Sustainable waste and resource management
to support the energy turnaround (wastEturn)

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Introduction
The energy content based on lower heating value of all waste fractions in Switzerland summed up to 124'000 TJ in 2012. With 63'800 TJ, municipal solid waste (MSW) contributes significantly to the energetic potential of the Swiss waste management. MSW highlights two areas for further optimisation: (i) increasing the current average electricity and heat-recovery efficiency from waste incineration (direct energy savings), and (ii) optimising material recycling from the waste (indirect savings). Chemical and pharmaceutical sectors are responsible for ca 15% of industrial energy demand in Switzerland. Considerable amounts of high-calorific residues accrues in these sectors, and appropriate management of these industrial wastes (IW) can also lead to substantial energy savings.

Structure
The joint project ‘wastEturn’ consists in four subprojects (SP; Fig. 1). Each of them addresses technological, systemic and application-related aspects in the corresponding field. The four subprojects together cover all 3 pillars of sustainability to reach an overall optimisation of the system. Close collaboration with several external partners and stakeholders (Fig. 1), both bilaterally within subprojects and through the project’s two advisory boards, ensures a strong link to practical issues.

Objectives
The wastEturn project aims to:
- identify and assess potential measures to increase eco-efficiency of the most energy-relevant waste streams;
- evaluate the financial viability of an environmentally optimal waste management;
- analyse barriers and drivers of the transition to optimal waste management systems and assess strategies for practical application;
- support implementation and operation of Waste-to-Energy (WtE) systems through models dealing with planning and scheduling problems under uncertainty;
- foster capacity building among industry, policy-makers, and academia in the direction of resource efficient waste management systems and sustainable development.

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SP 1: Optimising the energy recovery and the sustainability of Swiss municipal solid waste management;
Project leader: Stefanie Hellweg, ETH Zürich, ESD

SP 2: Optimisation of industrial waste-to-energy (WtE) and resource recovery systems;
Project leader: Konrad Hungerbühler, ETH Zürich, SETG

SP 3: Economic assessment of industrial and municipal waste treatment options and waste-to-energy (WtE) systems;
Project leader: Christoph Hugi, FHNW

SP 4: Initiating transitions of Swiss municipal solid waste management (InTraWaste);
Project leader: Michael Stauffacker, ETH Zürich, NSSI

Energy Turnaround
MSW and IW management in Switzerland show a large improvement potential in terms of direct (Fig. 2) and indirect energy savings. The joint project wastEturn aims at optimising the contribution of the Swiss waste management system to the Energy Turnaround, under consideration of environmental and economic performance, and to develop socially robust transition strategies for its implementation.