ITA
AITES

Tunnel Market Survey 2019

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MARKET ANALYSIS

INTRODUCTION

This study is the third edition of a market survey compiling global figures of construction of tunnels over the world.

One of the objectives is of course for stakeholders of the industry to know trends in the market as well as possibility of development for their own business.

Even for ITA, which is **the leading international organization promoting the use of tunnels and underground space through knowledge sharing and application of technology, getting global figures is a hard task. Since the first edition in 2014, ITA has pursued its work in collecting data. The ITA Member Nations (78 countries) have been involved in collecting the data prepared by ITA secretariat. In this analysis data are coming from 96 countries.**

Even with the help of ITA Member Nations, it is not meant to be a fully comprehensive market study but collecting more than 80%-90% of what has been done in term of tunnelling works during the year.

For some countries we succeed to get global figures but no detailed ones. Altogether it represents over 4,200 projects. 1615 projects were in construction in 2019, including 750 in China and 2615 were in study or planning phase, including 1280 in China.

GLOBAL CONSTRUCTION OUTPUT

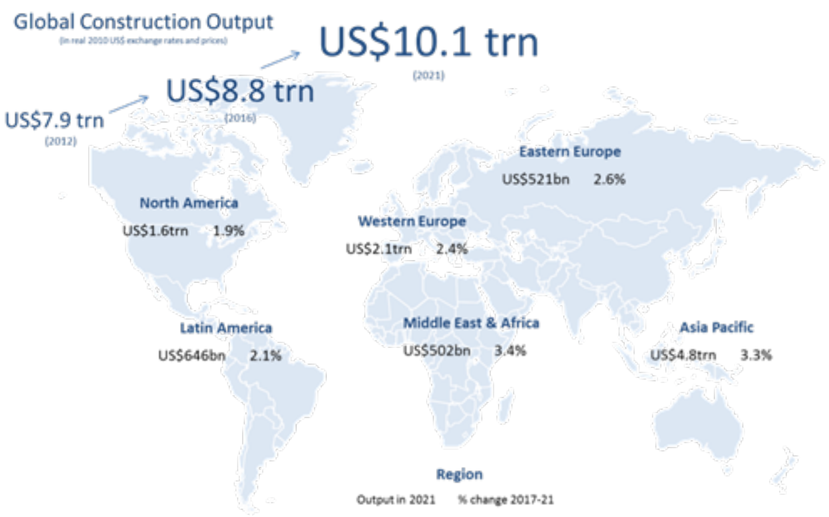
In 2017, the global construction industry output has been evaluated at 10.8 trillion US$ (9.2 trillion €) for a global world GDP of 80 trillion US $, so a share of 12.5%.

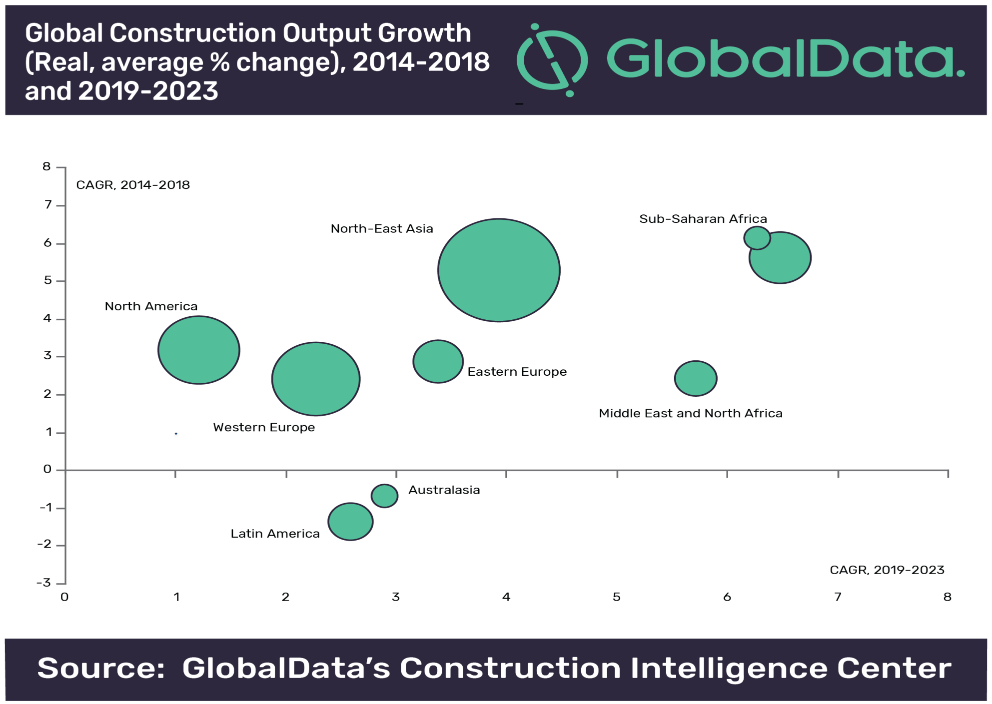
The global construction output growth has been during the last years higher than the global GDP.

With a growth of an average of 3.6% per year for 2018 and 2019, the estimation of the global construction output for 2019 is of 11.6 trillion US $ (10.5 trillion €)

The growth was supposed to continue at the same pace to reach 13 trillion US$ in 2022. Of course, the pandemic that has just occurred will totally change these figures, even though infrastructure construction could be encouraged in several parts of the world.

The growth pace of construction market in China has continued to slow down in the last years, where the growth in India and South East Asia has continued on a pace of #6%. In Australasia, the growth that was negative between 2013 to 2017 is now nearly reaching 4%





TUNNEL CONSTRUCTION IN 2019

As stated in the introduction, we have been collected data on tunnelling construction since 2011 in order to have a better view on what is going on and be able to present to you comprehensive figures in term of turn over and length of tunnels built in the world and in the different geographical areas.

The data collected represent around 1600 different construction sites all over the world. Some are quite big representing more than 500 million US$ of output in the year 2019 and some are very small sites with less than 1 million € output in 2019.

Worldwide this analysis shows a global output for tunnel and underground space construction of

 # 125bn€ (140 bn US$)

This is to compare with 86bn€/ 110 bn US$ in 2017

The growth of around 9% per year in the tunnelling market is 2.5 times as big as the global construction growth.

In terms of km of tunnels constructed the yearly average is the same as in previous years

5,200 km

This figure may seemed odd, but the main reason is that the information on China that we have had during these years may vary a lot, and as China is a very important share of the market it influences the global figures.

Considering that civil engineering is usually 20% of the construction market, the tunnelling market is representing 6 to 7% of the infrastructure construction market. Of course this share varies a lot depending on the countries.

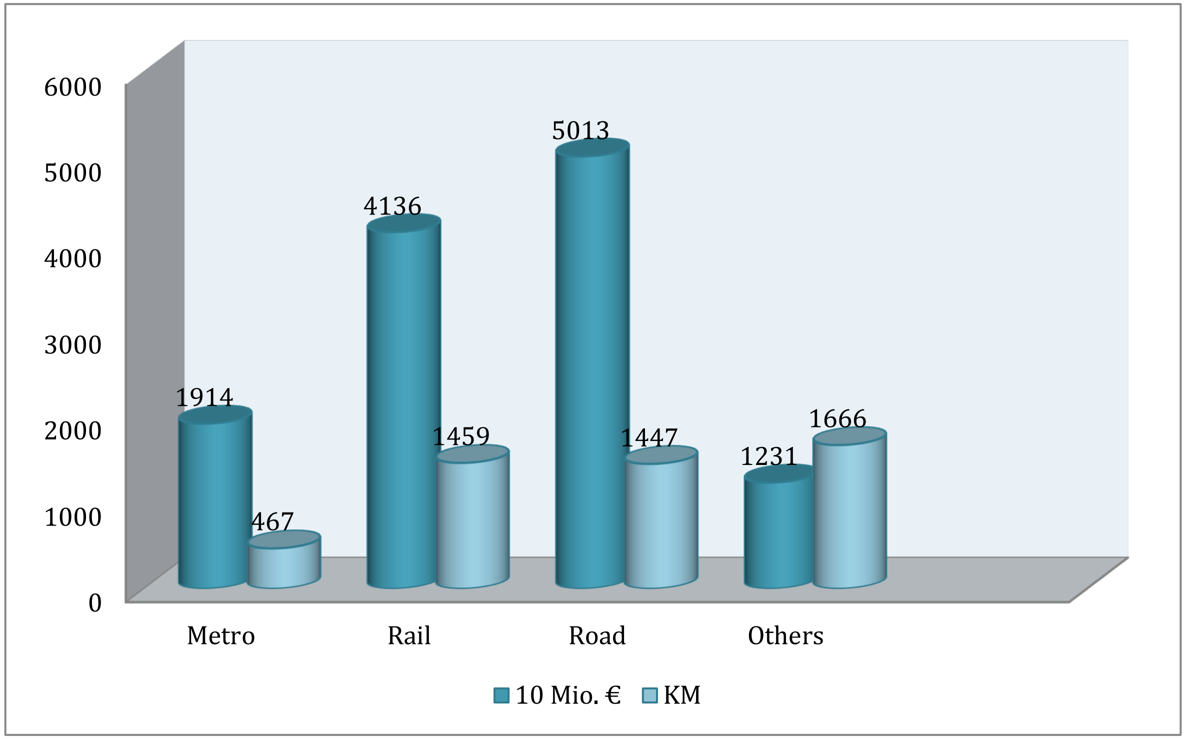
Nevertheless these figures really show the importance and in fact the growing importance of construction of tunnels in the world.

It is also interesting to see the breakdown by use of tunnels.

Rail tunnels are over the world representing a share of 29% of the length of tunnels excavated during the year and 34% of the output.

Road tunnels represent 29% in kilometres and 40 % in output, where metro tunnels represent only 9% in kilometres but 16% in output.

At the opposite other types of tunnels, including tunnels for hydro and utilities represent 33 % in length and only 10% in cost.

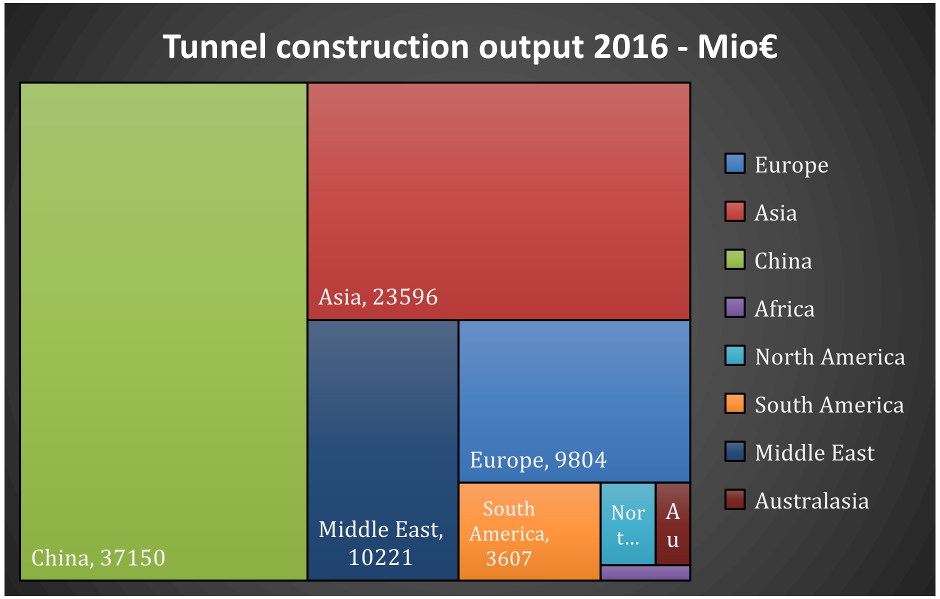


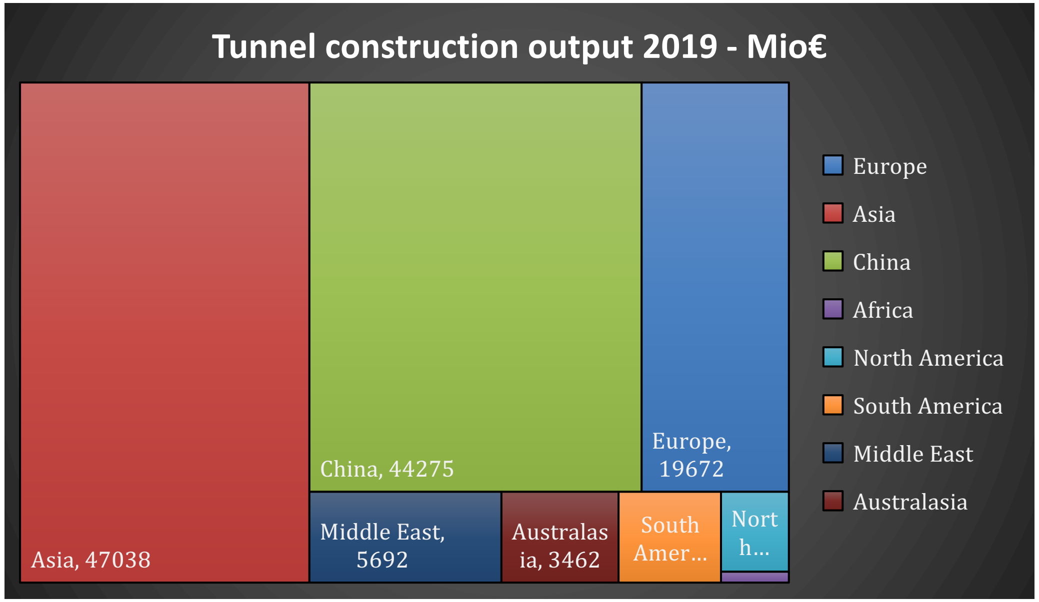
BREAKDOWN BY GEOGRAPHICAL AREAS

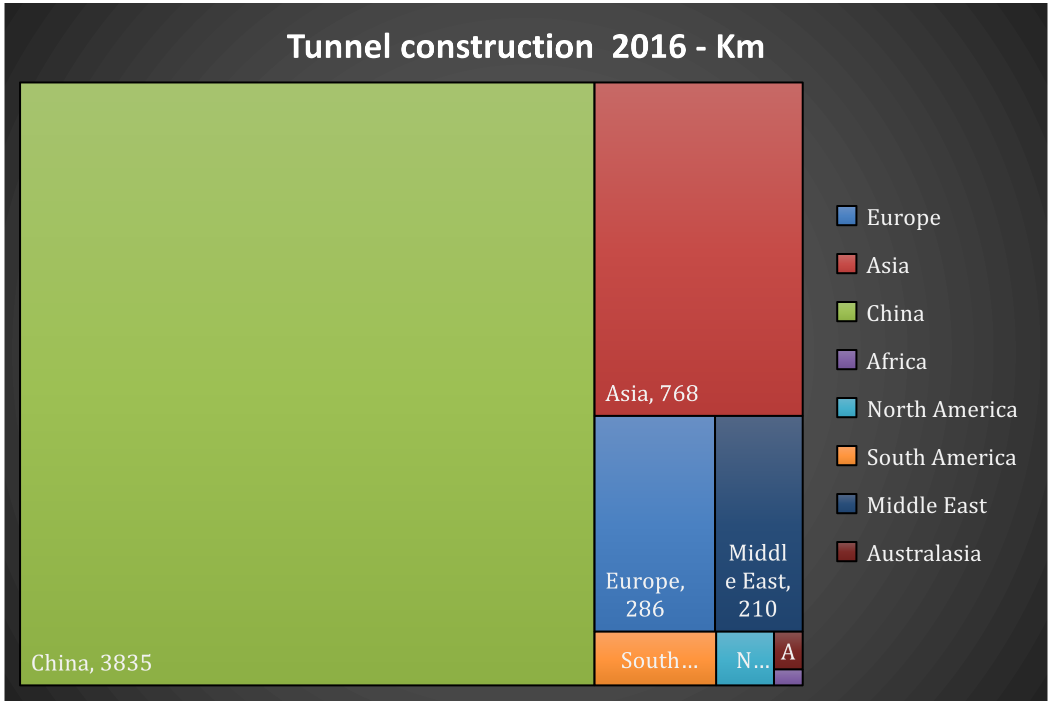
The evolution of the market between 2016 and 2019 is clear on the graphs hereafter.

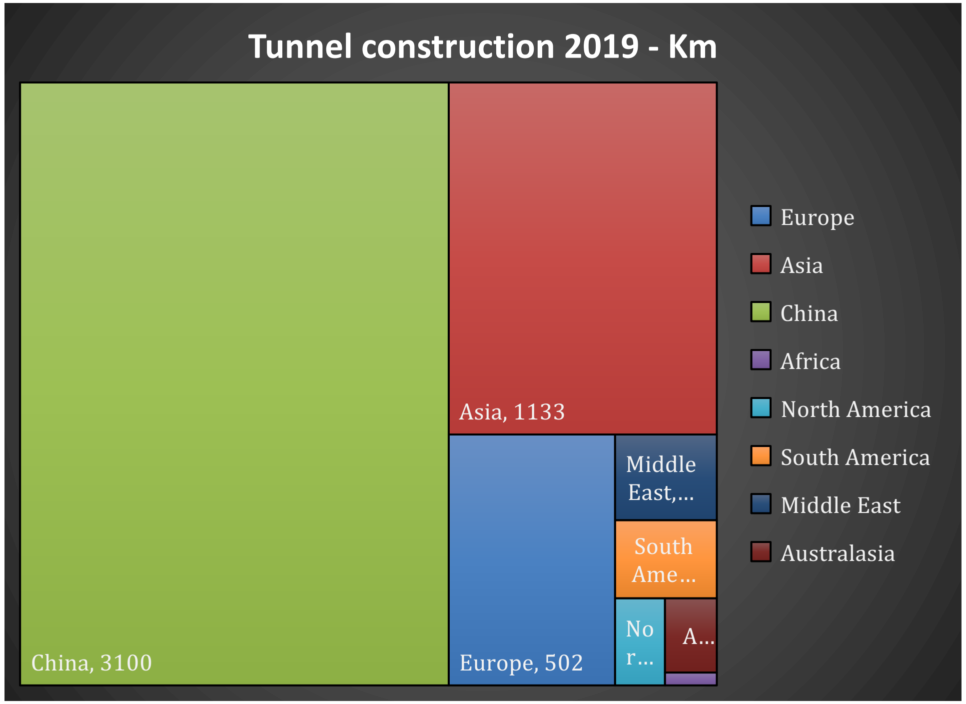
One main reason is the lower growth on the Chinese market compared to the other large markets that are Asia (without China) and Europe. This is partly due to the difficulty to get precise information on the ongoing projects, to a general slowdown of the global economic growth which lead to a total smaller global length of tunnels excavated compensated by an increase in the cost of construction, largely depending on the different uses of the tunnels.

For Europe and Asia we can observe a growth of 100% in the output and of 50 to 75% in the global length of tunnels.



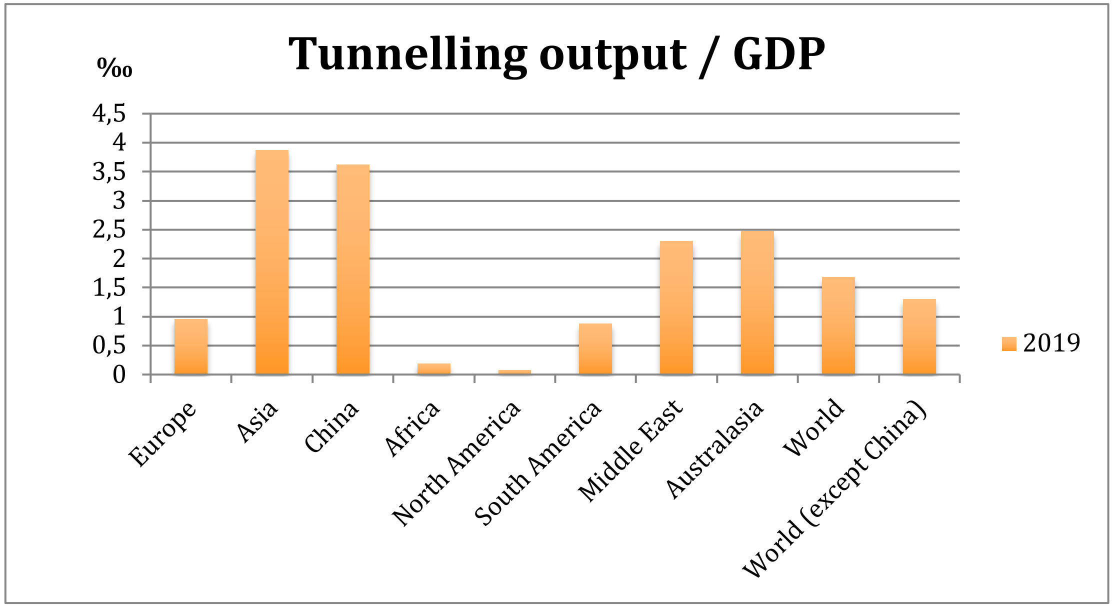






As for previous study, we have calculated the importance of the tunnelling construction in regards of the total GDP of the country.

Worldwide tunnel construction represents 1.7‰ of GDP varying from 0.1‰ in North America to 3.9‰ in Asia, with 1‰ in Europe, 2.3‰ in Midlle East, 2.5‰ in Australasia and 3.5‰ in China

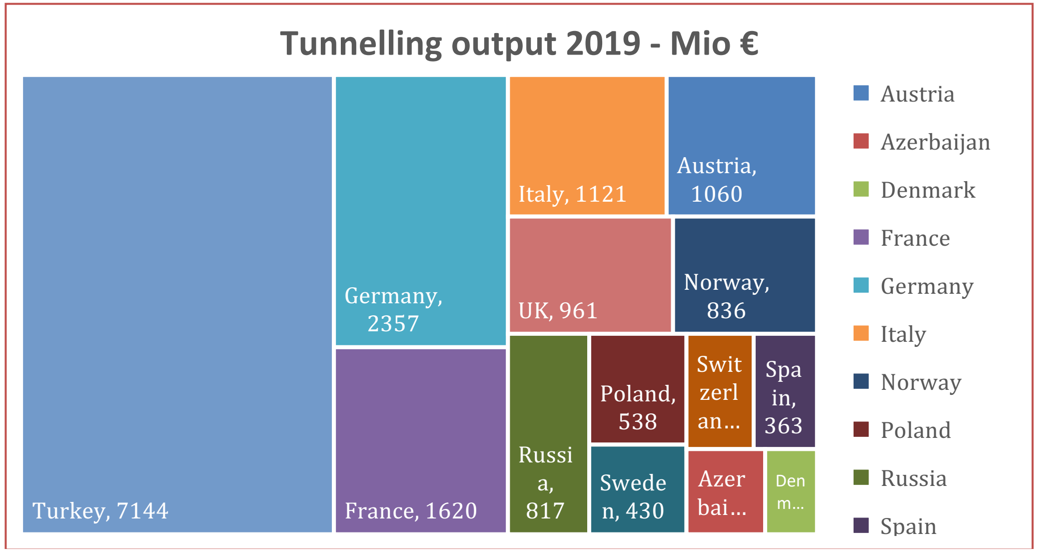


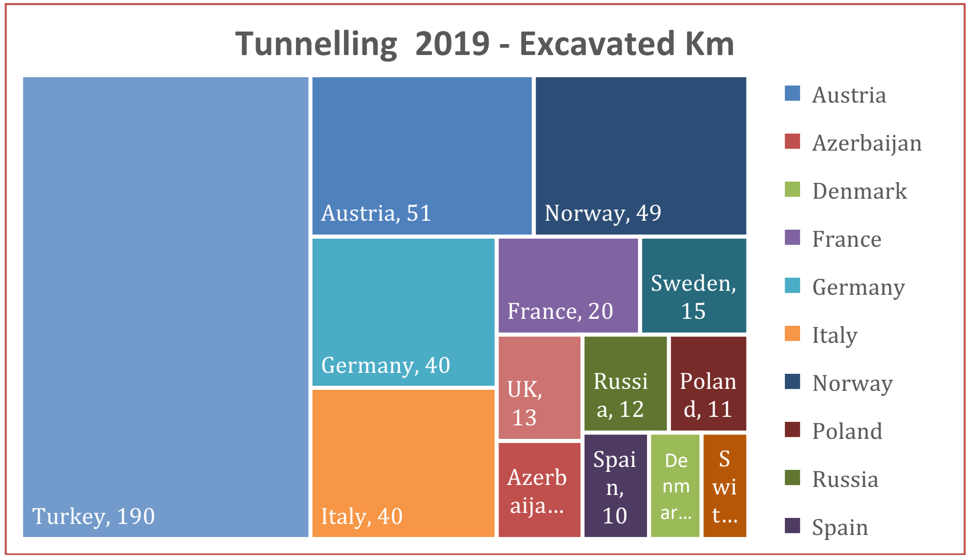
Europe

Until the beginning of the years 2010's, Europe has been the largest tunnelling market.

It is no longer the case, as China represents now by itself more than 50% of the length of the tunnels in construction and between 40 and 50% of the output of the tunnelling market

In 2019, Turkey became the first tunnelling market in Europe, both in term of output (7,144 Mio€) as in term of excavated kilometres of tunnel (190 km)
In term of output, Turkey is followed by Germany (2,357 Mio€), France (1,620 Mio€), Italy (1,121 Mio€), Austria (1,060Mio€) and UK (961 Mio€).
In term of length of tunnels excavated during the year 2019, Turkey is still the largest market in Europe (190 km), followed by Austria (51 km), Norway (49 km), Germany and Italy (40 km). This difference comes from the different types of tunnels built in the different countries. For example, 90% of the tunnelling output in France in 2019 is coming from metro construction, where in Norway it represents less than 5%.

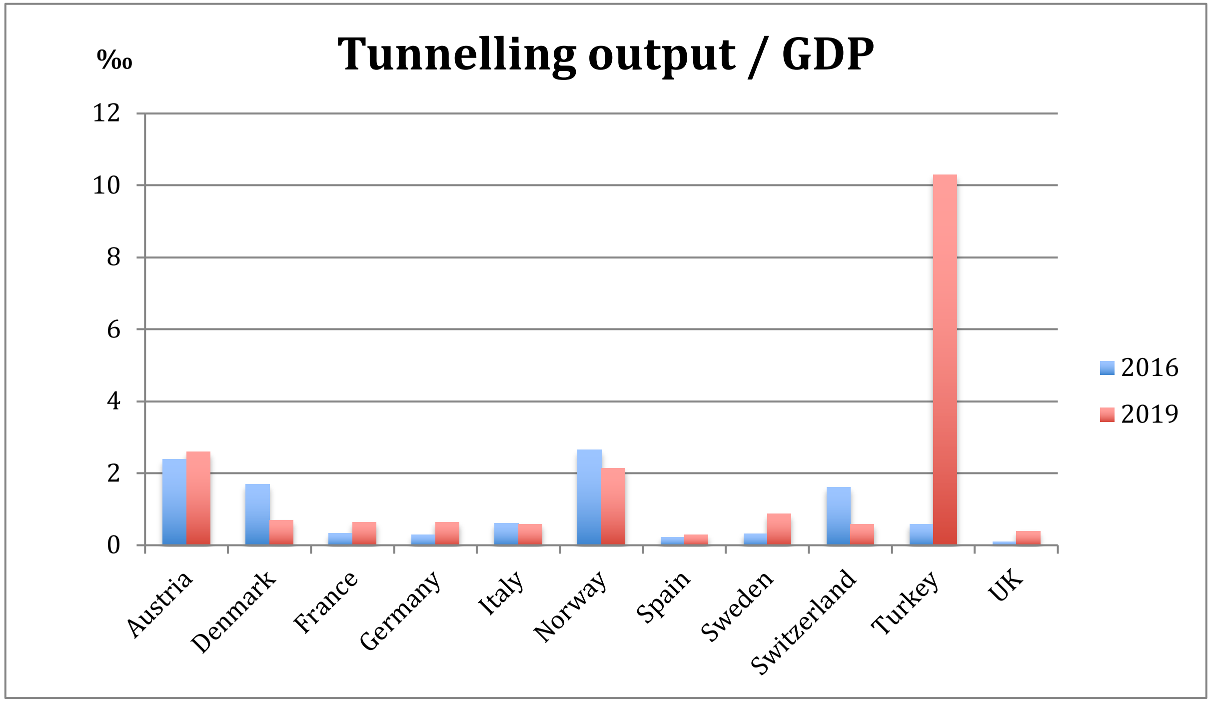




In details, tunnelling construction vs GDP shows changes along the years.

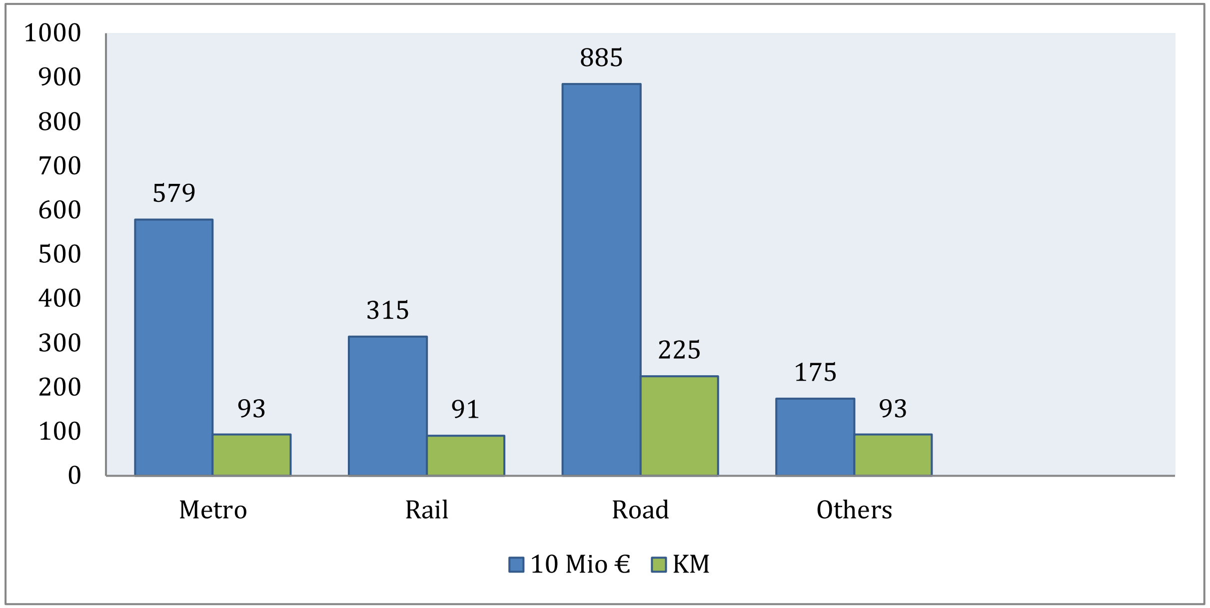
In 2016, Norway, with a ratio 2.65 ‰ was the country spending relatively the most on tunnel construction followed by Austria, Switzerland, Denmark and Italy and Turkey.

In 2019, Turkey has a ratio nearly 4 times higher (10.3‰) followed by Austria (2.6‰), Norway (2.15‰) and other European countries being between 0.6 and 1‰.



Repartition by use in Europe

On the graph opposite, you can see the repartition of tunnelling works by use of tunnels as well in output as in km.

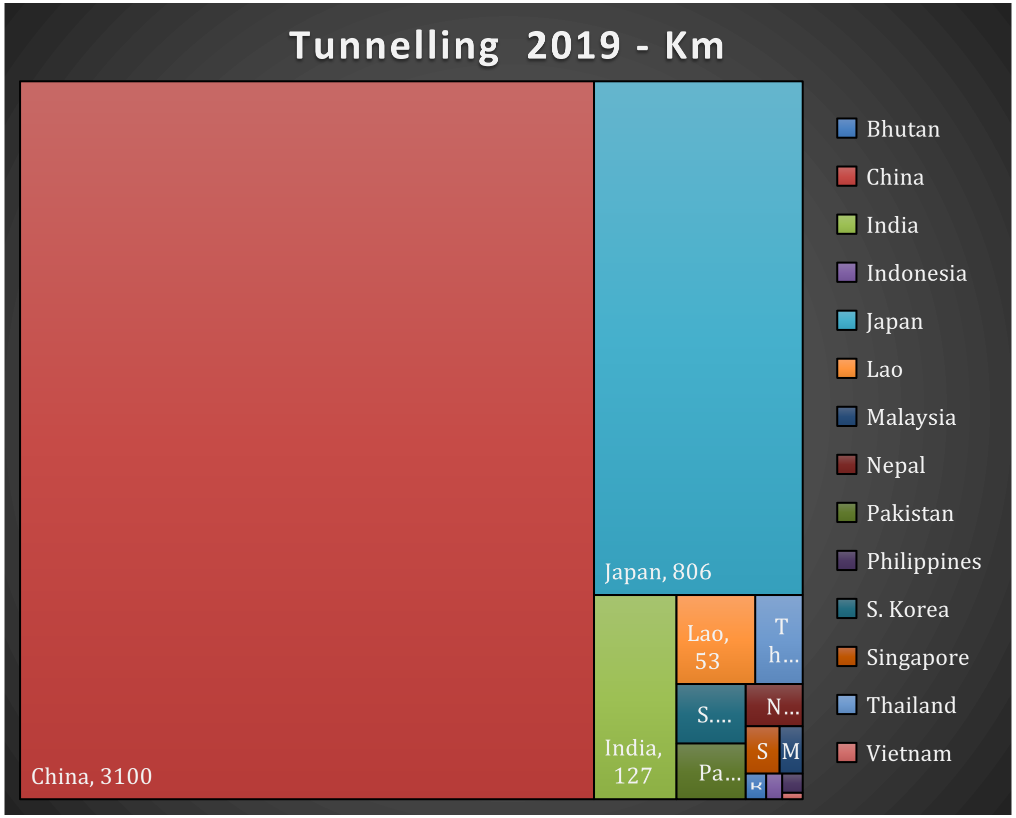


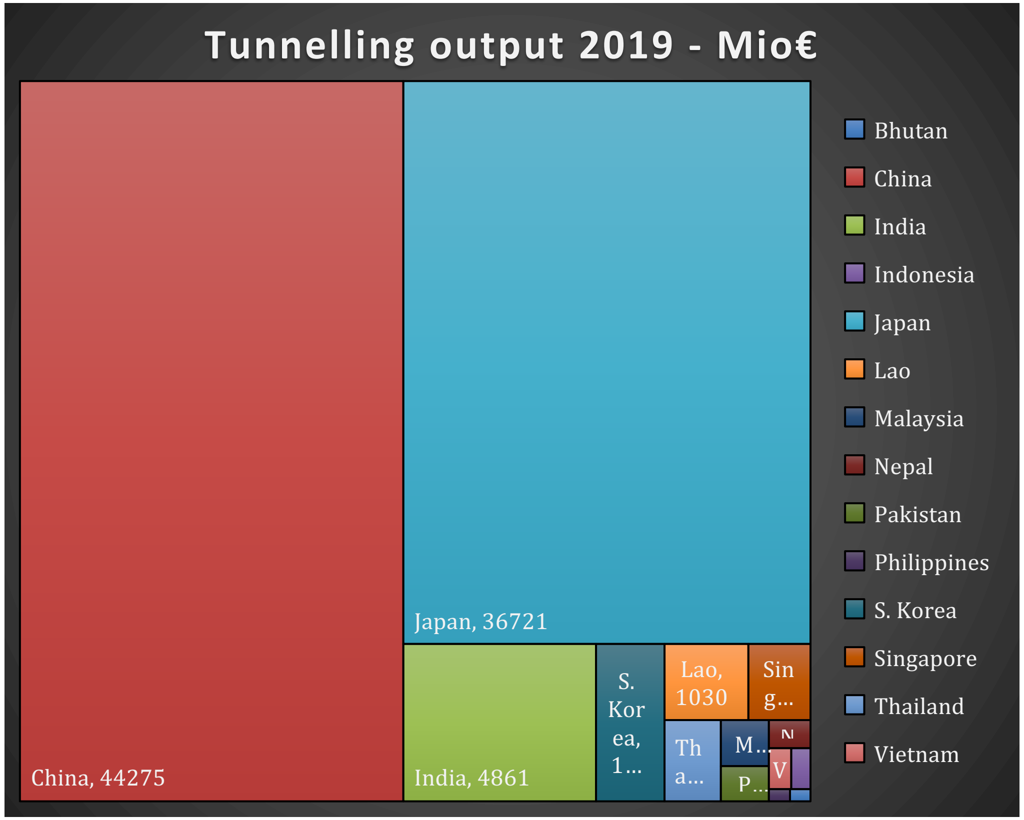
Asia

Globally, the whole Asia including China, represents more than 70% of the world tunnelling market.

China itself represents 60% of the length of tunnel excavated, the rest of Asia 23%; In term of output, China represents 35% and the rest of Asia 37.5%

If we consider only metro, rail and road tunnels, globally Asia represents 73%, including China for 35% in output and 82% in length including China (62%)



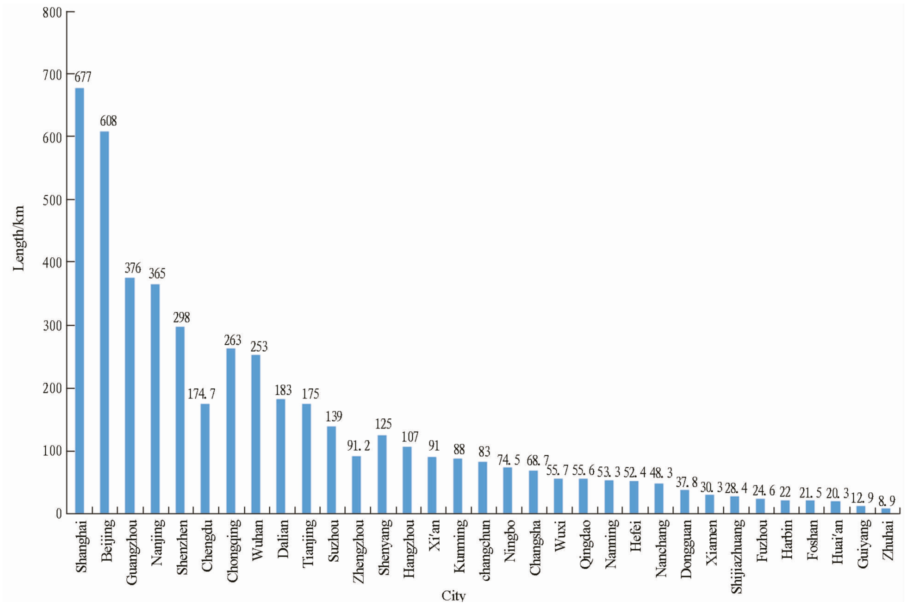


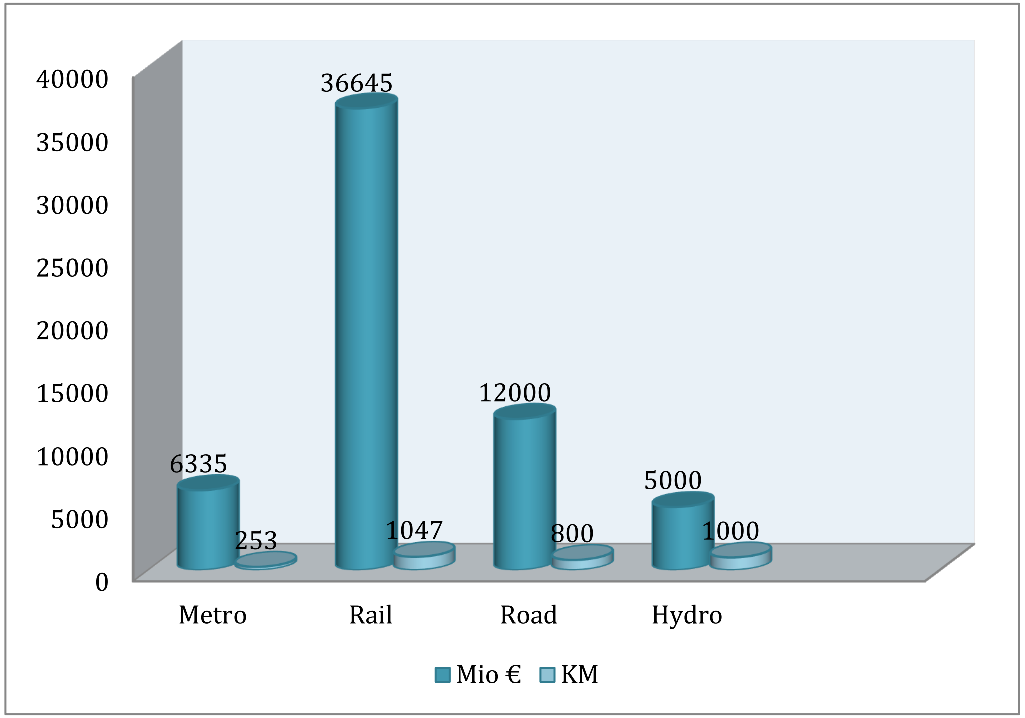
China

If China remains the biggest tunnelling market, its share is now only 35% compared to 45% 3 years ago in terms of output. Nevertheless, in terms of excavated length of tunnels, it still represents 60%.

Concerning tunnels, the initiating growth coincides with the allocating of the Olympic games to Beijing. The government decided in the same time to build metro lines in Beijing but also in many other countries but also to build all over the country a high-speed line network.
The latest statistics showed that end of 2019, the operating mileage of urban rail transit in mainland China was over 5,000 km. In the past years several cities opened their first metro lines such as Shijiazhuang, Guiyang, Xiamen and Zhuhai. The 5000 km are mainly subway with only about 250 km of light railway. 33 cities in China have got an underground metro network :

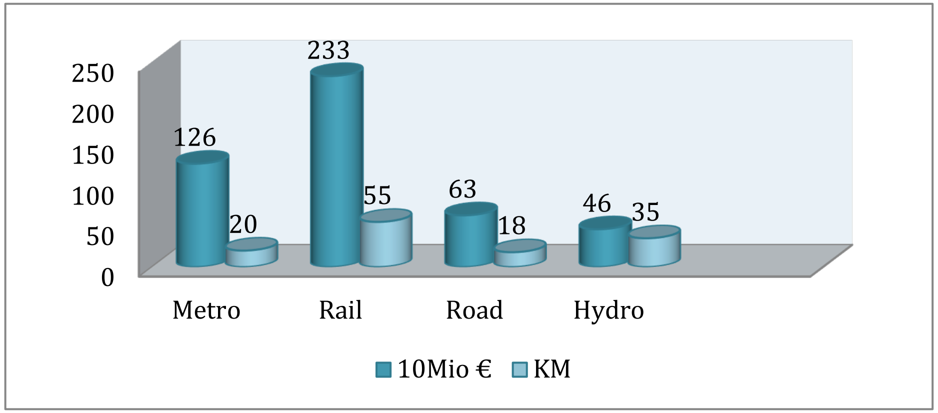
Yearly around 400 to 500 new railway tunnels are put into operation representing roughly 1000 km of new tunnels. At the moment the railway tunnels in operation in China Mainland are above 15,000 with a total length of about 16 to 17 thousand of km;
The tunnels for high-speed lines in construction are about 1,500 with a total length of about 3,057 km; among them 8 tunnels longer than 15 km were in construction
Concerning roads and mainly highways, around 1,000 tunnels are built yearly for a total length of 1,250 km.





India

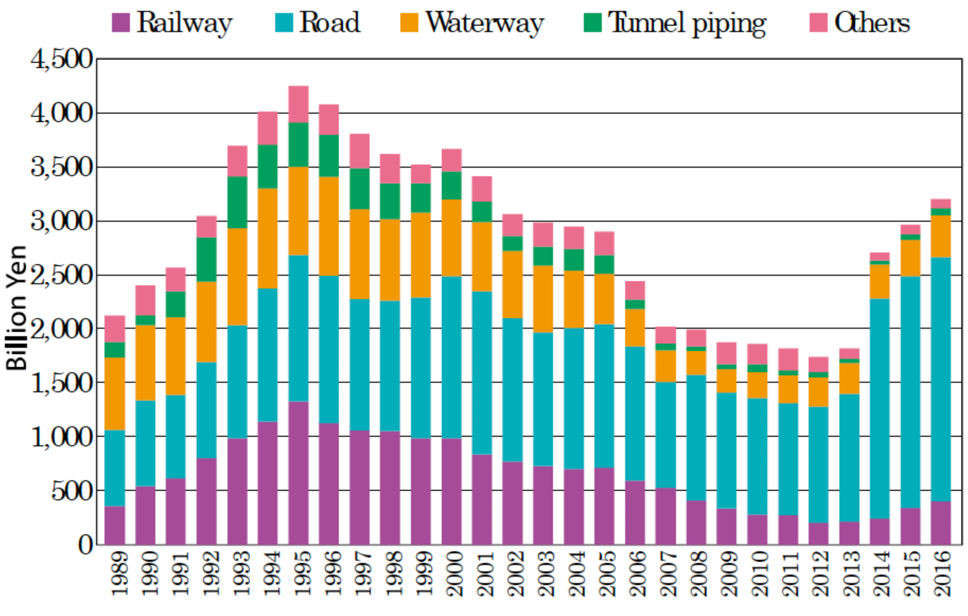
Compared to 2016, the global tunnelling market has nearly doubled and is continuing to grow. . The tunnelling output in 2019 reached 4,700 Mio € compared to 2,850 Mio€ in 2016. Main growth comes from rail and road tunnels.



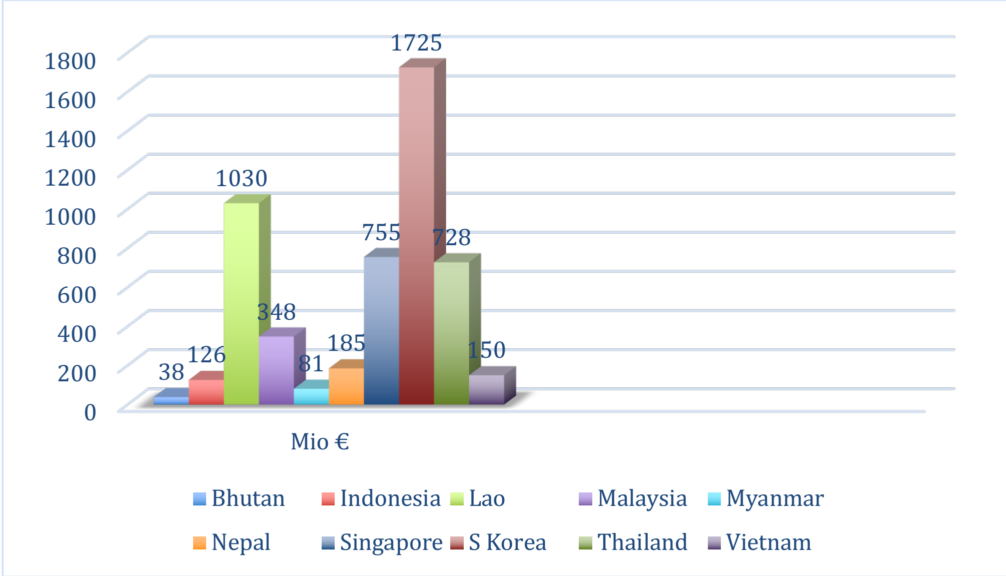
Japan

The total amount of construction investment in tunnels and underground spaces in Japan increased rapidly until 1995, but since 1995 it has been on the downturn due to continuing governments curbs on public investments. However, from 2011 it had been flat because of reconstruction demands after the Great East Japan Earthquake and in 2014 it tended to increase drastically again due to improvement projects of the transportation network for the coming 2020 Olympic games in Tokyo. Since then it has increased from 22bn € in 2014 to 36bn € in 2019 so a growth of 12.5% per year during these last 5 years.
Roads represent 60% of the total investment where railway tunnels represent 30% and metro tunnels only 3%

	No. of construction section	Total length (km)	Contract amount (US$bn)
Road	234	354	20.7
Railway	74	213	6.2
Waterway	150	261	5.1
Overseas	22	93	4.8
Others	46	96	1.8
Grand Total	**526**	**1017**	**38.6**



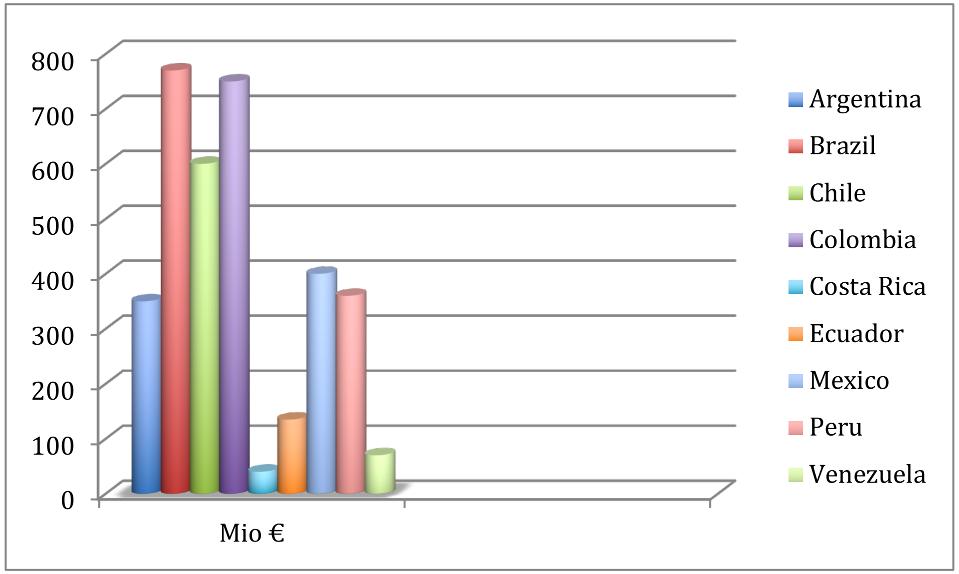
Other Asian countries



The two other major tunnelling markets are South Korea and Singapore. Both markets are mature, with mainly permanent metro construction in Singapore and metro and rail in South Korea. Even if the total amount of works done during the year 2019 has been less than in 2016 the global amount of works in progress has grew by more than 100% in the two countries. In Thailand, due both to metro construction and hydro projects the market has increased rapidly during the past years being multiplied by more than 4 between 2016 and 2019. In Malaysia despite periods of stop and go the market remains around 400 mil€ per year. The huge hydro projects in different countries such as Lao, Nepal and even starting in Bhutan are contributing the global growth in the region.

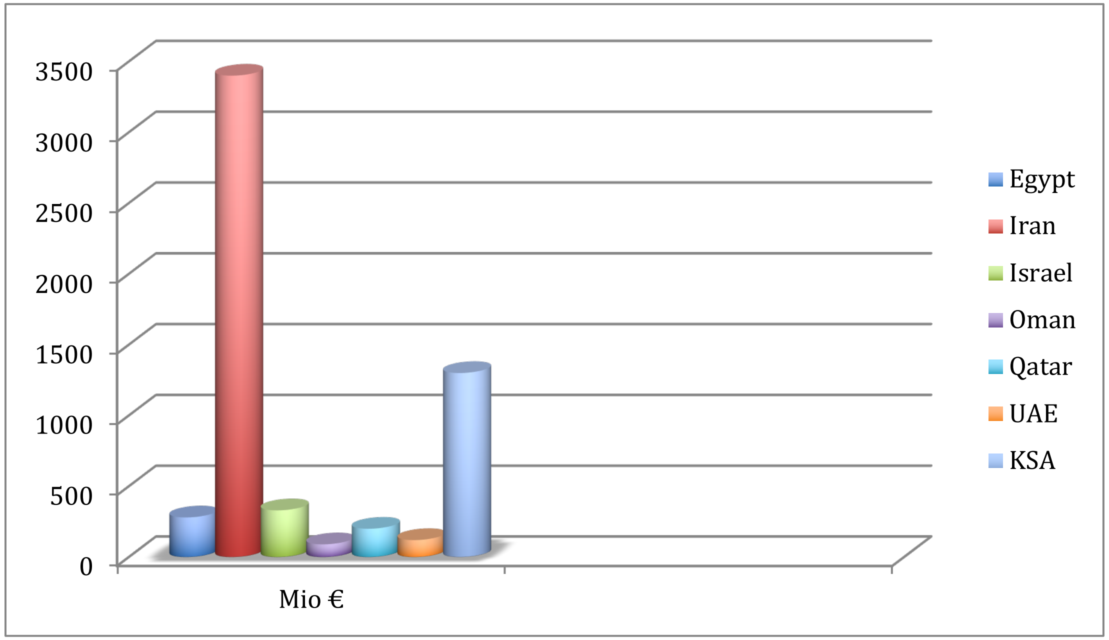
Latin America

The Latin American Countries have quite homogeneous market between 350 and 750 million € output. except The Latin American market remained stable during the past years with a global output of 3.1 bn€.



Middle East

Globally the Middle East region has been the most expanding region with a market growth of around 300%. This is mainly due to 3 countries Iran, Qatar and Saudi Arabia. In the two latest it is due to huge metro development and in Iran to road and rail tunnels.

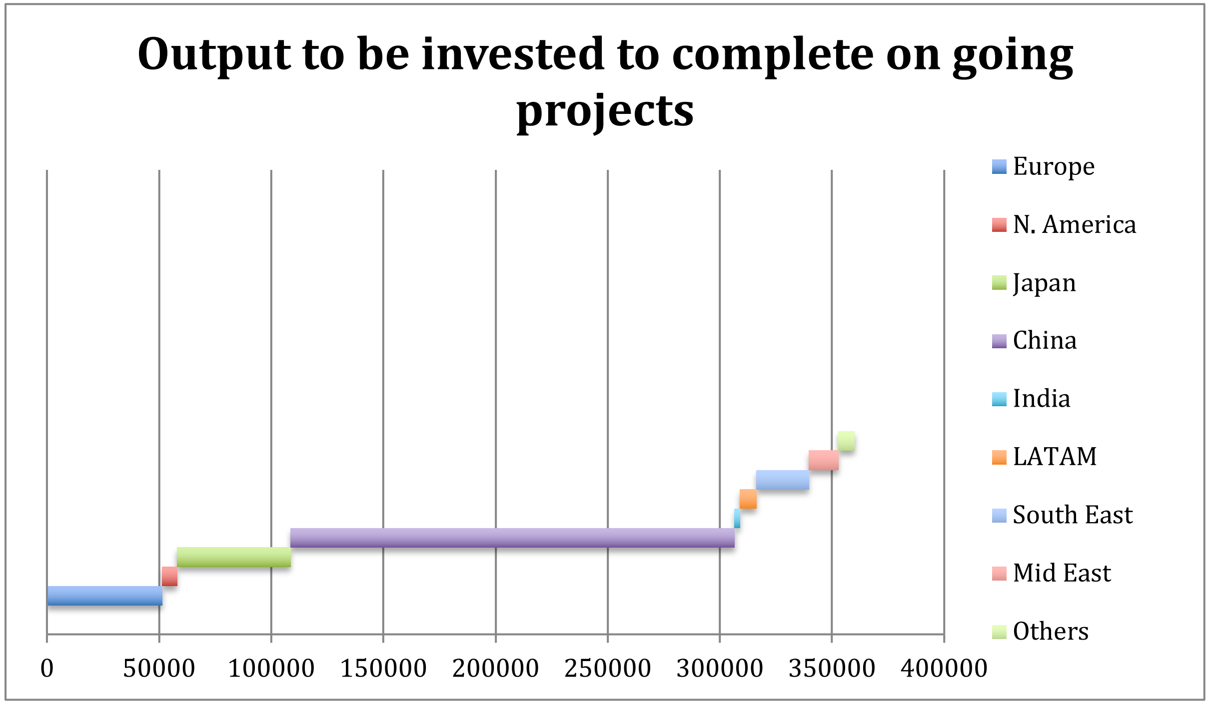


TUNNEL CONSTRUCTION PROJECTS

Taking into account all tunnels that were in construction in 2019, we have quantified the output still to be invested to complete all these projects.

This global out put is of **360 bn€** including 200 bn € for Chinese projects. It globally represents three years of work.

The geographical output of these projects to be completed is given below.



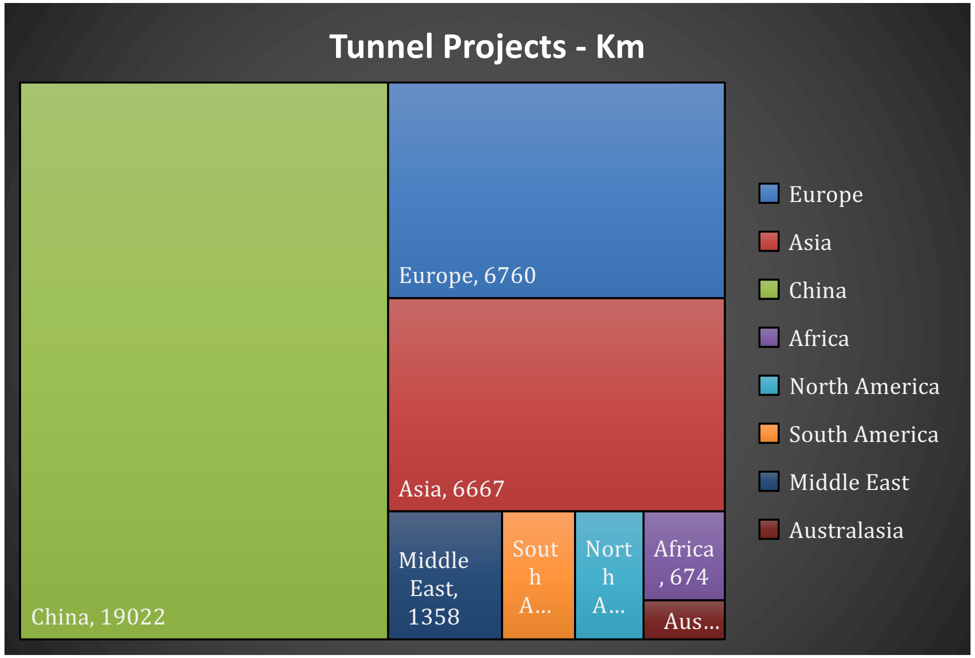
The planned global output is of 1385 bn€ representing more than 11 years of tunnelling works. Outside China it represents 912 bn€.

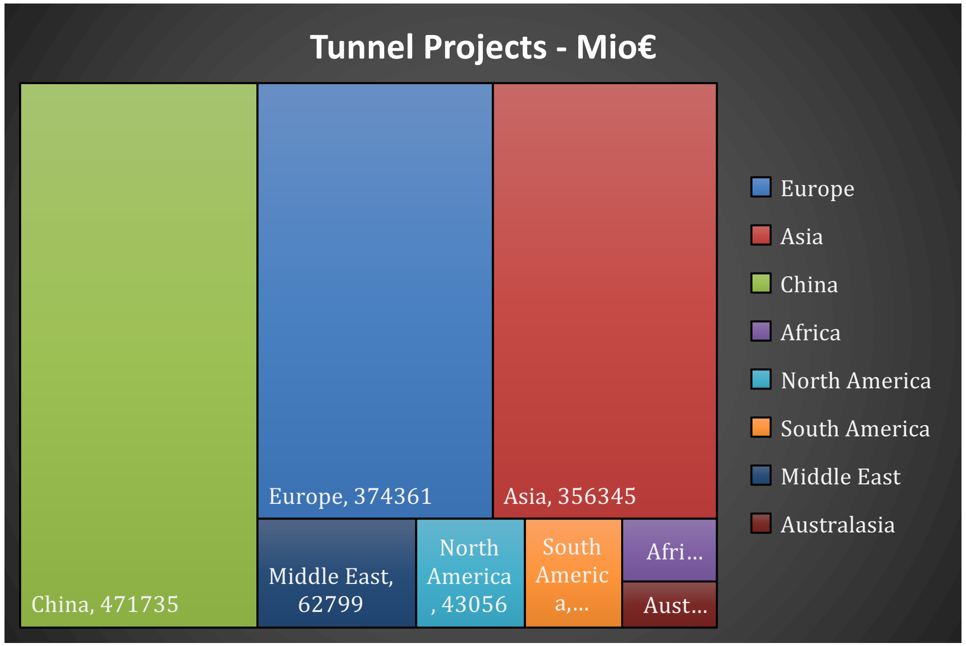
Concerning future projects in design or planning phases, the analysis is somehow a difficult task as the pace of programming is very changing from countries to countries.

We have identified tunnelling projects all over the world. For those which studies have already been made or being in an advanced stage, the information, notably on the cost are accurate, for those that will be built in a longer term or which are only at a feasibility study stage, the cost estimation has been made on average costs for similar projects in a similar geographical zone.

The data collected represent around 2,600 different projects all over the world. Depending on the stage of the project, the project can be considered as a whole or if the studies are more advanced, it could have been divided in several projects

As already written, in Europe most of projects often needs years or even decades to come to the construction stage where in other parts of the world decision and financing can go more quickly.





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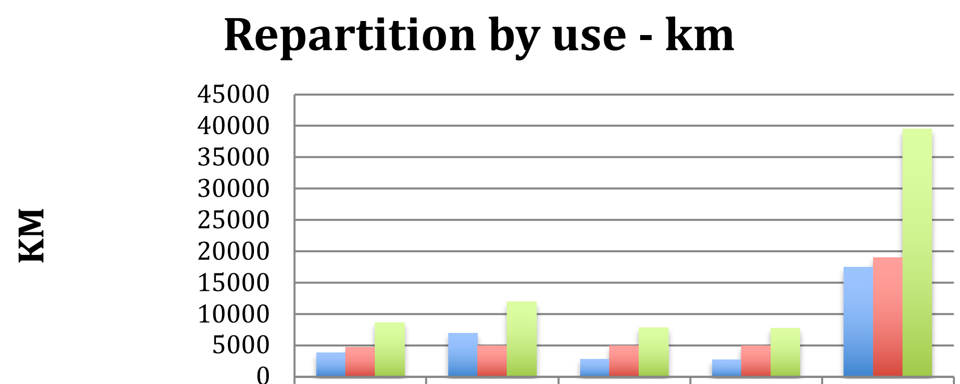
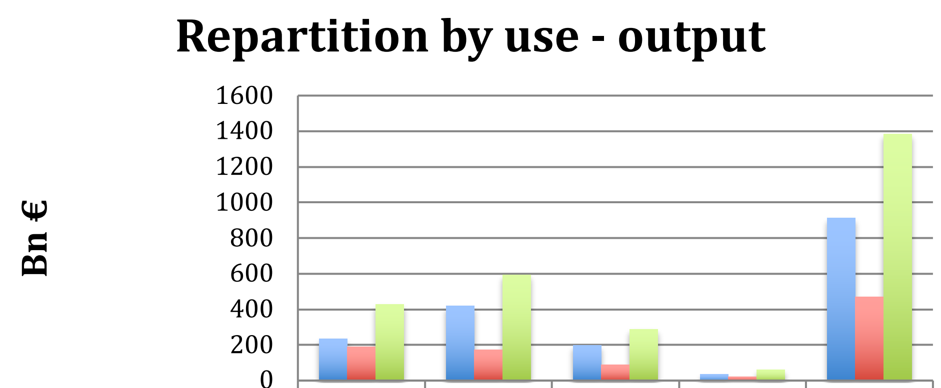
The repartition of future projects by use is given below for the world without China, China and the total world



	Metro	Rail	Road	Water ++	Total
World without China	3900	7000	2900	2800	17500
China	4800	5000	5000	5000	19000
World	8700	12000	7900	7800	39500



	Metro	Rail	Road	Water ++	Total
World without China	237	420	200	37	912
China	191	175	90	25	471
World	428	595	290	62	1385

AFRICA

In 2019, ITA released a first draft survey on prospective of Tunnelling and Underground Works in Africa. Taking into account the economic, population development of large cities we established a list of potential projects in 10 countries.

Country	Tunnels and Underground Space – Main projects
Egypt (MN)	Cairo Metro Lines 3,4,5 & 6 (102 km) Alexandria (40 km) – Road Tunnels (20km) – Rail Tunnels (25km); Waste water system (45km)- Hydro : <4 km
South Africa (incl. Lesotho)(MN)	Lesotho LHWP (#85km) - Gautrain (#10km) – Highspeed Johannesburg/Durban/Musina (5-8 km)
Morocco (MN)	Rail tunnels (15 + 40 km Gibraltar) – Road tunnels (10 km) – Hydro (5 km) – Waste water/ irrigation: 15 km – Metro (< 5 km) Casablanca
Ethiopia	Rail tunnels: (35- 40 km) mountainous north/northwest area – Road tunnels (4-6 km) – Hydro : (6 km) GERD, Gibe III , Koysha – Waste water/irrigation: (5 km) small scale projects
Kenya	Waste water/irrigation : 60-80 km (Master Plan 2030) – Rail tunnels (5 km) Kisimu – Road tunnels (< 2 km)– Hydro (6 km) Seven Forks, Magwagwa, Sondu – Metro (0 km)
Rwanda	Rail tunnels (5-8 km) – Road tunnels (2 km) Kigali – Waste water/irrigation: 20 km (Kigali, Mukanga, Nyagatare) – Hydro: 6 km (Rusizi III +IV)
Tanzania	Rail tunnels (10 km) Dar es Salaam-Morogno and Morogno-Makutoproa – Road tunnels (< 2km) – Hydro (6-8 km) – Waste water/irrigation (10-15 km)
Nigeria (MN)	Metro (6-8 km) Nairobi – Rail tunnels (10-15 km) - Road tunnels (< 1 km) – Waste water/irrigation :(> 15 km) Abuja, Kano – Hydro : 40 km (Mambilla, Zunguru, Guara)
Ghana	Rail tunnels (3-5 km) Ghana to Burkina line – Road tunnels (< 3 km) – Hydro (2-4 km) – Waste water/irrigation: (10 km) Accra, Kumasi, Metro (0 km) Accra and Kumasi light rail elevated lines planned.
Ivory Coast	Metro (5 km) Abidjan – Rail tunnels (10 km) – Road tunnels (< 2km) – Waste water/irrigation: 5 km – Hydro (5 km)

CONCLUSION

Of course, the pandemic that hit the whole world in early 2020 and is not yet over, will have consequences on the tunnel market for 2020 but also for the following years.

In many countries, most construction sites have been on hold for several months and mandatory health measures are having an impact on the rate of progress of the tunnel works.

In view of the progress of major projects, a reduction of up to 25% in the length of the excavated tunnels, depending on the country, could be envisaged for the year 2020. It could represent up to 1000 km less excavated.

For the years to come, the various conjuncture institutes forecast an overall growth in construction of around 10 to 15% in 2021 (compared to 2020) and growth of 2 to 4% per year in the following years (2022 to 2024).
At this stage, it is difficult to predict what the exact consequences will be on the tunnelling industry.
It seems that in Europe, for example, the number of tenders has not decreased, but we do not have enough hindsight to know whether this will last.

In many countries, the infrastructure sector is expected to show relatively healthy growth driven by government efforts, particularly in rail and public transport, as well as in energy and utility projects. All of these projects generally generate tunnelling works.

In some countries, the recovery may take longer. This seems to be the case in India where the budget deficit affects investments in the public sector. Latin America, which is severely suffering from the pandemic, is the continent where construction is contracting the most - around 25% - and could continue to contract in 2021.

Conversely, China, which is the largest market for tunnel construction, appears to have weathered the consequences of the pandemic with infrastructure investments falling by less than 1% and even increasing by more than 5%. in rail transport in the first eight months of 2020.

If we try to aggregate the above information, we could see an overall decline of 10% to 15 % in 2020 and a growth of around 3-5% per year (compared to 7-9% in previous years) in the 3 years to come.

MARKET SUMMARY

		In construction in 2019															FUTURE PROJECTS													
	2016	2019		Metro			Rail			Roads			Hydro/ water			To be done	Projects		Metro			Rail			Roads			Hydro/ water		
	Mio€	km	Mio€	Mio€	Km	€/km	Mio€	Km	€/km	Mio€	Km	€/km	Mio€	Km	€/km	Mio€	Mio€	Km	Mio€	km	€/km	Mio€	km	€/km	Mio€	km	€/km	Mio€	km	€/km
Afghanistan	0	0	0														140	2,6							140	2,6	53,8			
Albania	4	8	93							71,0	5,0	14,2	12,0	3,0	4,0	150	495	31,0							455	7,0	65,0	40	24,0	1,7
Algeria	38	3	183	133,0	2,0	66,5				50,0	0,7	71,4				357	1775	37,0	825	15,0	55,0	250	12,0	20,8	700	10,0	70,0			
Angola		3	31										30,5	2,6	11,7	70														
Argentina	277	20	352				265,0	4,0	66,3				87,0	16,0	5,4	1137	4880	178										4880	178,0	27,4
Australia	750	46	3462	850,0	17,0	50,0	443,0	6,0	73,8	2168,0	22,7	95,5				5900	14265	257,5	2950	64,0	46,1	6525	113,5	57,5	4250	50,0	85,0	540	30,0	18,0
Austria	875	51	1060	8,2			838,0	39,0		127,0	2,0	63,5	98,0	10,0	9,8	2094	9266	219,0	1300	22,5	57,8	3950	69,0	57,2	3903	120,0	32,5	50	8,0	6,3
Azerbaïdjan	49	12	334	45,0	1,0	45,0	110,0	2,0	55,0	148,0	2,3	65,8	31,0	6,5	4,8	230	8705	183,0	7200	160,0	45,0	490	10,0	49,0	925	13,0	71,2			
Bangladesh		2	154							154,0	2,0	77,0				650														
Belarus	200	1	85	75,0	1,0	75,0										250	600	7,0	600	7,0	85,7									
Belgium	18	0	43				10,0									98	5363	87,0	643	4,4	146,1	3850	72,0	53,5	870	10,0	87,0			
Bhutan	42	4	38										38,0	4,0	9,5	241	2370	82							2170	62,0	35,0	200	20,0	10,0
Bolivia		0																												
Bosnia Herzegovina	26	5	52							39,0	2,2	17,7	13,0	2,6	5,0	178	1195	50,0							1195	50,0	23,9			
Brazil	1100	25	770	115,0	2,1	54,8	135,0	2,4	56,3	280,0	4,0	70,0	120,0	16,0	7,5	2662	10395	173	4180	64,2	65,1	4500	90,0	50,0	645	8,4	76,8	70	10,0	7,0
Bulgaria	8	2	148	127,0	1,5	84,7	3,5			18,0	0,5	36,0				662	3416	60,0	822	12,0	68,5	1664	35,0	47,5	930	13,0	71,5			
Canada	270	7	185	60,0	1,0	60,0	9,0						115,0	6,0	19,2	695	6272	140	3672	66,0	55,6				1770	21,0	84,3	830	53,0	15,7
Chile	700	18	603							270,0	3,4	79,4	248,0	15,0	16,5	2476	7750	145	4593	73,3	62,7	1900	34,0	55,9	750	11,7	64,1	525	28,3	18,6
China	37150	3100	44275	6335,0	253,4	25,0	20940,0	1047,0	20,0	12000,0	800,0	15,0	5000,0	1000,0	5,0	198537	471735	19022	191480	4787,0	40,0	183255	5235,0	35,0	72000	4000,0	18,0	25000	5000,0	5,0
Colombia	405	14	754							754,0	14,0	53,9				786	1576	37							1576	37,0	42,6			
Costa Rica		1	34							34,0	0,5	68,0				47	41	15							107	1,5	71,3	63	13,0	4,8
Croatia		0															1450	42,0				645	18,5	34,9	805	23,5	34,3			
Czech Republic	27	1	38				2,0			36,0	0,6	60,0				47	8476	163,0	550	11,0	50,0	7886	150,0	52,6	40	1,0	40,0			
Denmark	360	8	218	108,0	1,1	98,2				101,0	6,7	15,1	8,5	0,5	17,0	3245	17495	207,0	4700	53,0	88,7	4735	62,0	76,4	4800	82,0	58,5	60	8,0	7,5
Ecuador	405	2	135	135,0	2,2	61,4											420	13	320	5,5	58,2							100	7,5	13,3
Egypt	300	5	282	282,0	4,5	62,7										1054	7330	170,0	6350	103,0	61,7	930	17,0	54,7				500	50,0	10,0
Ethiopia		4	119				107,0	3,3					12,0	1,0		147	1284	38,0				1155	33,0	35,0	105	3,0	35,0	24	2,0	
Finland	60	5	130	20,0	0,5	40,0	12,0	0,1	120,0	37,0	0,5	74,0	61,0	4,3	14,2	486	12573	246,0	580	12,0	48,3	11400	225,0	50,7	565	7,5	75,3	23	0,8	28,8
France	780	20	1620	1415,0	15,5	91,3	110,0	3,5	31,4	65,0	1,0	65,0				6903	28394	379,0	14256	196,0	72,7	6160	103,0	59,8	7888	70,0	112,7	90	5,5	16,4
Georgia	80	0															640	24,0				240	4,0		280	5,0		120	15,0	8,0
Germany	965	40	2357	68,0	0,9	75,6	449,5	10,8	41,7	1831,0	27,5	66,6	9,2	1,0	9,2	3335	17313	307,0	4220	67,0	63,0	6393	131,6	48,6	6618	97,5	67,9	122	11,0	11,1
Greece	500	2	69				14,0	0,8	17,5	55,0	1,5					158	6275	100,0	2080	31,3	66,5	700	13,0	53,8	3425	47,0	72,9			
HK-China	720	3	305	5,0	0,3	16,7				300,0	2,9	103,4				410	10450	34,0	10450	34,0	307,4									
Hungary		0															1230	38,0	540	22,5	24,0	15	1,0	15,0	675	14,0	48,2			
Iceland	33	2	38							38,0	2,0	19,0				15	1967	71,0				720	14,0	51,4	1000	32,0	31,3	247	23,0	10,7
India	2850	127	4681	1260,0	20,0	63,0	2333,0	55,0	42,4	630,0	18,5	34,1	460,0	33,5	13,7	2380	55431	1503	16825	288,0	58,4	21665	407,0	53,2	11720	322,0	36,4	4770	421,0	11,3
Indonesia	130	3	126				99,0	1,5	66,0	10,0			17,0	1,5	11,3	273	5640	83	1125	18,0	62,5	275	5,0	55,0	2700	18,0	150,0	1540	42,0	36,7
Iran	5371	74	3384	704,7	22,3	31,6	684,8	10,3	66,5	1406,1	22,8	61,7	118,8	18,8	6,3	6682	16398	462,0	11440	225,0	50,8	2760	54,0	51,1	1388	21,0	66,1	810	164,0	4,9
Ireland		0															1880	21,0				1880	21,0	89,5						
Israel	630	7	331	240,0	5,0	48,0				91,0	1,5	60,7				884	6765	158,0	5930	142,0	41,8	485	12,5	38,8	350	6,5	53,8			
Italy	1075	19	1121	284,3	4,2	67,7	480,0	8,0	60,0	355,0	6,9	51,4	2,0			6141	20331	336,0	4260	57,5	74,1	7628	144,2	52,9	8430	142,7	59,1	33	1,8	18,3
Ivory Coast		0															910	25,0	250	5,0	50,0	550	10,0	55,0				110	10,0	11,0
Japan	13925	806	36721	1027,0	14,0	73,4	11240,0	183,0	61,4	22248,0	309,0	72,0	2206,0	300,0	7,4	50600	184155	2611	15325	210,0	73,0	146000	2101,0	69,5	22500	300,0	75,0			

		In construction in 2019																FUTURE PROJECTS												
	2016	2019		Metro			Rail			Roads			Hydro/ water			To be done	Projects		Metro			Rail			Roads			Hydro/ water		
	Mio€	km	Mio€	Mio€	Km	€/km	Mio€	Km	€/km	Mio€	Km	€/km	Mio€	Km	€/km	Mio€	Mio€	Km	Mio€	km	€/km	Mio€	km	€/km	Mio€	km	€/km	Mio€	km	€/km
Kazakhstan		0															**80**	**1,0**	80	1,0	80,0									
Kenya		2	**12**										12,0	1,5	8,0	60	**1317**	**131,0**				275	5,0	55,0				1042	126,0	8,3
Kuwait		0															**6010**	**128,0**	5000	96,0	52,1	450	6,0	75,0	360	6,0	60,0	200	20,0	10,0
Lao	130	53	**1030**				720,0	34,0	21,2	40,0	0,5	80,0	270,0	18,0	15,0	2371	**2256**	**120**							480	8,0	60,0	1776	112,0	15,9
Lebanon	50	2	**14**														**1000**	**12,0**							1000	12,0	83,3			
Luxemburg		0																												
Malaysia	419	8	**348**	306,0	4,0	76,5	12,0	0,2					30,0	3,5	8,6	437	**8308**	**148**	1650	30,0	55,0	5640	102,0	55,3	101	15,0	6,7			
Malta		3	**6**										6,0	2,9	2,1	125	**850**	**14,0**							850	14,0	60,7			
Mexico	130	8	**400**				307,0	3,0	102,3	45,3	1,0	45,3	50,0	4,2	11,9	284	**580**	**38**	430	7,6	56,6							250	30,0	8,3
Monaco		0																												
Montenegro	35	3	**166**				166,0	3,0	55,3							1020	**440**	**4,0**				225			215	4,0	53,8			
Morocco	320	1	**20**							20,0	1,0	20,0				25	**7568**	**156,0**	1000	10,0	100,0	4300	91,0	47,3	2188	40,0	54,7	80	15,0	5,3
Myanmar		4	**81**				67,8	1,7					12,9	2,7	4,8	145	**150**	**30,0**										150	30,0	5,0
Nepal	275	18	**185**							3,0			182,0	17,9	10,2	867	**7115**	**284**	3000	66,0	45,5	1000	27,0	37,0	1385	34,0	40,7	1730	157,0	11,0
Netherlands	140	2	**173**							173,0	2,0	86,5					**765**	**7,0**				765	7,0	109,3						
New Zealand		4	**191**				150,0	1,4	110,3	5,0			36,0	2,7	13,3	640	**1538**	**37,6**				183	13,5	13,6	1355	24,0	56,5			
Nigeria		0															**3710**	**110,0**				2900	50,0	58,0	140	2,0	70,0	670	58,0	11,6
North Macedonia	15	0	**20**							20,0	0,4	50,0					**2510**	**51,5**				2150	25,5	84,3	180	3,0	60,0	180	23,0	7,8
Norway	775	49	**836**	34,0	3,2	10,6	213,6	7,0	30,5	513,7	29,0	17,7	75,2	10,0	7,5	2777	**26730**	**971,0**				7150	132,0	54,2	18764	750,0	25,0	682	183,0	3,7
Oman	250	2	**85**							85,0	1,5	56,7					**4660**	**85,0**				1600	28,0	57,1	3060	57,0	53,7			
Pakistan	125	29	**269**							50,0	3,5	14,3	220,0	25,5	8,6	238	**6056**	**323**				5020	200,0	25,1	278	15,0	18,5	758	108,0	7,0
Panama	240	0															**3050**	**78,0**	2750	43,0	64,0							300	35,0	8,6
Peru	360	15	**367**	227,0	4,7	48,3				90,0	4,4	20,5	50,0	6,0	8,3	167	**10455**	**231**	5450	115,0	47,4	1700	23,0	73,9	2980	64,0	46,6	325	30,0	10,8
Philippines	10	3	**40**	23,0	1,0	23,0							17,0	1,7	10,0	1288	**4110**	**70**				900	35,0	25,7	3210	35,0	91,7			
Poland	75	11	**538**	370,5	8,0	46,3	45,0	0,6	75,0	122,5	2,4	51,0				1497	**4745**	**77,0**	2550	39,0	65,4	875	21,0	41,7	1320	17,2	76,7			
Portugal	12	1	**6**										6,0	1,0	6,0	15	**408**	**10,0**	310	5,3	58,5	70	1,3	53,8						
Qatar	1850	13	**196**										196,0	13,0	15,1	116														
Romania	80	1	**20**										20,0	0,5	40,0		**3650**	**89,0**	1895	60,0	31,6				1755	29,0	60,5			
Russia	1100	12	**817**	817,0	11,5	71,0										2533	**26985**	**482,0**	17495	402,0	43,5	6200	57,0	108,8	3290	30,0	109,7			
Rwanda		0	**3**										3,2			3	**347**	**11,0**				220	5,0	44,0	90	2,0	45,0	37	4,3	8,6
S. Africa Lesotho		0														12	**4550**	**160,0**	1500	40,0	37,5	1225	19,0	64,5	325	8,0	40,6	1200	96,0	12,5
S. Korea	3080	31	**1725**	214,0	2,6	82,3	832,0	16,0	52,0	637,0	8,0	79,6	42,0	4,0	10,5	9500	**62180**	**1073**	22380	282,0	79,4	25200	597,0	42,2	14600	198,0	73,7			
Saudi Arabia	1770	16	**1280**													3920	**16761**	**257,0**	13550	197,0	68,8	2750	38,0	72,4	461	22,0	21,0			
Serbia	50	3	**124**				50,5	1,4	36,1	73,5	1,2	61,3				372	**2570**	**37,0**	1500	20,0	75,0				1070	17,0	62,9			
Singapore	1385	12	**755**	485,3	4,2	115,5				139,4	1,5	92,9	130,3	6,0	21,7	6199	**3900**	**55**	3400	49,0	69,4				500	6,0	83,3			
Slovakia	250	2	**133**				37,0	1,0	37,0	96,0	1,3	73,8				475	**4135**	**92,0**							4135	92,0	44,9			
Slovenia		0	**16**													109	**1441**	**34,0**				1071	22,0	48,7	370	12,5	29,6			
Solomon Islands		0															**25**	**3,3**										25	3,3	7,6
Spain	330	10	**363**	90,0	1,5	60,0	86,6	3,2	27,1	161,0	4,0	40,3	20,0	1,0	20,0	1640	**16581**	**308,0**	3625	64,0	56,6	9874	203,0	48,6	2885	38,0	75,9	27	5,0	5,4
Sri Lanka		2	**7**										7,0	1,5	4,7	25	**186**	**5,5**							186	5,5	33,8			
Sweden	130	15	**430**				222,0	3,5	63,4	138,0	5,5	25,1	70,0	6,0	11,7	846	**6934**	**118,0**	1860	20,0	93,0	2160	52,0	41,5	2714	36,0	75,4	200	10,0	20,0
Switzerland	600	7	**388**				182,3	0,5	364,6	185,3	4,0	46,3	20,0	2,0	10,0	528	**35026**	**577,0**	770	6,0	128,3	16118	245,0	65,8	15772	231,0	68,3	2366	95,0	24,9
Thailand	130	32	**728**	320,0	6,0	53,3	140,0	4,0	35,0				264,0	22,5	11,7	849	**12168**	**249**	2080	32,6	63,8	6900	65,0	106,2	2274	19,2	118,4	913	132,0	6,9
Tunisia		0																												

	In construction in 2019														
	2016	2019		Metro			Rail			Roads			Hydro/ water		
	Mio€	km	Mio€	Mio€	Km	€/km	Mio€	Km	€/km	Mio€	Km	€/km	Mio€	Km	€/km
Turkey	900	190	**7144**	2203,0	41,0	53,7	113,5	4,2	27,0	4438,0	116,0	38,3	388,0	29,0	13,4
UAE		3	**120**	72,0	1,0	72,0				32,5	0,3	108,3	16,0	1,3	12,8
UK	240	13	**961**							10,0	0,7	14,3	911,0	12,6	
Ukraine	12	3	**125**	125,0	2,5	50,0									
USA	775	36	**1184**	529,0	6,0	88,2				40,0	0,4	100,0	615,0	30,0	20,5
Venezuela	170	0													
Vietnam	375	1	**150**	30,0	0,5	60,0									
Zambia		0													
Zimbabwe															

	To be done	FUTURE PROJECTS													
		Projects		Metro			Rail			Roads			Hydro/ water		
	Mio€	Mio€	Km	Mio€	km	€/km	Mio€	km	€/km	Mio€	km	€/km	Mio€	km	€/km
Turkey	11807	**18644**	**394,0**	3620	54,8	66,1	535	13,5	39,6	13364	230,0	58,1	1125	95,0	11,8
UAE	577	**3875**	**85,5**	3825	85,0	45,0				50	0,5	100,0			
UK	3573	**70561**	**878,0**	9606	112,0	85,8	41320	480,0	86,1	16210	163,0	99,4	425	32,0	13,3
Ukraine	126	**4322**	**45,0**	4302	43,5	98,9				300	1,5				
USA	5570	**36204**	**638**	6153	63,0	97,7	17736	274,0	64,7	5542	41,2	134,5	6723	259,0	26,0
Venezuela															
Vietnam	242	**2100**	**27**	1500	20,0	75,0				600	7,0	85,7			
Zambia		**48**	**4,0**										48	4,0	12,0
Zimbabwe		**24**	**2,0**										24	2,0	12,0

Total Europe	**9804**	**500**	**19672**	**5790**	**93**	62,0	**3146**	**89**	35,5	**8852**	**225**	39,3	**1751**	**93**	18,8
Total Asia	**23596**	**1136**	**47343**	**3670**	**53**	69,8	**15444**	**295**	52,3	**24211**	**346**	70,0	**3896**	**442**	8,8
China	**37150**	**3100**	**44275**	**6335**	**253**	25,0	**36645**	**1047**	35,0	**12000**	**800**	15,0	**5000**	**1000**	5,0
Total Africa	**358**	**12**	**368**	**133**	**2**	66,5	**107**	**3**		**70**	**2**	41,2	**58**	**5**	11,3
Total N. America	**1175**	**52**	**1769**	**589**	**7**	84,1	**316**	**3**	105,3	**85**	**1**	60,9	**780**	**40**	19,4
Total S. America	**3657**	**95**	**3015**	**477**	**9**	53,0	**400**	**6**	62,5	**1428**	**26**	54,3	**505**	**53**	9,5
Total Middle East	**10221**	**120**	**5692**	**1299**	**33**	39,6	**685**	**10**		**1615**	**26**	61,9	**331**	**33**	10,0
Total Australasia	**750**	**50**	**3653**	**850**	**17**	50,0	**593**	**7**	80,6	**2173**	**23**	95,7	**36**	**3**	
TOTAL	**86711**	5047	**125786**	**19143**	**467**	41,0	**41630**	**1461**	28,5	**50434**	**1449**	34,8	**12357**	**1669**	7,4
TOTAL without China	**49561**	**1947**	**81511**	**12808**	**214**	**60**	**4985**	**414**	**12**	**38434**	**649**	**59**	**7357**	**669**	**11**

Total Europe	51435	**374361**	**6760**	**89284**	**1483**	60,2	**146869**	**2333**	63,0	**125998**	**2403**	52,4	**5790**	**540**	10,7
Total Asia	76715	**366795**	**6701**	**77815**	**1031**	75,5	**212600**	**3539**	60,1	**62844**	**1047**	60,0	**11837**	**1022**	11,6
China	198537	**471735**	**19022**	**191480**	**4787**	40,0	**175000**	**5000**	35,0	**90000**	**5000**	18,0	**25000**	**5000**	5,0
Total Africa	674	**21533**	**674**	**3575**	**70**	51,1	**10875**	**225**	48,3	**3548**	**65**	54,6	**3235**	**317**	10,2
Total N. America	6549	**43056**	**816**	**10255**	**137**	75,1	**17736**	**274**	64,7	**7312**	**62**	117,6	**7803**	**342**	22,8
Total S. America	7275	**38567**	**870**	**17293**	**301**	57,5	**8100**	**147**	55,1	**6058**	**123**	49,4	**6263**	**302**	20,8
Total Middle East	13233	**62799**	**1358**	**46095**	**848**	54,4	**8975**	**156**	57,7	**6669**	**125**	53,4	**1510**	**234**	6,5
Total Australasia	6540	**15828**	**298**	**2950**	**64**	46,1	**6708**	**127**	52,8	**5605**	**74**	75,7	**565**	**33**	17,0
TOTAL	360958	**1394650**	**36496**	**438747**	**8720**	50,3	**595118**	**12035**	49,4	**290034**	**7900**	36,7	**61979**	**7789**	8,0
TOTAL without China	162421	**922915**	**17474**	**247267**	**3933**	**63**	**420118**	**7035**	**60**	**200034**	**2900**	**69**	**36979**	**2789**	**13**

ASSOCIATION
INTERNATIONALE DES TUNNELS
ET DE L'ESPACE SOUTERRAIN
AITES

ITA
INTERNATIONAL TUNNELING
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