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Think Global – Act Local: A Common Approach for International Projects and Local Markets

Andres Kronenberg

Leading technology providers for energy-from-waste plants (EfW) are continuously adapting their business models to serve markets that have been experiencing dramatic change over the past decade. Public infrastructure projects were traditionally developed and then owned and operated by governmental or municipal organizations. Since the beginning of the new millennium, however, the trend in the EfW markets has shifted towards public-private partnerships and the complete privatization of the waste management infrastructure. As a result, turnkey plants have been in greater demand than individual technology lots. Zurich-based Hitachi Zosen Inova (HZI) and other leading companies in the industry have adjusted their business models to deliver turnkey EfW plants for different markets.

The industry is now facing a second transformation, as the European markets are nearly saturated, and large projects are to be developed globally. HZI and its subsidiaries have been involved in the development of projects in international markets.

An important aspect for successfully processing large projects is the ability to combine global know-how with broad awareness of the regional and local requirements. This article shows the areas where a combination of global and local knowledge is required and how this can be achieved: either by becoming a local company or by teaming up with local partners and learning from each other.

1. The Transformation of EfW markets

1.1. From lot projects to turnkey plants

EfW plants are social infrastructure projects that were originally developed by municipalities and operated by public utilities. Working in conjunction with an external advisor, the individual lots for such projects were awarded to one or more EPC partners, and these were typically put out to tender. Until 2000, this was by far the most common approach to developing new concepts for waste management and the resultant construction of EfW plants. The dominant markets were those in Switzerland, Austria, Italy, France, the Netherlands, and Japan. After 2000 there was a marked change in the waste management sector, and between 2000 and 2010 only fifty percent of projects were still structured in this manner. The other half were set up in such a way that following a contested competitive process, a municipality awarded a contract for the local or re-gional handling of waste as well as the operation of the EfW plant to a private company. This in turn awarded an EPC contract to a general contractor, which was responsible for the design and construction of the turnkey plant. Since 2011, this has been the predominant approach, accounting for eighty to ninety percent of projects. Meanwhile, the range of potential clients has expanded significantly, both in terms of geographic mix and nature. Plant constructors/general contractors are thus facing completely new challenges, which can vary greatly depending on the region and culture in question.

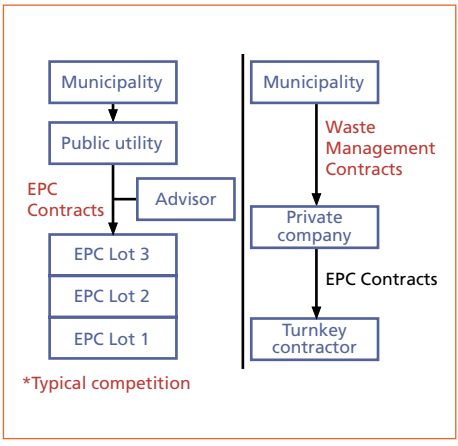

Figure 1: Typical project structures before 2000 (left) and after 2000 (right)

While the municipalities set very specific technical requirements for the lot projects, private plant operators and investors are these days focusing increasingly on func-tionality and discounting, i.e. the just-in-time, profitable operation of the EfW plant. HZI has addressed these requirements by combining its tried-and-tested technologies in the areas of combustion and flue gas treatment with its profound expertise in project management and the ability to deliver turnkey plants. Examples of projects that gave the company the opportunity to prove itself were Poznan in Poland, and Riverside and Ferrybridge Multifuel 1 (both in the UK).

HZI is currently executing three further projects of this kind with private clients in Dublin (Covanta), Ferrybridge Multifuel 2 (Ferrybridge Multifuel Energy Ltd.) and Edinburgh (FCC Environment), with more set to follow in the coming months in Central America as well as Northern and Eastern Europe.

1.2. New markets, new demands

In the past ten years, the European EfW market has been strongly dominated and shaped by the UK and a few continental markets. Most of these are now practically saturated,

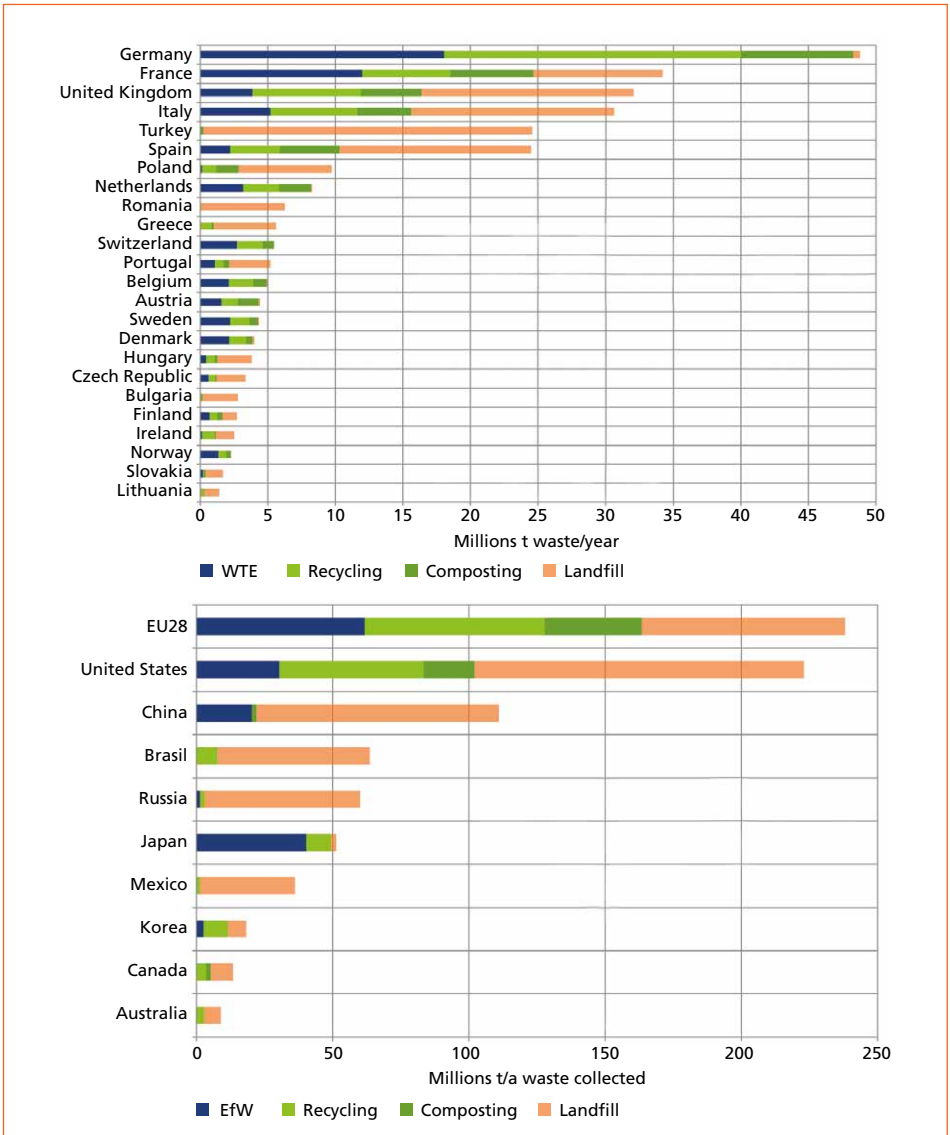

Figure 2: Amount of MSW collected in different regions in Europe and worldwide

and there is demand for alternative waste treatment facilities such as recycling plants and composting. At the same time, new opportunities are also opening up to enter markets in regions where EfW has thus far not been: discussed as part of waste management given the predominant use of landfill. However, the trend is moving clearly away from landfill and toward sustainable waste treatment and the recovery of energy and materials from waste. Eastern Europe and Turkey are attracting particular attention: There has been a change in thinking in these areas of late – both in ecological and economic terms – and this has created considerable potential for new EfW projects. The same can be said of spot markets worldwide.

Figure 2 shows an overview of the amounts of household solid waste collected in various countries and regions worldwide. The bars break these amounts down into the proportions of waste that are recycled, composted, sent to landfill, or used as fuel in thermal EfW facilities. The figure for the 28 EU states together is also given as a reference. The larger the share of landfill, the greater the potential for realizing EfW plants. It is clear that apart from Japan, all of the regions shown still have considerable scope for expanding waste management. These regions together with India are expected to become increasingly relevant with regard to the development and implementation of major EfW projects. This article aims to share some of the experience HZI has already gained in these regions.

2. Challenges for international plant constructors in new markets

Below we assess the most striking differences between the traditional European EfW markets and certain spot markets that have developed in the recent past. A PESTLE analysis is an established tool for identifying external factors in a newly accessed environment that have a direct influence on future business activities. The individual factors are categorized as follows: political, economic, social, technological, legal, and environmental. Such an analysis is important in that the results help companies to recognize the potential and characteristics of the new market, and they can use these findings to derive market development strategies. The aim of the PESTLE model here is to show where the individual markets differ and how an international technology firm can deal with these differences by involving local partners.

2.1. Political factors

The political factors set out how local business is influenced by government decisions and other political measures.

EfW markets come under the direct influence of politicians. Legislation on waste management and regulations on promoting renewable energies play a key role here in the development of new projects. The role of government-related organizations that have responsibility for waste management defines, among other things, how EfW projects are developed, financed and executed, and how the plants are subsequently operated. In the execution phase especially, it is particularly important to be aware of the trade

agreements, the tax and remuneration systems, and the applicable laws in the individual countries and regions. An internationally active plant constructor must understand the various concepts with regard to the design, construction, financing and execution of socially relevant infrastructure projects – irrespective of whether the owner is a public entity or private company. A local partner supports the company with their knowledge of the characteristics of the market in question, and helps ensure that the available competencies and expertise are harnessed optimally.

2.2. Economic factors

Economic factors determine the affordability of the infrastructure for first-class and effective waste management, and include interest rates, inflation rates, and exchange rates. These parameters have a direct impact on the overall costs of an EfW project, as well as on local material procurement activities. While the international partner knows how to draw up business models, how to calculate the return on investment from the planned facility, and how to design a plant to maximize the returns, the local partner has important insights into regional pricing policies and helps in selecting local sourcing partners. Both functions play a major role in keeping costs low and thus making the project more profitable overall.

2.3. Social factors

If the social acceptance of an infrastructure project is paid too little heed, or none, this can cause the whole project to fail. These social factors must be taken into account already in the quotation phase, and handled and managed appropriately.

An international company that wants to establish a foothold in a new market must build up and maintain close relations with local companies and opinion leaders from the start to understand all of the social influences they could encounter with the future project. It is preferable in this case if the company can call on a local partner with the necessary resources to evaluate the impact of the project on the local environment and safety so that the project and technology can be adapted accordingly. Other implications for social co-existence such as the construction of the plant in the existing landscape or changes to the regional waste management industry must also be appreciated by all those involved, and all activities must be geared towards this as comprehensively as possible.

2.4. Technological factors

Although it can be assumed at first glance that responsibility for the technical aspects lies with the international partner, the local resources can also have a direct impact on project success. The level of development of other technical installations gives an indication of the standards and technological complexity the regional workforce has faced to date. These factors become relevant already in the early phases of construction, when it comes to designing the plant in such a way that it can be built safely and efficiently with the resources and machinery available locally, and using the standard building methods in the area in question. The plant should also be designed in such

a way that it can be maintained in future with the available workforce and expertise. The operation must also be set up to ensure that the plant can be run safely and professionally by trained staff on site. Gearing the design to address these factors requires close collaboration with the local partner and a mutual understanding of the necessary conditions and responsibilities.

2.5. Legal factors

Over the longer-term perspective, national and regional legislation have a significant influence on demand for EfW facilities. Long-term infrastructure projects are directly dependent on legal frameworks that govern financing, preserve investors' assets, and promote the development of new fixed assets. Such requirements also influence aspects such as the composition of waste and threshold levels for emissions, which must in turn be taken into account in the construction and design. Projects with international involvement therefore call for both sides to have well-founded knowledge of the legal environment. The international partner provides the expertise regarding the legal bases, codes of conduct and standards in the country of origin. Meanwhile, the local partner specifies the local norms, laws, and regulations that must be observed in constructing an EfW plant. Here, too, close collaboration, knowledge transfer and the reconciliation of both principles are essential for the success of the project.

2.6. Environmental factors

There is an extremely diverse array of environmental influences a project can be exposed to. Whether a region is affected by regular sandstorms or extreme heat, whether it is in an area of strong tectonic activity, or whether the warm and humid climate attracts pests are all factors that have an immense impact on the design and operation of an EfW plant. An international partner must be aware of these natural elements, and the planning, construction, and operation have to be adapted accordingly. A local partner with corresponding experience gained in other projects in the region is of essential importance in such instances. The ecological and geographic requirements not only vary from country to country, there can even be differences within a radius of just a few kilometers. A general contractor will therefore have no option other than to deal with the circumstances in detail, and to expand and diversify their plant construction capabilities appropriately.

3. Challenges in collaborations between local contractors and a global technology supplier

Experience with a wide range of projects worldwide has shown that joining forces with an international partner in implementing an infrastructure project such as an EfW plant is an attractive option for local contractors. Cooperation agreements also offer many advantages for the international contractor, particularly when an initial joint project gives rise to others. Such references are important for both sides, and both make their contribution to the success of the venture accordingly.

Figure 3: In Riverside (UK) waste is shipped via the River Thames

At first glance, an EfW facility does not appear to be greatly different from any other power plant. However, the devil is in the details, and time and again there are new challenges that have to be addressed. The Riverside project in the UK perfectly highlights the need to be meticulous from the outset. The plant was built near London on the banks of the River Thames, and has been in operation since 2011. Much of the waste is delivered by barge. This required the construction of a jetty – new ground for HZI.

Ferrybridge 1 is an example of how complex an EfW project can be for all involved. The plant has two lines and processes around 416,000 tonnes of waste a year. With net electrical energy efficiency of over 30 percent it ranks among the most efficient plants in the world. In its function as general contractor, HZI bore wide-ranging responsibility in this project for aspects including compliance with all technical, commercial and legal requirements, the entire engineering and design, delivery and checking of the production goods and their assembly, the organization of the building site and the coordination of its own staff as well as those of subcontractors. The project was based on a total of 19,700 technical drawings and plans as well as 1,450 HAZOP studies (hazard and operability studies). During the 36-month construction phase, up to 850 workers were on site every day. A total of 15,260 tonnes of steel was used in the construction, twice the amount used in the Eiffel Tower, and 140 km of power cables and a further 100 km signal cables were laid. Complexity on this scale has to be handled professionally, and simply dividing up the tasks between the international and local partners is not enough. Such a project not only calls for specialist expertise and considerable nous in terms of organization, it also requires excellent communications skills and painstakingly accurate coordination among all those involved.

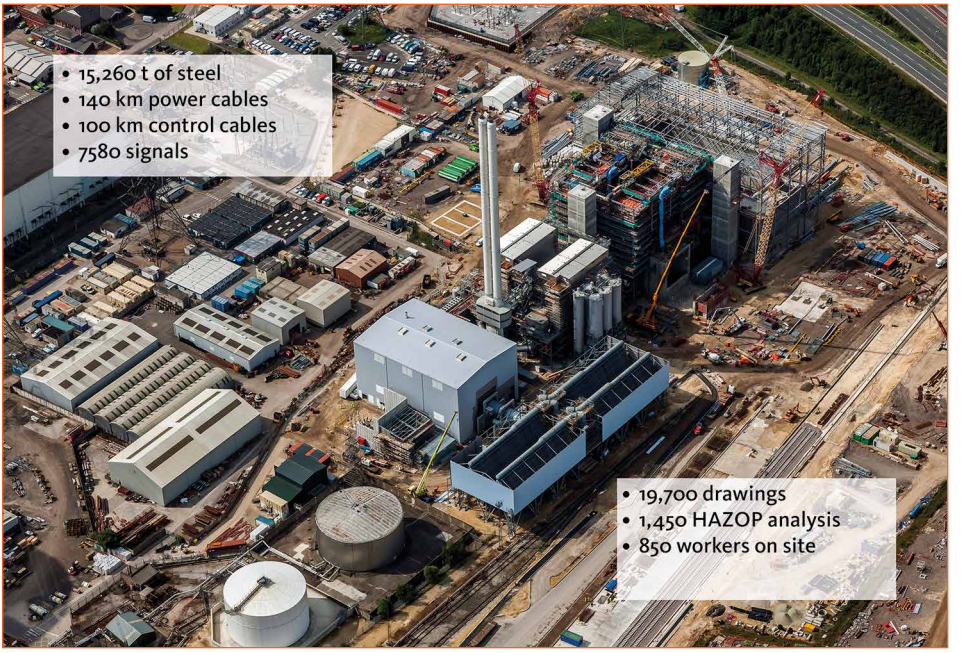

Figure 4: Ferrybridge Multifuel plant – a complex project under construction, 2013

4. Successful examples

In new markets in particular, an international company is heavily reliant on local connections. These are forged either by the company itself becoming local, for example setting up a branch, or by joining forces with local partners. Sharing knowledge in both directions plays a special role in this regard.

The projects Poznan in Poland, Jabalpur in India and the Istanbul project for IMM in Turkey are taken as examples for excellent collaboration between the international technology provider and local companies.

4.1. Poznan project in Poland

In the case of the Poznan project, SITA Zielona Energia, a joint venture between SUEZ Polska and Marguerite Fund, concluded a waste agreement with the City of Poznan for 25 years, with the company also taking on the operation and maintenance of the future plant. The EPC contract for the construction of the total plant was awarded to a consortium comprising Hitachi Zosen Inova and the German company Hochtief. From the outset, great importance was attached to close cooperation between the parties involved as well as the involvement of local resources. HZI managed the setting up of the project centrally from its head office in Zurich, thus ensuring that international know-how was available to all parties at all times. With regard to engineering in particular,

the project team was reliant on being able to call on industry-wide expertise in the areas of bottom ash treatment and the solidification of residue. Being able to use an international network of suppliers also made it possible to secure economic advantages in material procurement. The local economy benefited from this project in that the majority of the construction was carried out using mainly workers from the region. Furthermore, emphasis was placed in the planning on adapting the plant design in line with the local circumstances and regulations.

Figure 5: The EfW plant in the Polish city of Poznan was handed over to the client in 2017

The plant was handed over to the client in 2017, and processes more than 210,000 tonnes of waste a year, generating 31.5 MW of district heat and 15 MW of electricity which is supplied to several tens of thousands of households in the region.

4.2. Jablpur project in India

HZI's first EfW plant in India (in Jabalpur) is a good example of how such a cross-cultural project can be carried out successfully with the right planning.

HZI identified India as an emerging EfW market at an early stage, and decided to establish a local team in Hyderabad. The technical know-how for this was prepared at head office in Zurich. Working together with Indian colleagues who had specific knowledge of the local standards and requirements, LoCAL 580 was developed – a standardized plant concept that meets the needs of the Indian market. This concept was then transferred to Hyderabad, and adapted as far as possible to the local circumstances. HZI as the international partner trained and prepared its Indian partners in such a way that

the project could be largely designed and executed locally. With a few exceptions, the value chain is also served in India. Head office in Zurich now has merely a supporting advisory role in respect of specific technical issues.

Figure 6: The plant in Jabalpur (India) involved mainly the local workforce and equipment

4.3. Istanbul Project in Turkey

HZI has now been named as the preferred bidder by IMM, the Istanbul Metropolitan Municipality for the construction of the first major operational EfW plant in Istanbul. To enable it to act as pragmatically and effectively as possible in this new market, the Swiss tech firm has teamed up with the Turkish building contractor Makyol as its local partner. The aim was to learn from each other and to benefit from each other's specialist knowledge, thereby ensuring that the best possible and most efficient solution could be found for this specific project. The setting-up of a special purpose vehicle (SPV) locally, working in close collaboration with head office in Zurich and certain European partners, will also ensure that the Turkish economy benefits directly from this project.

HZI is also working based on the same principles for further upcoming projects in Eastern Europe and Central America, with a view to properly addressing the specific demands of the markets in question.

Think globally, act locally – this credo holds the key for expanding the footprint of EfW technology worldwide. Achieving this will require international contractors to openly cooperate with local companies and learn how to deliver complex projects together.

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