***International Joint Seminar on:* "TOWARDS SMART SUSTAINABLE CITIES – INTEGRATED APPROACHES", June 15-16, 2017**

Honorary Guests

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Name ***Professional Link***	***Email***	***Affiliation*** ***Institution Link***	***Abstract***
Damir Aidarkhanov https://www.linkedin.com/in/damir-aidarkhanov-1962b018/	aidarkhanov@nu.edu.kz	Center for Energy and Advanced Materials Science, NLA, *Kazakhstan* https://nla.nu.edu.kz/en/ceams/rireesefe/laboratory-of-solar-energy	**Organic photovoltaic research in Solar energy laboratory** Due to increasing energy demand and approaching depletion of fossil fuels, as well as rising climate and ecology concerns, the renewables become more promising energy source, capable of maintaining sustainable development of the mankind. The biggest available renewable energy source on Earth is the Sun, or solar radiation. Bulk heterojunction organic solar cells are one of the most promising type of devices that convert solar energy into electrical energy. Despite of several advantages over the existing inorganic photovoltaic devices, such as low cost, light weight and robustness, polymer based technology has certain drawbacks hindering commercial use. Main three application limiting factors can be summarized as relatively low efficiency, stability and scalability. And main research effort of many scientific groups is directed towards overcoming these bottlenecks. One of the main research activities of Solar energy laboratory is fabrication and characterization of devices using newly synthesized low-bandgap polymers. The advantage of polymer materials is relative flexibility in synthesizing materials with required properties. The properties of materials and devices is measured using electrical (solar simulator, SCLC, FET), optical (IQE/EQE, absorption spectra) and microscopy techniques (AFM and etc.). Another complimentary research technique is modeling of organic solar cells. Numerical simulations of the bulk heterojunction (BHJ) organic solar cells (OSC) has several purposes. The most important of them are attempt to better understand the mechanisms underlying the photovoltaic effects in BHJ region, determination of the key parameters of the solar cell, and optimization of the OSC performance by investigating the influence of parameters on solar cell efficiency. Prospective research areas include perovskite solar cells due to significant progress in efficiency increase in relatively short times, and thermoelectric devices for solar cell efficiency enhancement.
Kairat Aitpayev https://www.researchgate.net/profile/Kairat_Aitpayev https://www.linkedin.com/in/kairat-aitpayev-0855115a/?ppe=1	kairat.aitpayev@nu.edu.kz	CTO of LLC "Computer Vision Technologies" https://nla.nu.edu.kz/en/ceams	**Automatic traffic surveillance, from idea to realization** Within framework of «Smart City» program, particularly the city of Astana, as well as the upcoming date of the «EXPO-2017" is necessary to ensure safety of citizens and foreign visitors. Our project is aimed to improve road safety. With the creation and introduction of the automatic traffic violations detection on a large number of intersections and line regions, it is planned to increase the driving culture and make traffic safer. Cameras used today are expensive and not as effective. In this talk I will be introducing our realization of whole system with hardware and software, which is scalable to big cities. I will also be discussing challenges our team met while realization this project in Astana city.
Mehdi Bagheri https://seng.nu.edu.kz/home/about-us-3/faculty/electrical-and-electronic-engineering-department/mehdi-bagheri-2/	mehdi.bagheri@nu.edu.kz	School of Engineering, NU, *Kazakhstan* https://seng.nu.edu.kz/	**Smart Building, Concept, Opportunities and Challenges in Kazakhstan** It is almost usual that smart building is confused with an automated building. Distinguishing these two concepts is quite crucial and helps significantly to align all research efforts towards developing smart structure rather building automation. Successful smart building implementation should bring energy efficiency and saving, resident comfort, time saving, higher security, safety, skilled systems and greenhouse gas reduction for city. Smart building should also be able to collect solar, wind, and geothermal energies to feed building internal demands and transfer additional generation to electricity network. It should also be eligible to connect to smart city and transfer data for monitoring systems for load prediction and demand response. However to reach a smart building, one possible solution is to use smart meters. All above mentioned concepts are possible to manage if a smart meter is implemented in building. Smart meter is different with AMR (Automatic Meter Reading) and AMI (Automated Meter Infrastructure). Smart meter is able to control and manage entire building tasks including energy consumption, appliances, electricity robbery prevention, demand forecasting, health and environmental condition, disturbances, and data transfer and automation. This presentation is going to discuss on smart meter implementation, challenges and opportunities in Kazakhstan.
Zhumabay Bakenov https://nu.edu.kz, batterykazakhstan.com	zbakenov@nu.edu.kz	School of Engineering, National Laboratory Astana, Nazarbayev University, *Kazakhstan* https://seng.nu.edu.kz/	**Rechargeable aqueous Li-ion batteries for large scale application** Lithium-ion batteries (LIBs) lead the market for portable electronics and electric vehicles. However, LIBs have serious issues due to use of flammable, low conductive and expensive organic electrolytes, which restricts their application in large-scale energy storage. Rechargeable hybrid aqueous battery (ReHAB) uses aqueous electrolyte of low-toxicity, low cost and excellent safety, which make them excellent candidates for large scale applications including renewable energy integration into grids. In this work we present recent status of development of ReHABs at Nazarbayev University.

Mannix Balanay https://goo.gl/ApA8Sb	mannix.balanay@nu.edu.kz	School of Science and Technology, NU, *Kazakhstan* https://sst.nu.edu.kz/home/	**Organic Photovoltaics: Future prospects and challenges** Prof. Richard Smalley, a 1996 Chemistry Nobel laureate, said that the topmost problem of humanity is on energy. And by solving the crisis in energy we can eventually solved most problems that we have right now. Solar energy is seen as the most likely alternative to fossil fuels, however, most of the photovoltaic cells are based on inorganic-based compounds which are expensive due to its high production costs. Organic solar cells, introduced by Grätzel in 1991, has attracted a lot of attention being a cheaper alternative and can be made flexible. In this talk, I will be introducing the different types of organic photovoltaics and comparing their advantages and disadvantages, which includes but not limited to dye-sensitized, polymer, and perovskites solar cells. I will also be discussing on how we can further improve the photon-to-current conversion efficiency and lifetime. Some results will also be presented that have been done in our laboratory. Lastly, the potential future directions and the challenges encountered especially in the commercialization phase will be discussed.
Livia Camenisch http://www.unisg.ch/de/personenverzeichnis/6cf67681-cf29-4f00-b02b-af8e7b4d66bb	livia.camenisch@student.unisg.ch	University of St. Gallen, IFF-HSG, *Switzerland* http://www.iff.unisg.ch/	**New Borders in the European Common Market for Electricity** During the last 10 years the energy policy substantially changed. Among other factors the state support for renewable energy production causes the decentralization of the electricity supply and as a consequence the transformation of the whole energy system. Major energy utility companies struggle to cope with the speed of this change. In Switzerland, as a consequence of the increased supply of solar power during midday, pump storage plants are not profitable. At the same time these central power plants are still necessary to ensure the electricity supply, because they – other than the electricity production from sun and wind – don't depend on weather conditions. This conflict between the aim to support renewable electricity and the need to ensure electricity supply is only one of the many distortions in the electricity market. Some European countries use quota systems to reorganize the electricity market. In this market model, a certain amount of the electricity mix (the quota) must consist of renewable electricity. Players on the demand side, such as electricity suppliers, have a legal obligation to meet this quota; if they fail, they have to pay a penalty fee. In order to support the national increase of the renewable electricity production and to ensure the security of electricity supply with national power plants, these quota models are often nationally limited. This limitation raises legal questions regarding the compatibility with international legal frameworks such as the WTO's General Agreement on Tariffs and Trade (GATT) or the Treaty on the Functioning of the European Union (TFEU). Their fundamental goal is to eliminate restrictions in international trade. An unequal treatment of nationally produced and imported electricity is therefore contrary to international law. Nevertheless nationally limited quota models in Sweden and Belgium have been approved under the TFEU.
Vicente Carabias-Hütter https://www.zhaw.ch/en/about-us/person/cahu/, https://www.researchgate.net/profile/Vicente_Carabias-Huetter, https://www.linkedin.com/in/vicente-carabias/	cahu@zhaw.ch	ZHAW Institute of Sustainable Development, *Switzerland* https://home.zhaw.ch/~cahu/dateien/CV_Carabias_2017b.pdf, https://www.zhaw.ch/en/engineering/research/platforms/smart-cities-regions/, https://www.zhaw.ch/ine	**Drivers, barriers and strategy development for smart sustainable cities** The concept of smart sustainable cities is a combination of solution-oriented and integrated approaches based on technological and social innovations to address the current and future challenges of cities to improve the way cities function. To tackle these challenges, applied research aims to enhance the existing planning routines of cities by developing and testing systemic tools for multi-level stakeholder participation processes as well as for future-oriented thinking in city development. It entails many opportunities to create intelligent networking of action areas in order to improve conditions for smart sustainable city development. With integrated approaches the quality of life of city residents shall be increased and the involvement of relevant stakeholders enabled. At the same time a reduction of energy and resource consumption in cities is sought. In recent years, the concept of smart sustainable cities gained increasing importance as several initiatives, networks and projects were realized. However, many smart city projects focus on single measures in the areas of mobility or smart housing and fail to provide systemic local solutions. In addition, smart city projects have shown that a systemic, integrative view is demanding and that the participation of the local stakeholders and the incorporation of their knowledge can be improved – for instance through joint vision-building, scenario and strategy development towards smart sustainable cities, and the realisation of their respective roadmaps. Finally, there are different barriers and drivers, which hamper and foster the implementation of smart sustainable city concepts. To tackle these challenges of smart city approaches, joint research projects of ZHAW and partner organisations aim to develop services and tools for systemic planning and implementation. To this end, a variety of smart city processes at different stages, such as the Smart City Winterthur initiative, have been moderated, analysed and supported from the initialization of the local concept over the development of its components to the implementation of pilot projects and scaling-up to real-life deployment. In this sense, the smart sustainable city approach can be seen as an urban laboratory, investigating how innovation ecosystems could be organised and how participatory foresight could thereby be of support.
Hansjörg Dennig https://www.linkedin.com/in/hans-joerg-dennig/	denn@zhaw.ch	ZHAW Centre for Product and Process Development, *Switzerland* https://www.zhaw.ch/de/ueber-uns/person/denn/	**Bicar-Feasibility study of electro-mobile sharing concept for the last mile** «Increasing urbanisation and the threat of climate change call for new strategies for more sustainable urban transportation systems. BICAR represents a unique, pioneering project, created under the leadership of the Centre for Product and Process Development of the Zurich University of Applied Sciences (ZHAW). The BICAR mobility concept shows how urban mobility can be realised in an efficient and user-centred way – while also being ecologically friendly and energy efficient."
Nassipkul Dyussembekova https://www.linkedin.com/in/nassipkul-dr-ing-dyussembekova-916bbb97/	n.dyussembekova@mail.ru	Kazakh-German University, LLP "KazCES" *Kazakhstan* *www.dku.kz*, *www.kazces.kz*	**The introduction of decentralized sources in the low voltage level of power grid in Germany and Kazakhstan** Kazakhstan is rich in natural resources including coal, oil, natural gas and uranium and has significant renewable potential from wind, solar, hydro and biomass. In spite of this, the country is currently dependent upon fossil fuels for power generation. Coal fired plants account for 75% of total power generation leading to concerns over greenhouse gas emissions and impacts on human health and the environment. This thesis presents the results of research related to interrelationships of integration of micro CHP (combined heat and power) units in low voltage networks in Kazakhstan. In Kazakhstan the problems are connected with the compliance of voltage level, high losses and emissions in the environment. This is due to the decrease in production of heat and electric energy from coal . The exchange of experiences in Germany with the integration of decentralised generation will help to modernise Kazakh networks. Furthermore the influence of decentralised generation on low voltage networks is investigated to improve the voltage levels and to minimize emissions and the losses.
Andrey Filchenko https://shss.nu.edu.kz/faculty/2020-2	andrey.filchenko@nu.edu.kz	School of Humanities and Social Sciences, Nazarbayev University, *Kazakhstan*	**The challenges of multilingualism for smart innovation: the cases of Russia and Kazakhstan** As it is justly noted, the success of smart innovation is dependent on the acceptance and participation of the key stakeholders in the process, namely the private and corporate citizens, political elites, public institutions (formal and traditional), public policy planners and managers, various media and consumers. In the context of energy industry, it is thus deemed important that the knowledge about new technologies of energy production and use, as well as information about various aspects of implementation of innovative technologies needs to be open, accessible and disseminated among the key stakeholders. It is equally important that the key stakeholders, especially those immediately affected by the technologies, enjoy inclusive participation in the policy making and implementation. Alternatively, instead of a single inclusive discourse space, there will exist multiple exclusive and often opposing discourse spaces, demonstrating features of isolation and conflict. The current state-of-affairs in the energy discourse in Russia and Kazakhstan is often characterized by either colonial rhetoric, or the rhetoric of opposition and conflict, where the opposing parties are the energy industry and policy makers on one side, and local communities, especially indigenous minorities, researchers and advocacy groups, on the other side. The resultant real and perceived social tension poses challenges for researchers, investors and public agencies. Consequently, meeting these challenges has to be a notable component of smart innovation and smart governance. The presentation is based on the primarily academic research projects in documentation and description of linguistic / cultural diversity in North-Western Asia: Siberia and since recently Kazakhstan.
Philippe Forêt https://shss.nu.edu.kz/faculty/philippe-foret	philippe.foret@nu.edu.kz	School of Humanities and Social Sciences, Nazarbayev University, *Kazakhstan* https://shss.nu.edu.kz/	**The global political ecology of the Lithium commodity chain** Abstract: An analysis of the governance of green energy is highly relevant to many policy-makers, including those who will come to Astana to participate in Expo 2017 "Future Energy." The global transition toward a low-carbon economy depends on the reliable supply of Lithium (Li), a metal that stores and delivers energy. Our paper will pioneer research on commodity trade within the context of a greener economy. We intend to unify within a conceptual framework a field of knowledge that has remained fragmented and has excluded contributions from the humanities and social sciences. Our project will anchor new concepts in the political economy of the Anthropocene. To study the governance of strategic resources, we will employ an interdisciplinary tool developed by geographers. The "Global Production Network" (GPN) postulates that production and transaction always involve social networks. These are composed by different actors, relationships, norms and rules embedded in the structure and institutions at the local, national and global levels. We will use GPN to describe the global Lithium market and analyze conditions in production countries (Argentina, Chile, Bolivia), in consumption countries (Switzerland), and in future Lithium-exporting countries (Kazakhstan).

Sébastien Hug		State Secretariat for Education, Research and Innovation SERI, *Switzerland*	***INTRODUCTORY REMARKS TO SMART-FUNDING SESSION***
René Itten https://www.zhaw.ch/en/about-us/person/ittn/ https://www.researchgate.net/profile/Rene_Itten https://scholar.google.ch/citations?user=6af3d7YAAAAJ&hl=de&oi=ao	ittn@zhaw.ch	ZHAW Institute of Natural Resource Sciences, *Switzerland* https://www.zhaw.ch/en/lsfm/institutes-centres/iunr/	**High Efficient 3rd Generation Multi-Junction Solar Cells Using Silicon Heterojunction and Perovskite Technology: Life Cycle Based Sustainability Impacts** René Itten[1*], Matthias Stucki[1] The global demand for electric energy is rising continuously and mainly covered by fossil or nuclear technologies. Photovoltaic (PV) solar energy conversion can support the transition to a sustainable energy production relying on renewable energy sources. However, with increasing applications of new PV technologies on a large scale, it is important to analyse its environmental impacts throughout the photovoltaic value chain. Promising new PV technologies for the high efficient generation of electricity are silicon heterojunction (SHJ) and organometal halide perovskite (PSC) solar cells. The combination of the SHJ and PSC technology in multi-junction tandem cells has the potential to achieve a conversion efficiency of up to 30 %, significantly reducing the required area for photovoltaic electricity generation. The goal of this study is to analyse the environmental impacts of PSC technology as well as the combination of SHJ and PSC in multi-junction solar cells using 2-terminal tandem technology. We performed a prospective life-cycle assessment to identify the carbon footprint (greenhouse gas emissions, GHG) and primary energy demand (PED) of the PSC and SHJ-PSC solar cells. The comparison of PSC single-junction with mono-Si single-junction PV technology reveals that electricity production with stabilised PSC cells causes lower greenhouse gas emissions per kWh, if the lifetime of the PSC modules exceeds 20 years. However, the current PSC research cells are only stable for a time period of several hundred hours and are subject to oxygen, light, moisture or temperature induced degradation. The PSC single-junction cell has to exceed a lifetime of 23 years with less than 1.5 % degradation per year in order to be competitive with the mono-crystalline single-junction cell. The PSC technology has a lower carbon footprint than the SHJ-PSC tandem technology, but due to lower module efficiency the area demand for the PSC technology is significantly higher.
Reiner Keller https://www.philso.uni-augsburg.de/lehrstuehle/soziologie/sozio6/Team/Keller_Reiner/	reiner.keller@phil.uni-augsburg.de	University of Augsburg, *Germany* https://www.philso.uni-augsburg.de/lehrstuehle/soziologie/sozio6/Team/Keller_Reiner/	**The sense of words for sustainable development: the approach of the Sociology of Knowledge** This presentation addresses the question of how new vocabularies of motives like those emerging around the complex issue of 'sustainable development' affect the everyday life of people and organizational practices, and how they might either help to create new experiences and innovative ways of ecological action, or, on the contrary, promote risks for politics of transformation. It therefore builds on theories and arguments from social phenomenology, sociology of knowledge and the Sociology of Knowledge Approach to Discourse in order to demonstrate how, in the sustainability transition realm, word clusters become meaningful patterns for interpretation and action, and, by drawing on case studies, how they might guide and redirect social action in very different ways according to their concrete context of implementation.
Zhandos Kerimkulov www.drinu.org http://www.lamec.org/ http://www.geodatacasia.org/ http://www.burabay-geo.kz/	zhandos.kerimkulov@nu.edu.kz	School of Engineering, Nazarbayev University, *Kazakhstan* https://seng.nu.edu.kz/	**Integrated Storm Water Management Planning (ISMP) with High resolution Digital Terrain Model, automated water pumping network for drainage systems** **by Dr. Jay Sagin (Zhanay Sagintayev) and Zhandos Kerimkulov** The storm water management system should be improved in many cities, including Astana. The drainage maintenance will ensure this city is clean, safe and healthy. When the drainage maintenance is not proper ,the pure water gets contaminate with drainage water and infectious diseases may spread. When the drainage is blocked, then it will create many problems such as traffic jams and dirty environment. As well, manhole lid is not closed properly there is a chance of of accidents and people falling into the drainage To solve all these problems, a remote alarm system is required for transmitting current states of information detected by sensors set inside the manhole to a managing station. Our NU group of researchers have worked on developing an automated sensor based platform to control the storm water. We developed the geo-information portal, which remotely collects data from the sensors. The sensors are connected to the water pumps on the chain of the storm water collection tanks networks. The geo-portal provides visualization and allows for the automatic monitoring of water levels with different alarm systems. The automated remote alarm system operates to monitor and control the water levels in the tanks. Two horizontal liquid level sensors are installed at predefined water levels. A microcomputer, with wireless network process, collects all the data from sensors and sends an ON/OFF command to the water pumps. For proper surface level mapping, we developed the High resolution Digital Surface Model (DSM) and Digital Terrain Model (DTM). Our target is to apply drones with LIDAR for preparing the DSM. For the processed DSM-DTM verification and calibration, we use the Geodesy Polygon, which we just built and installed on the NU campus.
Aiymgul Kerimray https://www.researchgate.net/profile/Aiymgul_Kerimray	aiymgul.kerimray@nu.edu.kz	School of Engineering, NU, *Kazakhstan* https://seng.nu.edu.kz/	**Bottom-up modeling of residential sector decarbonisation scenarios** Globally, buildings accounted for one third of final energy consumption and are an equally important source of CO_2 emissions. Taking into account growing housing stock, rising energy demand in buildings and greenhouse gases emissions reduction constraint there is a need for analysis of economically feasible and realistic decarbonisation pathways for the residential sector. Energy system models are widely applied to aid decision making in energy planning and in estimating the impact of the introduction of technologies. A detailed building stock module was integrated in the national energy system framework with the aim to simulate the impact of GHG constraint by building typology (detached/flat and urban/rural) and retrofit option (roof insulation, triple glazing, etc.) and to track the response on the power, district heating and gas network infrastructures. Optimal mix of alternative heating technologies will be explored such as micro-CHP, heat pump, electric radiators and other technologies by building typologies and by regions of Kazakhstan.
Merla Kubli https://www.zhaw.ch/de/ueber-uns/person/kubm/ https://www.researchgate.net/profile/Merla_Kubli	kubm@zhaw.ch	ZHAW Institute of Sustainable Development, SCCER CREST, *Switzerland* http://www.zhaw.ch/ine http://www.iwoe.unisg.ch/ http://www.sccer-crest.ch/	**From solar prosumers to flexible prosumers? On incentives for solar prosumers from power grid tariffs to provide flexibility for smart grids** Solar prosumers are about to revolutionize the power sector. Utilities are challenged in recovering the costs of distribution grids, as parts of their revenue basis decreases through self-consumption. Adjusting the grid tariff sets off a reinforcing feedback loop that increases the attractiveness of solar investments, but also leads to a distribution effect between solar prosumers and conventional consumers. At the same time, decentral production and storage have a large potential to help to synchronize supply and demand in the power sector. Which grid tariffs recover distribution grid costs equitably without hampering the diffusion of solar power? Is a capacity tariff a suitable instrument to incentivize solar prosumers to adapt peak demand reduced operation? To address these questions, I present the simulation platform TREES (Transition of Regional Energy Systems), which is designed to understand the interactions between the diffusion of self-consumption concepts and the power utilities. Different grid tariff designs are tested in the virtual simulation environment and assessed for their impact on these competing goals. Participants will learn and experience how tariff designs and regulatory conditions influence the attractiveness and diffusion of solar prosumer concepts, demonstrated at hand of application cases in Switzerland. Our research results are first insights contributing to an improved understanding of the solar prosumers' willingness to provide flexibility for smart grids and how new renewable energies can be successfully integrated into power markets.
Peter Marty ch.linkedin.com/pub/peter-marty/28/778/3b4	peter.marty@zhaw.ch	ZHAW Zurich University of Applied Sciences, *Switzerland* School of Life Sciences and Facility Management Institute of Natural Resource Sciences	***SESSION CHAIR***

		Research Group for Regional Development www.zhaw.ch/iunr/regionaldevelopment	
Georgios Mavromatidis www.carmeliet.arch.ethz.ch/People/Mavromatidis	gmavroma@ethz.ch	SCCER FEEB&D, ETHZ, *Switzerland* http://www.carmeliet.arch.ethz.ch/	**A multi-dimensional view on modelling of urban decentralized multi-energy systems** Decentralized multi-energy systems (DES) are a promising solution for the realization of the goals in the *Swiss Energy Strategy 2050*. DES can reduce CO_2 emissions by incorporating high shares of locally available renewables, while ensuring affordable and reliable energy supply to urban buildings. The aim of this contribution is to present an overview of the joint DES-related research activities at *ETH Zurich's Chair of Building Physics* and *EMPA's Urban Energy Systems Laboratory* within *SCCER's Future Energy Efficient Buildings and Districts (FEEB&D) project* – Phase I and II. With the core focus placed on modelling for the transition towards DES, the two research groups develop integrated modelling tools based on optimization and simulation principles. Due to the inherently multi-faceted nature of DES, these models investigate design and operating aspects of DES from multiple angles like decision-making under uncertainty, controllability and integration with future electrical infrastructure, planning at whole-city scales, and interactions with architecture. Moreover, the groups' activities extend beyond academic research through collaborations with industry and local authorities that apply the developed tools in real-world projects. Finally, this contribution besides presenting the groups' research activities, aims also to facilitate future research collaborations via the corresponding sessions included in the Joint International Event.
Almagul Mentbayeva https://scholar.google.com/citations?user=l1whEYsAAAAJ&hl=en https://www.researchgate.net/profile/Almagul_Mentbayeva2	almagul.mentbayeva@nu.edu.kz	Center for Energy and Advanced Materials Science, NLA, *Kazakhstan* https://nla.nu.edu.kz/en/ceams	***SESSION CHAIR***
Farkhat Muratov https://www.linkedin.com/in/farkhat-muratov-932b3563/	fmuratov@nu.edu.kz	Center for Energy and Advanced Materials Science, NLA, *Kazakhstan* https://nla.nu.edu.kz/en/ceams	**Experience in operation of wind-solar power test ground at CER NU** Experimental renewable power system (RPS) was installed in January of 2011 on the territory of Nazarbayev University near boiler house. It includes three hybrid wind-solar power subsystems and, in total, contains three wind turbines with nominal power of 5 kW, 2 kW and 5 kW and 17 solar cells with nominal power of 250 W (Fig. 1). Each wind-solar set is supplied by power electronic facilities such as controllers, accumulators, and DC/AC inverters. Test site is also supplied by weather station that presents information data about wind speed, wind direction, solar radiation, inside and outside temperature, and so on. Scales and numbers of most devices are chosen with consideration of capability to install similar ones by small business companies and private individuals. Originally, the RPS is aimed to answer the research questions such as: - is it possible to successfully produce renewable energy in climate conditions typical for Kazakh steppes? - is the produced renewable energy sufficient for human activity, especially in agriculture sector? - is the RPS capable to be connected to a global power grid?
Nani Nabiyev http://kazatu.kz/en/faculties/energy-department/the-department-of-radio-engineering-electronics-and-telecommunication/nabiyev-nabi/	nabi@nabiyev.online	S.Seifullin Kazakh AgroTechnical University, *Kazakhstan* http://kazatu.kz/en/	Poster Session/Junior Researchers
TO BE CONFIRMED	**TO BE CONFIRMED**	International cooperation, Science committee, MES RK, *Kazakhstan*	
Liliana N. Proskuryakova http://fp7.hse.ru/inco; http://lsts.hse.ru/en	lproskuryakova@hse.ru	National Research University Higher School of Economics, *Russia* https://www.hse.ru/en/	**The role of renewable energy within future energy systems** Several technological revolutions are happening in the energy industry simultaneously since the early 2000s. Advances in robotics and personalised production equipment, combined with application of new and special properties materials, lead to rapidly changing characteristics of industrial production and power generation facilities: increased productivity, reduced negative impact on the environment, lower costs. Equipment is becoming increasingly complex in all areas, resulting in higher efficiency. One of signs of the technological revolution is the fast growth of the renewable energy sector. During the previous two decades the energy industry in Russia and other fossil fuel rich countries have been developing in a conventional way. Availability of large volumes of resources has turned into a significant barrier hindering gradual substitution of fossil fuel heat and power generation with safe and efficient alternative energy sources. The research project to be presented at the conference was implemented with the use of Foresight methodology, and comprised three stages. First, key global energy industry trends, 'weak signals' and 'wild card' were identified with implications for Russia. Second, four possible scenarios for the renewable energy sector's development were developed: "New energy paradigm (3D)", "Relying on hydrocarbon exports", "Worst-case forecast comes true", and "Centralised diversification". Third, policy options for Russian companies and public authorities were developed for the advancement of the renewable energy sector. Today global economic development focus is changing: the extensive growth model is being replaced by 'green growth' – hydrogen economy, distributed and small-scale energy generation, actively adaptive smart grids. All actors realise that the new development paradigm is inevitable. The need to deal with climate issues and resource limitations together, taking into account environmental and social challenges, prompts the majority of countries, including Russia, to design economically viable programmes for the utilization of existing renewable energy potentials and exploring new clean energy technologies.
Jean-Loup Robineau https://people.epfl.ch/jean-loup.robineau?lang=en	jean-loup.robineau@epfl.ch	EPFL, SCCER FURIES, *Switzerland* https://www.epfl.ch/	**A multi-period Mixed Integer Linear Programming (MILP) model for investment planning of energy systems in an urban context** Cities account for around two-thirds of global primary energy consumption and energy-related greenhouse gas emissions, with a projected increasing trend. To reduce their impact on climate change and fossil depletion, cities will have to make substantial investments in energy efficiency measures and renewable energy. Optimisation, and more specifically Mixed Integer Linear Programming (MILP), has been extensively used in the literature to optimise the design of energy systems in an urban context. However, the optimal solutions obtained in these studies are usually static, corresponding to fixed market and demand conditions, and do not consider sequentiality of investments over a given time horizon. In this study, a novel MILP model is developed in order to optimise the investment planning strategy of an urban energy system for a given scenario of evolution of energy prices, technology capital costs, energy demand, and resource availability, as well as discount rates and technology lifetime. The model allows maximising the efficiency of capital allocation for retrofit, renewal and/or development of the energy system infrastructure by using the net present value as an objective function, while taking into account the existing infrastructure, with its remaining lifetime. The model is applied to a case study in Geneva, Switzerland.

Tom Richard http://www.iee.psu.edu/content/tom-richard http://www.psiee.psu.edu	trichard@psu.edu	Institutes of Energy and the Environment, Penn State University, *USA* http://www.psiee.psu.edu http://sustainability.psu.edu/ http://www.newbio.psu.edu http://www.bioenergy.psu.edu	**Integrating Combined Heat and Power with thermal energy storage for optimizing building energy efficiency** Modern societies expect energy to be abundant, affordable, reliable, clean and safe. Achieving all of these goals simultaneously has been challenging for conventional centralized energy resources. As energy generation becomes more decentralized there arise several opportunities to transform these challenges into opportunties. These include multi-directional communication between energy generating devices and energy use, batteries and other forms of electricity storage, thermal storage, occupancy and activity sensoras, taking advantage of the «Internet of Things». This presentation will focus on the integration of of Combined Heat and Power (CHP) distributed generation with building demand using thermal as well as battery storage. Energy storage can help to bridge three kinds of gaps that occur today with an energy portfolio largely based : 1) the gap that occurs when renewables (clean?) are intermittent (reliable?) and there is a mismatch between power generation and electricity demand (affordable); 2) the daily gap between demand for thermal energy (heaviest on cold nights) verus power (heaviest during the day, especailly summer afternoon (abundant? reliable?), and 3) a very brief power outages that wreck havoc with instrumentation, lights, and worker safety (reliable? Safe?). Substantial energy savings are possible with CHP when a building's thermal and electirical loads are well designed, balanced, and fully integrated with sensors and controls interfaced to the grid. Building integrated CHP can provide an immediate path toward achieveing abundant, affordable, reliable, clean and safe energy. http://www.midatlanticchptap.org/ https://www.research.psu.edu/navyyard
Philippe Roesle	philippe.roesle@eda.admin.ch	Swissnex, *Switzerland*	***OPENING/CLOSING SPEECH SESSION CHAIR***
Luis Rojas-Solórzano https://www.linkedin.com/in/luisrojassolorzano/ https://www.researchgate.net/profile/Luis_Rojas-Solorzano2	luis.rojas@nu.edu.kz	School of Engineering, Nazarbayev University, *Kazakhstan* https://seng.nu.edu.kz/	**Technical and economic assessment of clean energy technologies** The world population has grown from 2500 million to +7000 million between 1950 and 2017, with current fastest growth rates in developing regions. Population and economic growth are driving the increase of energy demand. Projections by EIA and IEA for next 20 years predict an increase in consumption of fossil fuels, but a decrease in their shares as primary energy sources within the global matrix. For the same period of time, however, the fastest growing sources of energy are expected to be renewable energies, which an expected share of 14% in the global primary energy matrix by 2035. Therefore, in order to effectively tackle pollution and climate change, while supporting the growth of population and economy within the context of smart development, it is mandatory to facilitate the access and assessment of clean energy technologies to everyone in the planet. Clean energy technologies comprise the efficient use of energy and the implementation or renewable energies in daily lives. However, Clean Energy Technologies (CET) have typically higher CAPEX than conventional technologies and, despite their typically lower OPEX and being environmentally cleaner, in many cases, due to lack of a proper life cycle cost analysis, CET are discarded in initial considerations of new or retrofitting projects. This presentation introduces, with an example of a Wind Farm in Astana, how to perform a techno-economic feasibility analysis of a CET project using the decision-making support tool RETScreen (developed by Government of Canada). The analysis includes the determination of the impact on the reduction of greenhouse gas emissions.
Roman Rudel www.isaac.supsi.ch	roman.rudel@supsi.ch	University of Applied Sciences and Arts of Southern Switzerland, Department for Environment Constructions and Design Institute for Applied Sustainability to the Built Environment www.isaac.supsi.ch http://www.supsi.ch/isaac/ricerca-applicata/progetti/lista.html?fullText=&dipartimento=isaac&disciplina=-1&stato	**Innovative algorithm based smart grid approach** The diffusion of renewable and decentralized energy generation represents a growing challenge in the energy sector and requires new strategies to manage the distribution grid balancing intermittent generation patterns with the consumption behaviour. The introduction of active control systems requiring so called smart or intelligent grids. Contrary to the mainstream approach based on a central control with a dedicated communication system SUPSI developed a completely decentralized approach. The basic idea of this solution was to control the decentralized loads by an intelligent control unit for single household appliances. The control mechanism is based on a self-learning and adaptive algorithm using the local information of the grid (voltage) to plan a grid friendly behaviour of the principle loads in a distribution grid to significantly reduce peak loads and to reduce the extension of the existing grid infrastructure. The concept was tested in different pilot studies and a large utility in Switzerland is developing a commercial product called Gridsense. **Photovoltaic in urban area: energy for smart cities** The building sector is responsible for the consumption of roughly 30% - 40% of the total final energy consumption in the developed and industrial countries. Until recently the reduction of this energy consumption was focused on increasing the energy efficiency of buildings through more performant building insulation and new materials. The use of photovoltaics in urban areas was not considered in spite of the large horizontal and especially vertical surfaces for a number of reasons. With the reduction of PV-modules, the development of aesthetically attractive and versatile PV technologies architects started to use photovoltaics in urban areas with Building integrated photovoltaics. Switzerland with only few open spaces for large photovoltaic installation is particularly active in the development of aesthetically interesting photovoltaic solutions. Our institute is engaged in the development and the quality check (certification) of BiPV products, supports the the elaboration of guidelines to use photovoltaics for historical buildings. It also holds the BiPV competence center for the Swiss Federal Office of Energy with an interactive internet platform to raise awareness among professionals of the building sector and to help to overcome barriers to the diffusion of this technology. A further aspect regards the development of innovating designing tools and 3D simulater, which can help to resolve difficulties and optimize the use of photovoltaics in urban environment facing particular problems due to shading together with a local start-up inSun.
Alejandro Santis https://www.linkedin.com/in/asantis/	alejandro.santis@bfh.ch	BFH-CSEM Energy Storage Research Centre, *Switzerland* www.bfh.ch/energy	**Prosumers: Facilitated Integration of Renewable Energy Sources through Stationary Battery Systems** The widespread growth of decentralized micro-generation (particularly PV) means that consumers are interacting with electricity supply systems in new ways, becoming «energy prosumers» – both producing and consuming energy. Such «prosumerism» has the potential to create challenges for grid management. The talk seeks to provide an overview on the research and development activities at BFH within the framework of the project Prosumer-Lab, which deals with the topic of integration of prosumer into the distribution grid. One of the main goals of the project is the optimization of own consumption using optimal grid behavior as boundary condition for the sake of achieving an optimized integration of decentralized prosumers into the distribution grid and thus a win-win situation between prosumers and grid operators. **Have E-Vehicles finally arrived? Battery assisted vehicles and future developments** The current momentum in the electrification of the traditional drivetrain in passenger cars as well as the growing number of pure electric driven vehicles fuels hope for a transition towards a more sustainable mobility. Unfortunately, the advent of electric vehicles has been announced before and failed on its promises. We have therefore to ask ourselves what is different this time, especially what progress has been made or can be expected in the near future to justify this new hype? The presentation will focus on key technological innovations made in the last years as well as what can be expected in the field of batteries and electric mobility. In the second part of the presentation, some example projects that are currently carried out at the research centre will be presented. **Swiss Research and Development networks with special focus on Mobility Technologies and Systems** The Federal Council and Parliament are planning on making far reaching changes to the energy supply in Switzerland. In accordance with the Energy Research action plan, research networks between higher education institutions were created in 2014, the Swiss Competence Centres for Energy Research (SCCERs). These networks are looking for solutions to the technical, social and political challenges arising as a result of the energy revolution.The competence centre Efficient Technologies and Systems for Mobility aims at developing the knowledge and technologies essential for the transition of the current fossil fuel based transportation system to a sustainable one, featuring minimal CO_2 output and Primary Energy Demand as well as virtually zero-pollutant emissions.
Yerbol Sarbassov https://www.researchgate.net/profile/Yerbol_Sarbassov	ysarbassov@nu.edu.kz	Center for Energy and Advanced Materials Science, NLA, *Kazakhstan* http://energylab.kz/teams	**Development of clean coal technology for energy sector of Kazakhstan** The energy sector of Kazakhstan is mainly produced from coal-fired power plants and heavily linked to the coal production industry. By 2013, roughly 80% of energy is generated by coal-fired power plants. According to the IEA, the total CO_2 emissions from coal combustion including Electricity & District heating production were 146 Mt in 2013, representing 60% of the total CO_2 Kazakhstan emissions in recent years. Most installed coal-fired power plant uses pulverised coal boilers and the installed capacity now exceeds its manufactured lifetime and is operating under critical conditions with insufficient investment. Hence, power plants have lower efficiency, high emissions and a negative environmental impact. Most Kazakh solid fuels supplied to coal-fired power plants are classified as bituminous coals and the ash content of these coals mainly (Ekibastyz coal) is around 40%, and its sulfur content is 0.7 to 1%, leading to low efficiencies. As a result, this continues to contribute largely on the environment in urban areas, emissions of pollutants into the atmosphere. Therefore, this work will focus on the need to develop

			clean coal technology in Kazakhstan in order to use the energy resources as coal in more efficient and environmental way. Thus, the fluidized bed technology will be a subject of discussion. The fluidized bed technology has advantages over pulverized coal combustors with lower NOx and SOx emissions and fuel flexibility to utilize a wider range of solid fuels including biomass. In addition to that, the presentation will also cover the research activities and an available infrastructure at Nazarbayev University in the field of clean coal technology.
Uwe W Schulz https://www.hslu.ch/en/lucerne-university-of-applied-sciences-and-arts/about-us/people-finder/profile/?pid=926	uwe.schulz@hslu.ch	Lucerne University of Applied Sciences and Arts – School of Engineering and Architecture, *Switzerland* www.hslu.ch/ea-international	**An entire CO_2 Neutral Region?** In Switzerland, Buildings demand approximately a third of the total domestic energy supply. They are typically operated at a minimum cost, have their proper aesthetics and age, thus are equipped with various technologies, leading to the conclusion that no "one-fits-all-solution" can help to address global warming. An increasing use of irregular available renewable energy is adding to the challenge. Strategies to minimize the seasonal / daily gap between energy demand and supply include a combination of different user profiles, various sources of local / regional renewable energy and smart control of decentral production plants and storage facilities. The territorial extend of appropriately grouping such buildings and energy sources may vary from a small neighborhood, to a district, to an entire village. In this paper, three approaches from various research teams are presented, which collectively have the potential to form a step-by-step guideline for other regions, intending to create "An entire CO_2 Neutral Region". **First**, it is important to align all stakeholders around that objective. How that can be done is demonstrated for a Swiss Mountain Region (Zernez) through a simulation, bringing together Inhabitants, the Municipal Councilor, the Utility Company, Energy Advisors and Finance Managers. **Second**, a technical solution is to be implemented, for which an example is given through a central Switzerland district (Suurstoffi) covering approximately 165,000 m² floor space (1,500 residents, 2,000 students and 2,500 workplaces). While the study only includes energy use for the operation of the building facilities for heating, ventilation and air conditioning (HVAC), it does include conventional and hybrid photovoltaic panels to cover the entire electricity demand for the building operation (for the heat pumps, circulating pumps and heating bands) as well as supplying heat for the regeneration of the ground storage. **Third,** an optimization could be done through a simulation and / or a laboratory setup, like the presented NODES Lab; addressing the thermal energy infrastructure, in particular Low Temperature Networks (LTN). The test benches were designed to measure dynamic thermal plant performance whereas system boundaries, heat sources, building loads and controls are emulated with a real-time simulation or implemented as Hardware-in-the-Loop components.
Natalie Schwarz https://www.zhaw.ch/en/about-us/person/scrz/ https://www.zhaw.ch/no_cache/de/forschung/personen-publikationen-projekte/detailansicht-projekt/projekt/3079/	natalie.schwarz@zhaw.ch	ZHAW Applied Linguistics, *Switzerland* https://www.zhaw.ch/en/linguistics/research/organisational-communication-and-public-spheres/	**Smart Governance embedded in multilingual discourses (The case of Switzerland)** Innovations for integrated smart cities are dependent on their acceptance among key target groups such as citizens, politicians, public managers, consumers and the media. Knowledge about new technologies and integrated approaches to their implementation must therefore be shared, legitimized, and distributed in the public sphere. In a "glocalized" world, those tasks have to be carried out in multilingual contexts. The case of energy policy change in Switzerland shows the pertinent challenges for researchers, investors, and public agencies. Meeting those challenges could be called a practice of smart governance. The presentation is based on the preliminary work and initial explorations of a project funded by the Swiss Federal Office of Energy (SFOE). Until 2019, this project is developing a huge multilingual corpus of energy discourses in five languages, English among them.
Hanna Sotnikova https://www.linkedin.com/in/hanna-sotnikova-aa0abb9/ https://www.zhaw.ch/de/ueber-uns/person/sotn/	sotn@zhaw.ch	ZHAW Institute of Computational Physics, *Switzerland* https://www.zhaw.ch/de/engineering/institute-zentren/icp/	**PV self-consumption with heat pump systems: Optimizing systems with electrical and thermal storage by use of simulation** Self-sufficiency of systems with photovoltaic (PV) energy production gets more and more important. Demand side management with the use of heat pump and thermal energy storage has proven to be an efficient and effective means for increasing the PV self-consumption ratio. Accurate prediction of the self-consumption and the resulting self-sufficiency quota requires a comprehensive simulation including heat pump characteristics, thermal balance of the building and hot water demand profiles. These simulations are usually elaborate and time consuming. This work presents a fast but reliable estimate of the system's PV self-consumption potential. It is based on the well-known tool Sunny Design, which has been extended by the capability to calculate the building and hot water energy demand, and applying heat pump model with realistic characteristic curves. The proposed algorithm is capable of including battery storage and advanced controllers as future extensions. The algorithm is in accordance with the physics-based simulation tool Polysun which includes device physics as well as controller details with a tight coupling between the electrical and the thermal part of the system. The newly introduced model parameters in Sunny Design are calibrated and validated with the detailed Polysun model.
Bruno Storni http://www.supsi.ch/home/strumenti/rubrica/dettaglio.4693.html	bruno.storni@supsi.ch	SUPSI Institute of Applied Systems and Electronics, *Switzerland* http://www.supsi.ch/home.html	**Water supply: sustainability through an Integrated approach** Water supply systems , drinking water distributors are fundamental stakeholder for the implementation of public sustainability politics, promoting efficient water and energy consumption by modernizing public infrastructure toward a smart city future. However up to now Water supply utilities are generally not running very good environmental practices, large part of water supply infrastructure, pipes network is under the ground, not visible, is old and consequently is not in always in good shape. In facts large amounts of drinking water are lost through leaks formed in the years progressively without great notice. Water supply utilities justify a quite large amount of losses as normal, physiological. However Water supply utilities on one side may provide a leverage effect on sustainability but on the other side they are faced with the problem of running an old and aging public infrastructure with limited financial resources not allowing adequate refurbishing. A different approach has been developed by the Municipal Water Supply of Gordola , in a step by step approach adopting a set of different measures to reduce water consumption, experimenting and implementing new good practices, from technical to management aspects. Instead of a planned large financial investment to produce and pump more water from a neighbor wheel dimensioned with the classical practice, Water supply utility with EAWAG a reaserch institute, developed new method of monitoring pipe network that lead to a drastic leak reduction reducing water demand. In parallel some Demand Side Management DSM principles have been implemented on one side through information and sensibilisation on consumer behavior and on the other by adopting progressive tariffs and some limitation to large consumers. Additionally a new small energy production unit has been realized producing 250 kWh/y. The activity is going on since 15 years, with continuous improvements, in 2016 we reached the best waterworks efficiency with the lowest leak figure since statistical data are available. New technologies such as IoT and in general ICT are the next step towards a further reduction of consumption in particular peak and better efficiency of the distribution network toward an highly efficient almost zero leaks water supply systems
Peter Stücheli-Herlach https://www.zhaw.ch/de/ueber-uns/person/stue/ https://www.zhaw.ch/no_cache/de/forschung/personen-publikationen-projekte/detailansicht-projekt/projekt/3079/	peter.stuecheli@zhaw.ch	ZHAW Applied Linguistics, *Switzerland* https://www.zhaw.ch/de/hochschule/	**Smart Governance embedded in multilingual discourses (The case of Switzerland)** Innovations for integrated smart cities are dependent on their acceptance among key target groups such as citizens, politicians, public managers, consumers and the media. Knowledge about new technologies and integrated approaches to their implementation must therefore be shared, legitimized, and distributed in the public sphere. In a "glocalized" world, those tasks have to be carried out in multilingual contexts. The case of energy policy change in Switzerland shows the pertinent challenges for researchers, investors, and public agencies. Meeting those challenges could be called a practice of smart governance. The presentation is based on the preliminary work and initial explorations of a project funded by the Swiss Federal Office of Energy (SFOE). Until 2019, this project is developing a huge multilingual corpus of energy discourses in five languages, English among them.

Aigerim Uyzbayeva https://www.linkedin.com/in/aigerim-uyzbayeva-5592bb26/	aigerim.uyzbayeva@nu.edu.kz	Center for Energy and Advanced Materials Science, NLA, *Kazakhstan* https://nla.nu.edu.kz/en/ceams/rireesefe/laboratory-of-intelligent-systems-and-energy-efficiency	**Development of Energy Efficient and Smart Building at Nazarbayev University** For the past decade the world has become more sensitive to the issues of efficient energy use and environment protection. The International Energy Agency (IEA) estimates that existing buildings are responsible for more than 40 percent of the world's total primary energy consumption and for 24 percent of global CO2 emissions. The economy of the Republic of Kazakhstan is highly dependent on traditional energy sources like coal, oil and gas. It accounts for an estimated 20-30% of GDP, over 50% of fiscal revenues and 60% of exports. The Government has set a target on transition and adaption path for sustainable and rational use of energy sources through improving energy efficiency in buildings and industry, as well as integration of renewable energy into the power network. There is no doubt that comparing to the conventional dwellings the buildings with the greater energy efficiency and smart features have the potential to minimize the negative impact on the environment and offer health related benefits for an occupant. Nazarbayev University Research and Innovation System, PI in collaboration with National Laboratory Astana, PI proposed developing and building an experimental facility with support of Shell Company that would serve as a prototype of energy efficient house for households in rural areas as well as a testing laboratory for scientific purposes. This approach will allow using the building not only as an example of modern rural house but also conducting interdisciplinary research and perform the approbation of different construction elements, control and monitoring systems of engineering systems. The main aim is to develop a new facility which will support innovation in not only energy efficiency but at smart homes, new materials and new building techniques and bring together companies, research partners and local government to extend understanding of building performance.
Natalia Veselitskaya https://www.researchgate.net/profile/Natalia_Veselitskaya	nveselitskaya@hse.ru	Higher School of Economics, Moscow, *Russia* https://www.hse.ru/en/org/persons/32509709	**Smart city strategies for Moscow and Kazan development** In the framework of the project "Participative Foresight for Smarter Cities: From a Vision over Scenarios to Roadmapping" case studies for Moscow and Kazan were conducted. This work helped to develop the key characteristics of the smart city strategies for Moscow and Kazan. These characteristics include: • principles of the smart city concept; • drivers and barriers; • key actors; • priorities. Principles of the smart city concept in Moscow: • the quality of the urban environment improvement; • creation of a new architectural and artistic appearance of the city's historic center. Principles of the smart city concept in Kazan: eco-urbanism; smart growth; smart location; low carbon; inclusivity and identity. The key drivers for the smart city development: • Improving cities' infrastructure: energy, water and transportation systems. • Enhancing cities' global attractiveness to business and for economic development. • Creating a more attractive city and improving the quality of life. Barriers for the smart city development: • Lack of funding. • Departmental silos and lack of coordination. • Lack of alignment on priorities. The departments responsible for the smart city management (key actors) include: • Planning departments (transportation, parks and recreation, emergency management). • Information technology (health and human services, housing and community development). • Economic development (administration and regulatory affairs). Priorities for the Moscow smart city development are as follows: • quality of life; • city management; • IT infrastructure; • media and advertising. Priorities for the Kazan smart city development are as follows: • medicine; • high technology; • education; • tourism. As the result of the analysis the key features of the smart city strategies for Moscow and Kazan were identifies. They will form the background for the scenario development on the next stages of the project.
Yelena Yerzakovich https://kz.linkedin.com/in/yelena-yerzakovich	yelena.yerzakovich@undp.org	UNDP-GEF, *Kazakhstan* http://alatransit.kz/ru/biblioteka	**City of Almaty Sustainable Transport** UNDP/GEF City of Almaty Sustainable Transport is a 6-years project launched in 2011, to assist Almaty city in coping with the transport-related emissions by promoting the sustainable transport options and implementing demonstration projects. Transport related CO2emissions could increase from 2.65 mln. tons in 2012 to 4.99 mln. tons in 2023, if no changes are made to the de facto private car-oriented strategy. Project will share result of the studies conducted in Almaty during last five years regarding changes in mode share and travel habitat of citizens in the biggest city of Kazakhstan. Project assist to city administration in designing of City Almaty sustainable transport strategy via testing of different scenarios at the transport model and setting of specific indicators. Data collection exercise was critical part of this works and still is a big challenge for cities of Kazakhstan due to lack of reliable official statistic data and coordination at local level. CAST project also made recommendation for development of the sustainable urban mobility plans for other cities of Kazakhstan and will report about outcomes of public discussion with stakeholders. We also would like to share our experience in organizing Transport Innovation Challenge Hackathon in Almaty and report about first results of IT solutions designed to improved quality of life and mobility in the cities.
Onur Yildirin https://www.zhaw.ch/de/ueber-uns/person/yild/	yild@zhaw.ch	ZHAW Institute of Sustainable Development, *Switzerland* https://www.zhaw.ch/en/engineering/research/platforms/smart-cities-regions/, https://www.zhaw.ch/ine	**Smart City Innovation Office in Winterthur, Switzerland** Poster Session/Junior Researchers