



Under the city

Words: Yvonne Wirth | Pictures: Robert Hack

MTU 20V 956 TB32, Wien

What makes the city with the best lifestyle in the world so good to live in? In the Austrian capital, Vienna, simply everything is perfect. The historical city center with its old sand-colored buildings, the Vienna Hofburg, the Opera, the Ferris Wheel and the Stephansdom cathedral is a World Heritage Site. The cultural amenities, the open and friendly people and the cleanliness make everybody feel good. And then there are the public transport services operated by Wiener Linien – underground, trams and buses to take you to every corner of the conurbation. To make sure the lights never go out on the underground in particular, the complete underground railway system is protected by four MTU emergency backup gensets.

For the seventh time in succession, the Austrian capital was this year voted the best city in the world to live in. Anyone who has been there will not be surprised by that result. Around half of the city is made up of green spaces, the old buildings tempt you to take a stroll, the Danube offers swimming and epicurean delights are in plentiful supply. No visitor leaves without sampling a genuine Wiener Schnitzel and a slice of Sachertorte. The Stephansdom cathedral decoratively dominates the city center. Along the shopping mile, the Kärntner Strasse, the pavements teem with people. On many of the street corners are big blue cubes displaying a large letter "U". You do not need to go far to find an underground station in this city. The public transport connections make Vienna one of the best places to live for people of all ages. The 1.8 million Viennese at present have a total five underground lines at their disposal, comprising the U1, U2, U3, U4 and U6. So far the system extends to 79 km of track but that figure is set to grow once the U5 is added. Vienna's underground is a relatively new arrival. It was not built until 1978 and so is not quite 40 years old. By comparison, the four oldest European underground systems in London, Budapest, Glasgow and Paris started service between 1860 and 1896.

Under the urbs

The underground is operated by [Wiener Linien](#). "The Vienna underground is the city's favorite mode of transport," Reinhard Glaser, technical consultant at Wiener Linien, is pleased to pronounce. "Up to one and a half million people – and rising – use it every day." On their way to work, to school, to see the sights or on an excursion from the kindergarten – you see people of every age on the Vienna underground. Large entrance halls, marble flooring and modern art are what strikes you on entering the stations. Escalators take you from bright daylight into the equally light neon-illuminated underground stations and onto the platforms. Every few minutes, the "silver arrows" – as they are called by the locals – whizz in and out of the underground stations. First of all, you hear a thunderous rumbling emanating from the dark tunnels, and then the rattling of the rails. The silver trains shoot into the station accompanied by a quite noticeable rush of air and squealing brakes. The doors open, a swarm of passengers spills out and at least as many take their places from the platform. The underground trains

travel at up to 80 kph. It is rush hour – people are hurrying to work. A mad scramble from one train to another. The myriad shoe soles clap and clatter on the floor and the cacophony of voices continually reverberates, with the announcer on the PA system mixed in for good measure. Clunk – the doors close, there is a loud hiss and the train disappears into the dark tunnel as quickly as it emerged. And if you miss your train, the next one will be along in just a couple of minutes. "What is special about the Vienna underground are the clean stations, the frequency of the trains and the reliability of the service," Glaser explains. "So passengers get around the city very quickly." The stations also have much to offer the traveler. Karlsplatz underground station is decorated with marble floors. Illuminated signs show the way to the various lines and city sights. There is even classical opera music playing in the toilets. Brightly lit advertisement hoardings, giant screens showing breaking news from around the world, neon signs on the floor – electricity is important here.

If there is a power failure, the emergency backup gensets would take over the power supply.[Reinhard Glaser, Wiener Linien]

"Normally power is supplied by a main feed and can be switched over to a reserve feed," elucidates Glaser. But so that everything carries on working even if there is a power outage, there are four [MTU emergency backup gensets](#) for supplying the underground stations with electricity. "If there is a power failure, the emergency backup gensets would take over the power supply. That means that the lighting systems, escalators, control systems, signaling systems and public address systems for announcements from the main control center would still function," Glaser expounds. So, for example, lifts move to a predefined level, automatically open their doors and allow the passengers to get out. The station lighting would also remain fully functional. That ensures that people could be safely evacuated from the station and the stations then closed. To supply the individual underground stations with enough electricity, about 2 MW of power per underground line is required. That would be insufficient for the trains themselves. They simply come to a standstill if the power goes down.

Once a month there is a test run to simulate an emergency.[Michael Tomes, K&W]

Engines on the spot

MTU emergency backup gensets have been providing power security for the underground since 2003. The first three MTU 20V 956 TB32 engines were installed in 2003. They are actually inside the stations at Karlsplatz, Schottenring and Praterstern. Each of those engines produces 4,400 kW of mechanical power. They are housed in underground generator rooms, while the silencer and filter systems are accommodated in beautifully designed buildings outside. Like the one on the Karlsplatz, one of Vienna's main transport interchanges. No passer-by would think that hidden here somewhere below ground there is a massive blue MTU monster weighing 21.5 t. Thanks to the insulation the engines are inaudible even when they are running. "Once a month there is a test run to simulate an emergency," explains Michael Tomes, who is in charge of project handling at MTU distributors [K&W](#). "The engines are run at 80% capacity during the test run." Luckily there has not been a power failure so far, but the engines would do their job if they were needed. In 2013 the original three engines were followed by one of the new-generation 16V 956 TB33 models with an output of 5,000 kW. It is located at the Wasserleitungswiesen underground depot. All four together currently cover Vienna's entire underground network.

Especially in this emergency power sector, every engine is a one-off.[Giovanni Coiro, MTU Onsite Energy]

A Series 956 oddity

MTU distributor K&W installs and maintains the engines. "When the engines are first installed, we have a five-year maintenance contract with Wiener Linien," Tomes recounts. "After that, the contract is put out to tender on a yearly basis." The K&W fitters are given special training for the Series 956. "What is special about these engines is their impressive size," states K&W service mechanic Lukas Sajdak with obvious pleasure. "Technically the engine has a lot to offer. It is monitored and controlled by MTU's own ADEC-Uni engine management system, it has eight integrated turbochargers and an air starter system that starts the installation in under ten seconds." For MTU the engines for the Vienna underground were a new challenge. "It was the first time we had technically configured the engines for such a backup power application," relates project coordinator Giovanni Coiro of MTU Friedrichshafen. "Before then, the Series 956 engines were only used in ships and nuclear power plants. Here, entirely different demands

are required." In particular, the engines' self-monitoring systems played a major role in this case, as previously the controller was connected to an external source. "With the help of the new ADEC-Uni control unit, the engine was designed to be able to analyze the signals immediately and respond accordingly." So Wiener Linien received one of the first Series 956 engines to be used for such an emergency-backup application. "Especially in this emergency power sector, every engine is a one-off," Coiro points out. "In contrast with standard production units, for this type of application every engine has to be specially adapted to the client's requirements." In the case of the Vienna underground, those requirements were clear. The power has to stay on to ensure all the people can safely get out of the stations.

Shape of things to come

To make Vienna an even better place to live, the underground will be further expanded in the future. The U2 line is to be extended in the coming years and the U5 line is currently at the planning stage. The extension of the U1 line is already under construction so that the Viennese will be able to travel to the Vienna spa for a spot of R&R and the residents in the south of the city can enjoy better connections to the center. This summer, a new MTU emergency backup genset is due to go into service at Neulaa station on the same line. This latest [16V 956 TB33](#) unit also conceals its 5,000 kW of mechanical power below ground. The generator room constructed specially for Wiener Linien is already finished. Now all it is waiting for is its big blue heart of steel.

Contact

Giovanni Coiro

Tel.: +49 7541 90-3275

Email Giovanni.Coiro@mtu-online.com

