



Use of a municipal waste for electric power generation in Republic of Tajikistan

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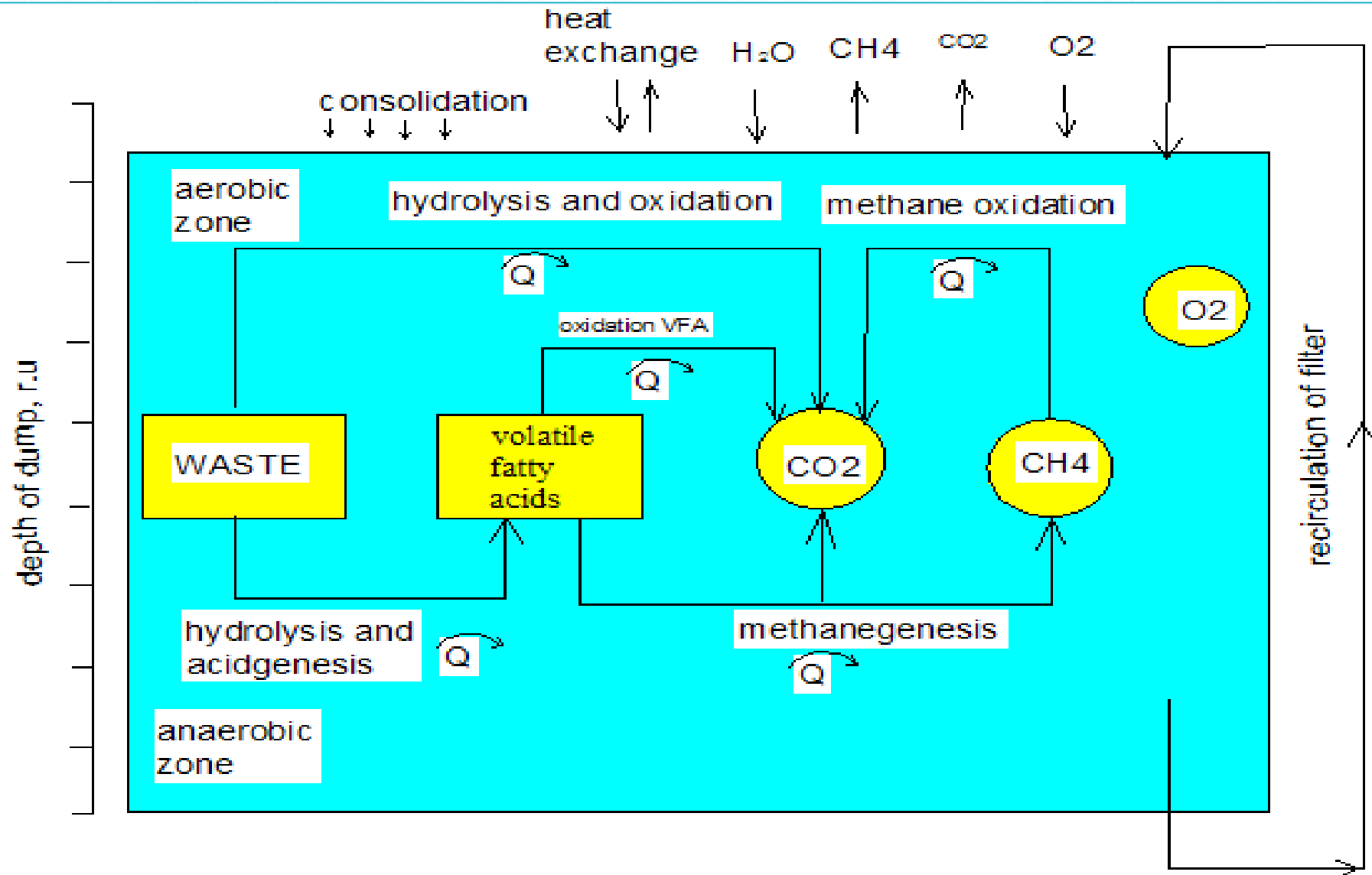
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Municipal landfills, great bulk of which (from 45 to 80 %) make organic substances, are a source of pollution of superficial and ground waters and additional receipt of methane to atmosphere. Biochemical transformations of organics are defined by presence or absence of oxygen. In aerobic conditions it enough quickly is oxidized by aerobic microorganisms, forming dioxide of carbon and accumulating microbe biomass. Such conditions are existed for a long time only in the uppermost layer of landfill. In it depth after fast exhaustion of oxygen begins slower destruction of organic substances with participation of anaerobic microorganisms. As a result the active (excitable) biochemical environment is formed



- Scheme of decomposition of organic substance of garbage on landfill*

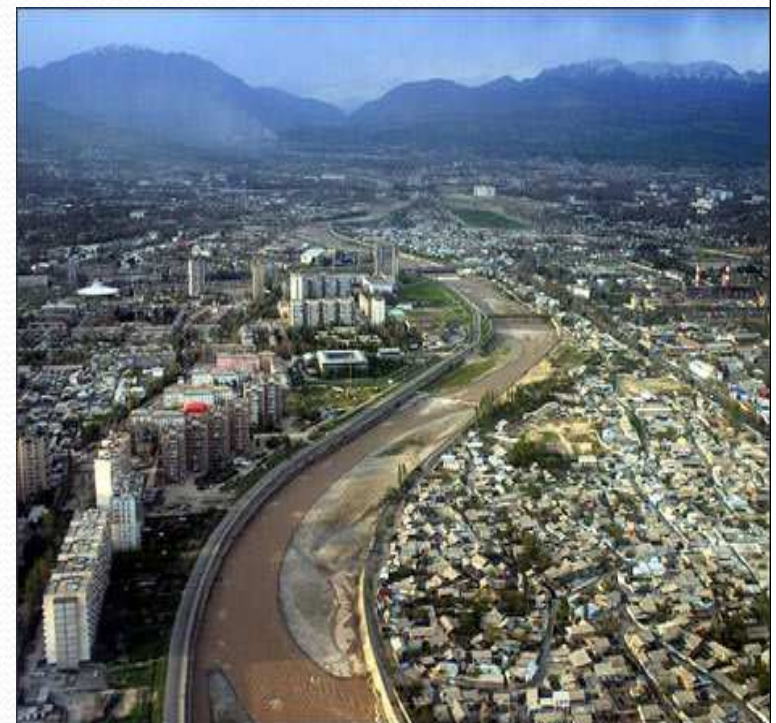
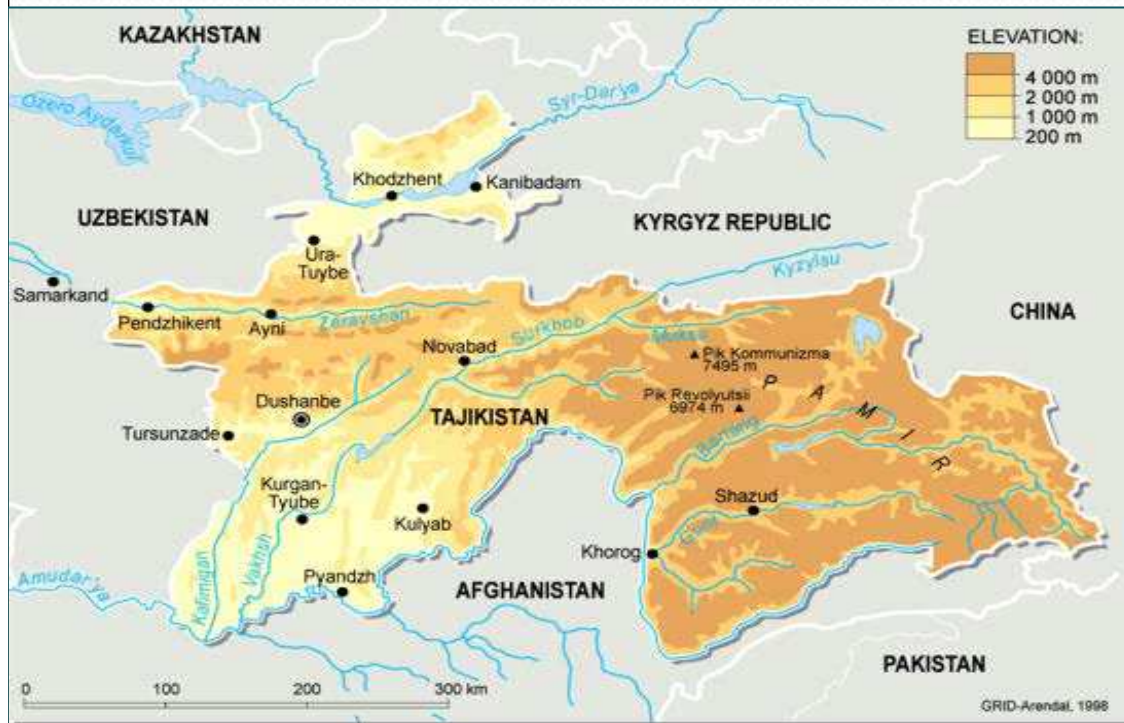




Biogas influence

- *Landfill gas has disastrous influence on a vegetative cover - as its accumulation in pore space of soil cover, causes asphyxia of root system and also is the fire-dangerous and explosive phenomenon. Gases allocated from landfills contain a large quantity of the toxic and harmful substances extremely dangerous as for health and life of people and animals, and for ecology as a whole.*
- *Landfill gas is hotbed gas which strengthens effect of climate change of the Earth in whole. Global issue of biogas is important parameter for calculation of look-ahead models of climate change. Because at ingress of biogas in environment negative effects both local and global character will formed.*

- *Dushanbe city - capital of Tajikistan is located on a southern slope of Hissar mountains in picturesque fertile valley at height of 750-840 meters over Baltic sea level. Being in the Central part of the Hissar valley, Dushanbe city plays an important role in social and economic, ecological and political position of Republic of Tajikistan.*

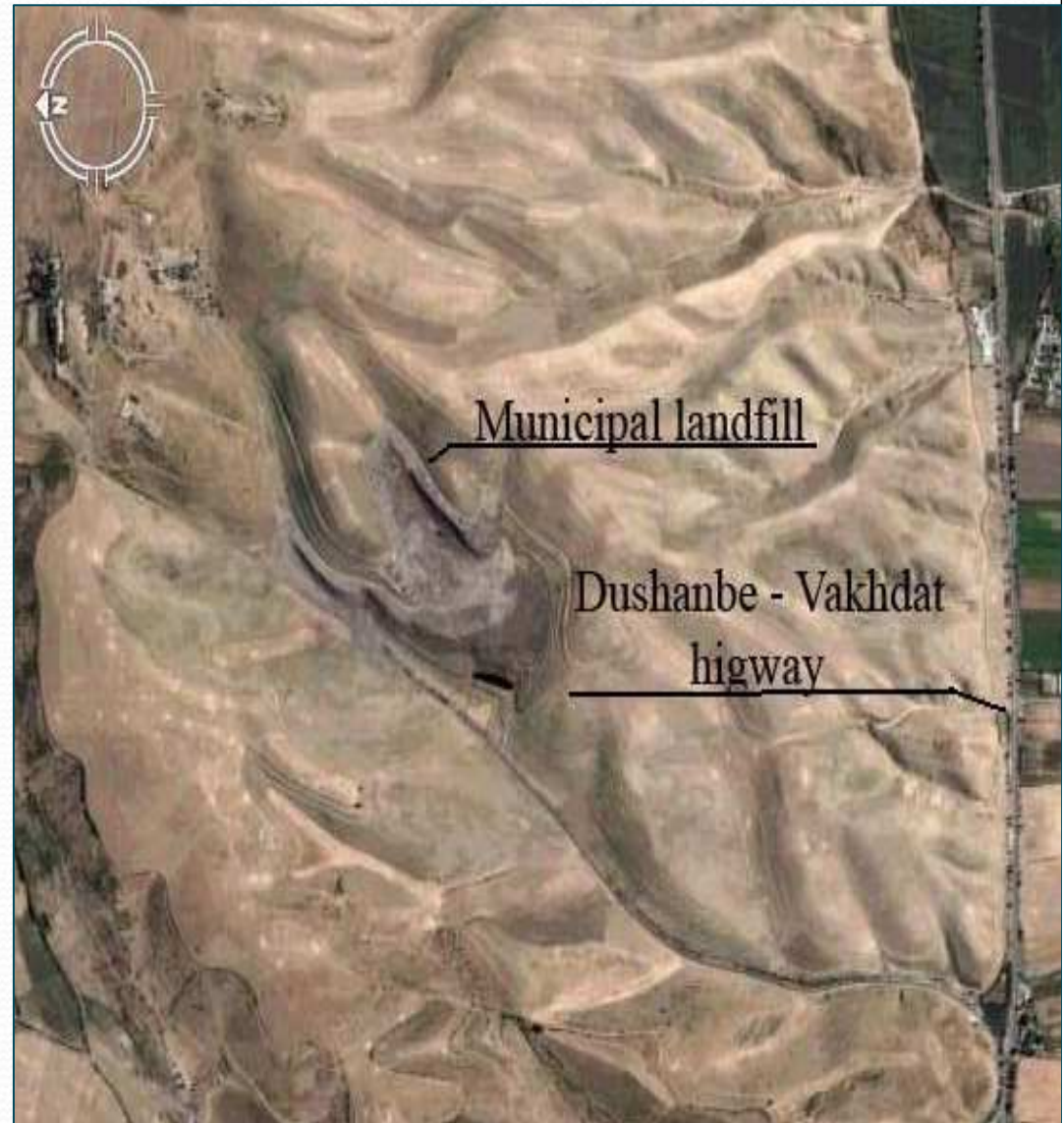


- *The climate of Dushanbe is characterized by the long hot summer with average temperature of air in July nearby 30°C and an absolute maximum 43 - 48 °C. Duration of frost-free period is 210 - 250 days. The mid-annual temperature makes 14.2 °C. The annual volume of precipitation makes 650 mm, in March drops out maximum amount of precipitation.*
- *The relief of investigated territory represents complex wavy system with rather deep ravines, sometimes with abrupt slopes, with a bias from 5-10 ° till 25-30 °.*



Landfill of Dushanbe city (photo made by GoogleMap)

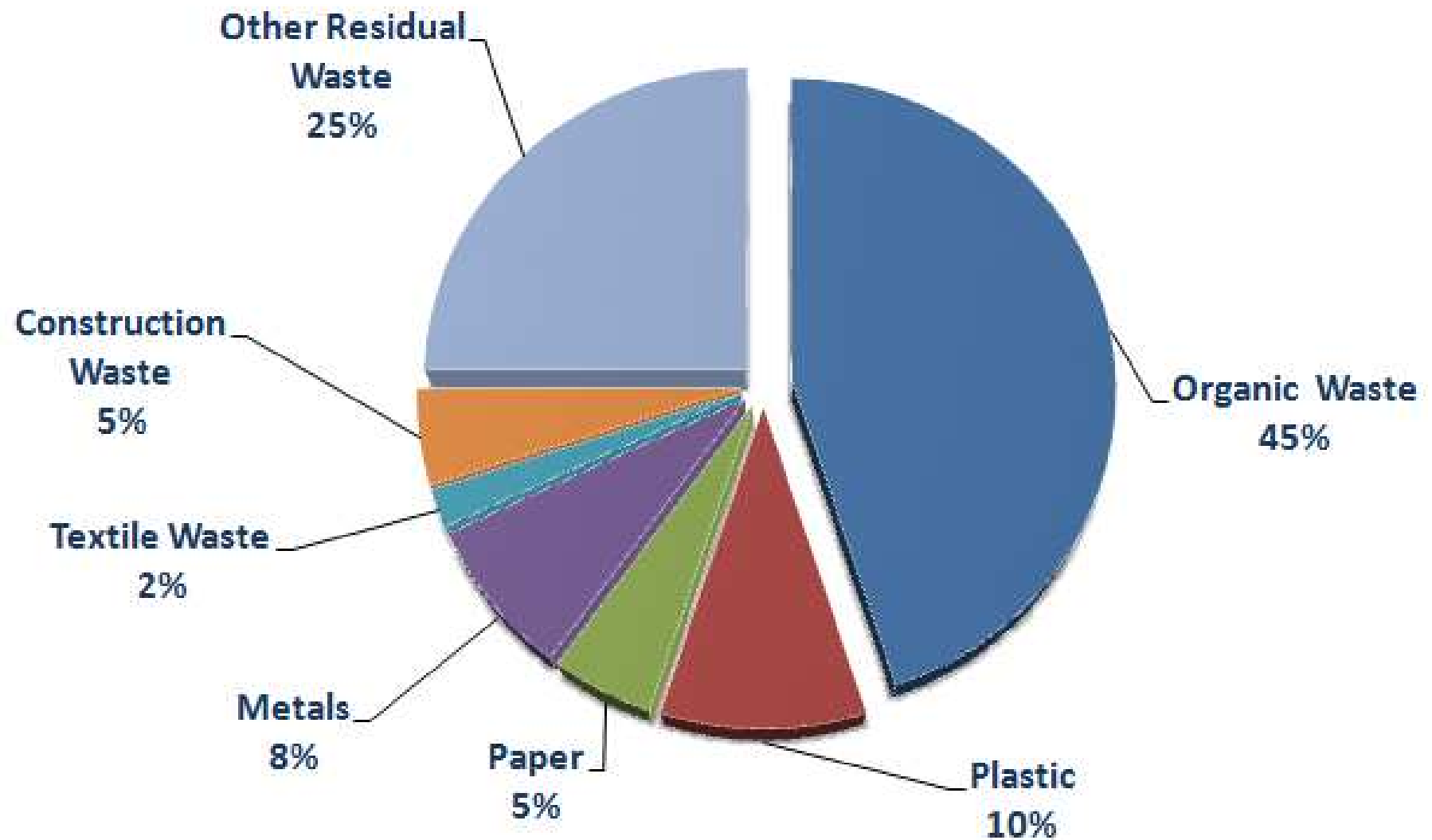
Municipal landfill of Dushanbe city which is located in a southeast part of a city in 2 km from a highway of Dushanbe - Vakhdat, at height nearby 870 - 930 m above sea level. The relief of investigated territory represents complex wavy system with rather deep ravines, sometimes with abrupt slopes, with a bias from 5-10 ° till 25-30 °




Municipal Landfill of Dushanbe city

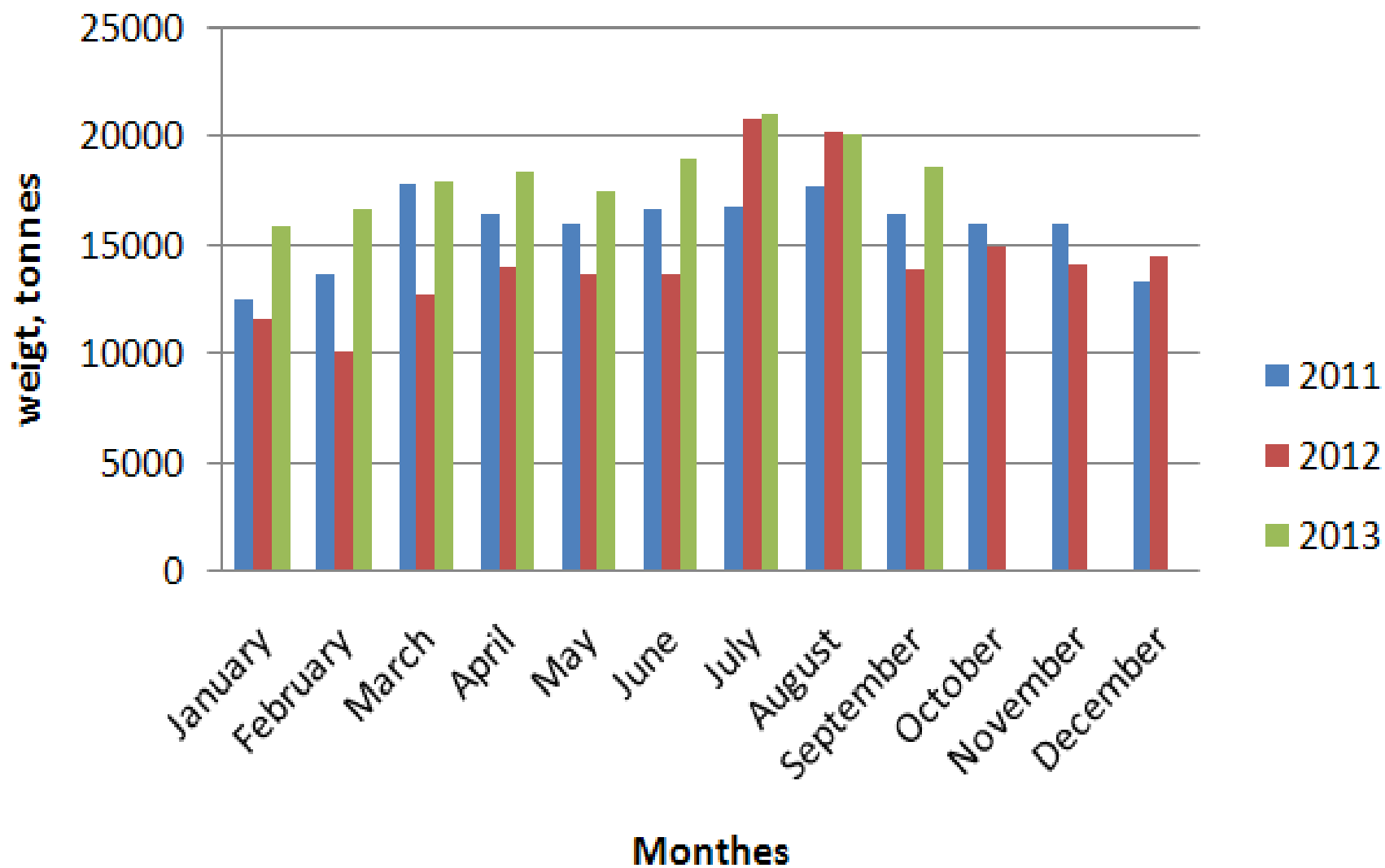


Waste structure



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- *According to the data of Center on management of municipal waste of Dushanbe city for period of 2011 to landfill it has been delivered 176 706 thousand tons of a waste and for 2012 - 159 528 thousand tons of a waste. If approximately to calculate for today on landfill it is buried near 5 million 775 thousand tons of waste*
 - *So for example, in USA from burial places of waste by the area 14hectares, where was alternately 1,0 million tones of household waste and 0,5 million tones of industrial wastes, it was extracted 60 million m³ of biogas in a year or 6868 m³/hour. It was Thus it was developed 13,1 MWt-hour of electric energy.*

Receipt of a waste on city dump for months 2011 - 2013



DYNAMICS OF GROWTH OF THE POPULATION OF DUSHANBE CITY

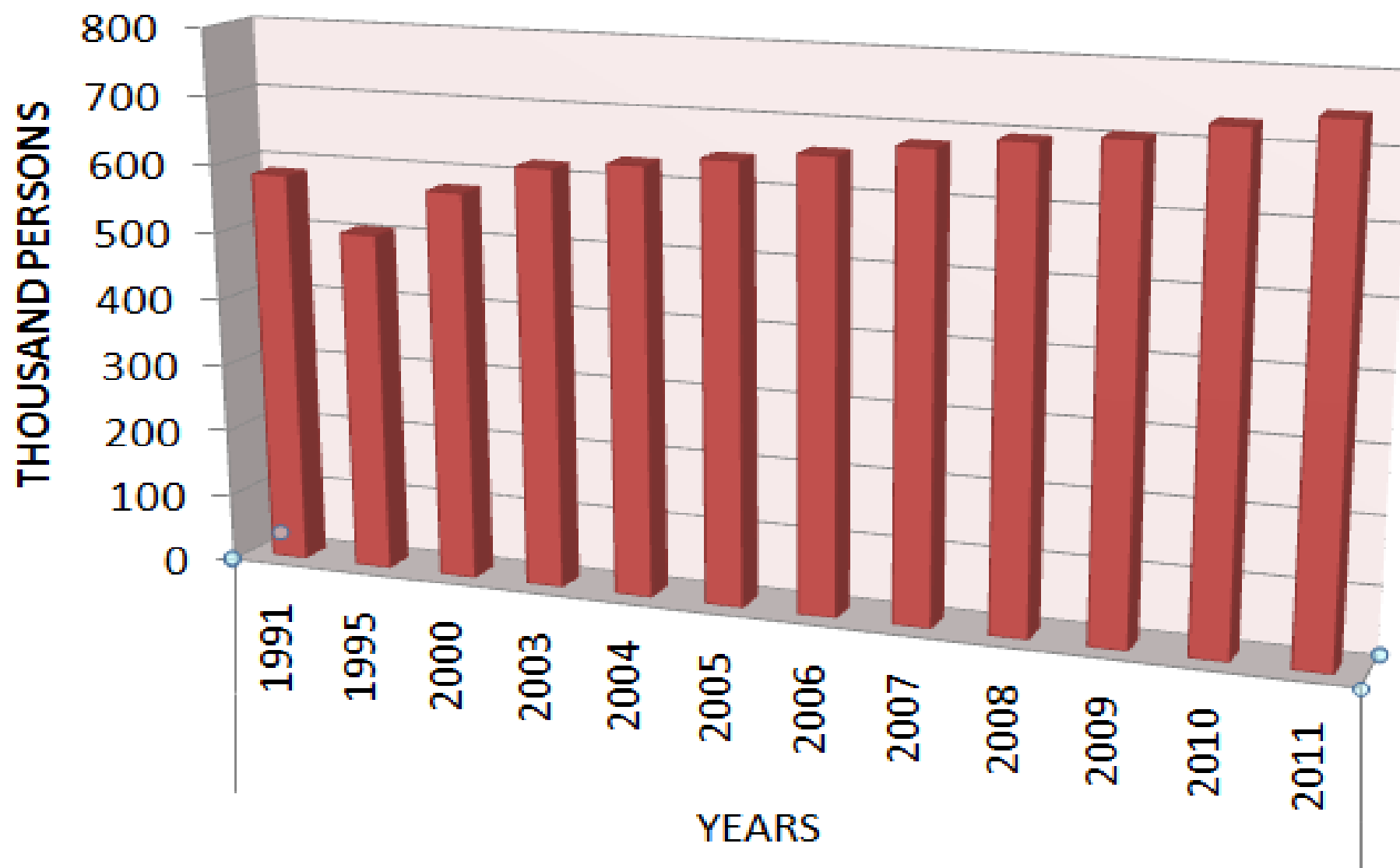
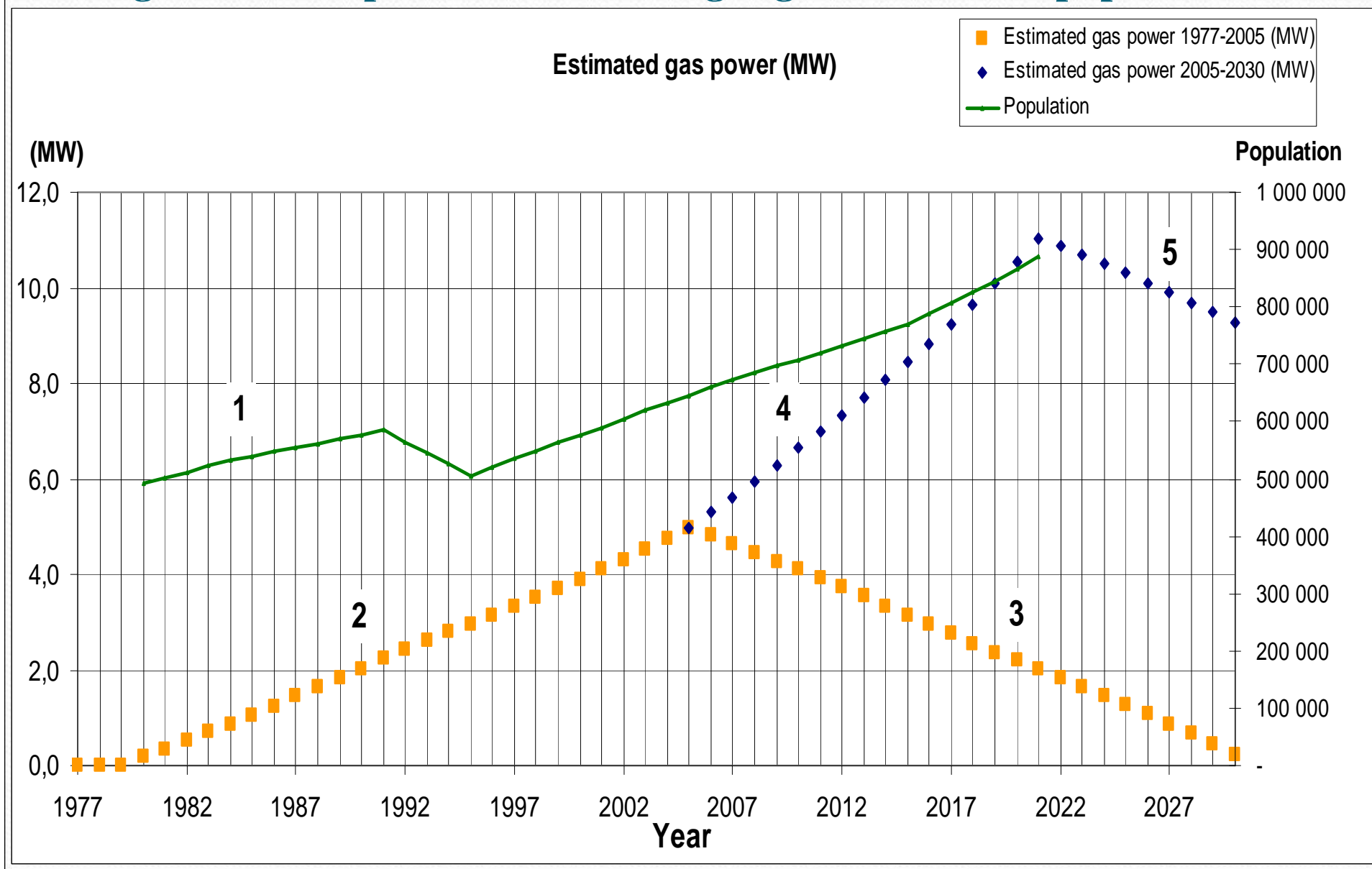


Diagram 1. Prospective volumes of gas generation and population size



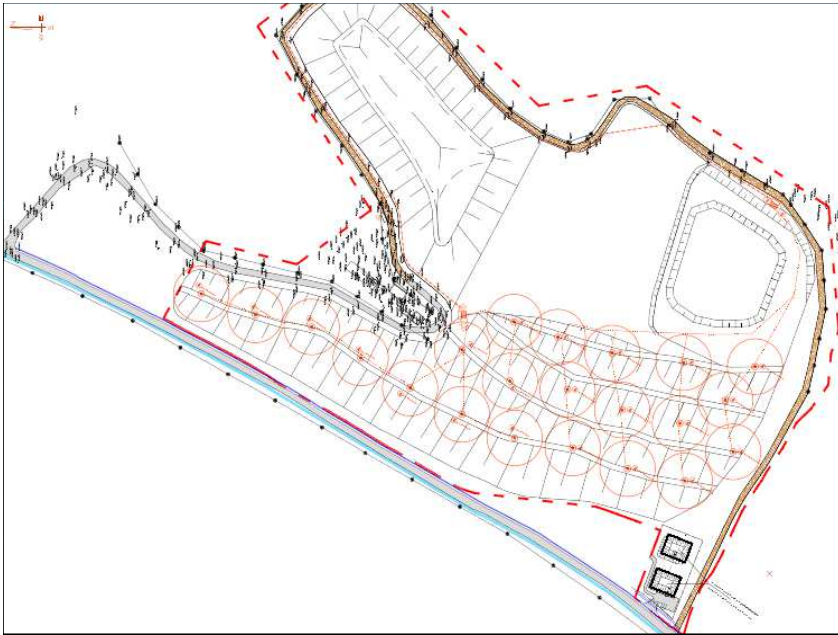



Photo 1 The scheme of installation of gas chinks on a one part of dump body

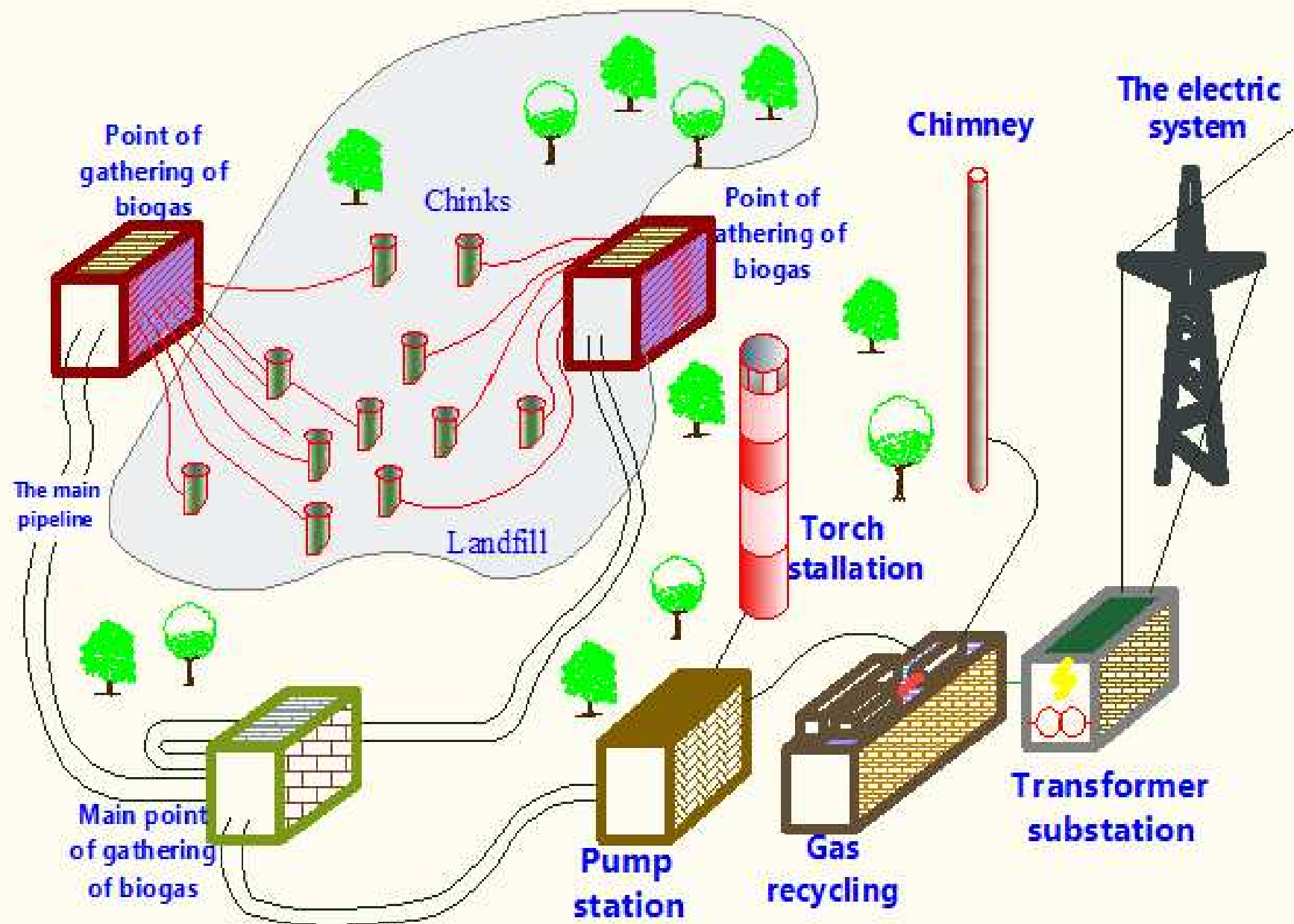


Photo 2 Sprinkle of body dump by layer of soil



Photo 3. Body of a dump, where gas chinks are installing (front view)

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- *As in domestic practice the system of recycling of biogas on Municipal landfills have not received a wide circulation yet, therefore the received biogas will be burnt, for prevention of issue of methane in atmosphere. But it is necessary to notice that in the developed countries of the world biogas with high efficiency is used for reception of thermal and electric energy, automobile fuel, is alternative of natural gas, is enriched and entered into gas systems of general purpose. In the best case from one cubic meter of gas it is possible to receive 1,5 kW*h of the electric power plus nearby 3 kW*h of thermal energy. By the gas extracted on large landfill it is possible to warm thousand cottages*



Conclusion

For Republic of Tajikistan where deficiency of electrical and thermal energy is great, it is necessary to have an additional alternative energy source. Though for power of our country use of landfill biogas has no decisive importance, but we can't to neglect this source both on ecological and for economic reasons. That confirm by true experience of number of the states.

Now there are several ecologically and economically attractive methods of recycling of landfill gas for the purpose of development of thermal and electric energy exists. And if to choose correct ways of its realization of these methods it is possible to receive an additional energy source that is especially important for Republic of Tajikistan.

Thanks for your attention

