

Polish Waste-to-Energy Projects and their Perspectives

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Abstract

The starting point of the paper was to characterise the current condition of the Polish municipal waste management and to outline the most important challenges in this scope. The main part of the paper presents an overview and assessment of the current advancement of Polish construction projects of municipal waste thermal treatment facilities/waste-to-energy projects. Overview and assessment concern both projects entered into the so-called indicative list already in the year 2006 with a still ongoing development process, as well as projects initiated in the recent years. The assessment includes the course of development of the oldest projects and points to significant reasons of implementation problems.

1. Introduction

Dynamic design works included in the governmental Operational Programme Infrastructure and Environment (POIiŚ) 2007-2013, supported with EU funds, are underway in Poland since 2006. Those works aim at constructing modern municipal waste treatment plants of waste-to-energy (WtE) type. Many papers have been published on the development of those projects, e.g. [1] and [2]. The present paper is another contribution on the subject. It contains an assessment of the current advancement stage of the projects as of June 30, 2012 which is of great importance for fulfilling EU requirements in the field of municipal waste management by Poland.

Poland's municipal waste management still deviates from the EU average, although in recent years systematic improvement can be observed. According to the Central Statistical Office GUS – Environment 2011 12.04 million tons of municipal waste were generated in Poland since 2010, amounting to approx. 315 kg/M per capita annually. According to EUROSTAT for the year 2010 [3] – approx. 252.1 million tons of municipal waste are generated annually in EU27 equalling to approx. 502 kg/M annually per capita in EU27.

EUROSTAT [3] further indicates that in the EU27 approx. 25 % of generated municipal waste is recycled, 15 % is composted, 22 % is combusted with energy recovery in thermal treatment plants of WtE type, and 38 % is still landfilled. According to GUS and EUROSTAT for the year 2010, the numbers are less encouraging for Poland; 18 % of municipal waste is recycled, 8 % composted, about 1 %, namely 0,4 % is processed through energy recovery in the only Polish municipal waste incineration facility operating in Warsaw, and 73 % is still landfilled. Taking into account the globally understood recycling (18 % + 8 %) Poland could be qualified into the group 2 of EU countries, where recycling or the share of thermal waste treatment exceeds 25 %. Therefore a slight progress in this respect might be observed.

Reversing the still visible disproportion in the municipal waste treatment methods in the Polish municipal waste management is to take place by gradually eliminating landfilling of unprocessed waste and at the same time increasing the share of recycling and the share of energy recovery in WtE plants. These are the main tendencies of the Polish municipal waste management policy, stipulated in the national waste management plan 2014. Therefore not only waste recycling, but also energy recovery taking place in specially designed incineration facilities will play a significant role. As mentioned above, the preparation for dynamic construction of the mentioned facilities in Poland goes back to the year 2006, when due to the Operational Programme Infrastructure and Environment 2007-2013 co-financed by the EU a chance of building 12 facilities in several cities and regions of Poland appeared. In what follows, I would like to present and evaluate this chance for Poland at the moment.

Summarising the assessment of the current condition of the Polish waste management one must mention the passing of a very important Act by the Polish Parliament of 01 July 2011 on further development of municipal waste management systems in Poland, including development of construction projects of municipal waste incineration facilities. It is the Act of 1 July 2011, amending the act on maintaining cleanliness and order in municipalities and other acts (Journal of Laws of 2011 No 152, item 897). This act is being introduced gradually from 01.01.2012 to 30.06.2013. Its provisions definitely amend the existing archaic model of fees for collecting and disposal of municipal waste. On 01.07.2013 at the latest, all fees for collecting and management of municipal waste will be directed to municipalities which according to the law are responsible for waste management. Presently, unfortunately with a two-year-delay, the passing of another important act, that is the new Waste Act, compliant with the Waste Framework Directive 2008/98/EC, is expected.

2. Milestones in WtE projects implementation

Below the most important milestones of development of currently undergoing construction projects of municipal waste incineration facilities in Poland were specified;

- 2006 by the efforts of the Ministry of Regional Development within the scope of the Operational Programme Infrastructure and Environment 2007-2013 the so-called indicative list of construction projects of municipal waste incineration plants was developed. The list was of priority character and included strategic facilities for the domestic municipal waste management. WtE projects in certain cities and regions of Poland included in the list had guaranteed EU subventions without the necessity to take part in competition,
- the published indicative list of construction projects of municipal waste incineration facilities with the estimated and guaranteed co-financing from the EU's Cohesion Fund for every planned incineration facility was approved by the European Commission (November 2007) and the Polish government (January 2008),

- ministerial departments responsible for implementation of the projects were assigned: the Ministry of Regional Development (in respect of decisions and control of the level of EU project's co-financing), the Ministry of the Environment (in respect of compliance with the waste management plan and environmental impact) and the Regional Fund for Environmental Protection and Water Management NFOŚiGW (as the project implementing agency). As far as cities or regions of the country where the building of municipal waste incineration facilities was planned are concerned, the local authorities and those companies designated by local authorities were made responsible for the projects,
- at the time 12 construction WtE projects in various cities and regions of Poland with the total capacity of approx. 2.5 million Mg/year were placed on the indicative list. It was agreed that a city or region, that a construction of incineration facility is planned for, must hold min. 300 thousand inhabitants and the planned incineration's capacity must equal to min. 100 thousand Mg/year,
- at the beginning of the year 2007 tenders were invited for preparation of necessary project documentation including not only a feasibility study, but also necessary documents for environmental impact assessment of the planned incineration facility including public consultation,
- for the needs of consultation and support of those for the Polish conditions virtually new construction projects of municipal waste incineration facilities, the European Commission together with the European Investment Bank and the European Bank for Reconstruction and Development have established an institution named JASPERS (Joint Assistance to Support Projects in European Regions),
- with regard to extending procedures of developing the necessary project documentation, which might affect the deadline of investment settlement within the Operational Programme Infrastructure and Environment set by the European Commission (15 December 2015), the Ministry of the Environment announced the date of 30.06.2010 as a deadline for completing the study work. All entities implementing a certain project, representing directly a city or a city company where a certain incineration facility was to be built, were obliged to present an application to the European Commission for its financing from the Cohesion Fund. Preparation of the application was possible only when a certain project came with complete project documentation and a decision on environmental conditions. The announced date of 30.06.2010 has become unattainable for several projects. The most frequent reason was not completing the environmental impact assessment procedure and not obtaining the decision on environmental conditions for a certain WtE project,
- from 01.07.2010 to 31.03.2011 verification of applications on the national level and qualification of projects for financing from EU funds took place. All applications submitted before 30.06.2010 or with a slight delay underwent the verification process by Polish experts in the formal-legal, technological, economic-financial aspect, as well as concerning environmental impact,
- after positive verification the process of signing applications to the European Commission for project financing from the Cohesion Fund followed. The first application was signed in April 2011,
- in April 2011 the first invitation to tender for construction of a waste incineration facility (Kraków) was issued, and the closing date for submission of bid documents for the last one (Białystok) of the then active municipal waste construction projects was June 2012,

- with the beginning of the year 2012 the first tender for currently active WtE projects and then for further ones, was issued. Currently the final arrangements concern selecting the contractor for the closed tender procedures,
- for fear that the extending tender procedures and selection of the contractor might again endanger the timely settlement of a certain project in front of the European Commission, the Ministry of the Environment suggested 30.06.2012 as a deadline for signing a contract with the contractor for building the incineration facility,
- 15.12.2015 is the final date for financial closure and for completing the construction of the incineration facility.

3. Assessment of the advancement of the construction projects of municipal waste incineration facilities

The assessment of the current advancement of the construction projects of municipal waste incineration facilities in Poland is to be conducted according to two main project categories;

- projects placed on the above mentioned so-called indicative list, that is priority projects co-financed by the EU commenced already in 2006. The overview and the assessment will comprise:
 - * general list of construction of WtE projects initially approved for realisation with a synthetic description of their current status,
 - * description of currently active projects,
 - * synthetic evaluation of successes and failures in the current stage of projects from the indicative list,
- synthetic description and evaluation of the remaining construction projects of WtE plants which for the past two years have been developing beside the projects from the indicative list. Those are projects which have not been subjected to any official governmental support or financial assistance programme so far. Such a programme is from a financial perspective conceivable for the years 2014–2020e, however it is still uncertain. Some of the projects have already opted for a model of financing within the framework of a public-private partnership.

3.1. WtE projects from the indicative list – planned and the current status

Table 1 illustrates the initial list for the years 2007-2010 of municipal waste incineration facilities planned for building in Poland and placed on the then indicative list according to the data presented in the papers [1] and [2], and the current status of those projects is provided in the right column of the table.

Table 2 presents further data on the currently active construction projects of municipal waste incineration facilities placed on the so-called indicative list of the Operational Programme Infrastructure and Environment 2007-2013.

3.2. Successes and failures of projects from the indicative list

Tables 1 and 2 allow for a summary of the successes and failures of WtE projects in Poland from the indicative list evaluated on the present stage of their implementation. The following observations can be made:

Table 1: Initially planned construction projects of municipal waste incineration facilities in Poland and their current status

No.	Code of the project*	Names of projects from the years 2006 – 2010 and their synthetic description as of 30.06.2010	Current project status and its synthetic description as of 30.06.2012
1.	POIiS 2.1.-2	WtE project for the city of Łódź – planned capacity: 250 thousand Mg/year	Inactive project**. Project did not meet I the required criteria by 30.06.2010. Environmental decision was obtained in January 2012. Further advancement of the project is possible outside of the indicative list according to the PPP model. Currently there are works underway on the guidelines for the PPP-based financing model. Design capacity: 200 thousand Mg/year.
2.	POIiS 2.1.-3	WtE project for the city of Cracow – planned capacity: 250 thousand Mg/year	Active project. One of the most advanced projects. On 11.05.2012 obtained the final approval of the European Commission. Tender for selection of the contractor in the last approval stage. However the status of the localisation and environmental decisions appealed to the District Administrative Court still unclear. Design capacity: 220 thousand Mg/year.
3.	POIiS 2.1.-4	WtE project for the city of Warsaw – planned capacity: 265 thousand Mg/year	Inactive project. There were significant changes in the project objectives. In the year 2010 support with EU funds was renounced, now however this option is again conceivable. Projected capacity: 350 thousand Mg/year, by stage-by-stage construction process. First 1 x 90 thousand with subsequent 2 x 160 thousand Mg/year. Implementation with the support of EU funds according to the PPP model.
4.	POIiS 2.1.-5	WtE project for the city and region of Białystok – planned capacity: 100 thousand Mg/year	Active project. Presently in the process of deciding in the second stage of the tender for the contractor. However the status of the environmental decision appealed to the District Administrative Court still unclear. Projected capacity: 120 thousand Mg/year.
5.	POIiS 2.1.-8	WtE project for the city of Gdansk, Gdynia and Sopot – planned capacity: 250 thousand Mg/year	Inactive project. The formal requirements due 30.06.2010 have not been met. Environmental decision obtained in January 2012. Further advancement of the project possible outside the indicative list, according to the PPP model. Currently ongoing works on guidelines for a new model of financing. Projected capacity: 250 thousand Mg/year, however in the form of RDF.
6.	POIiS 2.1.-10	WtE project for the Metropolitan Association of Upper Silesia – planned capacity: 500 thousand Mg/year	Inactive project. The formal requirements due 30.06.2010 have not been met. Perhaps the project will be realised in the next programme of financing from EU funds later than 2015, or sooner within a PPP project or by a private investor.
7.	POIiS 2.1.-13	WtE project for the city of Poznan – planned capacity: 200 thousand Mg/year	Active project. Implementation according to the PPP model and with EU funds. Presently the final tender for selecting the operator is planned. Projected capacity: 210 thousand Mg/year.

Table 1: Initially planned construction projects of municipal waste incineration facilities in Poland and their current status – continuation 1 –

No.	Code of the project*	Names of projects from the years 2006 – 2010 and their synthetic description as of 30.06.2010	Current project status and its synthetic description as of 30.06.2012
8.	POIiS 2.1.-15	WtE project for the city of Szczecin – planned capacity 180 thousand Mg/year	Active project. Another besides Cracow, well-advanced project. Tender in the last stage of appointing the contractor. Projected capacity: 150 thousand Mg/year.
9.	POIiS 2.1.-16	WtE project for the cities of Bydgoszcz and Torun – planned capacity 180 thousand Mg/year	Active project. Another well-advanced project. The first tender for selecting the contractor was cancelled. Currently the invitation to the tender was issued again. Projected capacity: 180 thousand Mg/year.
10.	POIiS 2.1.-17	WtE project for the city and region of Olsztyn – planned capacity 120 thousand Mg/year	Inactive project. The decision on abandoning the project was made already in 2010. Instead of building a WtE plant it was decided to build a mechanic-biological waste treatment plant.
11.	POIiS 2.1.-18	WtE project for the city and region of Koszalin – planned capacity 120 thousand Mg/year	Inactive project. The formal requirements due 30.06.2010 have not been met. Further realisation of the project possible outside the indicative list, according to the PPP model. Projected capacity: 92 thousand Mg/year.
12.	POIiS 2.1.-14 (reserve list)	WtE project for the city and region of Konin – planned capacity: 100 thousand Mg/year	Active project. Reactivated from the reserve list. Presently in the process of deciding in the second stage of the tender for the contractor. Projected capacity: 94 thousand Mg/year.
		Planned number: 11 + 1 project from the reserve list Total planned capacity: 2,515 (thousand Mg/year)	Current number of active projects: 6 + Warsaw project Total capacity: 974 + 90 (Warsaw) (thousand Mg/year)

* the number of the project given in the table 1 corresponds directly to the ordinal number of the project placed on the list of individual projects (on the so-called indicative list) for the Operational Programme Infrastructure and Environment as of June 2010.

** assessment whether a certain project is active concerns above all verification, whether the project is still on the indicative list and is being implemented within the framework of the Operational Programme Infrastructure and Environment 2007 – 2013.

- from among 11 construction projects of municipal waste incineration facilities and one reserve project for the region of Konin with the total capacity of 2,515 thousand Mg/year, which were planned for the years 2007-2010 within the framework of the Operational Programme Infrastructure and Environment 2007-2013, currently (end of June 2012) there are 6 feasible projects with the total capacity of 974 thousand Mg/year, and possibly a project of one line with the capacity of 90 thousand Mg/year for the city of Warsaw,
- assuming that 6 currently active projects from the indicative list of the Operational Programme Infrastructure and Environment 2007-2013 in fact end up building 6 WtE plants with the total capacity of 974 thousand Mg/year, although at the moment they do not have successfully and definitely completed tender procedures for selecting the contractor, and two of them pose a finally clear issue of legal validity of the environmental decision, then in comparison to the 12 projects (including the reserve project), with the total capacity of 2,515 thousand Mg/year planned for the years 2007-2010,

Table 2: Characteristics of the currently active projects from the indicative list

No.	Official name of the project	City/region	Implementing entity	Capacity (thousand Mg/year)	Technology – waste type
1.	Municipal Waste Management Programme in Cracow	Cracow	KHK S.A.	220 (2 lines)	grate incineration – mixed municipal waste
2.	Building a WtE plant for the Bydgoszcz-Torun Metropolitan Area	Bydgoszcz and Torun	ProNatura Sp. z o.o.	180 (2 lines)	grate incineration – mixed municipal waste
3.	Building a WtE plant for the Szczecin Metropolitan Area	Szczecin	Municipality City	150 (2 lines)	grate incineration – mixed municipal waste
4.	Integrated Waste Management System for the Białystok Metropolitan Area	Białystok and surrounding municipalities	PUHP Lech Sp. z o.o.	120 (1 line)	grate incineration – mixed municipal waste
5.	Waste Management System for the city of Poznan	Poznan	City	210 (2 lines)	grate incineration – mixed municipal waste
6.	Ordering Waste Management in the area of the Konin Subregion	Konin and the Municipal Association	Koninski Region Komunalny (Municipal Association of the Konin Region)	94 (1 line)	grate incineration – mixed municipal waste
total				974 thousand Mg/year	

this result can hardly be called a success. Such a result both by volume and in financial terms is reached by approx. 40 % of the initial plans for the years 2007-2010. Such a poor use of funds from the EU allocated for the mentioned Programme for building a WtE plant within the framework of the Operational Programme Infrastructure and Environment can also hardly be seen as a success,

- the reason for this state of affairs can be attributed to a number of typically Polish conditions. Firstly, we are considering projects of constructions we did not have in Poland before. It was therefore unlikely that there was a foundation for them both on the side of the project, as well as in the mentality of inhabitants regarding the acceptance. Secondly, the scale of construction projects of municipal waste incineration facilities planned in the Program, although fully adequate to the needs resulting from the necessity of setting municipal waste management in Poland in order, did not meet well prepared and determined entities preparing the comprehensive project documentation requested by the European Commission. Determination was especially vital when the projects met with the public outcry inadequate to the assumed highest BAT-compliant technological and ecological standards of WtE projects. It led to extending environmental impact assessment procedures and resulted in delay in obtaining decision on environmental conditions. It must be mentioned that a legally valid environmental decision is the key to further realisation of projects.

Table 3: List of remaining projects

No.	Name of the project	Capacity thousand Mg/year	Remarks
projects originating from the indicative list			
1.	Łódź	200 (2 lines) mixed municipal waste	Project has a legally valid environmental decision which is a great asset. Currently the documents for conducting the tender with financing according to the PPP model are being prepared.
2.	Gdansk	250 (2 lines) Refuse-derived fuel RDF	Project has a legally valid environmental decision which is a great asset. Currently the documents for conducting the tender with financing according to the PPP model are being prepared. Planned combustion of Refuse-derived fuel RDF.
3.	Koszalin	120 (1 line) mixed municipal waste or RDF	Currently analyses of the project's financing according to the PPP model are being conducted.
4.	Katowice	500 (2 lines) mixed municipal waste	Concepts of further development are varied and very unstable.
remaining projects			
5.	Chrzanów	150 mixed municipal waste	Project does not have a legally valid environmental decision. The project is being included in the regional waste management plan for Małopolska. Its co-financing is expected to commence with the next edition of the Programme for the years 2014 – 2020.
6.	Oswiecim	150 mixed municipal waste	Project has a legally valid environmental decision. The project is being included in the regional waste management plan for Małopolska. Its financing is to be based on private capital.
7.	Tarnów	120 mixed municipal waste	Project does not have a legally valid environmental decision which is currently in the approval stage. The project is being included in the regional waste management plan for Małopolska. Its co-financing is expected to commence with the next edition of the Programme for the years 2014 – 2020.
8.	Gorlice	64 50 % – mixed municipal waste 50 % – RDF	Project has a legally valid environmental decision. The project is being included in the regional waste management plan for Małopolska. Its financing is to be based on private capital.
9.	Mielec	60 Refuse-derived fuel RDF	Project has a legally valid environmental decision. The project is being included in the regional waste management plan for Małopolska. Its financing is to be based on private capital.
10.	Radom	120 Refuse-derived fuel RDF	Project is currently in the approval stage of environmental decision. Its co-financing is expected to commence with the next edition of the Programme for the years 2014 – 2020.
11.	Płock	120	Project is currently in the approval stage of environmental decision. Its co-financing is expected to commence with the next edition of the Programme for the years 2014 – 2020.
12.	Other	approx. 300	Projects in the initial advancement stage which have been included in the current regional waste management plans. The plans are to be approved by 30.06.2012.
approx. amount		~ 2,154 thousand Mg/year	

3.3. Projects outside of the indicative list – perspectives of development

Below the evaluation and description of projects developing apart from official ones and higher evaluated projects from the indicative list is presented. They must be treated as long-term projects, feasible after 2016. The projects can be divided into two groups:

- projects originating from the indicative list. Those are projects which did not meet the requirements by the established deadline and therefore lost its active status in the aspect of EU financing. At the same time those projects are well elaborated,
- projects which were developing outside the indicative list from the very beginning, possibly with the hope of EU co-financing in the next edition of the Programme supporting their construction. Among those projects there are also such which were assumed, a priori, not to be supported by EU funds, but used the private capital or included the PPP model.

A list of such projects is shown in Table 3.

4. Conclusions

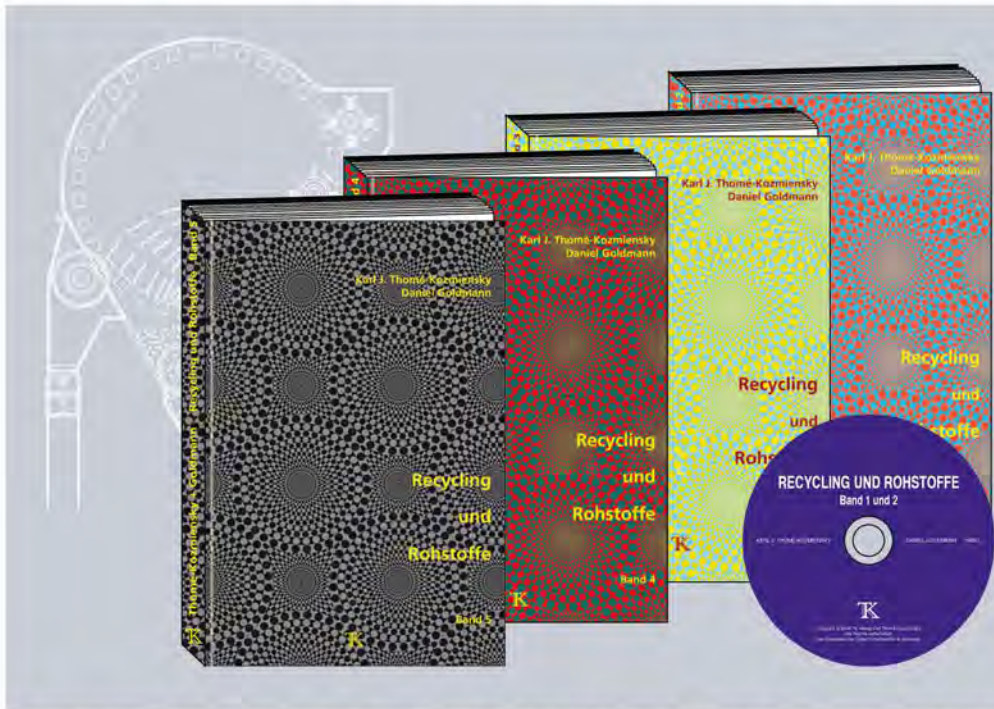
The aim of the paper was to analyse and evaluate two groups of construction projects of thermal waste treatment plants. The first and main part are WtE projects from the so-called indicative list the development of which commenced in 2006 with the establishment of the Operational Programme Infrastructure and Environment 2007-2013, completion of which must take place in December 2015. Projects from the years 2007-2010 included 12 WtE plants with the total capacity of ca. 2,500 thousand Mg/year. The analysis according to the current state indicates that optimistically speaking the building of 6 incineration facilities with the total capacity of 974 thousand Mg/year with possibly 1 line with the capacity of 90 thousand Mg/year for the city of Warsaw, is feasible. Thus the objectives for the years 2007-2010 might by volume and in financial terms reach about 40 % effectiveness or in the pessimistic variant even less.

The paper described also the other group of projects which either originated from the indicative list or developed outside of it. The total capacity of projects from this group exceeds 2,000 thousand Mg/year. Implementation of this long-term group of projects will be possible after 2016. It is difficult to forecast the feasibility of these projects.

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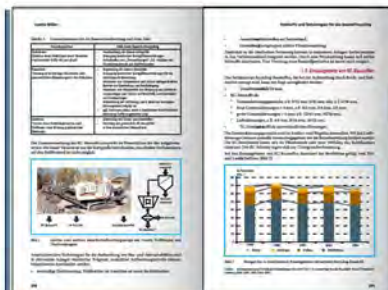
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