



## RICS-Impulse

Traffic Infrastructure in Switzerland:  
Are we ready for the Future?



## Zusammenfassung

Infrastruktur ist sowohl für deren Nutzer und Bereitsteller als auch für die Politik und Investoren zu einem immer wichtigeren Thema geworden. Alleine bis ins Jahr 2025 sollen weltweit rund 7.2 Billionen USD in alle Arten von Infrastruktur investiert werden, davon rund 30 Prozent in Verkehrsinfrastruktur. Die vorliegende Ausgabe von RICS Impulse beleuchtet vor diesem Hintergrund die Bedeutung und Herausforderungen betreffend der Verkehrsinfrastruktur in der Schweiz am Beispiel der Bundesstrassen, der Bundesbahnen, der Flughäfen sowie der Rheinhäfen. Diskutiert wurden diese Themen von führenden Experten aus den verschiedenen Bereichen der Infrastruktur an der RICS 2nd Annual Conference on «The Future of Infrastructure in Switzerland and its Impact on the Real Estate World», welche am 2. November 2015 in Bern durchgeführt wurde.

Es zeigt sich, dass trotz Veränderungen im Mobilitätsverhalten und neuen Technologien sowohl beim Strassennetz wie bei der Schieneninfrastruktur kein Weg am Ausbau vorbeiführt. Alleine die Stautunden im Strassenverkehr generieren erhebliche Wohlfahrtsverluste. Eine gute Infrastruktur ist indessen eine zentrale Voraussetzung für Wachstum und Wohlstand eines Landes. Auch im Flugverkehr wird bis 2030 mit einem um zwei Drittel höheren Passagiervolumen gerechnet, während die Rheinhäfen bis 2040 von einer Verdoppelung des Containervolumens ausgehen. Von zentraler Bedeutung ist daher immer mehr die effiziente Verzahnung und komplementäre Nutzung verschiedener Verkehrsträger. Eine weitere Herausforderung liegt in der Finanzierung der Vorhaben. Diese ist zunehmend in Frage gestellt was öffentliche Mittel betrifft. Die Erschliessung privater Investoren setzt angesichts der langfristigen Investitionen jedoch sowohl stabile rechtliche und politische Rahmenbedingungen als auch geeignete Investitionskanäle voraus.

## Riassunto

L'infrastruttura è diventata un tema sempre più importante, tanto per gli utenti quanto per i fornitori, gli investitori e la politica. Si stima che entro il 2025, nel mondo intero saranno investiti in infrastrutture intorno ai 7,2 miliardi di dollari, di cui il 30 per cento circa per infrastrutture di trasporto. Sulla scorta di questi dati, la presente edizi-

one di RICS Impulse illustra l'importanza e le sfide relative all'infrastruttura dei trasporti in Svizzera partendo dall'esempio delle strade e delle ferrovie federali, degli aeroporti e dei porti renani. Esperti di spicco di diversi ambiti legati alle infrastrutture hanno discusso di questi temi alla 2a conferenza annuale RICS intitolata «The Future of Infrastructure in Switzerland and its Impact on the Real Estate World», che si è tenuta il 2 novembre 2015 a Berna.

Risulta che, nonostante i cambiamenti nelle abitudini in fatto di mobilità e le nuove tecnologie per la rete stradale e ferroviaria, non sarà possibile prescindere da un'estensione delle infrastrutture. Le ore che passiamo in colonna nel traffico costituiscono una considerevole perdita di confort. Una buona infrastruttura è fondamentale per garantire la crescita e il benessere di un paese. Per il traffico aereo, si prevede un aumento di due terzi del volume entro il 2030, mentre i porti renani si aspettano un raddoppio del volume di container entro il 2040. Cresce quindi l'importanza di un'utilizzo complementare ed efficacemente coordinato dei vari modi di trasporto. Un'altra sfida sta nel finanziamento dei progetti, che i fondi pubblici faticano sempre più ad assicurare. Ma in considerazione degli investimenti a lungo termine, la partecipazione del settore privato esige condizioni quadro giuridiche e politiche stabili, nonché canali d'investimento adeguati.

## Résumé

Les infrastructures deviennent un sujet de plus en plus important, que ce soit pour les utilisateurs, les fournisseurs, les investisseurs ou la politique. D'ici 2025, environ 7,2 milliards de dollars seront investis dans le monde entier pour les infrastructures et 30 % de ce chiffre ira au secteur des transports. Ce numéro de RICS Impulse éclaire sur l'importance et les défis concernant les infrastructures de transports en Suisse, prenant l'exemple des routes fédérales, des chemins-de-fer fédéraux, des aéroports et des ports rhénans. Ces thèmes ont été discutés par des experts reconnus de différents domaines liés aux infrastructures lors de la 2ème Conférence annuelle RICS intitulée «The Future of Infrastructure in Switzerland and its Impact on the Real Estate World», qui s'est tenue le 2 novembre 2015 à Berne.

Il apparaît qu'en dépit des changements de comportements de mobilité et des nouvelles technologies dans le réseau routier et ferroviaire, il n'y a pas d'alternative à l'expansion des infrastructures. Les heures passées dans des embouteillages empiètent considérablement sur notre confort. Des bonnes infrastructures sont dès lors une condition essentielle pour la croissance et le bien-être d'un pays. Dans le secteur de l'aviation une augmentation de deux tiers du volume des passagers est prévue d'ici 2030 et les ports rhénans estiment que le volume des conteneurs doublera jusqu'en 2040. Une utilisation complémentaire et efficacement coordonnée des différents modes de transport est donc de plus en plus importante. Un autre défi réside dans le financement des projets, car il devient toujours plus difficile de pouvoir compter sur les ressources publiques. Cependant, au vu des besoins à long terme, la participation d'investisseurs privés dépend de conditions cadre juridiques et politiques stables ainsi que de canaux d'investissement adéquats.



## Traffic Infrastructure in Switzerland: Are we ready for the Future?<sup>1</sup>

Infrastructure has emerged as an important topic, in equal measure for policymakers, for users and providers of infrastructure, and for investors. The key challenges for these stakeholders are primarily associated with limitations of capacity, space and funding. At the same time, having the right infrastructure in place is an indispensable prerequisite for economic growth. Hence, it is essential that the proper investments are conducted today in order to support economic growth and wealth in the future.

How do providers and users of infrastructure perceive the current state of Swiss infrastructure accessibility, its quality and connectivity as well as its suitability to master future challenges? How can we finance infrastructure and invest in it going forward? And which role do politics and legal conditions play in this respect?

In the present issue of RICS Impulse, we analyze traffic infrastructure in Switzerland in the context of the different dimensions of infrastructure. In a first part, the scope and importance of infrastructure will be discussed. Based on this, the second part will showcase the role of traffic infrastructure in Switzerland, i.e., roads, railroads, airports, and ports, and in particular point out areas of improvement. In the third part, we discuss developments and challenges pertaining to financing and investment, the political and legal environment, and technology. We also highlight some of the lessons we should keep in mind.

### Why care about infrastructure?

The definition of infrastructure typically comprises assets related to extraction activities (as to, e.g., oil, gas, commodities), utilities (for, e.g., power generation, gas distribution, water supply), manufacturing (e.g., petroleum refining, chemical production), transportation (roads, railroads, airports, ports), and social infrastructure (including, e.g. hospitals, schools, defense facilities), as well as IT infrastructure. Several factors have contributed to a growing awareness about these types of infrastructure in general and mobility and transportation in particular.

According to a recent PwC study<sup>2</sup>, global spending on capital projects and infrastructure is expected to grow by 5 to 5.5 percent per year through 2025, resulting in a more than \$ 7.2 trillion investment volume in year 2025 across all types of infrastructure. Transportation hereby accounts for roughly 30 percent of this volume. Global investment into transportation therefore is likely to grow from an annual \$ 1.5 trillion to about \$ 2 trillion over the same period, while more than 50 percent of this is assumed to happen in emerging economies. The latter is associated with higher growth rates in these economies. Still, annual transportation investment in Western Europe is expected to increase from about \$ 60 billion in 2015 to approximately \$ 85 billion in 2025. Hereby, investments into the railroad network represent the main driver.

Needless to say that such investments require adequate funding. Given the limited financial resources in public households, new financing sources have and will become more relevant. In order to connect these financing needs with investor demand, new financing models in connection with infrastructure business models have been developed. However, even if financing is increasingly provided by the private sector and through pension funds, the quality of the investment heavily depends on the state's willingness to protect investor rights over the entire period of these typically long-term investments. Hence, investors may not only face economic risk but also political risk.

A third driver is the awareness that a well-functioning and reliable infrastructure constitutes a key factor in global competition, while bottlenecks on roads, railroads, airspace and in shipping but likewise in the provision of energy, utilities, goods and services not only lead to productivity losses but to a less attractive environment for entrepreneurial activities. Hence, the quality and reliability of infrastructure has a decisive impact on economic growth, innovation, and wealth. In this respect, a final important point needs to be considered: While economic growth can be fast and demand for certain types of infrastructure is likely to be volatile, the provision of infrastructure is mostly inelastic and often takes decades to be expanded or altered. Given that future demand is always difficult to forecast, flexibility in infrastructure provision has become an important criterion.



## How suitable is traffic infrastructure in Switzerland?

Let's first take a snapshot of our current traffic infrastructure in Switzerland. How well does our existing system of infrastructure address the needs of diverse users? How closely do different types of traffic infrastructure connect with each other? And how suitable is our infrastructure for the next 10 to 50 years? Quite obviously, the usage of traffic infrastructure experiences massive changes. People exhibit new travelling, shopping and living habits. New technologies such as driverless cars, cargo systems, and trains will change the demands on our transport needs as well as our communication behavior. Thereby, all sectors of traffic infrastructure will be affected, such as individual mobility and the way we use trains, the transportation of goods on roads, railroads, waterways and in the airspace.

### a) Roads

Construction and maintenance of roads in Switzerland is split among the federal level, the cantons, and municipalities. Here, we only focus on the first level. The situation and key challenges are as follows: Of our federal roads network with a total length of 1,334 kilometers, 490 kilometers can be categorized as overloaded, of which 185 kilometers severely. All traffic jams on this road network add up to an estimated 22,000 hours per year (in 2014) which is about 6 times the hours lost in 1995.<sup>3</sup> Multiplying this figure with the average number of people concerned and their potential average wages, these road bottlenecks cost us at least several hundreds of million Swiss Francs each year. The most affected routes are in the metropolitan areas of Zurich, Basel, and Geneva.

Short-term solutions to this problem target either the optimized use of available capacities or marginal increases in capacity. Examples include mobility pricing (e.g., at peak times), the transformation of emergency lanes into driving lanes, and the bottleneck elimination program focused primarily on agglomerations. By contrast, long-term solutions most likely call for an extension of the respective road infrastructure as it is illusory to reduce cargo on roads given foreseeable capacity limitations in the railroad network. However, it can be expected that driverless cars and related new forms of car sharing will further contribute to cost reductions and a better usage of existing road capacities and parking space. A further effect of the driver substitution will be a higher degree of safety and eco-friendliness.

Regarding the financing of these measures, it is noteworthy that despite increasing road traffic volumes over the period of 2003 to 2013, pollution has decreased. Furthermore, new power trains in cars and trucks become increasingly popular. Hence, fuel surcharges as a source for financing roads may not be a long-term option anymore. Also, total tax charges for road cargo are already at its highest level in Switzerland with about € 0.7 per ton and kilometer, which is 3-4 times the average of other European countries. However, given that this service remains crucial for local distribution, there are limits to this financing, as well.

### b) Railroad

Railroads in Switzerland represent another central backbone of our transportation infrastructure, both in the areas of passenger traffic and cargo. The challenges in this area are primarily related to the financing of expansion projects and investing into a higher reliability of this network since punctuality and technical faultlessness are universally regarded as an asset. The Swiss Federal Railways (SBB) operates a railroad network of 3,172 kilometers (2015) as well as 3,500 buildings, moves 1.21 million passengers per day, while SBB Cargo carries 205,000 tons of freight each day. However, SBB faces bottleneck problems especially at peak times and punctuality issues.

In order to expand this network, CHF 13 billion will presumably be invested by 2025. However, as a drawback, this likely goes along with an investment backlog on existing capacities of over CHF 2.5 billion by 2020 (source: SBB). While the focus of railroad investments in the past was primarily on making connections faster, more comfortable and hence increase mobility, today it is rather about providing the clients more individuality, virtuality, and variability as well as more integrated nodes of transportation. In particular, the railroad stations today not only address the traveler but provide an infrastructure for a variety of needs.

### c) Airports

In Switzerland, 65,000 people per day arrive through our airports. Although this is just a fraction of the 700,000 people arriving in Switzerland each day by car, bus, and train, airports nevertheless play an important role as gates to other parts of the world. For longer distances and travel times, passengers tend to prefer air travel. Furthermore, these numbers are expected to increase substantially over the next years: Forecasts for Zurich Airport assume passenger volume to increase from 25 million in 2015 to 44 million in 2030, for Geneva Airport from 14 to 24 million and for Euro Airport Basel-Mulhouse from 6 to 10 million passengers, respectively. While these are the projections assuming no bottlenecks in infrastructure, the effective capacity given the expected congestion will be significantly lower than demand.

Therefore, substitution of transportation means is limited. However, airports are important nodes where different types of ground transportation are connected with each other. It is thus fundamental to focus on both airport capacity and smooth interjunctions with the railroad and the road.

### d) Inland ports

Likewise, inland ports serve as nodes of co-modality where the seamless connection between road, railroad, and water transport is crucial. Already today, traffic volume on the Rhine river between Basel and Rotterdam is about 8 times the traffic volume of the total Swiss transalpine traffic. Therefore, Basel has a great potential as the start and the end of inland waterways and the Neat-Gothard axis: 25 percent of all container import and export volume and 12 percent of the total importation goes through the port of Switzerland in Basel. For mineral oil, even 30 percent enter Switzerland through

Basel. From there, 70 percent of transportations leave Basel to the rest of Switzerland, hereby 60 percent by train, a ratio which will increase with the ongoing consolidation of barge and railroad traffic. Between 1990 and 2014, total container volume has grown by the factor 6 and is predicted to more than double from today until 2040.

A key success factor hereby is the accessibility both in long distance and in the region as well as the stability in the supply chain when different means of transportation are involved. For instance, most foreign ports' strategy (e.g., port of Antwerp, port of Rotterdam) is to further shift the modal split towards a lower proportion of truck traffic and higher capacities of railroads while increasing barge capacity at the same time. This system of seamless connection to the railroad in the first place and the street in the second place is also material for the Port of Switzerland in Basel.

### Development and challenges

Given the importance of all four highlighted areas of traffic infrastructure, which underlying developments and requirements do we face?

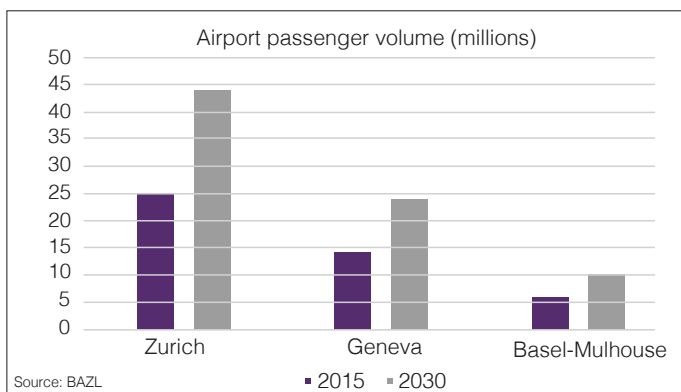
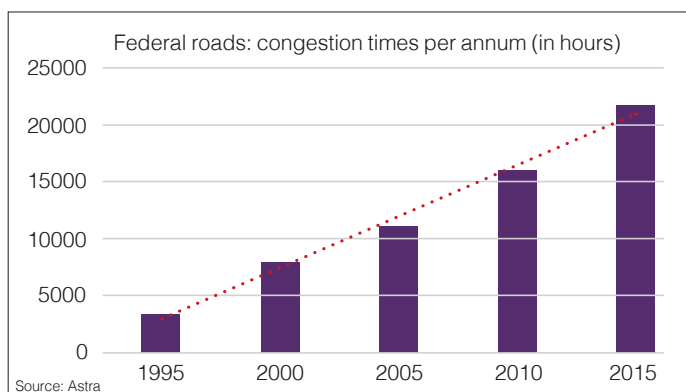
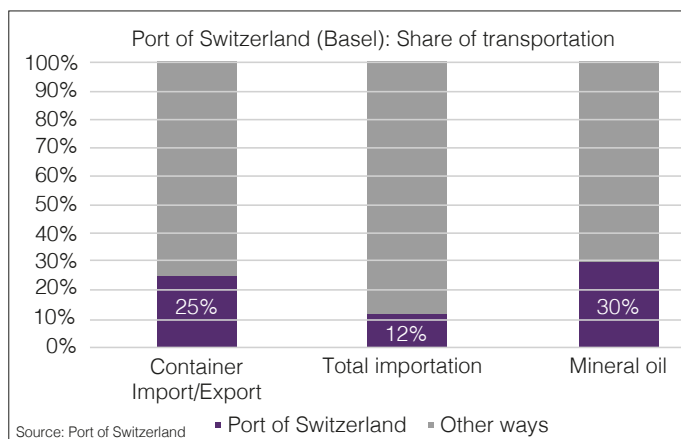
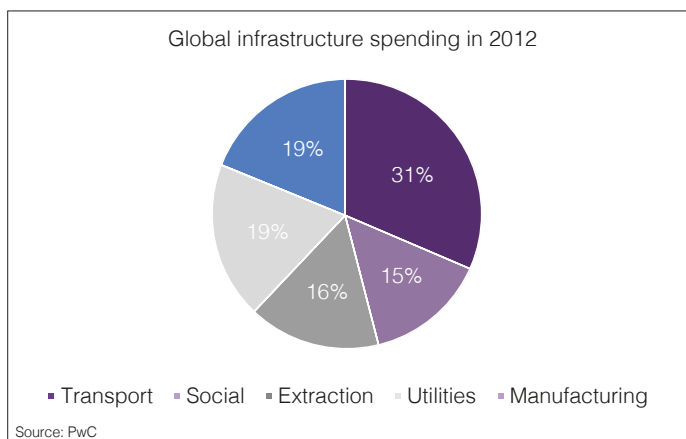
A first development which is already on its way today is a better infrastructure management. The increased availability of traffic data and algorithms allow for a better understanding of mobility behavior, risk factors, infrastructure usage as well as better forecasts. Furthermore, these methods, for instance, help evaluate intervention programs, support intervention planning as well as better evaluations of effectiveness, e.g., in the area of road maintenance.

A second development is the growing opening up of the private and institutional investor sector for funding infrastructure projects. While internationally, infrastructure investments have evolved as a substantial asset class, this way of financing and investing in Switzerland is still in its infancy. It is only since 2013 that pension funds are allowed to

hold direct investments in this asset class. At present, Swiss pension funds invest about 4 percent of their alternative assets in infrastructure which corresponds to about 0.3 percent of their overall assets.<sup>4</sup> Typical non-direct investment channels comprise special funds, limited partnerships and companies, fund of funds as well as infrastructure foundations. Further options include bonds issued by infrastructure companies, and some institutional investors also co-invest with private equity investors. At the moment, a significant part of local infrastructure investment is channeled into the energy sector while investments into Swiss traffic infrastructure yet is virtually irrelevant.

Which will be the future role of the public sector in the provision of infrastructure? And how should politics and public administration best accommodate this process? To keep investors interested in infrastructure investments, it is vital to maintain their trust in the political and legal environment. This is especially important given the very long-term nature of such investments. Several cases abroad have illustrated this area of conflict. One of the most prominent cases in the energy sector was Norway's decision to cut tariffs on gas shipping through the Gassled network last year which heavily impacted the profitability and led to estimated losses of \$ 1.8 billion for the investors, among them Allianz, the government fund of Abu Dhabi and a Canadian pension fund. And the example of South Africa has displayed the difficulties of enforcing road pricing if public resistance is too high.

As these examples show, an investment case based on tariffs for infrastructure usage is only as good as the likelihood that the respective government keeps its promises. The key question therefore is: Do discretionary and arbitrary activities of governments endanger the model of private financing for infrastructure? And how can investors be protected against political risks? Hence, beyond contractual agreements and economic uncertainties, political and legal risks are key concerns for investors, especially in this field.



## Which lessons should we learn?

Based on these reflections, the following conclusions can be drawn:

- First, a well-functioning infrastructure is key to economic development and wealth. This applies to all types of infrastructure, as investments are driven by the attractiveness of economic activities in a country. Regarding mobility and transportation, bottlenecks on roads, railroads, and airspace are the flipside of the benefits of density. Nevertheless, it is important to note that each day, these bottlenecks cause significant productivity losses, apart from safety issues, which justify at least some of the measures to eliminate them. Hereby, both investment into new infrastructure and the maintenance of the existing one are necessary.
- Secondly, on a global scale but likewise in Switzerland, the ongoing process of urbanization affects all types of infrastructure. What is needed is an infrastructure that is able to accommodate customer needs which, however, are changing rapidly. Hence, flexibility and availability of infrastructure are demanded.
- Thirdly, both passenger and goods traffic require seamless conjunctions between different types of transportation. It is inevitable to move away from the deep-rooted and often ideological conception of «competition» between road, railroad, and airspace.

Instead, each means of transportation has its specific role in the network. Where optimized connections and complementarity are needed, it is neither up to date nor efficient to favor one means of transportation against the other. What counts is the connectivity between different types of infrastructure.

- Along with this, pricing will change: Distortions arising from subsidized mobility on the one hand and traffic charges on the other will increasingly be questioned. The assumption that mobility will become more expensive is not only driven by capacity limitations but also by political intentions to do so. Instead, prices should reflect real demand for a resource with limited capacity and be connected to investments in order to eliminate such bottlenecks.
- The latter together with a stable political and legal environment will, finally, open up space for new financing models. This will also accommodate investor needs. While infrastructure investments are already widespread in the Anglo-Saxon world, institutional investors and financial intermediaries in Switzerland are just in the process of forming up. However, there is still a long way to tap the full potential of portfolio diversification and to take advantage of the funding opportunities this may generate.



1. On November 2, 2015, the RICS 2nd Annual Conference on «The Future of Infrastructure in Switzerland and its Impact on the Real Estate World» was held in Berne, Switzerland.
2. PwC: «Capital project and infrastructure spending: Outlook to 2025» ([www.pwc.com/cpi-outlook2025](http://www.pwc.com/cpi-outlook2025))
3. Source: ASTRA. For further information, also see Bundesamt für Strassen: «Verkehrsentwicklung und Verfügbarkeit der Nationalstrassen: Jahresbericht 2014», <http://www.astra.admin.ch/themen/nationalstrassen/00619/06681/index.html?lang=de>
4. Figures calculated based on data from Bundesamt für Statistik (BFS): «Die berufliche Vorsorge in der Schweiz – Kennzahlen der Pensionskassenstatistik 2008-2014», Neuchâtel, 2016.

## Committee RICS-Impulse «Traffic Infrastructure in Switzerland»

Important notice: Information, data, and interpretations rendered in this issue of RICS Impulse principally are compiled based on the contributions of the speakers at the RICS 2nd Annual Conference «The Future of Infrastructure in Switzerland and its Impact on the Real Estate World», held on 2 November 2015 in Berne, and the discussions with the participants. All further sources used in this text are explicitly indicated.

Conference lead and author	<b>Pascal Gantenbein</b> , MRICS, Prof. Dr., University of Basel, Faculty of Business and Economics
Conference presenters	<p><b>Hans Rudolf Hauri</b>, FRICS, Chairman RICS Switzerland</p> <p><b>Jürg Röthlisberger</b>, Director, Federal Roads Office FEDRO (Bundesamt für Strassen ASTRA); Speech: «Which road networks does Switzerland need in the future?»</p> <p><b>Peter Müller</b>, Dr., Director, Federal Office of Civil Aviation (Bundesamt für Zivilluftfahrt BAZL); Speech: «Airports as interjunctions in the transportation network»</p> <p><b>Hans-Peter Hadorn</b>, CEO, Port of Switzerland, Basel (Schweizerische Rheinhäfen Basel); Speech: «Inland Ports as Nodes of the Co-Modality»</p> <p><b>Jan Steuerl</b>, Principal, PwC Management Consulting, Munich; Speech: «Capital project and infrastructure spending: Outlook to 2025»</p> <p><b>Daniel Wiener</b>, President and Founder of ecos, board member of Cargo Sous Terrain; Speech: «Cargo Sous Terrain (CST) and the future role of the private sector in financing Swiss infrastructure»</p> <p><b>Martina Gmür</b>, Head Corporate Development, SBB Infrastructure; Speech: «What are the limits in the development of railways?»</p> <p><b>Nils Planzer</b>, CEO, Planzer Transport AG; Speech: «View from a user»</p> <p><b>Bryan T. Adey</b>, Prof. Dr., Institute of Construction and Infrastructure Management, ETH Zurich; Speech: «Potential improvements to infrastructure management»</p>