

## INGSA CASE STUDIES

***OSTAL:  
WASTE, LAND USE AND TECHNOLOGICAL DEVELOPMENT  
A SUFFICIENCY OF EVIDENCE CASE***

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# OSTAL

## WASTE, LAND USE AND TECHNOLOGICAL DEVELOPMENT A SUFFICIENCY OF EVIDENCE CASE

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Ostal is a large, developing country that after decades of civil war, instability, natural catastrophes and famine has now enjoyed a decade and half of peace, which in turn has fostered economic development and establishment of political institutions. Ostal's population is growing at 2.6% per annum and much of the population growth is located in the cities: the federal capital Magali that has nearly 4 million citizens but also provincial centres. Yet urban planning including residential building, utilities and infrastructure have not kept up with the rapid growth and economic development. Only half of the trash produced by the residents of Magali is collected while the rest accumulates in ditches, clogging the drainage and creating breeding pools for malaria mosquitoes. Waste collected in canals, streams and rivers is washed out to the sea and accumulates on beaches; piles of trash on street corners attract rodents. The waste that is collected is either incinerated out in the open (creating dangerous toxic fumes) or sent to landfills that are not well managed. In particular the major site once on the outskirts of Magali has now, through urban expansion, found itself surrounded by human settlement. Although official health statistics is lacking, there are reports of significant health effects suffered by people living in slums around Magali's largest dump site – proclaimed 'filled to capacity' in 2002 but still operating - who live from scavenging and selling useable waste to recyclers.

You are the Minister of Energy and Environment in the recently (democratically) elected government. You are determined to not only implement practical solutions that will tackle the problem of waste disposal, but also establish Ostal as the regional leader in environmental stewardship: from waste disposal to policies that will reverse the trend of the growth of greenhouse gases. Indeed Ostal was the leader in banning some of the forms of plastic materials and you are currently chairing the regional environmental association, ActionEnvironment. At the same time, the growing population and industry need much more energy than what is currently produced. The country largely relies on a few hydroelectric plants but the energy produced is both unreliable and insufficient. Solar panels have started to appear and there are some proposals to use geothermal energy but the lack of means to store solar power and the cost of using geothermal sources mean that these sources are used only in a limited fashion and cannot provide secure energy supply required in particular by industry and infrastructure.

## SCENARIO



### EVENT 1 – DAY 1

A young scientist & entrepreneur of Ostali heritage, with a PhD in Chemical Engineering from a leading German university, has approached you with a proposal to build an industrial plant that would turn the heat generated by burning the waste into electrical energy. He has a partnership with a major international company who have experience in building similar types of plants. They promise that the plant will produce 25% of electrical energy currently used in the country – provided that all the waste generated in Magali is directed to the new “waste-to-energy” plant. Waste incinerators using the heat generated either directly as heat or for electric energy have of course been used for a long time: in developed countries many are phased out because of the production of toxic gases (e.g. dioxins) and fine particles that have negative consequences for health, and also because waste is on average low in energy and hence inefficient fuel.

You have been assured that the new technology (developed during his postdoc years in Germany and Sweden) that will be implemented in the plant is able to capture 99% of toxic gases and turn them into inert materials. They accept that the waste is not as energy dense as fossil fuels however it is abundant, readily available and free.

### Questions for Discussion

- **What is the problem you are trying to solve?**
- **What information is going to be required to make any of these decisions?**
- **How will you get this information?**



## EVENT 2 – TWO MONTHS LATER

There has been considerable interest in the proposal among other members of the Cabinet. The entrepreneur and his international partner have come back with a fully costed plan. While they are providing technical know-how and support, there is considerable investment required on the part of Ostali government. Treasury has pointed out that there is no money in the budget. However the Minister of Development, Transport and Infrastructure suggested that there are funds budgeted for the development of new electrical energy sources: solar and geothermal, possibly also wind. They could be redirected towards the waste-to-energy plant.

This seems like a good idea although you argue that the exploration of other energy sources should not be dropped altogether but rather just postponed.

In the meantime the news about the proposed plan have found their way into the media. There is much excitement about the “local bright boy” finding a clean solution for Magali waste problems while providing Ostal with a stable source of electric energy. Everyone is in favour of the project: wealthier citizens of inner suburbs, who are excited about a solution to the trash, and those much poorer who live in the proximity of the landfill site and who have suffered the ill health effects. The only ones worried about it are those who make a living out of collecting and recycling trash. However the new plant promises to open new jobs and also there will be jobs managing the flow of waste into the so the net effect on employment should be acceptable.

### Questions for Discussion

- **What is the problem you are trying to solve?**
- **What information is going to be required to make any of these decisions?**
- **How will you get this information?**



## EVENT 3 – SIX MONTHS LATER

A contract with the consortium has been signed and preparatory work has begun. Although initially it was expected that the plant would be built on the old landfill, an engineering assessment has shown the site to be too unstable and the plant had to be moved elsewhere. The landfill site remains in its current form, requiring remediation, and the government had to spend further funds on the purchase of a suitable site: it is situated closer to residential developments but you are assured that that's not going to be a problem. Furthermore, although the consortium has initially promised to employ local workforce, detailed plans have shown that there are not enough trained workers so the international company has decided to recruit them overseas and bring them into the country just for the building stage.

While the construction is going on, you are travelling to a meeting of the ActionEnvironment (in a neighbouring country). You are asked many questions about the plant but the reception is cool. Other participants of the meeting see this as a step back in the environmental commitment. They see the plant as undermining sustainable, zero waste practices. The citizens of Ostal were producing relatively low (by international standards) amounts of waste: this plant seems to encourage them to produce more. And not only that, the plant diverts from practices of waste, reuse & recycle, entrenched in Ostali culture. Much of the waste, they point out, is organic and it would be much cheaper and more sustainable to build a municipal composting system. "There are many ways in which energy and waste are linked" said the representative of a neighbouring country, "but building an incinerator to produce electric energy is not a good way to think about it."

### Questions for Discussion

- **What is the problem you are trying to solve?**
- **What information is going to be required to make any of these decisions?**
- **How will you get this information?**



## EVENT 4 = TWO YEARS LATER

The plant was completed on schedule and it is in operation. There are some problems, though. For one thing, the plant requires specialized workforce and while the consortium promised to train up and employ local staff but that has happened only to a lesser extent. Most of the workers, especially engineers, are from overseas, though this is supposed to be just a temporary measure until the plant, in collaboration with Magali polytechnics, educate the workforce. Furthermore, full operation of the plant requires a steady delivery of waste. However the municipal collection system is not well set up for it. Trucks are not well maintained and often break down, collection dates and times change, people do not bring their waste to collection sites when requested. Some indeed take the waste to the old landfill, which remains an open dumpsite and a health hazard. The market in waste scavenging and recycling continues to operate. To make sure the plant can operate at full capacity and produce electricity as promised, the international partner has proposed to the government of Ostal to start importing soft plastic waste from overseas. The government could thus earn some cash while also ensuring a steady stream of fuel reaching the plant. This proposal has received mixed reception. Some people agree with this “sensible” proposal, which allows the plant to fulfil the promise of producing 25% of electric energy needed. Others are offended by the idea of Ostal becoming a “dumpsite of the developed world.”

Regarding the ability of technology to capture pollutants, it is working though not nearly at 99% (gases such as dioxins and furans are captured, but ultrafine particles, flue ash, not nearly as well). There is definitely an increase in air pollution around the plant and residents are occasionally complaining of the feeling of “burning” in their throats. Some are worried that, if this is happening now, when the plant is operating only intermittently, what sort of air will they be breathing in when the plant is operating at 100%.

### Questions for Discussion

- **What is the problem you are trying to solve?**
- **What information is going to be required to make any of these decisions?**
- **How will you get this information?**

## Notes for the mentor and for case expansion (not for distribution)

Consider the scenario from the perspective of various stakeholders:

- Government of Ostal
- Magali city council
- Magali health authorities
- International waste processing company – partner in the Magali plant
- Developing countries (looking to export their own waste)
- Environmental organizations
- People living in the proximity of the landfill
- People living in the proximity of the plant

Some considerations might include:

- Formulation of problem
- How to distinguish between two problems that are related, but may or may not be solved simultaneously?
- Planning for future, forecasting
- Handling unexpected situations
- Counting in the “human factor”



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