

CEWEP Waste-to-Energy Congress on »Energy and Resource Efficiency«

Technical Visit to the Würzburg Waste-to-Energy Plant (10:00 –12:00)



The Waste-to-Energy Plant

Das Müllheizkraftwerk Würzburg

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The WVV Group

• Energy

- electricity
- gas
- district heating
- drinking water

• Traffic

- trams and buses
- car parks and parking areas
- harbours

• Environment

- recycling
- composting

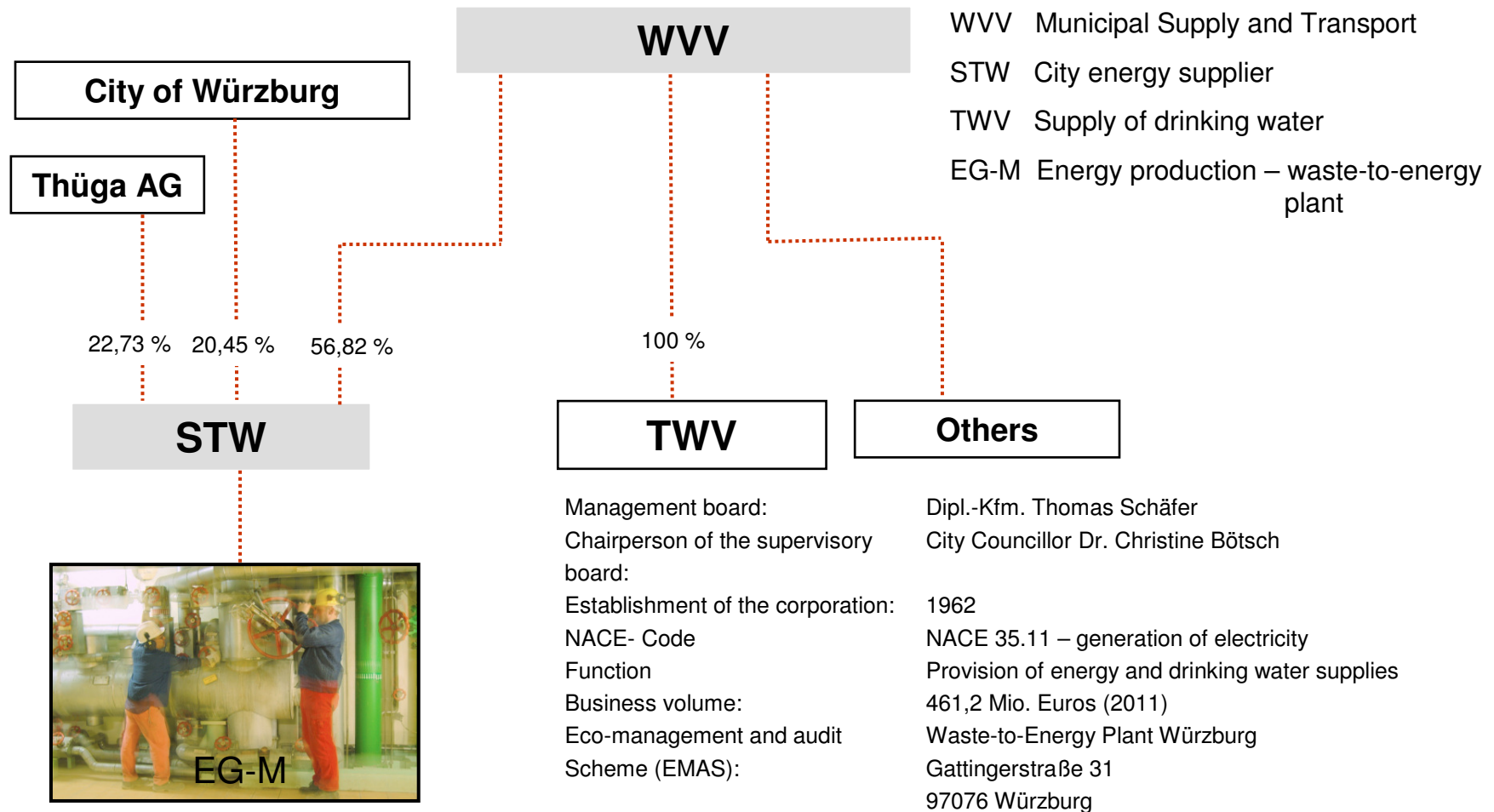


Key Data of the WVV Group



Energy		2011	2010	2009	2008
District heating	Mio. kWh	299,6	347,7	308,2	287,0
Electricity	Mio. kWh	1.513,9	1.398,4	1.124,5	1.109,5
Gas	Mio. kWh	2.629,9	2.976,9	2.830,0	2.682,8
Drinking water	Mio. m ³	8,3	8,2	8,1	8,5
Traffic					
Passengers (trams/busses)	Thousand	36.771	36.689	37.120	35.481
Passenger ships	Thousand	627	532	513	512
Materials handling	Thousand to	1.263	1.327	1.330	1.499
Short-term parker	Thousand	2.410	2.288	2.293	2.175
Environment					
Recycling of commercial waste	to	64.757	85.430	81.049	92.698
Recycling of organic waste	to	51.212	49.911	51.633	48.216

Distribution of Ownership



History and Development of the Waste-to-Energy Plant Würzburg

The plant is owned by Zweckverband Abfallwirtschaft Würzburg (Joint Waste Management Authority) which consists of the city of Würzburg and the counties of Würzburg and Kitzingen. The STW AG (city energy supplier) is commissioned by the Joint Waste Management Authority to operate the Würzburg waste-to-energy plant. The plant disposes the waste of approx. 900,000 residents.

1979	Foundation of the Joint Waste Management Authority of the district Würzburg - ZVAWS
1980	Official permission for the construction of the waste plant lines 1 and 2
1984	Initial operation of lines 1 and 2
1992	Extension of the waste pit
1993-95	Modernisation of the flue gas cleaning lines 1 and 2
1996	Official permission for the construction of the waste plant line 3
1996-98	Construction and initial operation of line 3
2001-03	Grate modernisation of lines 1 and 2
2005	Modernisation of grate line 3
2006	Optimisation of NO _x -removal in high-dust areas/catalytic denitrification of line 3
2009	Construction of a gas steam preheater for lines 1 und 2 for NO _x – catalytic converters

Key Figures of the Waste-to-Energy Plant

Input		2007	2008	2009	2010	2011
Waste	Thousand t.	205,85	210,92	208,73	204,61	202,36
Sludge	Thousand t.	9,58	7,68	9,91	8,45	8,19
Heating oil	Thousand t.	1,00	0,60	0,49	0,97	0,70
Heating oil	kg/t waste	4,65	2,73	2,24	4,55	3,32

Output – Energy		2007	2008	2009	2010	2011
Energy export						
Electricity export	kWh/t waste	444	447	437	429	416
Steam export	kWh/t waste	132	166	166	186	207
Plant energy usage						
Electricity	kWh/t waste	123	126	125	129	129
Steam	kWh/t waste	174	113	51	168	214
Total Energy Production	kWh/t waste	873	852	779	912	966
Calorific value of the waste	MJ/kg	10,56	10,436	10,50	10,57	10,70
Energy efficiency (R1)		0,63	0,63	0,62	0,60	0,63

Figures of the Plant

Waste pit

Capacity of the pit	ca. 9.000 m ³
Permanently vacant capacity	ca. 3.000 m ³ (ca. 5 days)
Number of tipping sites	10

Waste burning capacity

Lines 1 und 2	8,0 t/h each
Lines 3	15,0 t/h

Steam generator Line 1 und Line 2

Steam temperature	415 °C
Steam pressure	42 bar
Steam output	28,0 t/h

Steam generator Line 3

Steam temperature	415 °C
Steam pressure	42 bar
Steam output	60,0 t/h



The waste-to-energy plant in 1984.



The waste-to-energy plant in 2012.

Figures of the Plant

Steam Turbo-Alternator Set (STAS)

1) Steam turbines

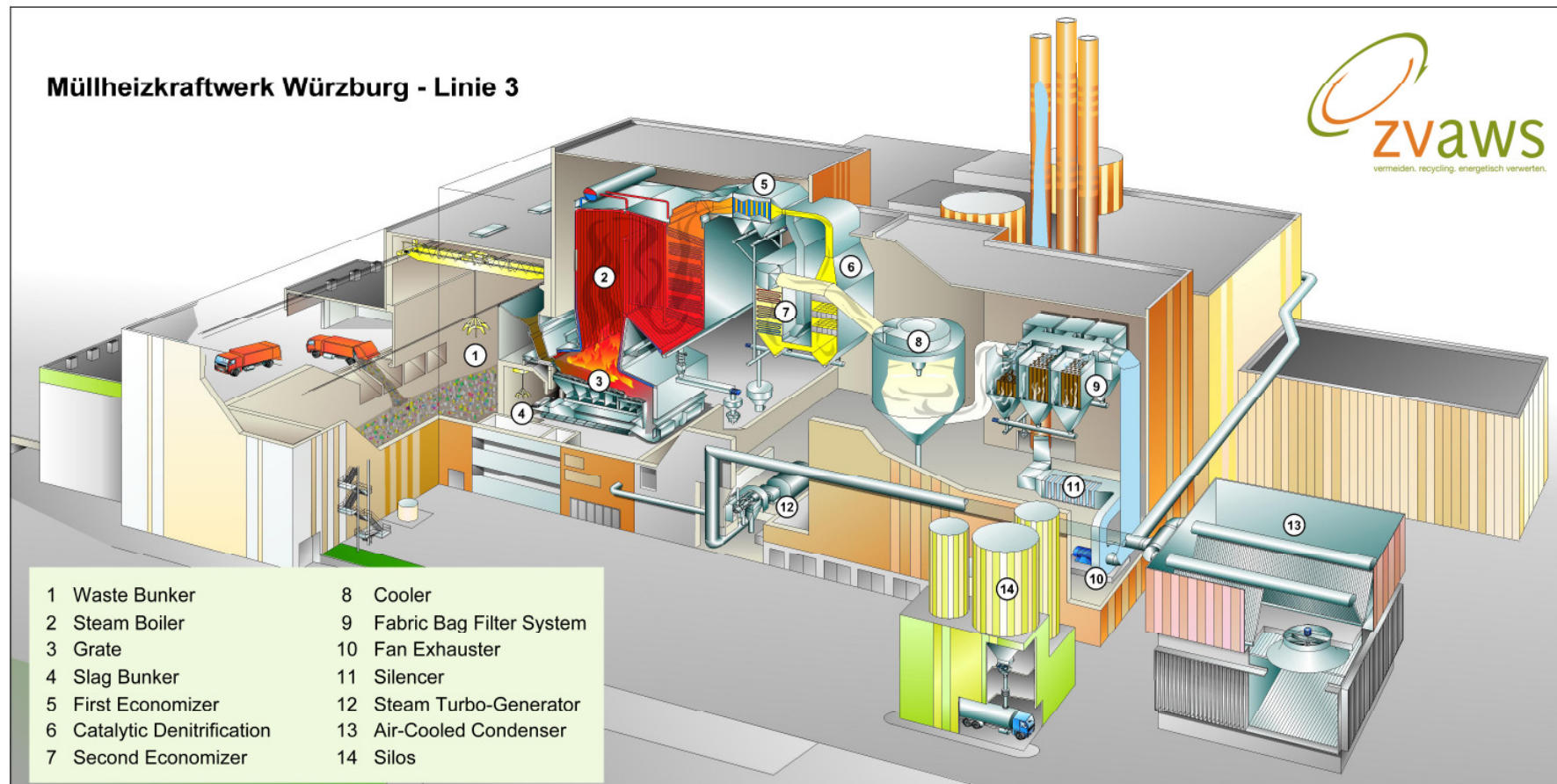
	STAS 1	STAS 2
Year of construction	1983	1998
Performance	11.550 kW	16.035 kW
Speed	7.100 min ⁻¹	7.500
Steam pressure/temp.	40 bar, 400 °C	40 bar, 400 °C
Steam extraction	6,3 bar/200°C	4,25 bar/175 °C

2) Generator

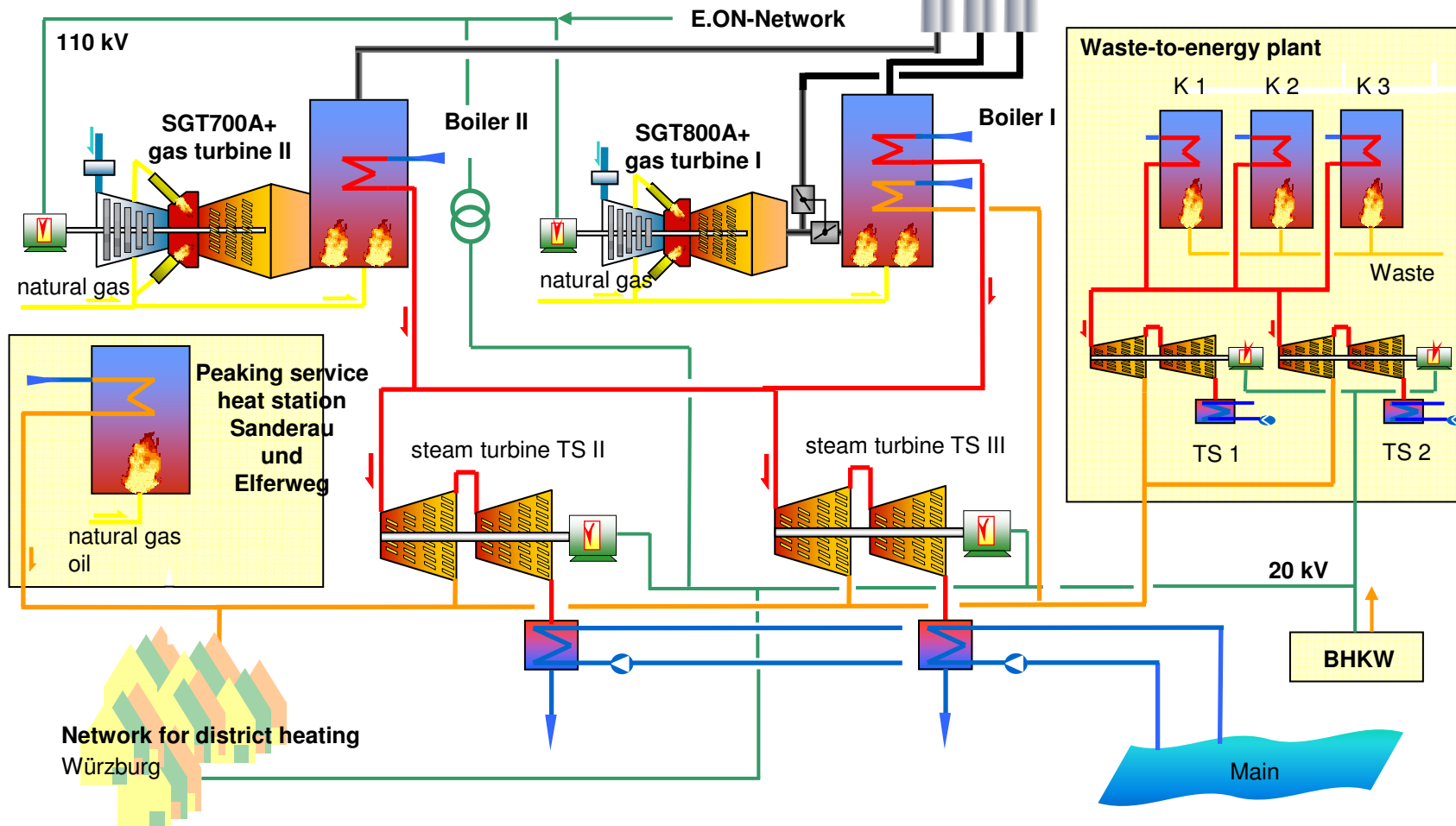
	1983	1998
Year of construction	1983	1998
Performance	12,85 MVA	20,044 MVA
Voltage	6.300 V	6.300 V
Speed	1.500 min ⁻¹	1.500 min ⁻¹

The Waste-to-Energy Plant Würzburg – an Animated Illustration of line 3

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Generation of Electricity and Steam



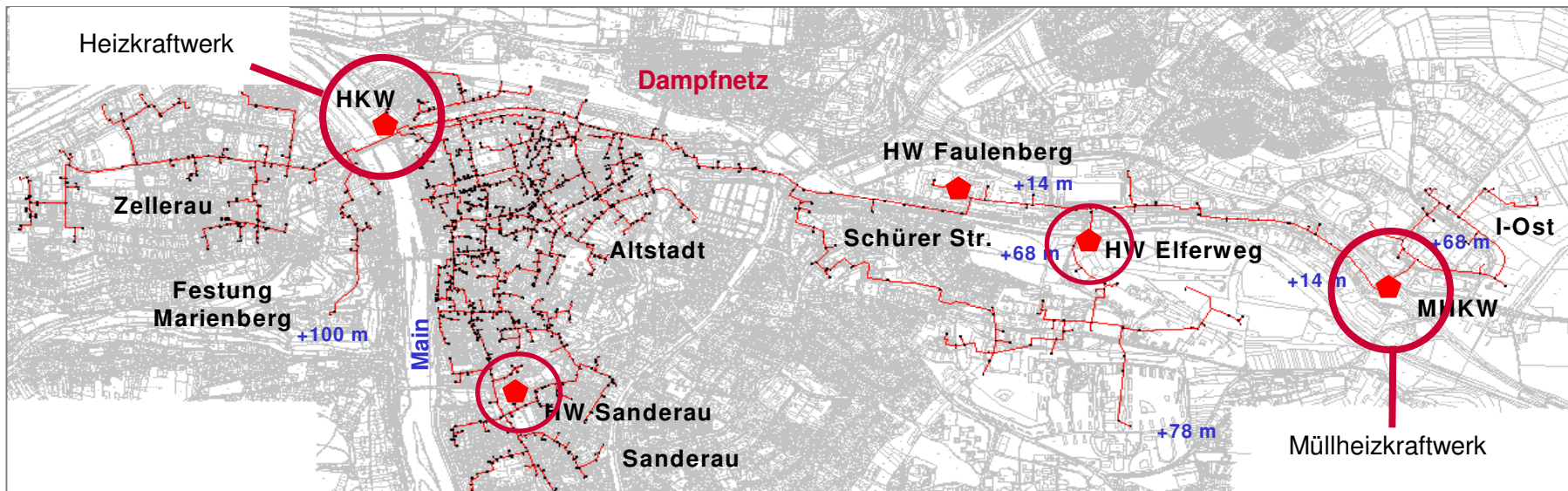
Supply of District Heating in Würzburg

Network for district heating since 1952

HKW, approx. 90 % of annual steam heat production

MHKW, approx. 10 % of annual steam heat production

HW Sanderau und HW Elferweg (peaking service heat station)



Environmental management system

Registration in the EMAS register

- EMAS - Europe-wide regulations for environmental management and audit scheme
- Application of EMAS in all "production facilities" of the WVV Group
- EMAS certification of the plant since 1998
- Regular communication through sustainability reporting



Tour of the Plant

Please form three groups to visit the waste-to-energy plant. We kindly request you to wear a helmet during the tour. The following routes will be taken:

- Group 1 (with Mr. X): first to the rubbish crane, from there with the elevator line 3 down to the grate incineration, and to the steam turbine and operator room; return to the conference venue by bus
- Group 2 (with Mr. Y): first downstairs to the operator room, then to the steam turbine, from there to the grate incineration, with the elevator line 3 to the rubbish crane; return to the conference venue by bus
- Group 3 (with Mr. Z): first downstairs to the grate incineration, then to the steam turbine, from there to the operator room, then with the elevator line 1/2 to the rubbish crane; return to the conference venue by bus

Energie. Verkehr. Umwelt.

Wir machen das für Sie.



Thank you for your attention!