IC4WATER RDI FUNDED PROJECTS BOOKLET

Process Control Technologies for Water Reuse

Acronym: Control4Reuse

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Project partners

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Project structure (WPs description):

WP1 System simulation platforms
Objectives:
- *defining water requirements for reuse*
- *developing a simulation platform*

Tasks:
Task 1.1 Characterization of reclaimed water requirements agricultural reuse-soil fertility, surface and ground water quality
- industrial reuse - max total dissolved and suspended solids, alkalinity, iron, copper, dissolved oxygen, hardness, and pathogens

Task 1.2 Plant/culture model development
Task 1.3 Treatment plant model development

WP2 Optimal estimation and control
Objectives: Design and development of optimal estimation and optimal control strategies of the integrated treatment reclamation system
Tasks:
Task 2.1 Analysis and control of treatment and reuse systems
- i. literature review and interfacing with WP1
- ii. model and control implementations, separated systems

iii.   analysis of models and control configurations

Task 2.2 Analysis and control of a deterministic treatment-reuse system

      i.   interfacing with WP1 and WP3

      ii.   model and control implementations, integrated system

      iii.   analysis of models and control configurations

Task 2.3 Analysis and control of a stochastic treatment-reuse system

      iv.   optimal state and parameter estimation, integrated system

      v.   optimal control, integrated system

WP3 Fault detection methods and evaluation indexes

Objectives: make use of the simulation platform and develop different FD methods and indexes to quantify and compare the performance of the control strategies developed in WP2

Tasks:

Task 3.1 Univariate and multivariate fault detection methods

      i.   analysis and implementation of univariate FD methods

      ii.   analysis and implementation of multivariate FD methods.

Task 3.2 Indexes for controller performance evaluation

quantifying the deviation (error) between the set-points and the measurements during a certain period of time

Task 3.3 Indexes for plant performance evaluation

effluent quality, cost factors related to the system operation, factors related to performance of the growth of plants

WP4 Implementation/evaluation of control strategies

Objectives:Full-scale implementation of the simulation platform built in WP1.

Tasks:

Task 4.1 Control4Reuse strategy in simulation

      i.   models review

      ii.   calibration and optimization

      iii.   tests of scenarios and evaluation

Task 4.2 Control4Reuse strategy in practice – on experimental sites

      iv.   identification of an irrigated perimeter sufficiently equipped to be used for control design

      v.   calibration and optimization

      vi.   tests of scenarios and evaluation

WP5 Project management and dissemination

Objectives: Coordination of work-package activity, reporting and internal communication between partners

Tasks:

Task 5.1 Management and communication

- setting up a platform and communication tools for information and data sharing,
- compilation of reports
- scheduling/organization of meetings

Task 5.2 Project monitoring

- monitoring WP milestones and deliverables
- detecting and reporting potential deviations
- risk management

Task 5.3 Dissemination

- publication in leading journals and conferences
- organization of thematic workshops/special sessions in recognized venues of the scientific/technological community

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