotsenko cycle (M-series) can be explained more clearly as follows. If to recall the well known from childhood conventional aneroid barometer scale, we can see a zone of high atmospheric pressure associated with dry air, and an area of low atmospheric pressure associated with moist air. In view of the known physical laws, the air from the area of high atmospheric pressure moves into the area of the low atmospheric pressure, thus creating a wind that will exist as long as the heat and mass exchange between the moving layers of air masses and atmospheric pressure between the zones becomes equal. Obviously, if we artificially humidify the air in one of the points of geospace, then, we thus artificially create a zone of low pressure, which in turn causes an artificial wind by moving air masses coming from the zone of high atmospheric pressure. If, in addition, we also divide the dry and wet flows in such a way as to prevent the phenomenon of mass transfer between them, then this artificial wind is more constant and does not subside. Having an artificial constant wind, we get a mass carrier that can do the work. This, in fact, is an engineering solution, known as the Maisotsenko Cycle (M-Cycle). The scientist has developed a heat-and-mass exchanger in which air streams are divided, wherein one of them is artificially moistened. Thus, a permanent artificial working wind within the device is created.

The Maisotsenko cycle and its application scope are protected by more than 200 patents worldwide. The first time the M-Cycle technology was proven and realized was by Coolerado Corporation, which produces several air conditioners (commercial, residential, solar, and hybrid). As proven by National Renewable Energy Lab (NREL) Coolerado’s Air Conditioners are 10 times more efficient, and Cool-
Erado’s Hybrid Air Conditioners are up to 80% more efficient than traditional systems. Energy from atmospheric air through the M-Cycle is the cheapest form of green energy. The U.S. Department of Energy (DOE) published the FEMP review (DOE/GO-102007-2325): "Coolerado Cooler Helps to Save Cooling Energy and Dollars". Coolerado Air Conditioners can be found in markets around the world — in Japan, Europe, Australia, South America, and Singapore as well as in the USA from Washington to Florida.

The next example is the so-called M-Recuperator, which implements the M-Cycle for all heat engines, including automobile engines. The effectiveness of the M-Cycle in this application is based on the most advanced heat recovery technology by implementing a unique process of evaporative cooling by evaporation of water into the air. Any engine of internal or external combustion engines (Diesel, Otto, Brighton, Stirling, etc.), working through the M-Cycle, does not require additional water, since it uses the back water that is extracted from the exhaust gases. Here we utilize not only the heat of exhaust gases, but also the heat taken...
away from the engine through the cooling jacket. Thus, we no longer need the car radiator, featuring a low heat dissipation and having large dimensions. In addition, the minimum temperature for cooling in the M-Cycle is a dew point of ambient air, which depends only on its moisture content, and not just always below the ambient temperature, but also below its wet bulb temperature. Therefore, in hot weather or in the mountains where the air is thin, the radiator is of low effectiveness and the engine fails. Contrary, the engine running through the M-Cycle feels better as thermal conditions are more extreme. As a result, only due to the heat of exhaust gas recycled through the M-Cycle we have an improvement of the combustion process because the burning moist air exhales 8–12 times less harmful substances into the atmosphere. But most importantly, its fuel consumption is twice as low as any existing models, including hybrid cars. What would you say about a 6-cylinder vehicle that gets 70 miles per gallon, creates almost no poisoning of the air, and is a few thousand dollars cheaper than current conventional models?

As a result, the official testing of the Maisotsenko Cycle by UC Davis Energy Efficiency Center (EEC), University of California, found that the heat-and-mass exchanger working on this cycle provides 80% power savings.

It then follows: What percentage of the oil circulation in the U.S. is burned by cars? — 65%. What percentage of oil can be saved by using a vehicle with the mentioned Maisotsenko heat recuperator? — 80%. This means that 52% of the oil burned in automobile engines can be saved using the M-Recuperator, i.e., there is a real opportunity to save half of the total oil burned in the U.S. But 51% is the percentage of imported oil in the overall quantity of oil in the U.S. In other words, a Maisotsenko heat-and-mass exchanger installed on cars would allow the U.S. to completely stop importing oil from the Middle East and South America! In several months the country could become fully energy independent from foreign energy suppliers.

Another example is the so-called solar air conditioner, which is a compact device with a fan running from a small solar panel and blowing into the Maisotsenko heat-and-mass exchanger. The output is a strong flow of cold air.

And yet, it is an incredibly cheap water desalinator with small power consumption and capable of producing fresh water, not only from salty or contaminated water, but also of extracting fresh water directly from atmospheric air. That is, the device is capable of producing fresh water even in the Sahara desert.

Hybrid air conditioners, the usual compression air conditioners can be equipped with the Maisotsenko heat-and-mass exchangers. The result: Energy consumption is 80% reduced.

A special device based on M-Cycle for conventional solar cooling is already in use by the Coolerado Company (Denver, CO). As a result, the efficiency of solar cells increases from 12% to 15% to 32% in comparison with conventional solar cells.

Also, using — Cycle together with solar radiation and wind energy technologies gives significant opportunity for many applications. For example, the Solar Cool-
erado Cooler R600 can cool a 2,500 square foot space and only uses about 700 W of power. That means it only needs four, 200-W photovoltaic panels to power it. A traditional compressor based air conditioner would require 20–40 solar panels to harvest enough solar energy to power the system.

Cooling towers can be modified with a device based on the M-Cycle that significantly reduces the temperature of cooling water in the tower, and effectively recycles the heat that is emitted into the atmosphere in conventional devices.

It should be noted that all these mentioned engineering solutions are not just some theoretical future plans. Some of the devices based on the M-Cycle are already on the market. Almost all of these practical applications are already being produced by Coolerado, Inc., on a commercial basis. However, all this is in regards to foreign markets, but not American. We have here Europe, Asia, Africa, Australia — almost the whole world, even Russia — there is some interest in the U.S. too, but this interest is mainly of scientific character, not commercial. It is especially disappointing that it was virtually unreported in the U.S. that is the apex of the practical application of the Maisotsenko cycle, the direct production of energy from the ambient air.

This effect was found in the mentioned solar air conditioner. The fact is that a small fan powered by a compact solar panel and blowing into the Maisotsenko heat-and-mass exchanger is not just creating the output stream of cold air, but this flow at the outlet is more powerful than the initial flow from the fan at the inlet. In accordance with the law of energy conservation in this case we may formally consider the machine as being a perpetual motion machine, and its founder can be accused of fraud or technical illiteracy. We can think so if we will not take into consideration what is really going on inside the heat-and-mass exchanger.

If the flow at the outlet was created solely by the input stream, we would consider a device as being a perpetual motion machine. However, the output flow has not been created solely by the input stream. The flow at the inlet only launches the heat-and-mass exchange process that extracts from the air an extra portion of the potential energy of the air transforming it into kinetic energy which creates a new flow more powerful than the initial stream. In other words, there is a process of generating kinetic energy from the extracted internal energy of the air. When this effect was observed and its physical nature understood, of course, the concept of Maisotsenko Exergy Tower (MET) was formed. And now, here is what this tower is about.

In Fig. 2 we see two concentric cylinders forming two air channels. The outer cylinder is actually a tower chassis. A thin-walled inner cylinder is made of a material with the inner surface impervious to moisture and the wetted outer surface. Thus, the central air channel contains dry air and the outer channel contains moist air. The moisture occurring in the second channel starts the process that we have described previously. Here, in the central channel of the tower the air flow moves
from the top to the bottom, as in the energy tower of Zaslavsky (Israel), and in the second channel the air moves from the bottom to the top, as in conventionally known solar towers. The effectiveness of such a tower is much higher (many times) in comparison with any known similar solutions. And it works all the year around, 24 hours a day, with no dependence on season, time, or weather conditions.

According to preliminary calculations, such a tower installed in the chimney of the standard two-to-three level individual house is able to generate at least 10 kW/h of electricity working 24 hours a day. In addition, it has some by-products — producing cold and water. That means that in summer this house is no longer in need of energy for air conditioning. And, if the sewage water is used to moisten the wet channel the production of purified water will be up to 2000 liters per day which is enough not only for the needs of one family but for many other houses as well. Considering that the energy performance of the tower, among other things, is a function of the height of the tower, it is easy to imagine how much energy we can get from the Maisotsenko heat-and-mass exchanger installed in an ordinary factory chimney 50 or 100 meters in height.

All discussed above is with respect to the M-Tower (MET) in a "pure form." But nothing in our material world can exist in a pure form. MET, in fact, is designed to work on our particular planet where the sun is shining and the wind is blowing. For the case of wind, MET can be equipped with the air intake, whereby additional energy is added to an already existing energy potential, which is usually taken to be utilized by wind generators. Whether we like it or not, through the external cladding of the tower the air, in a concentric channel, receives additional

FIG. 2: Schematic image of the exergy tower
heating from the solar radiation, and therefore, we have increased air weight loss. Thus, even without our will, this installation along with psychrometric air power automatically utilizes solar energy as well as in conventionally known solar towers. Only due to these two additional factors can the efficiency of the installation be increased several times and become able to provide not only a single private house with energy, but even the entire neighborhood.

Figure 2 is not an engineering drawing but just a schematic diagram. In reality, there is no inner cylinder but just a large surface of wet crepe paper with capillary properties and the cost of a penny. However, this is somewhat exaggerated. Of course, this paper is not cellulose and synthetic, and the corrugations are somewhat similar to a honeycomb. Also this paper is moistened in some ingenious way. But still the paper is the paper and the cost is still negligible, and the process of corrugation is already automated by the same company, Coolerado, Inc., and also costs a penny. Theoretically, significant cost is required only for the building process of the tower. However, even the most expensive factory chimney is many times cheaper that any power station of any conventionally known type.

Anyway, the reasoning about the costs of the MET is purely theoretical because today we are not in need of building such towers. The fact is that any factory has a factory chimney and any building, especially a high-rise building, has ventilation channels. The Maisotsenko heat-and-mass exchanger installed in the chimney and ventilation channel converts these towers and channels into the Exergy Towers. The quantity of existing chimneys and ventilation channels is quite enough to meet current energy needs. What about the future? All future factories will have chimneys, and all future buildings will have ventilation channels. So, most likely even in the future we will not need to spend money for building special towers.

As is easily seen, the prediction of the great Tesla came to pass, but only in that part where the great genius said that there are ways to waste the energy that surrounds us everywhere. However, this prediction was wrong in the part where the scientist says that when it does, humanity will advance with giant strides. Why? Let us return to the biography of Tesla. This is the famous project of Tesla, 1903, when the tower was completed at Long Island, a suburb of New York. With the help of equipment located on the tower Tesla was going to affect the earth’s ionosphere and shake the heavens with gratuitous ocean energy. But this, of course, was totally unacceptable for the magnates of the already established power business — as a result; J. P. Morgan, Jr., in the same year cut off funding for this project and part of the electric equipment was dismantled for debt. And so the scientific achievements of the genius of Tesla began to be diligently mocked.

Something like that, apparently, is happening now. No, the practical applications of the M-Cycle are not ridiculed or silenced. Many of the possible practical applications of the Maisotsenko thermodynamic cycle are intensively discussed and studied around the world and not only in the U.S., but this interest does not extend beyond the purely scientific level. For example, in Canada the University of
Ontario Institute of Technology is examining the ability of air power by using the M-Cycle.

In the United Kingdom, the University of Nottingham is carrying out mathematical modeling of the M-Cycle in its implementation in various fields of science and technology. Japanese researchers (Tokyo University of Agriculture) are exploring the possibility of a combination of the M-Cycle with solar radiation.

All applications that came to the world market are mainly of interest outside the U.S. This state of affairs is hardly accidental. Yes, it is advantageous if cars start to consume half as much gasoline than ever before. But who benefits? The consumer. But is it beneficial to companies that produce gasoline? Obviously not, since the reduction in consumption reduces the amount of sales.

Of course it is advantageous to have one’s own power in every home and access to electricity without paying a penny for it. But this is only beneficial to the consumer. For producers it is like death because they are no longer needed. In other words, history repeats itself. The only question is what form it will take this time — the form of tragedy or the form of farce? One hundred years ago the world was different; it had not been globalized. Today, what America will not take, other countries will take. That may well set America back.