Implementation of separate collection of biowaste

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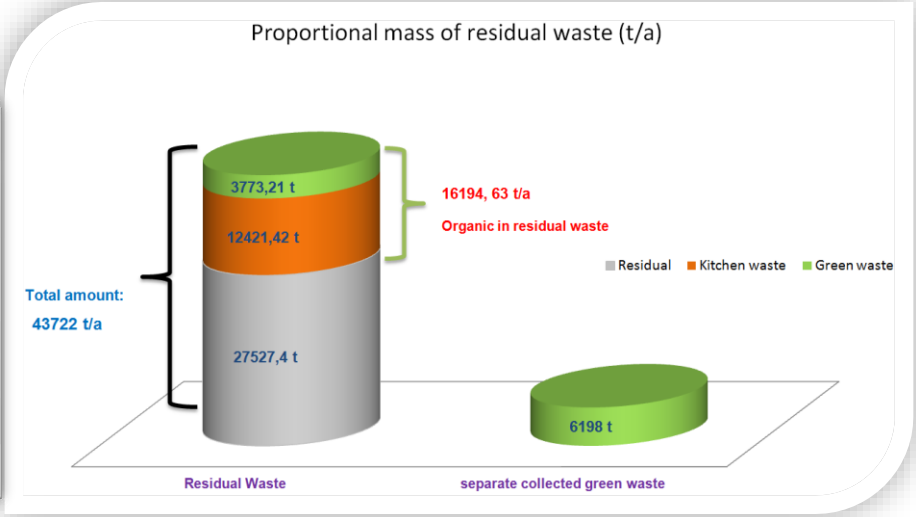
Starting point

- No area-wide separate collection of biowaste in Hagen
- Mostly thermal recovery
- Additional costs for the implementation
- Waste incineration plant in Hagen needs enough materials (residual waste) for its operation
- Low demand and price for composts
- Use of more garbage trucks will cause more CO2 emissions (for collecting biowaste!)
- Long transport routes to composting / fermentation plants



Institutional Setting

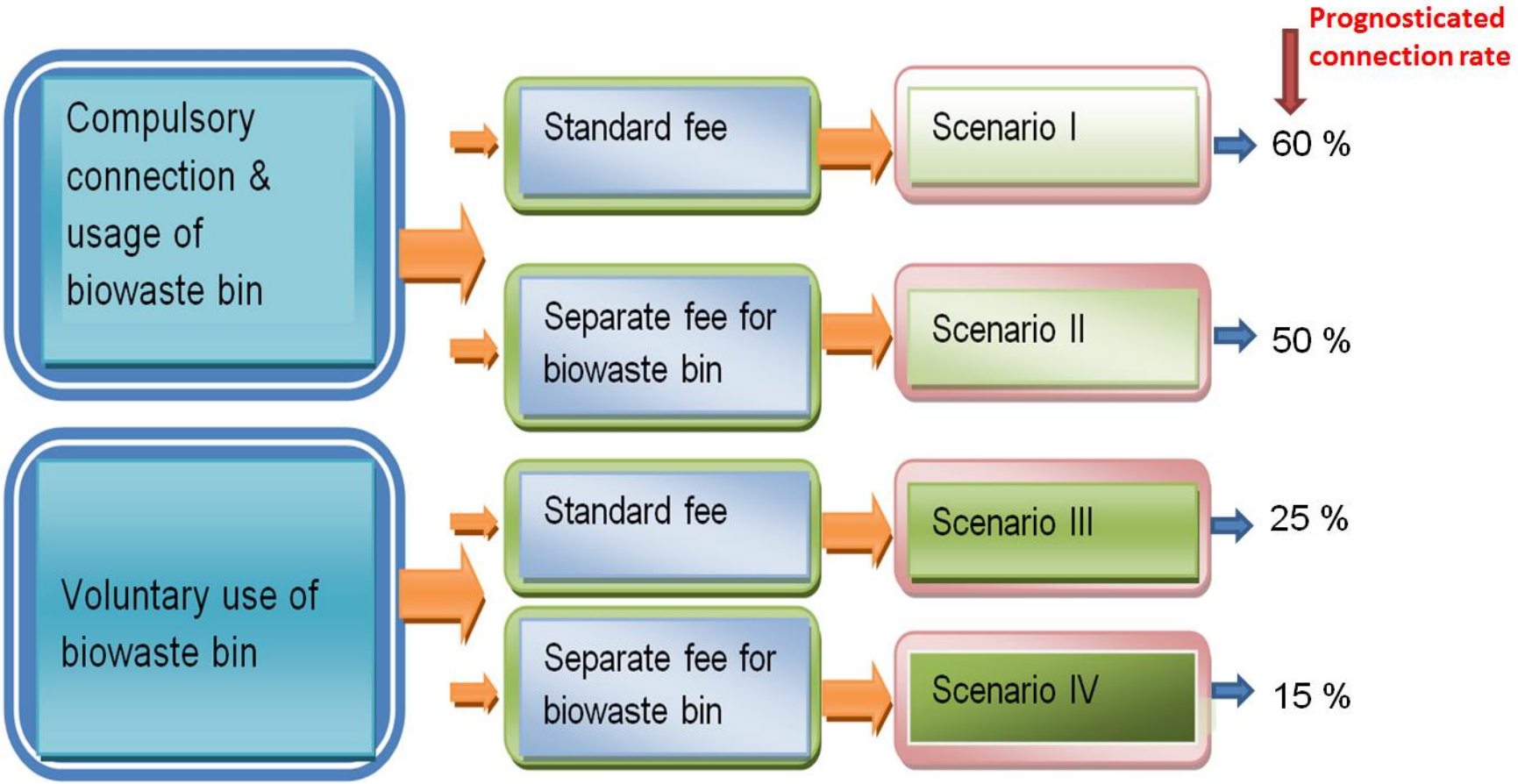
- Since Januar 2015 the separate collection of biowaste is mandatory in Germany.
- Separate collection of biowaste will be an essential element for the future:
  - Germany plans to phase out coal power plants by 2038 and has already focused on renewable energy sources like biomass
  - The continuos increasing price for carbon is one of the thought break.

- Biowaste constitutes about 30 % to 40 % of municipal waste in Germany. In Hagen arround 38 %!

- Other important reasons:
  - Reducing the residual waste
  - Generating renewable energy (biogas) OR composting
  - Decreasing greenhouse gas emissions

Approach

An overview of all four considered scenarios



- These scenarios were developed for an easy decision-making process

Outputs

- The developed scenarios were helpful for the calculation
- The same approach was used for the implementation of the recyclable materials bin (e.g. plastic, packaging) in the past
- One ward of the city was chosen for the test run (by name: Boele)
- High collection rate (biowaste) in comparison to the past
- Fulfill the requirement of the German waste legislation („KrWG“ = circular economy law)
- Recycling instead of energy (thermal) recovery
- Products: biogas & compost (circular economy!)
- Reduction of CO2 emissions

Scenarios	Residual waste (Mg/a)	Biowaste (Mg/a)	percentage change [%]
Current status	43722	0	0
Scenario I	39355	6788	- 10.0
Scenario II	40082	5668	- 8.3
Scenario III	41291	3913	- 5.6
Scenario IV	42398	2152	- 3.0

Scenarios	Total additional costs	Increase of fees for a liter residual waste (RW) & biowaste (BW)
	€uro / p.a.	%
Scenario I	€ 1.65 million	27.77 %
Scenario II	€ 1.4 million	12.8 % (RW) + 2.11 €/liter (BW)
Scenario III	€ 1.0 million	16.06 %
Scenario IV	€ 0.5 million	7.5 % (RW) + 1.82 €/liter (BW)

Lessons

- The regional & local considerations (Pro vs. Contra) are inevitable despite legal requirements
- Additional expenses are unavoidable
- After a successful run it will be expanded. For the present on a voluntary basis & other criteria (e.g. free space for bins, standard fee) will be also considered.
- The majority of the people refuse extra fees for a separate biowaste bin (on-site survey)
- Reduction of expenses (e.g. employees, vehicles) : change the collection interval (The previous weekly collection of residual waste was changed to twice weekly basis. So one week for biowaste collection and next week for residual waste!)

Transfer

- Necessary preconditions:

- good infrastructure (logistics)
- manpower
- availability of recycling paths within spitting distance
- Technical capabilities
- Financial resources / financing plan

- First steps:

- Scenario planning
- Cost calculation for each scenario
- Public-opinion poll
- Public awareness campaigns