Munich Transport Corporation (MVG)
Sustainability Report
2014/2015
Dear Readers

As part of Munich City Utilities (SWM) Munich Transport Corporation (MVG) is a major contributor to the high quality of life in the Bavarian state capital. Sustainability plays a key role in our activities, reaching far beyond saving energy, fuel and emissions. We always regard sustainability in terms of ecological, economic and social aspects, which we aim to combine to best possible effect.

MVG offers sustainable transport for Munich. However the bare fact that all rail vehicles in the MVG network run on traction current, the very epitome of e-mobility, is by no means a guarantee of sustainability in local public transport. In view of tomorrow’s challenges, including the energy transition and climate protection, smart traffic management assumes a pivotal role in enabling urban-friendly sustainable mobility.

MVG’s public transport services constitute an important pillar of the city’s sustainability strategy. We provide affordable mobility for all by underground, tram, bus and MVG Bike, thus also strengthening Munich as a business hub. We also help reduce inner-city car traffic, improving the quality of air and climate protection with over 16,000 bus and train journeys per day.

No other major German city currently uses local public transport so intensively as Munich. A current nationwide study confirms that of the seven major cities it compared, the Bavarian state capital offers the best public passenger transport network while according to surveys customer satisfaction has for many years topped the national average. Although we are suitably proud, there is still a lot of work to be done to improve the sustainability of transport in Munich and ensure that the ever-increasing mobility needs of our growing city are met while achieving maximum environmental friendliness. Funding is another constant challenge, as growing passenger figures and fare adjustments do not automatically generate more revenue.

We have a clear focus on modernisation and expansion. We have to continue increasing capacities on existing lines and build new routes. We also need to modernise our fleet as well as our stations and stops. And we need to build additional depots in order to operate one of the most attractive local transport networks now and in the future, and to maintain and consolidate Munich’s quality of life.

The following pages provide a picture of our sustainable single-source mobility activities for Munich. I wish you a stimulating read.

Herbert König
SWM CEO Transport and
Chairman of the MVG Executive Board
Munich Transport Corporation: backbone of a growing city

Munich public passenger transport can look back on a long history of around 140 years. It all began in October 1876 with a horse-drawn tram on rails; today as a municipal subsidiary of Munich City Utilities (SWM), Munich Transport Corporation (MVG) is Germany’s second largest municipal transport enterprise. Around 3,700 employees ensure daily mobility in Munich, a prosperous business metropolis currently numbering more than 1.5 million inhabitants.

As the major partner in the Munich Transport and Tariff Association (MVV), along with the S-Bahn Munich and private bus companies, MVG secures local public transport. It plans, finances and operates underground trains, buses and trams in Munich and since autumn 2015 also its own MVG bike rental system. MVG thus forms the backbone of local public transport in the Bavarian state capital. In 2015 MVG again secured its very high market share of urban transport. Accordingly, in 2015 MVG surveys reported 27 per cent of movement by Munich’s inhabitants by underground train, bus and/or tram (also for example in combination with bike). If journeys covered by the S-Bahn and other forms of public transport are included, the figure rises to a share of 30 per cent. Compare: on an average day people in Munich covered 25 per cent of travel driving by car, 7 per cent as car passengers and 15 per cent by bicycle, while 23 per cent of journeys were completed on foot. A new high of 38 per cent of Munich’s inhabitants used MVG transport (practically) every day, i.e. on four to seven days per week. Sixty-seven per cent of Munich’s inhabitants are regular users of underground train, bus and/or tram at least once a week. The high acceptance of MVG services by Munich’s citizens is underscored by the fact that only three per cent said that they never used MVG transport at all.
Munich Transport Corporation: backbone of a growing city

Munich Transport Corporation (MVG) is the backbone of a growing city. Around 1,200 stops and stations are located within 400 metres of all homes in Munich. Environmentally friendly sustainable and convenient mobility is supplied by a well-designed network covering more than 640 kilometres with night-time services and reliable customer care. By the end of 2016, 125 MVG bike stations will enhance the public transport network.

In 2015 again, MVG recorded a record number of people opting for its services: a total of 566 million passengers travelled by underground train, bus and tram, thus two per cent or 11 million more than the year before. Since 2004 demand has grown by a total of 28 per cent. In other words, today MVG conveys over 100 million passengers more than ten years ago and the trend is continuing, for instance due to the growing number of inhabitants. This was also the main reason for the increase in revenues from 456 to 483 million euros. The distance covered by all MVG transport trains and carriages amounted to 51.3 million kilometres or from the Earth to the moon and back 67 times. The reasons for the rise from 555 to 566 million passengers included the extension of MVG services in 2015 by around two per cent and increased use of MVG transport by students due to the low-cost semester ticket, which at the same time however resulted in less revenue.

The positive development in passenger figures confirms that despite increasing capacity deficits in its already stretched network, MVG still manages to make the most of growing potential demand from Munich’s swelling population and thus afford a valuable contribution to sustainably serving Munich’s booming community. No other German public transport service has to cope with increase rates of this order. SWM and MVG continuously extend their infrastructure and services in cooperation with Munich’s town hall to address this demand. MVG also focuses on complementary mobility offerings such as the new bike rental system MVG Bike, close cooperation with car-sharing providers and linking up several mobility modules to create so-called mobility stations, where in addition to established services, passengers can use further options for greater flexibility and personal mobility – in keeping with the corporate slogan ‘MVG – Ganz einfach mobil’.

MVG is firmly convinced that public passenger traffic is an important global key to solving urgent problems. Drawing on the motto of ‘Think globally, act locally’ MVG is committed to national and international networking and knowledge transfer. It is an active member in the Association of German Transport Companies (VDV) and in the International Association of Public Transport (UITP) in order to contribute to the further development of sustainable strategies for local public transport companies.

For more than a decade passenger figures have been increasing in all operating sectors.
Areas of activities and measures

In its strategic alignment, MVG is committed to Munich city’s objectives and public services for its citizens. The MVG mission statement refers to enabling eco-friendly mobility, deploying resources efficiently and a constant pursuit of cost efficiency. An attractive local public transport service with appropriate capacity supports Munich’s aim of becoming one of the country’s most climate-friendly municipalities. MVG affords a major contribution to qualified development with efficient use of existing infrastructures, it promotes business prosperity, strengthens the competitiveness of the business region and guarantees Munich’s lifestyle quality. A host of measures are dedicated to this aim:

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Discussion: dialogue with Munich Transport Corporation

In an ongoing dialogue with employees, customers and the public, SWM and MVG seek potential improvements and implement them successfully. Individual stakeholder groups and the citizens of Munich are actively involved in decision-making processes at the early project planning phase. Take, for instance, the ‘Tram Westtangente’: in the wake of planning for this new construction project covering around nine kilometres in the west of Munich, many info events and workshops were organised at which politicians, transport and environment associations and committed citizens could discuss their ideas and opinions on the tram plans with SWM/MVG experts, Munich city urban planning and building regulations officers. Feasible suggestions were incorporated at the pre-planning stage and then presented again to the public.

Cooperation in VDV

The Association of German Transport Companies (VDV) is aimed at an exchange of ideas and drafting standard principles for resource-saving sustainable transport systems in Germany. MVG has long been an active member of VDV, which numbers more than 600 public passenger transport and rail freight companies. Herbert König, SWM CEO Transport and Chairman of the MVG Executive Board, is also Vice-President of VDV.

Commitment within UITP

MVG has been a member of UITP, the International Association of Public Transport, headquartered in Brussels, since 2005. The International Association of Public Transport is represented in 90 countries and totals 3,200 members. By signing the ‘UITP Charter for Sustainable Development’ MVG has pledged to establish the three principles of sustainable development in its activities and business policy. In return the corporation benefits from the international exchange of ideas in the various UITP committees.

Herbert König has been UITP Vice President and Executive Board member since 2010. Election to this honorary post is also an expression of international recognition for MVG.

In May 2013 Gunnar Heipp, Head of Strategic Planning at SWM/MVG, assumed an important honorary office in UITP: he was elected Chairman of the Sustainable Development Commission and is thus member of the UITP Policy Board. Before he was a member of the commission, established in 2005, for eight years. The commission consists of 30 representatives from transport companies around the globe, from Montreal to São Paulo and...
Dubai to Hong Kong. The committee deals with all issues involving sustainability in relation to local public transport internationally and develops appropriate strategies for UITP. In autumn 2014 MVG Head of Planning Gunnar Heipp was invited to New York by the United Nations. As Chairman of the UITP Sustainable Development Commission he took part in the Climate Summit 2014, where along with many other transport company representatives, he strongly advocated the large-scale global expansion of urban public transport.

Local public transport companies were also represented, among others by MVG Head of Planning Gunnar Heipp, at the UN Climate Conference on 11 December 2015 in Paris, where 200 participating countries resolved a new climate agreement with binding goals from 2020. As Chairman of the UITP Sustainable Development Commission Mr Heipp emphasised the key role of local public transport companies in protecting the climate in Paris and canvassed for the further extension of rail and bus transport around the globe.

Germany is at the forefront of implementing measures to achieve CO₂ reduction targets on the international stage. Boosting the extension of local public transport and securing funding for services at local level would also be a significant signal in this respect. Other major countries like India and China, for instance, have already announced large-scale expansion programmes in local services in cities and rail transport as part of their climate protection agenda. So far emissions of traffic in this sector have not declined, but risen globally. This trend could be broken by a move towards environmentally friendly modes of transport. MVG does its part in increasing the appeal of local public transport in Munich.

In October 2015 MVG hosted the UITP International Rail Conference ‘Go Smart – Go Rail’. UITP Secretary General Alain Flausch, UITP President Masaki Ogata, Mayor Dieter Reiter and MVG CEO Herbert König, UITP Vice President welcomed more than 230 conference members from 31 countries.

Pictures above: Technical Visit participants inspecting the new C2 underground train in the Technical Base at Fröttmaning.

Picture below: Group picture of participants at the UITP Rail Conference 2015 Technical Excursion to the East depot in Einsteinstrasse.
Munich Transport Corporation
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I. Shaping the city – Steering Munich’s growth

In the upcoming years SWM and MVG must continue to extend existing capacities, increase service frequency and purchase new vehicle generations with more capacity and highest possible deployment flexibility to address the constantly growing volume of passengers. Not to mention modernisation, renovation and extension measures at key junction stations and also new depots in all three sectors.

Munich is growing at a rapid pace and local public transport must keep abreast of this development. Accordingly, SWM and MVG work alongside Munich’s policymakers to extend the network, covering new districts and improving services in existing or growing districts. Yet space is at a premium, especially in a city as populated as Munich. Different stakeholder groups frequently compete with one another to obtain ground for their own purposes – either for the housing industry, commerce or transport, whereby here a further distinction must be made between private motorised and public transport. Without doubt, in percentage terms, private motorised traffic takes up most space, foot and bike traffic the least.

However, even local public transport takes up space, but once its efficiency, capacity and average level of use is considered, things are quickly put into perspective. Even at 20 per cent utilisation local public transport is on par with other transport modes. From 80 per cent utilisation in March 2014. The ground-breaking ceremony took place on 26 February 2016. The planned extension of tram line 25 in the east of Munich is due to go into service in December 2016, thus connecting many residential, business and commercial sites along Einsteinstrasse and Truderinger Strasse. The renaissance of the tram in Munich thus continues. The Steinhausen tram project follows on from successfully completed expansion projects like the extension of Line 19 to Pasing (2013) and the tram line to St. Emmeram opened in 2011, in response to urban development in Bogenhausen and Oberföhring. On account of its ‘exemplary character for German tram cities’ the project was awarded the National Prize for Integrated Urban Development and Building Culture by the Federal Ministry of Transport, Building and Urban Development.

Of course, MVG not only focuses on trams with regard to developing Munich’s transport infrastructure: in the medium term a new underground section called the U9 bypass running north-south from Implerstrasse via the main station to Schwabing could relieve passenger volumes. A feasibility study commissioned by SWM/MVG proved that it would be fundamentally possible to build the relief route. The U9 bypass would substantially relieve the busiest city centre sections and stations in the existing underground network and permit new line connections. Passengers...
would also benefit from much shorter times due to direct journeys. The U9 bypass will be the key to underground system development when it will no longer be possible to increase frequencies on existing services in a few years’ time.

In 2014 underground station renovation and modernisation focused on the mezzanine level at the main station, which was reopened in February 2015. The modernisation and reopening of the mezzanine in the Marienplatz underground and S-Bahn station was also well underway.

**Environmentally friendly fleet**

In an industry comparison the MVG fleet achieved an above-average score with high energy efficiency and low exhaust emissions. The corporation places priority on sustainable eco-friendly technology for all new acquisitions. In 2015 the underground and tram sector used around 100,000 kilowatt hours per million passenger kilometres. Thanks to the fleet rejuvenation and resultant increase in energy efficiency as well as the mild winter of 2014/2015 energy consumption was less than in previous years. Bus diesel consumption increased by three per cent due to extended services. Eighty per cent of MVG transport services are electricity-based, so the share of service buses in Munich’s overall traffic amounted to just 0.6 per cent or 1 per cent of diesel-driven traffic. Its pollutant burden is thus negligible in terms of quantity. Due to the different types of drive and fuels, vehicles discharge different quantities of greenhouse gas, nitrogen oxide and particulate matter per passenger kilometre. While the underground discharges 43 and the tram around 46 grams of CO₂ emissions per passenger kilometre, buses discharge approximately 92 grams of CO₂. However, when looking at these values, the degree of utilisation is a decisive factor, as the greater the number of passengers, the better the CO₂ balance sheet per person. A car that on average conveys only 1.2 persons scores far less well in the emission of greenhouse gases than a service bus, tram or the underground. The advantage of local public transport increases with the very high use of MVG vehicles, especially during the rush hours. All drivers are trained regularly in energy-saving driving techniques to additionally optimise the pollution balance sheet.

The route of the new Steinhausen tram line: from Max-Weber-Platz to Berg am Laim station in just eight minutes. The line is due to go into service in December 2016 along with the new timetable.

Picture on the left: Future vision of the junction between Truderinger Strasse and Hultschiner Strasse.

Picture in the middle: The future stop situation on Riedenburger Strasse.

Picture on the right: A retaining wall along Truderinger Strasse creates space for the tram.
Energy-efficient underground trains

Since going into service in 1971 the Munich underground fleet has been continuously extended and modernised. First-generation A- and B-type trains, which have been in service since 1981, have been gradually replaced by modern C-type articulated trains since 2002. The first-generation C-type trains (C1) are distinguished by low-maintenance three-phase drive technology with advanced control, an aluminium body, improved brake energy recovery and sophisticated process controlling with integrated diagnostics and thus generate far less costs than the older A- and B-type trains due to their low maintenance.

The new C2-type articulated underground train was presented to the public in 2014. In the meantime the C2 train has received several design prizes, including the Red Dot Design Award and German Design Award. The C2 is a further development of the C1. It consists of six parts, is around 115 metres long, has around 4,500 HP and accelerates from 0 to 80 kilometres per hour in just 15 seconds. The installed LED lighting is considerably more energy-saving than the lighting in the C1. Distinctive light strips in green or red indicate door opening and closing, thus easing and speeding up passenger flow. This signalling also helps visually impaired passengers with orientation. Aside from the new LED light strips on the door edges, access-friendly fitments include separate intercom posts and door opening buttons installed at a low height. Video cameras and modern fire prevention equipment ensure safety. The train is very energy-efficient thanks to the recovery of around half the braking power. Drivers also had the chance of becoming involved in the planning of the C2: a model of the future driver’s cabin was specially designed for the purpose, which around 40 staff were allowed to try out. They could make suggestions and express wishes, which were implemented as far as possible in the development of the new train.

In 2015 €166 million were earmarked for new underground trains. A total of 21 C2 trains are ordered and will be delivered successively. MVG aims for 39 six-part C1- and C2-type articulated trains in its fleet, with more to follow.

The technical infrastructure will also be adjusted: a new repair shop complex for the articulated underground trains was completed beside the Allianz Arena at the beginning of 2016. C-train maintenance, inspection and repair are conducted here with no need for costly, time-consuming separation of these tasks. The new hall is around 160 metres long, 30 metres wide and has three tracks with maintenance pits. The new building was urgently required because the underground train fleet will be extended in the upcoming years and thus exceeds the capacity limits of the existing repair shop infrastructure. Since 2003 a certified environment management system to DIN EN ISO 14001 has been operated in the underground train repair shops. The consistent implementation of environmental policy ensures transparent processes and responsibilities, adherence to official and operative environmental protection regulations and ongoing improvement of high-level environmental performance.
I. Helping shape the city – Steering Munich’s growth

Pioneer with the new Avenio tram

Its low energy consumption and emission values mark this tram as a sustainable and environmentally friendly mode of transport. It also utilises street space particularly efficiently: more people can be conveyed in one tram than in two articulated buses. In 2015 a total of €30 million was earmarked for 22 new Avenio trams.

In autumn 2014 the new Avenio-type tram went into passenger service on Line 19. Newly developed by Siemens, the Avenio tram was first used in Munich. Compared to low-floor trams hitherto used in Munich, the number of doors has been increased from six to eight to increase the speed of passenger boarding and alighting. Five of the eight entrance areas are multifunction zones with sufficient space for prams. However, with very few exceptions, wheelchair passengers are restricted to use of the first door. With a distance of usually 18 cm between the pavement and tram floor, even with help, it is practically impossible for wheelchair users to board at one of the rear doors. Moreover a wheelchair space is only designated at the first door (by an appropriate pictogram on the first tram door). Like in all modern Munich trams there is a lift at the first door to allow wheelchair users to board and alight. Most wheelchair passengers need this lift when using the tram.

The Avenio is well-liked by passengers: interviewees in the first survey emphasised the comfort of the seating. The pleasant quality of the ride, modern technical equipment, high number of doors and increased space were all praised.

Permission for other lines where large vehicles are required is in the pipeline. Meanwhile the tram sector is looking further ahead into the future: some of the current new tram acquisitions are so-called double-traction models. The benefit of this concept is that a carriage can be taken off during off-peak times to reduce energy consumption and maintenance costs. Repair shops do not need to be converted for longer trams either – thus saving MVG more money.

Overview of the Munich tram system

- 119 million passengers in 2015
- Rolling stock: 113 vehicles
- Network length: 79 km
- 13 lines + 4 night lines
- 166 stations
- Average distance between stops: 474 m
- Average travel speed: 19.0 km/h
Smart bus fleet development

In 2015 around €10 million was calculated for new buses.

The Munich fleet – currently consisting of 300 SWM/MVG vehicles and around 200 vehicles from private cooperation partners – is already particularly eco-friendly. As MVG buses are in service for an average of only 12 years and every year some of the vehicles are replaced, ongoing replacement by the latest technology takes place on a continuous basis (currently: Euro VI standard), so specific bus emissions are constantly reduced. All Munich city buses are also fitted with soot filters. Currently more than 250 buses from the last purchasing rounds are also fitted with an extended NOx filter (SCRT system).

Due to the rise in bus passenger figures by almost 20 per cent over the past decade, MVG has also been opting for so-called trailer buses (bus plus trailer) since 2013. These combinations hold around 130 passengers, thus about 30 per cent more than a conventional articulated bus. The main advantage of this concept is flexibility: capacity can be adapted to requirements with little effort and thus particularly cost-effectively by simply taking off the trailer. In contrast to double articulated buses with a similar capacity, the use of trailers is more economical and eco-friendlier for Munich’s requirements. The trailer has a longer service life than the towing vehicle and does not consume energy unnecessarily for overcapacity during off-peak periods. The trailers are, of course, also designed for disabled people with a fold-out ramp.

In 2015, 23 additional articulated buses were delivered. Ten of the new vehicles are equipped with a special recovery module for reusing braking power. This energy is used, for instance, for starting off. Fuel consumption is reduced by up to 3.6% according to the manufacturer with correspondingly lower emissions. The 23 new buses offer more space at the second and third door: the floor area is more spacious as the two bench seats have been replaced by individual fold-up seats, leaving additional room for wheelchair users, prams and wheeled walkers.

Overview of the Munich bus system

- 193 million passengers in 2015
- Fleet: 310 vehicles, of which
  - 22 trailer buses,
  - 225 articulated buses and
  - 63 normal buses
- In addition 199 vehicles from private partners, operating on behalf of MVG
- Network length: 482 km
- 71 lines + 14 night lines
- 974 stations
- Average distance between stops: 495 m
- Average travel speed: 18.2 km/h
Pioneering e-mobility

Since 2008 SWM and MVG have been conducting long-term comparative tests of various hybrid bus concepts. The buses of different manufacturers vary in terms of interaction between combustion engine and electric motor and energy storage. In principle, it can be said that hybrid buses are practical, yet are more susceptible to breakdowns than conventional vehicles. On average, the fuel saving of 20 to 30 per cent promised by manufacturers, especially in the case of the articulated buses, could not be achieved. However, ongoing trialling helps in gradually coming close to this target.

The future is hallmarked for all-electric buses, thus eliminating the use of fossil fuel entirely. But the time is not yet ripe. So far only prototypes are available and many technical issues are unresolved. SWM/MVG support manufacturers’ progress through trialling. Since 2013 six different electric buses have been trialled by SWM and MVG for a few weeks respectively, with more to follow. All six vehicles have proved their worth in daily testing and achieved a reasonable driving performance with their batteries, although vehicle range largely depends on heating energy requirements. Basically, batteries will have to become a lot more efficient, and also smaller and lighter, before they can be used reliably and are affordable. Present estimates put the series maturity of e-buses in around five years’ time. Whether this will also include the articulated buses and bus trailers that are mainly required in Munich in the MVG network mainly depends on battery development, which cannot yet be predicted today.

Until vehicle technology and charging infrastructures have reached series maturity and are cost-effective to operate, series deployment of advanced diesel buses (still) remains first choice, also in terms of climate protection. After all, highly economical bus transportation also means affordable and climate-friendly public transportation.

In 2015 SWM and MVG were prime movers in the concept for the Integrated Action Plan for Promoting Electric Mobility in Munich (IHFEM), which envisages several supportive measures by the capital in the electric mobility sector from 2015 to 2017. For example, the integration of Pedelecs in the MVG bike rental system is being subsidised in a pilot. The plan also envisages a needs-oriented extension of the public charging infrastructure in Munich. The public utilities have been running public charging stations with 100 per cent green power since 2009. MVG will also be deploying two electric buses in regular line service from autumn 2016. A corresponding call for tenders was successfully concluded at the end of 2015. IHFEM is covering some of the procurement costs, but most are shouldered by MVG. The two buses are equipped with lithium-iron-phosphate batteries and according to the manufacturer’s specification have a range of up to 300 kilometres, the equivalent of the required daily mileage of a bus in the MVG network. Batteries are charged overnight at the depot. Service deployment is to be accompanied by a scientific evaluation. The decision on the practicality of future use in the entire MVG bus network will depend on the measured performance results, energy consumption and achieved reach.
Bus and tram prioritisation

Prioritisation is one of the key measures for consolidating and increasing the attractiveness of tram and bus transport. It reduces travel time, increases punctuality and improves journey comfort as many braking and restarting procedures are eliminated. In addition, thanks to the short journey times, fewer buses are needed on the faster lines, thus increasing the financial feasibility of local public transport and enabling practical improvements of MVG services elsewhere. Prioritisation means more transport services for the same price – and thus a bonus for the environment and boost for sustainable mobility.

There are several tools for enhancing line speed. A key role is played by priority signalling. Already a few hundred metres away from a junction the vehicle signals its approach to the traffic lights and gets the green light on the dot. Besides priority signalling, separate lanes are the most effective means of enhancing bus speed.

Many institutions are involved in prioritisation measures – for instance the town council, an inter-party work group, the labour and economic development, district administration, building, urban planning and building regulations departments, the government of Upper Bavaria and the Munich district committees. Bus prioritisation projects are funded by the Munich municipality and SWM. Projects are also funded to a certain extent by the Bavarian government.

The basis of the current bus priority plan is a 2015 town council decision stipulating prioritisation for at least one MVG bus line every year. In 2015 prioritisation of the Metro bus line 56 and city bus line 166 was implemented, cutting the respective journey times by up to seven minutes. In addition, an articulated bus was saved and could be deployed to provide a better service elsewhere in the MVG bus network. Another bonus: bus lines 57, 134, 143, 160, 161, 167 and 168 benefit from the prioritisation of lines 56 and 166, where they share routes.

By the end of 2015, 427 traffic lights were prioritised for MVG bus lines, the equivalent of 55 per cent. Around 30 traffic lights are added every year.

The tram network was already prioritised between 1994 and 2013 and converted to modern traffic technology. The average speed of Munich trams increased by 22 per cent to a current average of 19 kilometres per hour thanks to this measure and 16 fewer vehicles needed to be deployed.

Tram prioritising has achieved real added value for passengers: shorter journey times, greater punctuality, convenient stops and a better, more efficient service with new lines.

The success of tram prioritising is now also being applied to the bus sector. Prioritised signalling, redesigned stops, interchanges and crossroads, building bus lanes and separate filter lanes are some of the measures implemented.

Bus prioritisation in figures

- 16 buses and 122 minutes of travel time have been gained so far through prioritisation.
- 18 MVG bus lines are currently fully prioritised (52, 53, 54, 55, 56, 58, 59, 62, 100, 142, 145, 153, 154, 155, 166, 169, 184 and 198).
- 45 other bus lines have between 25 and 80 per cent priority signalling on their routes.
I. Helping shape the city – Steering Munich’s growth

Minimising noise

Road traffic is the predominant source of noise in Germany. More than half of Germany’s population feels traffic noise to be annoying or a nuisance. This is revealed by a representative survey by the Federal Environmental Agency on environmental awareness in Germany in 2012. MVG monitors its noise emissions and tries to continuously minimise vehicle and track system emissions through the use of modern noise attenuation technology. On the underground flange oilers are used to minimise noise. Twice a year the geometry of the individual steel tyres is measured on all underground vehicles. In the event of deviations, profiles are adjusted to the set values to prevent noise. All steel tyres are visually inspected during maintenance as standard and any irregularities eliminated as soon as possible.

In the case of new construction and track renewal, sound- and vibration-damping measures are explored, planned and implemented according to economic and technical feasibility. Legal standards are thus not only complied with, but exceeded on a regular basis. With the help of the so-called mass-spring system, a special structural procedure for tram tracks, the transition of vibrations and secondary airborne noise is reduced. Noise is also reduced by replacing ballast beds with grassed track. Reprofiling railheads during track maintenance reduces noise thanks to smoother running.

Noise emission caused by creaking on bends is considerably reduced by flange oilers and stationary lubricating systems close to very tight curves.

MVG noise reduction measures cover both vehicles and tracks.

Green track with high-level grassing is a particularly effective method of noise damping, reducing noise levels by an average of around 2 dB(A).
Responsible waste and cleaning management

A clean cityscape enhances citizens’ sense of well-being. Rubbish bins are therefore emptied daily at MVG overground stops. Rubbish from public and staff areas, vehicle cleaning in the network parking facilities, track bed cleaning and kiosks is gathered at the waste collection areas in the underground stations and then disposed of appropriately. The rubbish from all stations and overground stops is separated and fed into the waste management system. Controlled disposal by MVG saves valuable resources.

<table>
<thead>
<tr>
<th>Generated waste in tons</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2013</td>
<td>2014</td>
<td>2015</td>
</tr>
<tr>
<td>Technical base, repair shops</td>
<td>465</td>
<td>313</td>
<td>295</td>
</tr>
<tr>
<td>Underground stations</td>
<td>1,680</td>
<td>1,800</td>
<td>1,566</td>
</tr>
<tr>
<td>Tram and bus stops</td>
<td>735</td>
<td>700</td>
<td>875</td>
</tr>
</tbody>
</table>

Marienplatz, Sendlinger Tor and Odeonsplatz are maintained with particularly intensity. A staff of permanent cleaners ensure the cleanliness of ‘their’ station continuously from 5 a.m. to 10 p.m.

Rough and intensive cleaning is performed in the track bed of the underground both manually and by the MVG vacuuming train. The giant ‘Gobbler’ vacuum cleaner performance is equal to that of around 300 domestic vacuum cleaners. Every night the 1,000 HP giant rumbles through the Munich underground, cleaning the track bed and ballast of fine dust and disposing of around 250 kilograms of rubbish. Danger of fire caused by stray waste is also considerably reduced. SWM is the first German company to have invested in such a machine, at a cost of €5.5 million.

With a speed of around 2 km/h and the vacuuming performance of approximately 300 domestic vacuum cleaners, the rail vacuumer cleans the underground tracks.

Most water is used to clean the vehicles. Most of the cleaning water is recycled and mixed with rain water for reuse.
Saving energy

Saving energy and continuously increasing energy efficiency is a key pillar of MVG’s environmental responsibility. For this reason an energy management system to DIN EN ISO 50001 was introduced with SWM. Strategic and organisational measures and the setting of specific energy targets, based on a consumer analysis, are focused on as well as raising awareness and the training of all employees.

Using heat smartly:
groundwater as a source of energy

An innovative geothermal heating and cooling system at the Neuperlach Süd and Therese-Giehse-Allee underground stations uses groundwater heat. In Neuperlach Süd the groundwater supplies the heating circuit with energy, before it cools down and flows back into the ground via a well.

The groundwater temperature of 11 degrees Celsius in south-east Munich keeps the outdoor ramps and stairs snow and ice-free thanks to in-house developed heat-optimised building materials. Around 75 per cent heating costs are saved compared to the previous heating system. Dispensing with road salt and gravel protects the environment, saves costs and avoids building damage.

At Therese-Giehse-Allee a CO₂ heating system was installed that uses no electricity at all. It is a stand-alone system that regulates itself via the temperature difference between groundwater and ambient air and thus requires no sophisticated control and feedback control systems. Carbon dioxide carries the heat from the water to the cold surface in a closed piped circuit surrounded at the lower end by groundwater and which at the top branches off at all stair levels. The CO₂ gives off the heat energy to the cold pipe walls and heats the floor covering, thus melting the snow. The transport medium, CO₂, cools down in the process, condenses and runs down the pipe walls to reabsorb the heat from the groundwater and carry it to the surface. The energy saving compared to the previous electricity-driven heating system is up to 90 per cent.

The geothermal heating system at Therese-Giehse-Allee in Neuperlach ensures that the entrance to the underground is kept clear of snow and ice.
MVG mobility management offers many services, advice and courses to inspire the enthusiasm of as many people as possible for local public transport and ensure safety and considerate behaviour in traffic.

Welcoming newcomers

When you move to a new city, you first have to find your way around — the MVG Newcomer Package helps you do so with practical information on how to explore the city with local public transport, on foot, by bike or car sharing. The package includes a special bonus in the form of an order slip for requesting further information and trial tickets. Advice for newcomers is part of MVG mobility management partnered by the state capital Munich in a specially created initiative called ‘München – Gscheid mobil’.

Mobility education in schools

MVG conducts three complementary mobility education projects for schools a year. So far around 92,500 children in Munich have taken part, learning safe and considerate behaviour in traffic through play. Since 2005, in cooperation with Green City e.V., MVG has been inviting children to take part in the ‘Mobi-Race’ MVG school project and acquire mobility skills and manage public transport. Fourth and fifth graders are taught how to find their way around the city and use public transport on their own. At the same time, learning about the environment and climate protection encourages an intelligent choice of transport, laying the foundation stone for sustainable mobility at an early stage of childhood. Children put into practice what they have learned in an extensive puzzle hunt at the end of the event.

MVG also offers two school projects focusing on buses and the underground. The ‘Underground’ school project was initiated back in 2000 aimed at explaining to fourth to eighth graders how to conduct themselves properly in the underground and at stations and familiarise them with safety equipment and its use in emergencies. The project is free for schools — any school and school type from the fourth to eighth grade can take part.

The aim of the ‘Bus’ school project is to engage first to fifth graders in discussion and teach them important aspects of social behaviour, behaviour in traffic generally and specifically in buses and identify improvement potential.

Mobility training for senior citizens

Around 30 per cent of MVG passengers are older than 60 — a growing trend. Short boarding and alighting times or technical innovations are particularly challenging for older passengers. Yet many senior citizens depend precisely on local public transport to get around — especially when their own car or bicycle or walking long distances is not an option.

In cooperation with various institutions, MVG offers regular free courses for older passengers to break down prejudices and practise safe negotiation of public transport. During the course, everyday situations are replicated in a parked bus to practise safe boarding and alighting and explain safety equipment. Questions about how to find your way round stations or taking wheelchairs or wheeled walkers are answered.

Course dates are organised in agreement with Munich’s senior citizen and service centres and conducted in small groups to allow personal attention and guarantee optimum support.

The highly positive feedback from participants, with an average age of 78, confirms the success of this offering. MVG mobility training thus helps to improve quality of life for senior citizens and enables them to continue leading independent active lives, reduces accidents and increases social integration.
Accessibility: ease of access for everyone

MVG aims to ensure accessibility to the underground, buses and trams for everyone. MVG has therefore long been regarded as one of Germany’s most disabled-friendly transport corporations: low-floor vehicles, lifts, folding ramps, escalators and elevators are all standard. Accessibility plays an important role in the modernisation of stations and stops and new additions to the fleet. MVG drivers are also trained regularly on providing the necessary assistance should support be required for boarding and alighting. The orientation system for the blind including, for instance, tactile ripple-effect floor covering at platform edges facilitates orientation for blind and visually impaired persons.

Munich Transport Corporation cooperates with the Bavarian Federation of the Blind and Visually Impaired (BBSB) in conducting courses for the blind and visually impaired. The key aspect of these events is: How do blind persons perceive the underground, how can they find and use safety equipment in an emergency? Instructed by MVG employees and specially trained mobility instructors, visually impaired passengers try out various safety items: emergency levers, emergency call buttons on emergency columns and the safety area beneath the platform edge. The blind and visually impaired courses provide valuable insights for both passengers and MVG staff. During such courses the issues and concerns felt by visually impaired passengers in dealing with public transport become clear. MVG also maintains a constant exchange with disabled persons’ associations through its permanent officer for the disabled.

The two new MVG customer centres at Marienplatz and Hauptbahnhof are accessible to modern standards. However, optimisation is also sought at existing stations: the light design on the new main station mezzanine includes LED spotlights on the handrails at the entrances and escalators for enhanced visibility. Information on the operating status of elevators and escalators at www.mvg-zoom.de and the disabled-friendly design of the website are further examples of MVG’s commitment to accessibility for all.

Trialling of luminous yellow ramps on underground platforms

The platforms in Munich’s underground stations are built at two different levels. Around 50 first-generation stations have platform heights of 100 centimetres above the top edge of the track and are thus five centimetres lower than the platforms built from the 1980s onwards. At three stations partial platform raising was tested to reduce the height difference between the platform and underground train entrance for passengers with restricted mobility. The non-slip plastic ramps are mounted level with the first vehicle door and are designed to ease boarding and alighting. The tilt angle was coordinated with disabled persons’ representatives and the actual pilot was approved by the Technical Supervisory Authority TAB. Trialling was very successful. However retrofitting of further partial platform raising is subject to town council approval and as yet unresolved financing.
Safety as first priority

MVG’s first priority is passenger and personnel safety. The safety concept is thus under continuous development. Over the past four years emergency columns have been installed on the platforms and mezzanines of all 100 underground stations, with a current total of 449 emergency columns. The large emergency columns group together various safety mechanisms: emergency and info phone, and on the platforms an emergency stop for every track and fire extinguisher. Some 119 of the posts are fitted with a defibrillator, which can be used by laymen to save the lives of passengers with cardiac arrest. The posts were specially developed by MVG. Targeted courses, flyers and MVG commercials familiarise passengers with the SOS post features.

Police and underground security personnel are on duty 24/7 to increase subjective and objective safety for passengers. The risk of becoming victim to violence in MVG stations or transport is very low – statistically speaking, less than one act of violence takes place per three million journeys by underground, bus or tram in Munich.

Total spending on removing vandalism damage amounted to around €1.5 million, a little lower than the average in previous years. As in past years, the underground accounted for around 80 per cent of the damage sum. Damage in the MVG bus and tram sector and overground stops totalled around €176,000.

MVG assumes that the decline is due to the extension of CCTV surveillance. MVG reports fewer offences in places where cameras are mounted. Culprits are frightened off, more cases are solved. Other preventive measures, like targeted deployment of underground guards and swift removal of vandalism damage, also has a positive effect and stops copycat offences.

At the end of 2014 the MVG network was equipped with almost 4,800 video cameras, of which more than 3,100 were in underground trains, buses and trams.

Improving punctuality

MVG’s punctuality statistics deem a service to be late if it is more than 120 seconds overdue or was cancelled. The arrival time at the last stop is definitive. Punctuality and the comparability of the resulting statistics is influenced by network conditions, like distance between stops, size of roadbeds or bus lanes, frequency of services, degree of networking, traffic situation on roads etc. Bus and tram operations are particularly influenced by external factors like private transport (traffic jams, illegal parking, road accidents) or roadworks.

Compared to the previous year bus punctuality remained at a steady 79 per cent. By contrast, due to the aforementioned factors and rising passenger figures, punctuality declined to just over 75 per cent for trams.

MVG constantly endeavours to improve punctuality. Measures include prioritisation on further lines, building separate bus lanes or bus capes, more personnel at peak times and more frequency increases. Thanks to such optimisation measures the underground achieved a punctuality value of 94 per cent in 2015.
Quality management –
customer centricity and service

All SWM/MVG sectors certified to quality management standard DIN EN ISO 9001:2008 again successfully passed their TÜV audit in 2015. The basic aim is to define processes and work flows and constantly optimise them to improve customer satisfaction. Aside from continuous quality assurance and improvement in operative sectors, the ‘Customer-centric service quality’ project was also continued, including the deployment of test customers. ‘Working undercover’ is top priority for test customers. All stops, vehicles and personnel are continuously tested by them according to a fixed set of criteria. Along with other customer-related quality parameters, based on DIN EN 13816, all results are finally incorporated into in-house-developed software.

The quality monitor, or ‘Q monitor’ for short, provides internal decision-makers with a platform for gaining an overview of the current status of quality criteria and deduce any potential need for action. Any impairment of service quality should be identified at an early stage and immediately remedied. The high level of customer satisfaction already achieved was confirmed by both test customers and the current customer satisfaction survey: in 2015 overall customer satisfaction with MVG averaged at 1.87 on a scale of 1 (very satisfied) to 4 (dissatisfied). This average thus corresponds to a ‘satisfied’ tending towards ‘very satisfied’ rating. In a national comparison this is once more an excellent above-average result.

An independent market researcher interviews more than 3,000 passengers every year for the MVG customer satisfaction analysis. In 2015 MVG services users particularly appreciated proximity and access to stops and stations: the extensive MVG network is thus perceived very positively by Munich’s inhabitants. The eco-friendliness of MVG transport and short journey times, especially on the underground, were also commended. MVG staff did well, too – interviewees gave top marks for the friendliness of service personnel.

An efficient information service is more important today than ever. And although you can find out a lot online, two MVG customer centres, two MVG ticket and info counters and a total of five MVG info points are staffed with personnel to advise customers and answer individual questions.
III. Focus on employees

Employees are an enterprise’s most valuable asset. As employers MVG and SWM are responsible for the welfare of employees and their families. Achieving a good work–life balance enjoys top priority at SWM/MVG – not only because they regard themselves as partner-like employers, but also because SWM/MVG identify the opportunities offered for enhancing performance and working climate.

Since 2011 a collective agreement negotiated by MVG and the ver.di trade union allows for direct employment of drivers by MVG, thus considerably strengthening the corporation. At the end of 2015, 798 persons were already directly employed by MVG. Besides a contract of employment for an indefinite period, new employees also enjoy extensive fringe benefits.

Promoting diversity and equal opportunities

As economically powerful, reliable and socially responsible employers SWM/MVG are committed to diversity and equal opportunities. SWM has not only enshrined this intent in its own group works agreements, but also documented its commitment by signing the government-promoted ‘Diversity Charter’ in 2011. The many different nationalities represented in the enterprise reflects personnel management’s focus on diversity and also a number of disabled employees that exceeds statutory requirements.

In 2010 SWM signed the Munich Memorandum for Women in Management to make more of the potential offered by highly motivated, highly qualified women. As part of this declaration of voluntary commitment SWM promises to employ a balanced ratio of women in management at all levels of the hierarchy commensurate to their qualifications and to exercise gender equality in remuneration and promotion. In 2015 SWM launched the ‘Expertises’ women’s network. The aim of the women’s network is to bring together female managers and committed female employees, allowing them to share ideas and promote mutual support.

Work–life balance

SWM/MVG are pioneers in Munich when it comes to managing the work–life balance: employees benefit from a host of flexible working time models, mobile work options, health plans, placements in kindergartens and crèches, info events and venues on work–life balance subjects and reintegration into professional life after parental leave and support in the care of family members. Since 2014 SWM has not only provided information on their extensive offering twice a year, but also offers employees the chance to discuss selected topics with experts and ask questions directly over what is called ‘Living & Working with SWM’.

SWM/MVG’s expertise in reconciling work and family life is confirmed by the ‘audit berufundfamilie’ certificate awarded in 2008. This is not an accolade for a one-off achievement of family-friendliness, but stands for SWM’s commitment to a continuous process.

Nurturing young talent

Top rankings every year in the Chamber of Industry and Commerce exams for Munich and Bavaria are proof of the high training standards at Munich’s public utilities. Training young people is an investment in the future for SWM/MVG, enabling them to fill vacancies with their own qualified employees.

‘Trainee Day’ takes place every year at SWM. Interested young people, parents and teachers are given the opportunity to talk to apprentices and trainers and find out all they need to know about the 13 different professions offered by SWM and MVG. These professions are spread over commercial, electrical, technical and other specialised areas. During driver training, for instance, the focus is not only on driving underground trains, buses or trams. The young people work their way through various SWM/MVG departments to obtain a comprehensive picture of the different areas of activity. Deployment in repair shops, the customer centre or MVG headquarters and insights into marketing and sales are all

Whether basic and further training, company health management or childcare – SWM/MVG adopt an holistic approach comprising designing the work environment, HR and healthcare, confirmed by the ‘audit berufundfamilie’ seal of quality from the charitable Hertie Foundation.
III. Focus on employees

part of the training. The youngsters are involved in work, vehicle and staff planning, take on customer service tasks and make sure our vehicles are ready for service.

At the training centre in Hans-Preissinger-Strasse an info booth provides the young people with details of dual work and study at SWM, an application check and offer of free application photos. Often even before the end of training most apprentices are usually offered a contract of employment for an indefinite period with exciting assignments and the excellent prospects of a versatile and innovative enterprise.

Commitment to graduates is another important pillar of corporate responsibility and a far-sighted personnel policy. As part of the 'SWM Talents' scheme students can gain practical experience during study through internships and dissertations. The top graduates join the 'SWM Top Talent' promotion scheme.

Active healthcare

SWM and MVG have always attached great importance to employee health. For more than a decade SWM has set benchmarks in the industry with its workplace health management system and has received several awards for its holistic approach. For instance, in 2008, 2009 and 2012, SWM received the German Corporate Health Award from the umbrella organisation of company health insurers BKK Bundesverband.

There is a special ‘VBfit’ health scheme for the transport business sector, designed specifically for drivers and repair shop and headquarters staff. Part of the VBfit concept is about involving colleagues locally, who act as multipliers in their teams and bring health issues in the various sectors to the notice of the project managers.

However there is more to health than just physical well-being: aside from preventive measures like nutritional advice, health coaching, sport and leisure options, SWM also offers employees intensive support in dealing with emotional problems. SWM has been a member of the Munich Anti-Depression League since 2010. Lectures, theme days and exhibitions provide employees with important information, suggestions and support.

One support concept for employees after traumatic situations or emergencies has been in place in the transport business unit since 2001. In the event of traumatic experiences like accidents, suicides or physical attack, drivers are provided immediate support by a crisis intervention team, including trained personnel from the Workers’ Samaritan Federation. Aftercare is conducted together with the trauma outpatient department of the Isar-Amper Psychiatric Hospital to deal with any resultant emotional disorders. Only after recovery from the experience reintegration at the workplace is carefully prepared.

Accident prevention

Accidents can be minimised, but never completely excluded. Occupational safety tasks range from advice on how to design workplaces to meet safety and ergonomics standards and introducing safe work methods to support in the procurement of working materials. The high safety standards are checked on the basis of regular workplace and company inspections. Investigations into the cause of accidents are held in occupational safety committee sessions and in some cases also directly on site with the persons involved; by incorporating innovations in the accident prevention sector improvements are implemented on an ongoing basis. Training for works councils, fire prevention helpers, safety officers and apprentices also enhances progressive accident avoidance.

<table>
<thead>
<tr>
<th>Accident statistics in transport division*</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
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</thead>
<tbody>
<tr>
<td>SWM transport division</td>
<td>155</td>
<td>187</td>
<td>191</td>
</tr>
<tr>
<td>MVG</td>
<td>22</td>
<td>70</td>
<td>66</td>
</tr>
</tbody>
</table>

* Notifiable workplace and commuting accidents.
IV. From transport corporation to mobility service provider

Car ownership was long regarded as a status symbol. Today people focus on flexibility, simplicity and environmental friendliness when it comes to mobility. The so-called sharing economy, making a splash in many business areas, has long been the norm in urban transport.

Munich Transport Corporation also realised long ago that users increasingly prefer smooth interaction between all forms of mobility — regardless of whether private or public transport or modern offerings like bike rental or car sharing. MVG regards additional services as an opportunity for development and from a purely transport company is becoming a ‘multimodal mobility service provider’ offering provider-independent ‘single-source’ mobility.

One of the first steps in this direction was the ‘MVG Fahrinfo München’ app with up-to-date timetable information for the underground, bus, tram and S-Bahn and live departure times for all modes of transport.

Since the end of 2013 app users have also been able to buy their electronic tickets directly via the app. The mobile ticket, called ‘HandyTicket’, is an impressive success story: by May 2016 more than four million mobile tickets had already been sold. Since its introduction, revenue totals around €18.5 million. In 2015 MVG introduced the so-called extension ticket, allowing season ticket holders to add zone rings as required for journeys outside their ticket’s zone of validity. The mobile ticket portfolio was also extended to include short trip and electronic strip tickets. Digitalisation at MVG goes far beyond the ticket offering. MVG answers customer questions and requests online, for example on Facebook and Google+.

Aside from the website and app, the Twitter account @MVGTicker provides current ticker news.

The MVG website at www.mvg.de was not only fully revised in terms of content, but also changed to what is known as ‘responsive design’ so that the website is presented clearly in a user-friendly manner on smartphones or tablets. The website provides fast connection details, current operations news, information about ongoing and future projects and a direct link to the city’s car-sharing providers.

Mobile operators have upgraded the mobile network in the underground to address customer needs for fast, efficient Internet access by substantially increasing transmission capacity for passengers. In addition, free public wireless Internet via M-WLAN, a service of the state capital Munich, is already offered at 23 sites in Munich, implemented by SWM and supported by M-net and muenchen.de. No registration is necessary and no user details are requested.
Mobility stations: pooling mobility modules

The transformation from transport company to a comprehensive mobility service provider is taking shape at München Freiheit, where SWM/MVG and the Munich municipality are conducting a pilot project to pool as many mobility forms as possible in the one place. In November 2014 the ‘Mobility station München Freiheit’ was opened by Lord Mayor Dieter Reiter during the Eurocities Annual Conference. The project aims at offering users a versatile, flexible and smartly linked array of mobility modules at a central location. The quality of urban life is to be enhanced by reducing the number of private car journeys to the city centre. At the München Freiheit mobility station a touch screen display at a specially erected post supplies information on current underground, bus and tram departure times via ‘MVG multimobil’, and offers practical information about nearby car-sharing vehicles and MVG bikes.

Precisely when combined with public transport, car sharing makes a practical contribution to eco-friendly mobility, clearly relieving the burden on traffic and the environment. Car sharing offers all the benefits of car ownership, without the purchase and running costs, while relieving road traffic. Thanks to the MVG service, Munich’s wide range of car-sharing providers is easy to find and use. The mobility station consists of several modules: MVG is now enhancing existing underground, bus and tram services with car sharing, e-mobility and the MVG bike rental system. The station offers Bike+Ride parking, a taxi rank, Park+Ride parking spaces and a charging post.

The mobility station aims to provide customers with the right mobility option for every journey type so that a car of their own is no longer necessary. The project is of major strategic importance to Munich: if the expected positive impact on traffic is realised, the mobility station may become a blueprint for sustainable solutions to mobility issues in burgeoning metropolises. The impact on traffic, experience with the operation and economic effectiveness of the pilot project will be professionally evaluated at the behest of MVG and the state capital Munich, with the results to be presented before the town council in 2016. The results will play a decisive role in the continuous optimisation and development of MVG mobility stations.

The MVG bike rental system, MVG Bike, was launched in autumn 2015 in an initial development phase with a fleet of 1,200 bikes and 125 bike stations, erected successively. Bikes can be picked up and returned at the stations and at all publicly accessible spots within a designated area. The stations are mainly located at traffic interchanges and stops and are an integral part of the city’s local public transport service. In future, additional stations, especially in residential areas, are to be set up to emulate in model form the impact on traffic of a denser station network. The detailed station building plans and site fine-tuning was closely coordinated with the city administration and respective district committees. The specially developed ‘MVG more’ app is not only the key to the new bike rental system, but also to the car-sharing vehicles of cooperation partners. At the same time, the app shows bus and train departures in real time. To increase the incentive to leave cars at home, MVG IsarCard subscribers are given attractive discounts by all car-sharing providers.