



60 Years of Waste Incineration in Vienna – How Waste Management contributes to the Energy Autarchy of the Austrian Capital

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Clarion Congress Hotel, Prague, CZ



Environmental Management and Engineering

Helga Stoiber



Contents

- **Who We Are**
- **Waste Incineration in Austria - Overview**
- **Waste-to-Energy in Vienna**
- **Current Development in Austria**



We are a **leading Austrian consulting and engineering company** in the field of waste management, with offices in Vienna, Linz, and Carinthia.

Since the 1990s, we have made the development and analysis of **sustainable waste management options** our responsibility.

Our company provides consulting and engineering services for waste treatment, recycling and recovery, **waste-to-energy** and **biomass-to-energy**, energy efficiency, air pollution abatement, monitoring and **remediation of landfills and contaminated industrial sites** etc.



UVP WtE Reference Projects – Examples (1)

Concept, Feasibility Study, Basic Engineering, EIA Permitting:



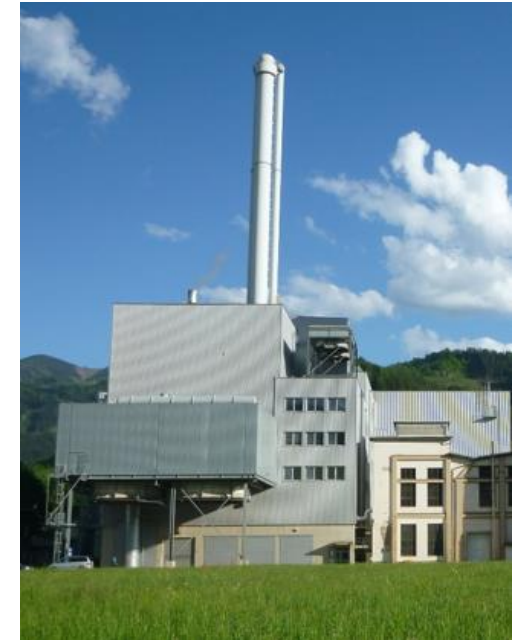
**RVL Lenzing 1K8
(1998)**

110 MW
300,000 t/a



**EVN Dürnrrohr 1+2
(2003)**

2 x 60 MW
360,000 t/a



**ENAGES Niklasdorf
(2003)**

40 MW
145,000 t/a



UVP WtE Reference Projects – Examples (2)

**Concept, Feasibility Study,
Basic Engineering and EIA Permitting:**



**RHKW Linz
(2012)**

76 MW
275,000 t/a



**Norske Skog K9
(2022)**

49 MW
250,000 t/a

**General Planners in
Construction Phase:**

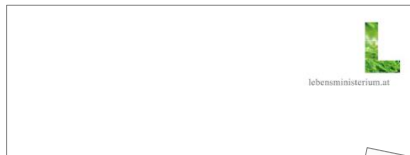


**SKN Nettingsdorf
Black Liquor Boiler
(2020)**

185 t/h HP steam



UVP's White Books on Waste-to-Energy



Thermische Abfallbehandlung in Österreich

Weißbuch - Zahlen, Daten, Fakten - 2. Auflage



MINISTERIUM
FÜR DAS
LEBENSWESE
ÖSTERREICH

Industrie

WASTE - TO - ENERGY
IN AUSTRIA
WHITEBOOK
FIGURES, DATA, FACTS



BIELA KNIHA
ENERGETICKÉHO ZHODNOCOVANIA ODPADOV
V SLOVENSKEJ REPUBLIKE

ÚDAJE, ČÍSLA, FAKTY



Bratislava, 2020

**BIELA KNIHA ENERGETICKÉHO
ZHODNOCOVANIA ODPADOV V
SLOVENSKEJ REPUBLIKE
ÚDAJE, ČÍSLA, FAKTY**

AUSTRIA (1999, 2009, 2015)

https://www.bmk.gv.at/themen/klima_umwelt/abfall/Kreislaufwirtschaft/verwertung/studien/weissbuch.html

SLOVAKIA (2020)

<https://www.ewia.sk/wp-content/uploads/2021/03/biela-kniha.pdf>

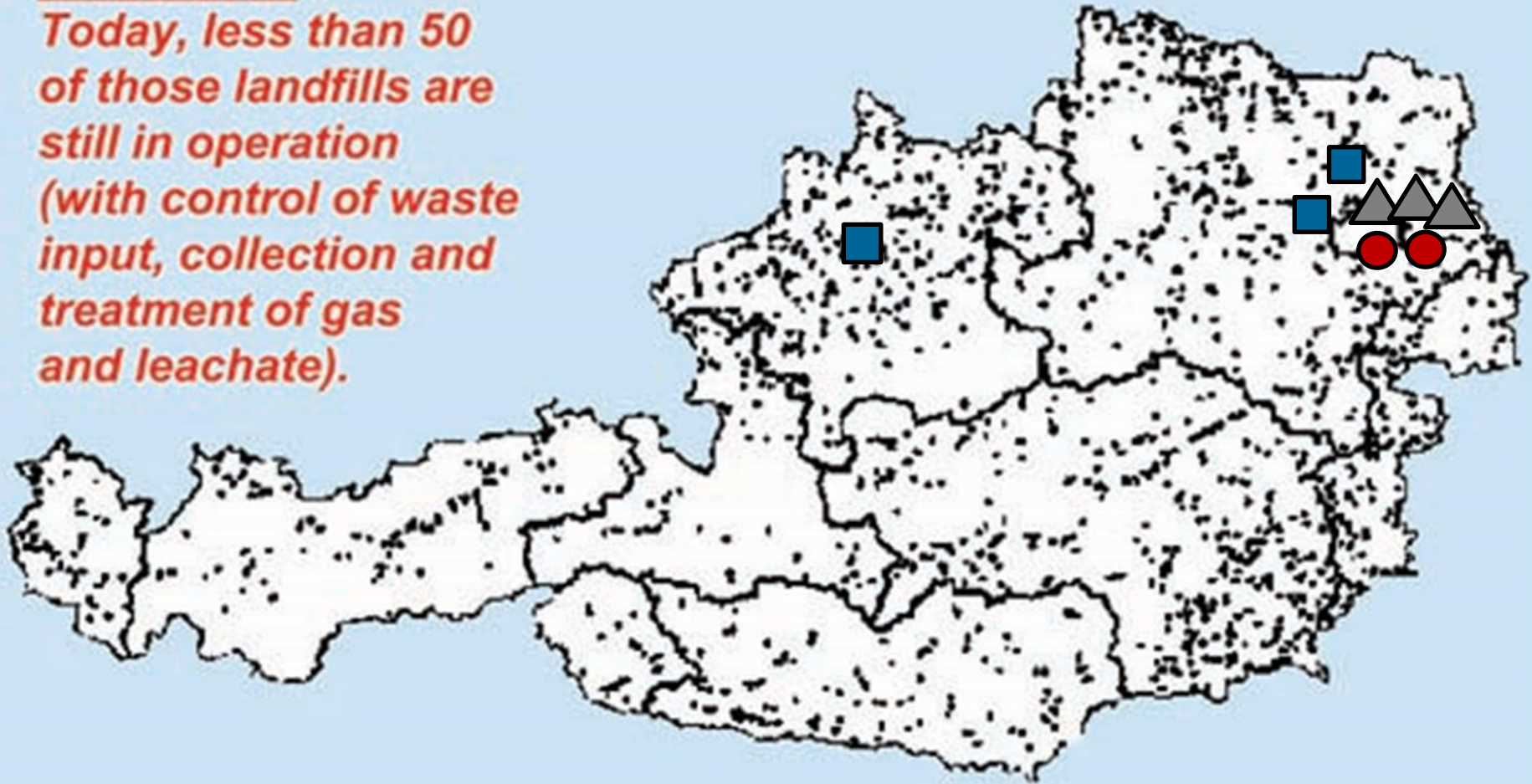


Landfill & WtE in Austria - 1984

1.800 registered Landfill Sites + illegal Deposition

Please note:

Today, less than 50 of those landfills are still in operation (with control of waste input, collection and treatment of gas and leachate).

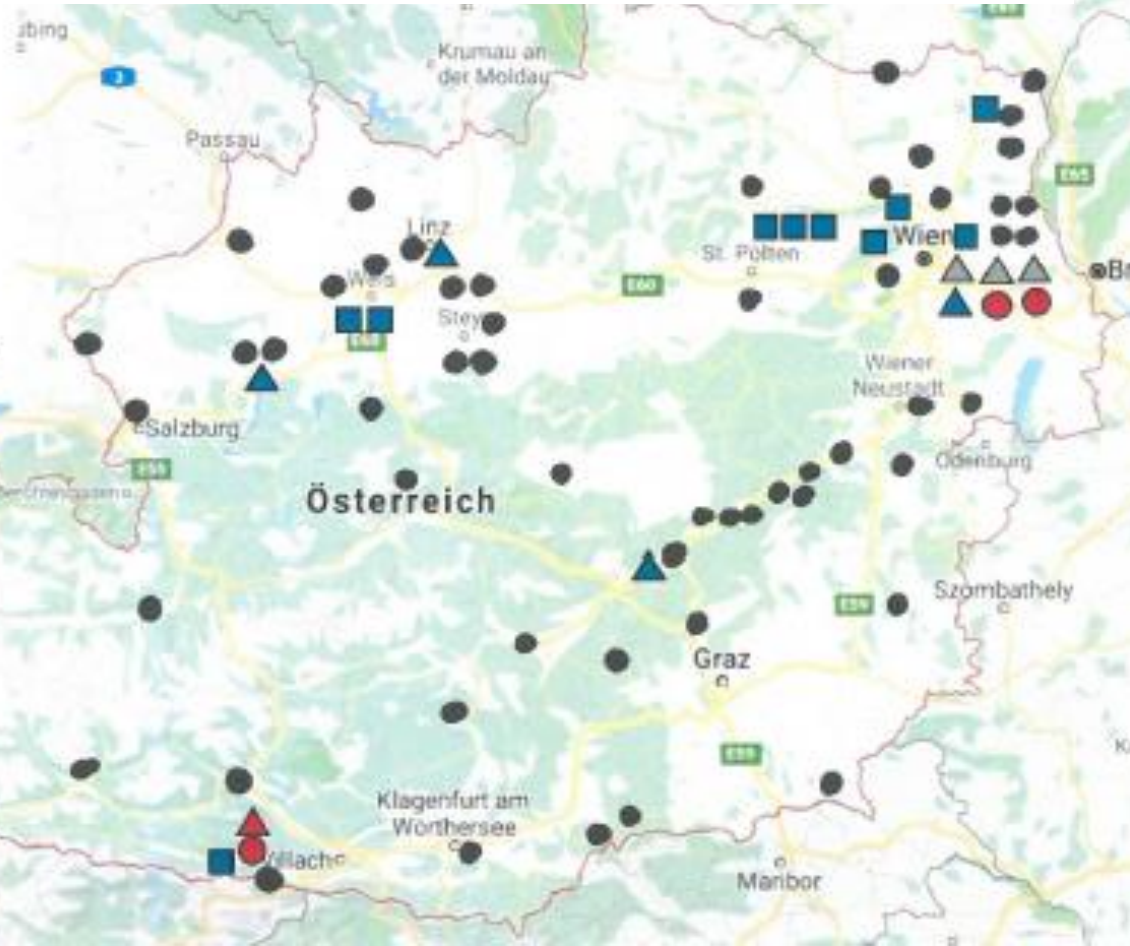




Landfill & WtE in Austria - 2015 (~2023)

62 Landfill Sites for „Residual Waste“ and „Mass Waste“ with control of incoming waste, landfill gas collection and energy production, leachate treatment

- Rostfeuerung
- △ Wirbelschichtfeuerung
- Drehrohrofen
- Siedlungsabfälle
- Gefährliche Abfälle
- Klärschlamm, mechanisch entwässert



Anlagen im Scope des BREF Waste Incineration.



(Quelle: H. Stoiber, UVP GmbH)



Austrian MSWI Plants - 2015 (~2023)

Tabelle 52: Thermische Behandlungsanlagen für Siedlungsabfälle

Thermische Abfallbehandlungsanlage	Feuerung/Abfalleinsatz	Kapazität [t/a]
Müllverbrennungsanlage Wien Spittelau	Rost (gemischter Siedlungsabfall)	250.000
Müllverbrennungsanlage Wien Flötzersteig	Rost (gemischter Siedlungsabfall)	200.000
Müllverbrennungsanlage Wien Pfaffenuau	Rost (gemischter Siedlungsabfall)	250.000
Müllverbrennungsanlage Wels	Rost (gemischter Siedlungsabfall)	305.000
Müllverbrennungsanlage Dürnrohr	Rost (gemischter Siedlungsabfall)	525.000
Müllverbrennungsanlage KRV Arnoldstein	Rost (gemischter Siedlungsabfall)	96.000
Müllverbrennungsanlage Zistersdorf	Rost (gemischter Siedlungsabfall)	130.000
Wirbelschichtofen 4 Wien Simmeringer Haide	Wirbelschicht (Rückstände aus der mechanischen Abfallaufbereitung, Klärschlamm)	110.000
Reststoffverwertung Lenzing	Wirbelschicht (Rückstände aus der mechanischen Abfallaufbereitung, Rückstände aus der Altpapieraufbereitung, Klärschlamm)	300.000
RHKW Linz	Wirbelschicht (Rückstände aus der mechanischen Abfallaufbereitung, Klärschlamm)	255.000
ENAGES Niklasdorf	Wirbelschicht (Rückstände aus der mechanischen Abfallaufbereitung, Klärschlamm)	131.000
Gesamt (gerundet)		2,6 Mio.
<i>Datengrundlage: EDM (Datenstand Juli 2016)</i>		

(Data for 2015)

(Quelle: Bundesabfallwirtschaftsplan 2017, Teil 1 - <https://www.bmnt.gv.at/...>)



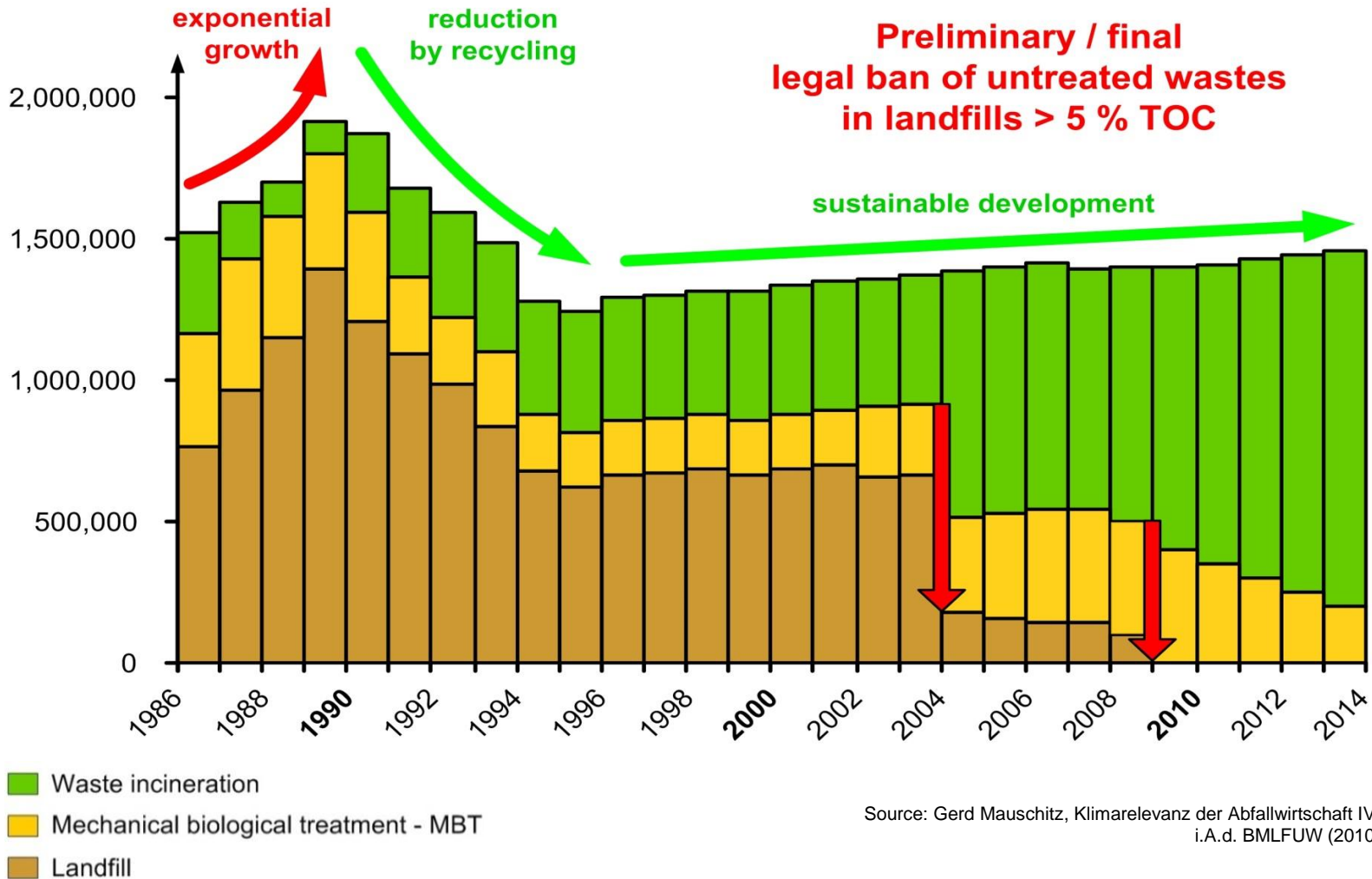
Diverting Waste from Landfill in Austria (1)

- **Hazardous and Special Waste Management Act, 1983**, (first guideline on sanitary landfills for solid waste disposal in **1977** by the Environmental Ministry)
- **Federal legislation on the Environmental Protection Fund, 1983**
- **Guidelines for Waste Management in Austria 1988**
- Federal legislation on clean-up of landfills and contaminated sites, **1990** (including a **disposal tax on landfill operations** for clean-up activities)
- Decree on separate collection of **Bio-Wastes**, 1991
- Decree on separation of **Construction and Demolition** waste, 1991
- **Ban on disposal of hazardous wastes in landfills** by July **2001** (except of inorganic wastes encapsulated in closed salt formations)
- Decree on landfills including the **ban on disposal of wastes exceeding 5 % TOC (Total Organic Carbon) for new landfills by the beginning of 1997** and limitation for **existing landfills** until beginning of **2004** (limited exemptions until end of **2008**, and limited exemptions for stabilized residues from MBT)



Diverting Waste from Landfill in Austria (2)

Residual Municipal Solid Waste collected in Austria
Figures in tons per year



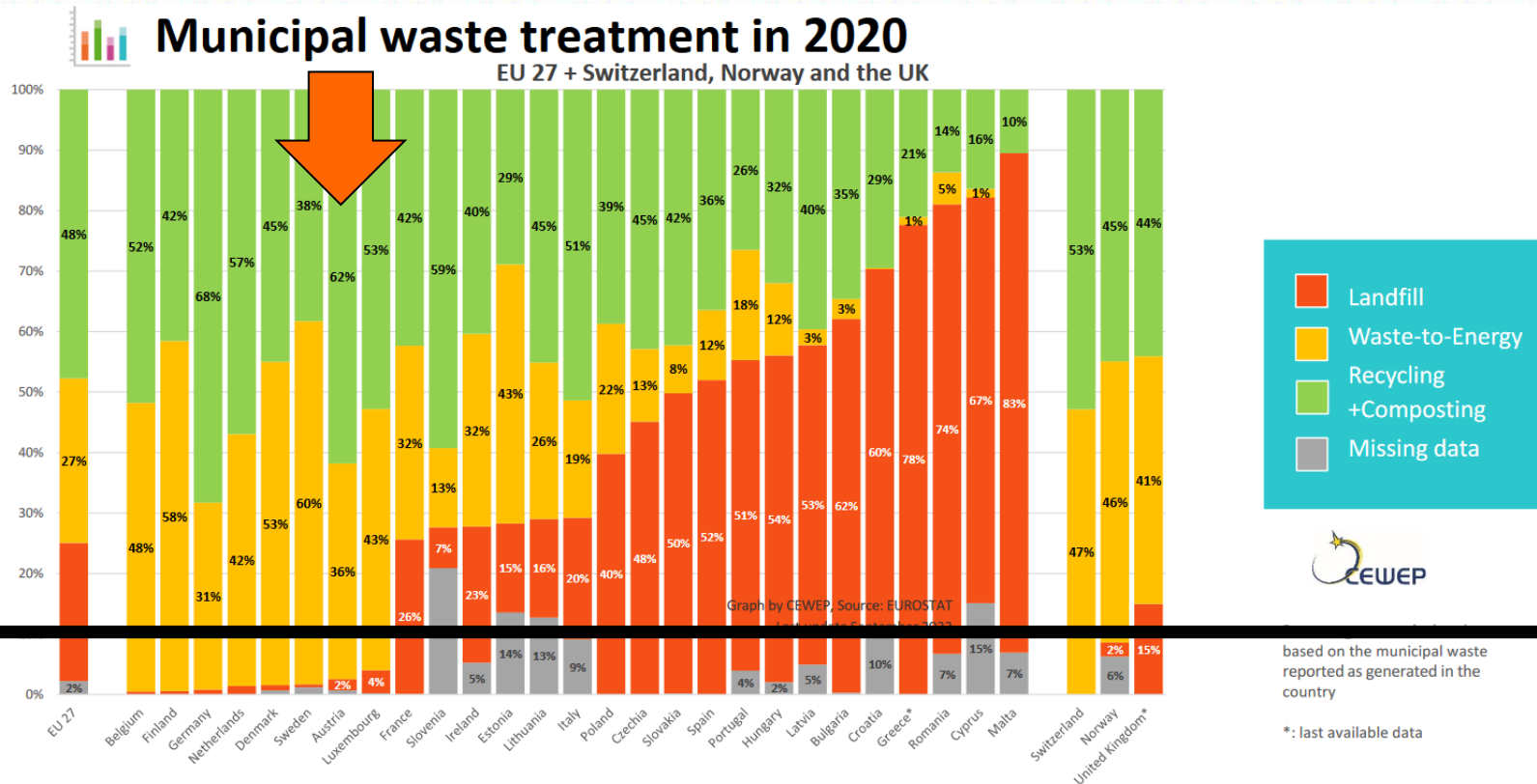
Source: Gerd Mauschitz, Klimarelevanz der Abfallwirtschaft IV, i.A.d. BMLFUW (2010)



Municipal Waste Treatment in Austria (2020)

EU Landfill Directive 1999/31/EC, as amended by Directive (EU) 2018/850:

Member States must reduce the amount of municipal waste sent to landfill to 10% or less of the total amount of municipal waste generated by 2035.



based on the municipal waste reported as generated in the country



Vienna's Waste Incinerators (1)





Vienna's Waste Incinerators (2)

MSWI Flötzersteig

- 1963 + adaptations
- Grate, 3 Lines
- 200,000 t/a
- MSW
- Wien Energie

MSWI Spittelau

- 1971 + adaptations
- Grate, 2 Lines
- 250,000 t/a
- MSW
- Wien Energie

MSWI Pfaffenau

- 2008
- Grate, 2 Lines
- 250,000 t/a
- MSW
- WKU,
operated by Wien Energie



Vienna's Waste Incinerators (3)

Simmeringer Haide

- Wien Energie

Consisting of:

WSO1-3

- 3 BFB incinerators
- 1980 and 1992
- 65,000 t/a (total)
- Dewatered sewage sludge
- Recently adapted to new operating conditions at EbS sewage plant

DRO1-2

- 2 rotary kilns
- 1980
- 100,000 t/a (total)
- Hazardous waste

WSO4

- 1 BFB incinerator
- 2006
- 110,000 t/a (total)
- Mechanically pre-treated (municipal) waste, dewatered sewage sludge



Vienna's Waste Incinerators – Energy Production

Data for 2020

	Flötzersteig	Spittelau	Simmeringer Haide & Pfaffenu
Waste Input	200,000 tons	270,000 tons	360,000 tons
District Heating	51 MW (55,000 HH)	58 MW (69,000 HH)	75 MW (52,000 HH)
District Cooling	-	17 MW (4,860 AC)	-
Electricity	-	14 MW (22,000 HH)	9 MW

HH ... Households

AC ... Air condition device

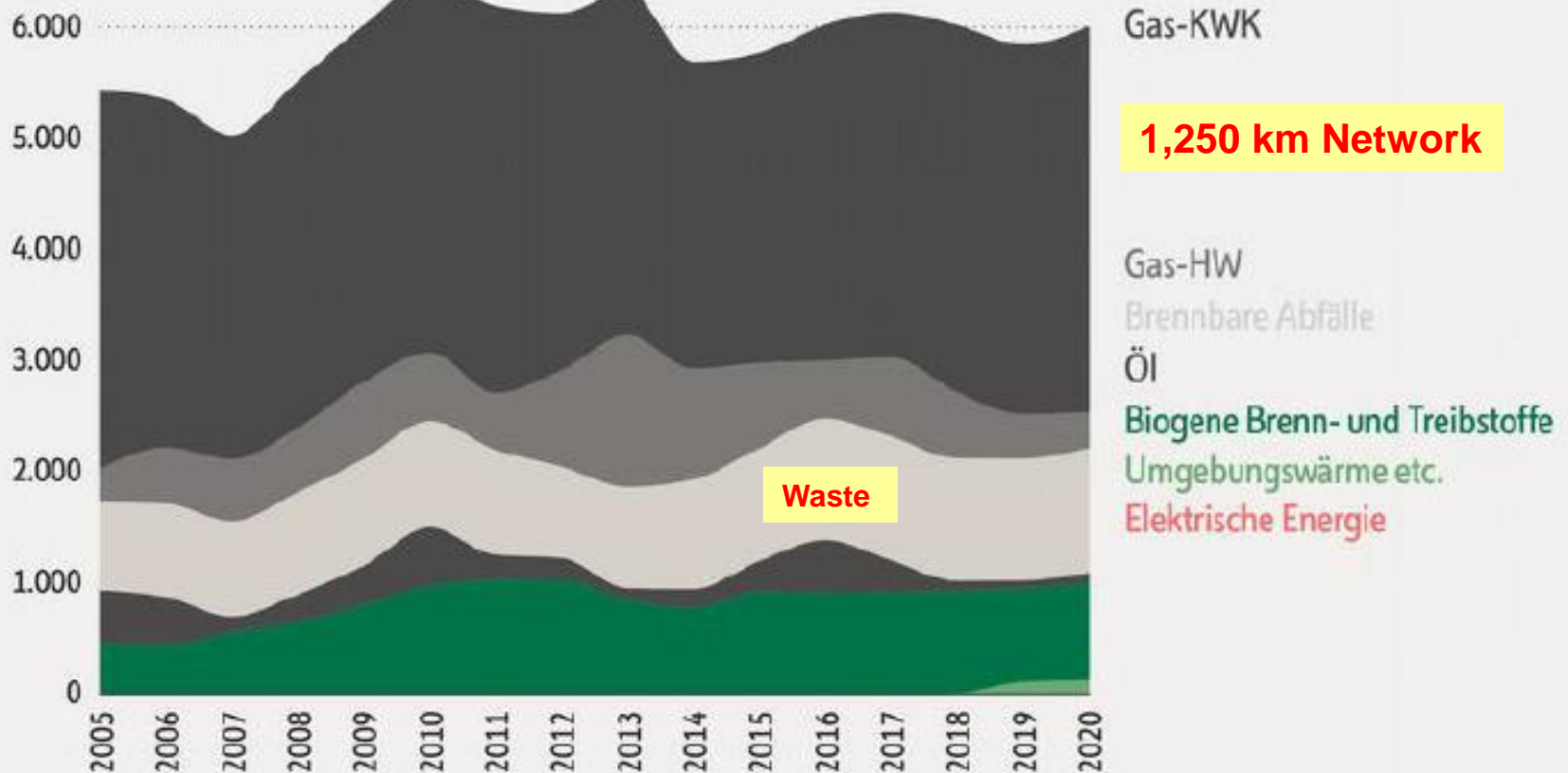
Source: Wien Energie Umwelterklärung (2022)



District Heating

Fernwärmeerzeugung nach Energieträgern [GWh / a]

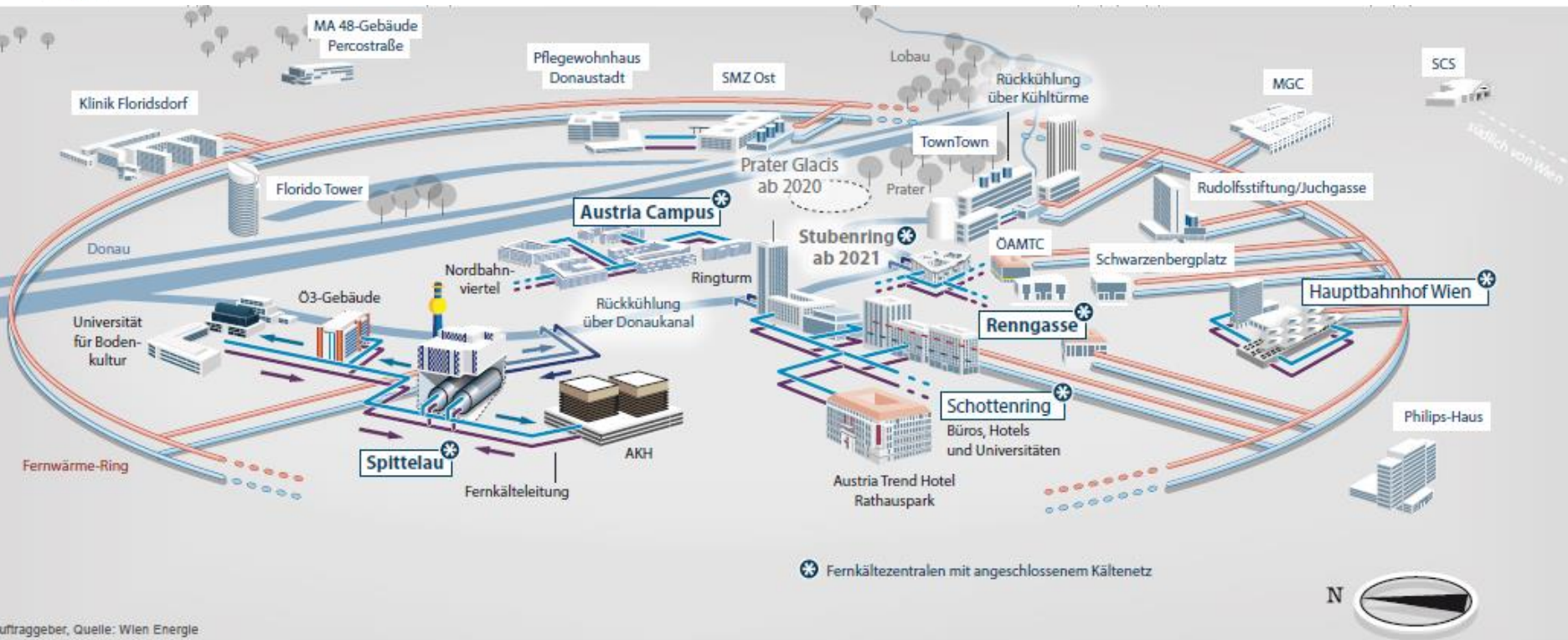
2020:
6,010 GWh/a Total District Heating Production,
of which 1,122 GWh/a (18.7%) from combustible waste



Source: Energy Report of the Municipality of Vienna 2020,
<https://www.wien.gv.at/spezial/energiebericht/>



District Cooling



Auftraggeber, Quelle: Wien Energie

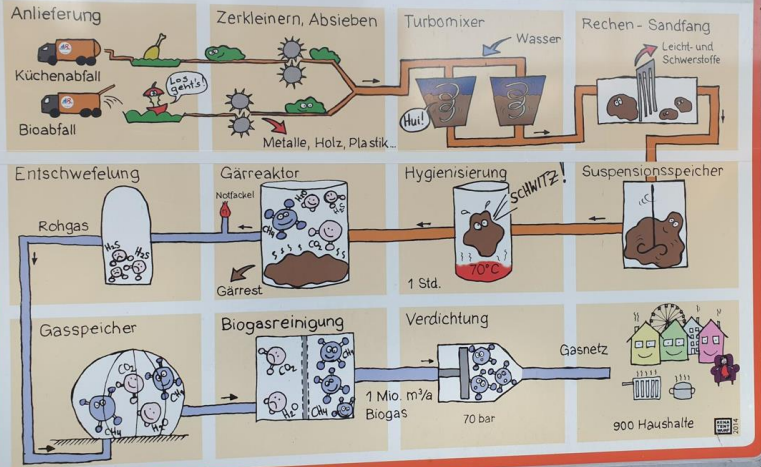
- Since 2007
- Technology: Absorption Refrigerators
- Big Cooling Centers, e.g. at MSWI Spittelau → Cooling networks (6° C / 16° C)
- Decentralized Cooling Installations in big buildings without connection to cooling network → operated with district heating

Source: Wien Energie, Umweltbericht 2021 (2022)



Biogas

Die 18^{ER} Biogasanlage



(c) UVP GmbH



(c) UVP GmbH

Biogas Production

- Since 2007
- Wet pre-treatment
- Anaerobic Digestion
- Input: 22,000 t/a of kitchen waste
- Output: **1.7 Mio Nm³/a biogas**
- 55-70% CH₄

Biogas Treatment Plant

- Since 2015
- Membrane technology
- Output: **1 Mio Nm³/a biomethane**
- 99% CH₄
- Fed into Vienna's gas net
- Gas supply for 900 households
- **CO₂ reduction: 3,000 t/a**



Current Development (1)

AT Waste Act § 15 (9): Mandatory railway transport of >10 tons of waste

1. 300 km in Austria from 01.01.2023 onwards,
2. 200 km in Austria from 01.01.2024 onwards,
3. 100 km in Austria from 01.01.2026 onwards.

Revision of AT Waste Incineration Ordinance, 2022 Draft:

Decision still pending.

Adaptation to BREF WI.

“Regulations of Concern” are:

1) Mandatory phosphorus recovery for sewage treatment plants >20,000 inhabitant equivalents, from 01.01.2030 (TBD: 2033?) onwards:

- 60% P recovery at sewage treatment plant OR
- 80% P recovery from sewage sludge incineration residues OR
- P use in fertilizer production according to Fertilizer Law OR
- P use as additive in compost according to Compost Ordinance.

2) **ELV for NH₃ from waste incinerators:** Daily average (DA) and Half-hourly average (HHA) of 5 mg/Nm³ → SCR required also for small installations.



Current Development (2)

General observation:

Massive changes on the waste market are expected or are already taking place, triggered by **the current energy situation**.

Industries producing and in possession of combustible waste want to decarbonize their energy production by incinerating their waste.

General observation:

Austrian sewage sludge treatment and phosphorus recycling market is currently organizing itself. Single projects are being developed and prepared for permitting.

Vienna:

EbS sewage treatment plant has started to produce biogas via anaerobic digestion of sewage sludge → LHV has significantly decreased.

Wien Energie to adapt Simmeringer Haide WSO1-3 + free capacities available.

Graz:

Project for 37 GWh/a district heating from SS incineration and heat recovery from sewage treatment plant is currently under development.



Thank you for your Attention!



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