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ABSTRACT	
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Institution	Università degli Studi di Verona
City	Verona
Country	Italy
Conference topic	**5. Environmental engineering and sustainable development in process industry**
Title	Preliminary results of the full-scale Short-Cut Enhanced Nutrient Abatement (S.C.E.N.A.) in Carbonera WWTP
Keywords (max. 5 words)	Short-Cut Enhanced Nutrient Abatement; biological nutrients removal; external carbon source; Horizon 2020-SMART-Plant
Abstract (max. 300 words)	*The increasingly stringent environmental regulations are leading to the necessity to improve effluent quality at low cost in wastewater treatment plants (WWTPs). When anaerobic digestion is accomplished, the usual practice is to return back the sludge reject water to the main line. Altough this stream volume represents a negligible amount (<1% of daily average influent flow), it may increase the nitrogen and phosphorus load up to 25 and 40%, respectively. Within this context, the application of Short-Cut Enhanced Nutrient Abatement (S.C.E.N.A.) in Carbonera WWTP was studied. During the start-up of the Sequencing Batch Reactor (SBR), the volumetric Nitrogen Loading Rate (vNLR) increased from 0,15 to 0,55 kgN/m^3 d in 30 days, while the complete via-nitrite pathway was achieved in 15 days. During this period the Ammonium Uptake Rate (AUR) increased from 2,06 to 10,56 mgN/g VSS h. Carbon source for nitrogen denitritation and via-nitrite phosphorus removal was produced by mixed primary and secondary sludge acidogenic fermentation at mesophilic conditions. The observed yields were 0,15-0,18mgCOD$_{VFA}$/gVS, resulting in a VFA (as COD) to soluble COD ratio higher than 80%. The observed nitrogen and phosphorus removal efficiencies were 87% and 69% respectively, resulting in a phosphorus content in the sludge of about 35-40mgP/gTS. Preliminary calculations showed an energy consumption of about 6,5 kWh$_{el}$/kgN$_{rem}$, corresponding to a potential energy saving higher than 65% compared to the treatment of the same stream in the main line.*
Brief biography (CV) (max. 70 words about each author)	**Vincenzo Conca** is PhD student in Biotechnology at University of Verona. He got a master degree in Agro-Industrial Biotechnology in

	2017 with a thesis concerning via-nitrite enhanced phosphorus recovery. His research is focused on via-nitrite sidestream treatments for resource recovery from sludge reject water (i.e. nutrients and biopolymers). He is currently operating the first Short-Cut Enhanced Phosphorus and PHA recovery (S.C.E.P.P.H.A.R.) in Carbonera WWTP within the context of the Horizon 2020 "SMART-Plant" project. **Dr. Cinzia Da Ros, PhD** is post-doc researcher in Biotechnology Department at University of Verona. She is expert in the recovery of energy and added value products from different organic waste by fermentation and anaerobic digestion. In the last years she focuses on anaerobic supernatant treatment by innovative processes to recover phosphorous and biopolymers. She has published 10 peer-reviewed papers in international journals. She has been involved in several European projects (Horizon2020, Water JPI, FP7 Project) **Dr. Nicola Frison, PhD** is assistant professor of Chemical Plants at University of Verona deealing with the integration of innovative biological systems in existing wastewater treatment plant for the valorisation of municipal wastewater and sewage sludge, recovery of phosphorus and biopolymers. He has published 25 peer-reviewed papers in international journals. He was technical and operative advisor for research commissioned by water utilities and industries. The research activities of Nicola Frison were complementary of several funded EU projects (Horizon2020, LIFE+ and FP7 programs). **Prof. Francesco Fatone, PhD** is environmental engineer and associate professor of Chemical Engineering. He has published 66 peer-reviewed papers in international journals. He is expert of advanced treatment, phosphorus and biopolymers recovery in municipal wastewater treatment plant. He was co-chair of the second largest IWA specialist group, editor of international water related scientific journals, chair or member of the several scientific committees. Francesco has recently coordinated the H2020 (SMART-Plant), he has been team leader of n.2 H2020 projects, n.1 Water JPI, and n.1 LIFE+.