Meeting Mariya Gabriel with [redacted] Robert Bosch GmbH, and [redacted]

Scene setter

You will meet [redacted] Bosch, [redacted] committed that all 400 Bosch facilities around the world will be carbon neutral as of 2020 [redacted] is therefore an excellent example that transition to carbon neutrality is possible even in difficult times ([redacted]).

Bosch's core operating areas are spread across four business sectors: mobility (hardware and software), consumer goods (including household appliances and power tools), industrial technology (including drive and control), energy, and building technology. Over 60% of Bosch business is in the mobility sector.

Bosch participates in the Research Framework Programmes. The group has received up to now 60Million Euros of EU contributions by Horizon 2020. In FP7 the EU contribution going to Bosch was 32Million Euros. Detailed statistics can be found in annex.

In the email requesting the meeting, Bosch indicated the following subjects for discussion:

- Horizon Europe and future European Partnerships
- The Important Project of Common European Interest instrument (IPCEI)
- Artificial Intelligence

Partnerships

Bosch could be interested in a number of future partnerships of Horizon Europe. Within the current candidate partnerships most relevant for Bosch are the "Key Digital Technologies" partnership (covering microelectronics and software), the "Mobility and Safety for Automated Road Transport" automated vehicles partnership, the "Towards zero-emission road transport (2ZERO)" the "AI, data and Robotics", and the "Smart Networks and Services".

Important Project of Common European Interest instrument (IPCEI)

An Important Project of Common European Interest (IPCEI) is a mechanism enabling Member States to provide funding for strategically important transnational projects extending beyond the state-of-the-art, without violating State Aid criteria.

Bosch is a participant in the IPCEI on Microelectronics, which was approved by the Commission on 18 December 2018.

Artificial Intelligence

The Bosch Centre for Artificial Intelligence (BCAI) was established on January 1, 2017.

Bosch [redacted]

[redacted] Bosch Centre for Artificial Intelligence [redacted]

Objective(s)

- Inform on the status of Horizon Europe Programme.
- Seek the support of Bosch in order to secure the ambitious budget for Horizon Europe in the forthcoming MFF negotiations.
- Get feedback and suggestions from Bosch on transition to carbon neutral industry, Innovation policies, including partnerships, Important Projects of Common European Interest, and Artificial Intelligence.

Line to take

Horizon Europe

- The most important debate currently is the Multi-Annual Financial Framework (2021-2027), of which Horizon Europe is an element. The Commission has proposed € 100 billion for this programme.
- The European Parliament has called for an increase of the Horizon Europe budget to € 120 billion and the level of budget is vital for having significant impact.
- The R&I investments at the European level main objectives is to deliver the science needed for, innovative cross-sectoral solutions helping to deliver on our European priorities.
- The "Green Deal" and "Europe fit for the Digital Age" are major priorities of the new College to which Horizon Europe will make an essential contribution. A decreased budget for Horizon Europe would not allow Europe to take the global lead on the major challenges of our times and become the world's first climate-neutral continent.
- A decreased budget would also mean delaying vital ecological and societal transitions in Europe, for instance in the areas of climate change, digital, industrial transformations, health, oceans, and climate-neutral and smart cities.
- Moreover, since research and innovation are also at the core of the productivity and competitiveness of our economy, a Horizon Europe budget decrease by for example 10 billion EUR, would result in a GDP loss of 110 billion EUR over 25 years and an estimated job loss of 100000 by 2040.

Future Partnerships

- European Partnerships are key in preparing the transition towards a greener, socially relevant and digitally enabled economy and will directly support the priorities of the new Commission (the Green Deal, a Europe fit for digital age, an economy that works for people).
- Safe and automated road transport for instance is very relevant to achieve the European Green Deal, as it would contribute to reducing the carbon footprint of the transport sector and to attain zero-pollution. In addition, it would contribute to safe, accessible and affordable transport objectives. Finally, it would allow to ensuring the continued modernisation of key transport systems, with a strong focus on digital innovation, as well as open up to new market opportunities.
- This partnership would have strong links with other proposed partnerships, e.g. 'Smart Networks and Services' and 'EuroHPC' will be crucial in developing the digital infrastructure (5G corridors, quantum computing) needed for Europe to be world leader for fully autonomous safe mobility; 'Artificial Intelligence, big data and robotics' aims to support further development and application of AI.
- I expect that the Commission will adopt its proposals for institutionalised European Partnerships based on Article 185 and Article 187 before the summer 2020.

Partnership on safe and automated road transport

- The development of automated driving technologies and systems have made tremendous progress but there are still major R&I challenges to overcome before we can see these vehicles on our roads.

- We see challenges at several levels: human, technical, societal, economic and regulatory (e.g. development of vehicle technologies, its interaction with surrounding environment, connectivity and data sharing, real world-testing but also public and policy makers' awareness and acceptance, development of skills and insurance models).

- The European partnership must pool all the resources and bring all actors together to address these challenges. The development of automated vehicles also needs innovation and roll-out in other segments (for connectivity, digital maps, sensor development, Artificial Intelligence, etc.). We also need public authorities in order to run the tests in our cities and public transport operators to integrate the shared mobility services in the public transport system.

- Another key problem is that public and private sector R&I actions and their subsequent implementation are not necessarily aligned. There is a multitude of R&I programmes and projects at European, national and regional levels, but very often all the different programmes and tests are not well coordinated.

- The European partnership should address those automated mobility systems and services that can bring gains in terms of safety and efficiency of the overall transport system.

- Therefore, the development of shared, automated mobility services should be a priority of the European partnership.

- They can provide seamless door-to-door mobility of people and freight delivery services, which can lead to healthier, more accessible, greener and more sustainable cities, as long as they are integrated in an effective public transport system.

Ethical issues related to connected and automated driving

- With regard to ethics, the Commission has set up earlier this year a dedicated EU group of ethical experts to address specific ethical issues and concerns related to automated mobility, which are essential for securing public acceptance and trust in these vehicles.

- This expert group will provide guidance on how ethical considerations should be taken into account, when developing and deploying connected and automated driving systems and services in Europe. The guidance report can be expected by summer next year and it will address recommendations in the following areas:

    - safety, dilemma and risk assessment,

- responsibility and liability around the design and use of automated vehicles,

- Privacy, data collection, profiling, security, data access/sharing, ownership

Artificial Intelligence

- Artificial Intelligence is a "Key Enabling Technology" of industrial and societal relevance. In fact, AI will result in solutions to societal challenges, leading to innovations that will improve our lives, our work, our ways of communication, our education, and our health. Concrete examples are the advancement of deep learning in medical diagnosis, self-driving cars and drones, robots in deep sea and space exploration.

- The challenges in AI include foundational research improving hardware (chips for AI, but also mechatronics and advanced sensing and actuation for safer, faster, more precise, and more energy efficient robots), algorithms, achieving explainable AI (transparent decision making), adaptive learning, and improving smart, collaborative, safe and efficient robots and autonomous systems.

- Applied research is also needed to advance and demonstrate technological progress, meeting the requirements of applications and sectors' needs.

- Common AI platforms sharing tools and resources in AI, and reinforced collaboration among researchers are expected to combat fragmentation and foster progress more efficiently, thus strengthening Europe's position.

- Horizon Europe will provide R&I investments will all these areas in synergy with other programmes of the MFF (Digital Europe Programme, Connecting Europe Facility, Structural Funds, etc.).

- It is encouraging that companies like Bosch are investing in Artificial Intelligence. This will boost the competitiveness of the European Industry.

- Furthermore, the concept of human-centric approach to AI developed in the Commission Communication "Artificial Intelligence for Europe" (COM(2018) 237, 25.04.2018) will lead an to an ethics by design AI that will defend the European citizens' fundamental rights. This will be a requirement to all projects developing and/or deploying AI in Horizon Europe.

Defensive points

What is the state of play concerning Horizon Europe?

Budget, synergies and international cooperation remain the three main areas of Horizon Europe open for negotiations with the Parliament and the Council. Further negotiations on Horizon Europe depend on the results of the MFF agreement: the Commission has proposed the MFF based on 1,11 % of the EU GDP, the Parliament based on 1,3% of the EU GDP, the Finnish Presidency has proposed a range from 1,03% to 1,08 %.

Currently the Council is negotiating its position on the recitals and synergies (Annex IV), expected to be adopted as PGA on 29 November 2019.

The Council has the intention to change the legal base of the Specific Programme, by removing Art. 173 and leaving only Art. 182 TFEU as legal basis. This implies that the Specific Programme will be handled as a consultation file and not under ordinary legislative procedure. At the exchange of views foreseen by the Inter-Institutional Agreement on Better Law-making, the three institutions agreed that the appropriate legal basis for the Specific Programme would be adapted in light of the significant changes made in the Specific Programme compared to the original Commission proposal.

Does the participation of MS in the funding, proposed in some of the future partnerships, have the potential to negatively influence the future projects definition, chances for funding, geographical balance and administrative requirements?

The Commission supports a future implementation that relies on a single set of rules for national and Union contributions, with central implementation and management. This is not currently supported by Member States. We hope that MSs could change their position, so that the new partnerships will be much more efficient. We count on the support of the private partners on this at national level.

Background notes

CVs

Bosch Centre for Artificial Intelligence

The Bosch Centre for Artificial Intelligence (BCAI) was established on January 1, 2017.

Bosch [redacted]

Use cases

Machine learning: The focus is on machine learning; that is, recognizing patterns and contexts and exploiting these insights. This information is derived from vast amounts of data generated by sensors. Example: parking sensors.

Applications sectors include Mobility (automated driving), connected industry (predictive maintenance), and robotics.

Partnerships in the area of artificial intelligence

Cyber Valley

Partners from industry, academia, and government are collaborating closely in the field of artificial intelligence. The aim is to fast-track efforts to translate basic research findings into real-world applications. [redacted]

Delta Lab

A research alliance with the University of Amsterdam. This partnership aims to facilitate the exchange and transfer of expert knowledge in the field of deep learning.

Carnegie Mellon University

A research alliance with the Carnegie Mellon University (USA) that aims to facilitate the exchange in the field of robust deep learning.

Artificial Intelligence – State of Play of Commission Actions

The European Commission advocates AI for the good and for all. It has published a comprehensive and ambitious strategy for AI in Europe. It is organised around three pillars:

1. Strengthening Europe's technological and industrial capacity in AI and facilitating its adoption;

2. Preparing for the socio-economic changes caused by artificial intelligence, especially on the labour market;

3. Ensuring an appropriate ethical and legal framework.

This ambitious strategy requires corresponding investments and after 2020, investments in Europe should progressively reach a total of 20 billion euros per year, public and private investment combined.

In June 2018, the Commission set up a 52-member High-Level Expert Group on AI representing a wide range of stakeholders, and tasked it with drafting AI ethics

guidelines as well as preparing policy and investment recommendations. At the same time, the European AI Alliance, an open multi-stakeholder platform with over 3,500 members, was set up to engage interested parties broadly in discussions about AI and to provide broader input for the work of the AI High-Level Expert Group.

The High-Level Expert Group on AI published its Ethics Guidelines for Trustworthy AI in April 2019.

On 26 June 2019 the High-Level Expert Group on AI published policy and investment recommendations for AI development and uptake in Europe. The Commission is in the process of analysing the recommendations.

To ensure a coordinated approach, the Commission is working closely with the Member States. Together they drew up a Coordinated Plan on AI, published in December 2018, which identifies priority areas of action and investment. The plan will be updated regularly.

The Commission has opened a call for proposals for networking AI excellence centres in Europe, with the deadline for submissions on 13 November 2019.

On 19 November 2019 the Commission published a call for proposals to further develop an Artificial-Intelligence-on-demand platform. The action to be funded will enhance the AI-on-demand-platform that is currently being built. The goal of the AI-on-demand platform is to mobilise the whole European AI ecosystem in order to make available and provide access to AI resources for all EU users.

For the period 2021-27, the new multi-annual budget for the EU includes very substantial proposals for boosting investment in AI via Horizon Europe and the new Digital Europe programme.

Horizon Europe will be the EU’s flagship programme to support research and innovation. Out of a total of nearly €100 bn for 2021-2027, the Commission proposes to invest €15 bn in "Digital and Industry", which includes AI as a key activity.

The new Digital Europe programme aims to invest in large-scale digital capacity and infrastructure-building in the EU, helping its citizens, companies and regions to thrive in today's hyper-connected world and ensuring the EU remains competitive.

Out of the total amount of €9.2 billion provided via Digital Europe, €2.5 billion should be for AI. The funding will target in particular testing and experimentation facilities, and the data platforms crucial to the development of AI. Digital Europe also provides for €700 million in support of developing advanced digital skills, including in relation to machine learning, and €1.3 billion euros in support of deployment projects, including for SMEs to engage in digital transformation, notably in areas like AI.

The President-elect of the European Commission, Ursula von der Leyen, has put AI at the top of her political agenda:

1. She has proposed putting forward legislation for a coordinated European approach on the human and ethical implications of Artificial Intelligence.

2. She intends to prioritise the investments in AI, both through the Multiannual Financial Framework and through the increased use of public-private partnerships.

Partnership candidates that could be of possible interest to Robert Bosch GmbH:

- Mobility and Safety for Automated Road Transport: To provide a long-term framework for planning research and pre-deployment programmes for driverless vehicles across the EU and nationally. This is in line with the May 2018 Communication 'On the road to automated mobility: an EU strategy for mobility of the future'. Through the initiative, all relevant research and innovation activities can be streamlined, creating opportunities for integrated mobility solutions. This is a new partnership, without predecessor. Candidate for Article 187, but stakeholders have expressed strong preference for a co-programmed partnership, which is perceived more flexible for a completely new partnership to adjust direction and/or partner composition over time.
- Towards zero-emission road transport (2ZERO): Accelerating the transformation of the road transport system into zero-emission mobility through world-class European R&I and industrial system, with a competitive new generation of light weight, energy efficient and affordable vehicles and support measures to facilitate their rapid deployment. Successor of contractual Public-Private Partnership (cPPP) on Green vehicle initiative. Candidate for co-programmed. During the Member State consultation, it was proposed to assess the possibility to merge this candidate with 'Mobility and Safety for Automated Road Transport'.
- AI, data and robotics': The partnership on AI will help structuring the European AI community, develop a strategic research agenda and federate efforts around a topic that holds great potential to benefit our society and economy. Successor of two cPPP: on Big Data and on Robotics. Candidate for co-programmed.
- Key Digital Technologies: To enhance the research, innovation and business value creation of European electronics value chains in key strategic market segments in a sustainable manner to achieve technological sovereignty and ultimately make European business and citizens best equipped for the digital age. Successor of Electronic Components and Systems for European Leadership (ECSEL) Joint Undertaking. Candidate for Article 187. Major change in scope is the aim to widen European electronics value chains at hardware level to silicon photonics and embedded software.
- Smart Network and Services: Enabling the infrastructure basis in terms of key technologies and deployment for Next-Generation Internet services used by citizens and for "smart" services required by vertical sectors such as transport, energy, manufacturing, health and media. Successor of 5G cPPP. Candidate for Article 187.

European Partnership on Safe and Automated Road Transport

<u>Objectives and scope</u>

The overall objective of the European Partnership on Safe and Automated Road Transport is to provide a clear long-term framework for the strategic planning of research and pre-deployment programmes for connected, cooperative and automated mobility (CCAM) making sure that investments at local, regional and national level, both of public and private nature, are complementing each other more effectively. The European Partnership is looking for the best way to align EU R&I efforts in the field of CCAM to:

1. Improve safety and security of road transport;

2. Meet societal and market needs, including the inclusiveness and accessibility of mobility and more efficient traffic flows;

3. Reduce negative impacts, including congestion, air quality, energy consumption and climate change; and

4. Increase the effectiveness of R&I and accelerate market take-up of innovative solutions, contributing to maintaining and extending industrial leadership.

The European Partnership addresses for the next decade all development paths of CCAM (including automated passenger vehicles and trucks and shared automated vehicles) that are relevant from a public policy perspective, a road operator, a user / consumer perspective and from an industry perspective. The aim is to support the development and deployment of innovative (shared) mobility and logistics systems and services using fully connected and highly automated vehicles for passengers and freight.

The focus is on road transport, but it takes into consideration relevant interfaces with other modes (for instance railway crossings, but also transfers and integration with public transport) in order to make sure that safety is ensured, that efficiency and the optimal use of available infrastructure are improved and that new multimodal services can be developed for the benefits of users and society as a whole.

Policy context: Connected, cooperative and automated mobility (CCAM)

The Commission has outlined its strategy regarding connected, cooperative and automated mobility (CCAM) as part of its third mobility package and identified it as a European strategic value chain. It has also developed a roadmap on connected and automated transport in the context of the Strategic Transport Research and Innovation Agenda, to steer and coordinate R&I activities and policies in Europe. In this context, the Commission is considering a European partnership to provide a clear long-term framework for the strategic planning of research and pre-deployment programmes building on the roadmap on connected and automated transport. For 2014-2020, a total budget of around €300 million from Horizon 2020 has been allocated to support the introduction of automated driving systems for road transport. Horizon 2020 included actions in the area of ICT infrastructure to attain advanced levels of road vehicle automation, safe human-machine interfaces, road infrastructure to facilitate automated transport and aspects of driver and road user behaviour. This research area has not yet been covered by a Horizon 2020 partnership.

Given the complexity and the scale of the challenge, a European partnership could provide the clear long-term framework needed for strategic planning of research and pre-deployment programmes for CCAM.

Necessity for a European Partnership

CCAM is a complex ecosystem in which the vehicles the physical and digital infrastructure, technologies and human beings (traffic controllers, drivers, passengers, (motor) cyclists, pedestrians) will need to interact.

A system level approach is vital, given the need to preserve and enhance interoperability across the EU network, and to ensure a critical mass of demand to allow industrialisation of innovation.

Meanwhile, EU support and calls for proposals for CCAM have so far been looking mainly at specific technical solutions, their integration in specific use cases, and their

impacts on the users. More recently, several large-scale pilots have been launched to test the robustness and reliability of automated driving technologies, systems and functions and to assess socio-economic impacts.

However, a lot of Research and Innovation challenges need to be addressed in an integrated way, to achieve a systematic breakthrough in line with EU policy objectives. These include, among others technologies at vehicle and infrastructure level and for data communication and processing, personal data protection, cyber-security, ethics, social acceptance, as well as impacts on labour and skills, road safety targets, emissions, land use, CCAM system validation and global competitiveness. In addition, a large number of actors (local and regional authorities, road operators, service providers, vehicle manufacturers and suppliers, IT providers etc.) need to be involved in the development, large-scale testing and validation of solutions to address technical and non-technical challenges. Coordination at EU level is needed in order to develop harmonised solutions and to avoid fragmentation, duplication, inconsistencies and gaps. Hence, the EU needs a strong European R&I partnership in which all actors will pursue common objectives and clear deliverables in an aligned and coordinated manner.

Current status of preparation of the European Partnership

The preparations for the first wave of institutionalised European partnerships under Horizon Europe (including on safe and automated road transport) are currently ongoing, with impact assessments foreseen to be submitted to the board in January/February 2020.

These impact assessment studies will make a preliminary assessment of the different policy options of the European Partnerships. For the European Partnership on Safe and Automated Road Transport, the following policy options will be analysed in the impact assessment: baseline scenario, co-programmed European partnership and institutionalised European partnership.

The Commission (DG MOVE/DG RTD) works on developing a strategic R&I agenda, within the scope of the newly established CCAM platform (particularly in working group 1), together with Member States and all relevant stakeholders. A first outline of such an agenda could be presented during the CCAM platform plenary in December 2019, while a first stable draft could potentially be presented in spring/summer 2020.

The completion of, and agreement on, the agenda is also essential to determine the concrete participation of stakeholders in a future partnership, and the associated commitments in terms of their contribution, which is another precondition for any form of European partnership. This is particularly important for stakeholder types that have not (or only to a limited extent) been partners in previous research projects (e.g. road operators/authorities & cities), and might have more limited resources and dedicated capabilities, but which nonetheless have a key role to play in the further development of CCAM.

Contact(s): **(DG RTD), tel.:**

Annex

BOSCH

*** BOSCH is participating in FP7 and H2020 with its 26 subsidiaries listed at the end of the document.**

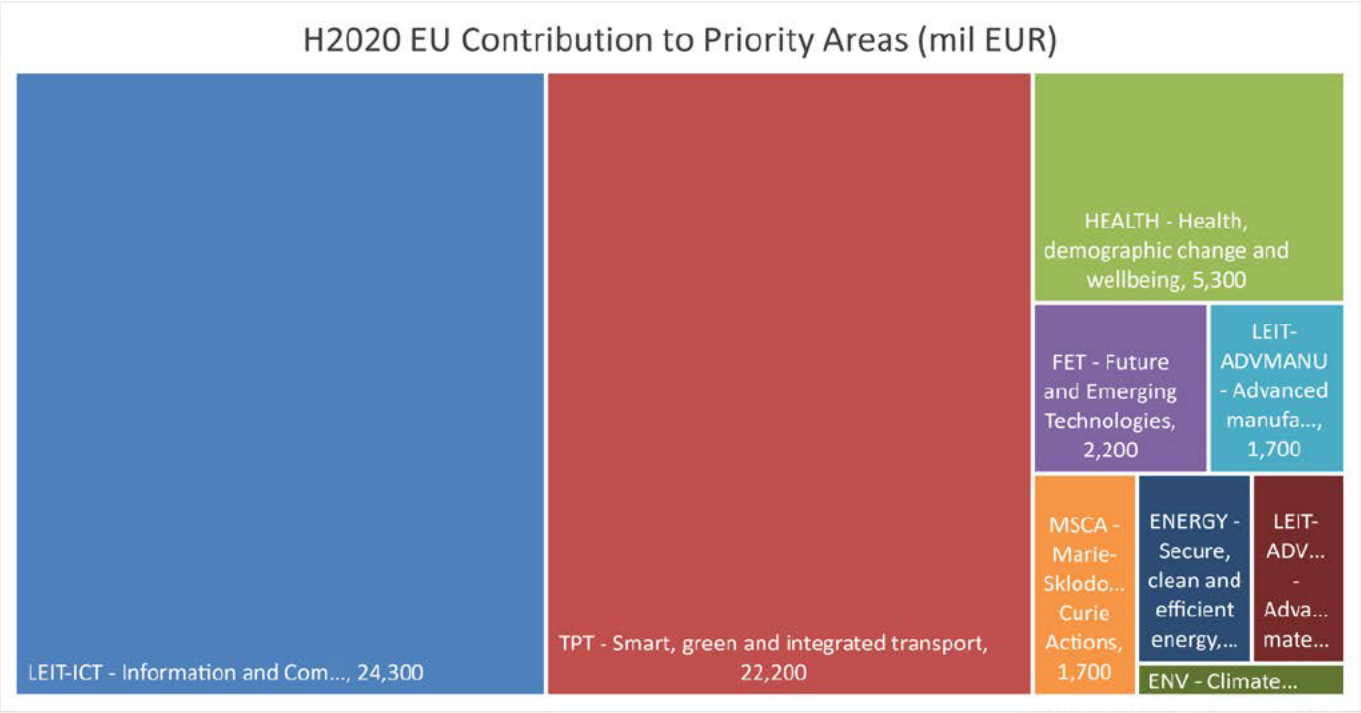
HORIZON 2020 and FP7 - Key data

	€60.8m	94	5	0	8	0
H2020						
FP7	€32.3m	78		0	4	
	of EU contribution	grants signed	grants under preparation	ERC PIs	MSCA projects	EIC projects

- **BOSCH received EUR 60.8 million** so far, **compared to 32.3 million received in FP7**;
- The **success rate** of proposals from BOSCH is **28.6%,** which is above the EU average of 13.6%;
- BOSCH participates in **111 projects** in Horizon 2020, compared to 80 participations in FP7;

Performance in H2020 priority areas

- **The top priority areas** in the H2020 budget going to BOSCH are the **Information and Communication Technologies** (EUR 24.3 million) and Smart, green and integrated transport (EUR 22.2 million);



List of subsidiaries and their participations

	FP7		H2020	
Participant Legal Name	**Nb. Participations**	**EC Contribution (M euro)**	**Nb. Participations**	**EC Contribution (M euro)**
BOSCH ENGINEERING GMBH	1	0	4	1.61
BOSCH LAWN AND GARDEN LIMITED			1	0.08
BOSCH REXROTH AG	2	0.32	3	0.71
BOSCH REXROTH BV*	3	0.26		
Bosch Rexroth Ltd	1	0.49	1	0.04
Bosch Security Systems B.V.	1	0.16		
BOSCH SENSORTEC GMBH			1	0.04
BOSCH SOFTWARE INNOVATIONS GMBH	1	0.51	4	2.04
BOSCH SOLAR THIN FILM GMBH	1	0.48		
BOSCH TERMOTECNOLOGIA SA			1	0.22
BOSCH THERMOTECHNIK GMBH	2	2.88	4	1.73
BOSCH THERMOTECHNOLOGY LTD			1	0
PROSYST SOFTWARE GmbH	2	1.03		
ROBERT BOSCH AFTERMARKET SOLUTIONS GMBH			1	0.25
ROBERT BOSCH AG			1	0.45
ROBERT BOSCH AG			1	0.26
ROBERT BOSCH AUTOMOTIVE STEERING GMBH			1	0.04
ROBERT BOSCH BATTERY SYSTEM GMBH			2	0.11
ROBERT BOSCH CAR MULTIMEDIA GMBH	1	0.44	2	0.31
ROBERT BOSCH ESPANA FABRICA CASTELLET SA			2	0.74
ROBERT BOSCH ESPANA FABRICA MADRID SA				
ROBERT BOSCH ESPANA SLU			1	0.05
ROBERT BOSCH GESELLSCHAFT FUR MEDIZINISCHE FORSCHUNG MBH	7	2.66	4	5.33
ROBERT BOSCH GMBH	57	22.87	75	46.78
ROBERT BOSCH HEALTHCARE GMBH	1	0.22		
ROBERT BOSCH STIFTUNG GMBH			1	0
	80	32.33	111	60.77