FORECAST OF SOLID WASTE GENERATION IN ATYRAU REGION

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Research methods

- The annual volume of solid household waste accumulation is expressed by the following formula:

$$M_{ann} = \sum_{1}^{n} p_i * m_i - Q_{rec} - Q_{inc} \quad (1.1)$$

- where: M_{ann}-annual residual amount, t/year;
- p_i – waste accumulation rate, t/year, person;
- m_i - population, people;
- Q_{rec} - annual amount of recycled waste, m^3/year;
- Q_{inc} - annual amount of incinerated waste, m^3/year.

Table 1. Population growth of the city of Atyrau for 2016-2019 (in %)

	Population growth compared to the previous year				Average
Years	**2016**	**2017**	**2018**	**2019**	
The percentage	3.95	4.35	3.35	4.8	4.1

Table 2. Population forecast of the city of Atyrau for 2019-2024.

	Population forecast of the city of Atyrau, (pers.)					
Years	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Total	355117	369676	385454	401257	417708	434834

For the city of Atyrau:

- M_{ann} 2019= 355117×2,27×0,3-0-0 = 241834.677 t/year
- M_{ann} 2020= 369676×2,27×0,3-0-0 = 251749.356 t/year
- M_{ann} 2021= 385454×2,27×0,3-0-0 = 262494.174 t/year
- M_{ann} 2022= 401257×2,27×0,3-0-0 = 273256.017 t/year
- M_{ann} 2023= 417708×2,27×0,3-0-0 = 284459.148 t/year
- M_{ann} 2024= 434834×2,27×0,3-0-0 = 296121.954 t/year

Conclusion

- The growth of welfare of the population and scientific and technical progress, in Atyrau and in the district centers of the region, and also in major towns of the districts there is growth of education MSW, followed by an increase in the volume of the waste mass [14]. This is especially true of Atyrau and such areas as Zhylyoy, Inder, Issatay. The performed forecast calculations indicate the prospect of further increase in the volume of waste generation both in the regional center and in the districts of the region