MEDIA STORY BANK: PROPOSALS TO RECEIVE FUNDING FROM THE GSK-SINGAPORE GREEN AND SUSTAINABLE MANUFACTURING PARTNERSHIP		
Projects	**Novel approach**	**Story opportunity**
GREEN ENGINEERING		
EVALUATION of PROCESS INTENSIFICATION in EARLY DEVELOPMENT or RETROFITTING EXISTING PROCESS for GREEN and SUSTAINABILITY BENEFITS  Principal investigator: Dr Teoh Soo Khean Institution: Institute of Chemical and Engineering Sciences (ICES) Email: teoh_soo_khean@ices.a-star.edu.sg Website Year of Award: 2013	Process Intensification (PI) is any chemical engineering strategy (either or both equipment and methods) that could lead to a substantially smaller (equipment size/production capacity ratio, or inventory), cleaner (reduced wastes or by-products), and more energy efficient technology which ultimately resulted in cheaper, safer, environment-friendlier and sustainable technologies. To date, in the open literature, there is no satisfactory methodology that systematically evaluates pharmaceutical processes in this aspect as they normally involve more complex chemistry and processing needs. There are many PI strategies, for example catalysis; intensive mixing; intensive heat transfer; use of continuous technologies to replace existing batch operation, integrated reaction and separation (IRS) which provides the benefit of shifting the reaction beyond equilibrium by in- situ separation/removal resulted in higher yields, reduced energy requirements, reduced waste disposal and lower capital costs, etc. We will evaluate a number of common chemical transformations often used in pharmaceutical syntheses, assessing the possibility of intensifying the reaction step in conjunction with its separation step, and also looking at overall process green and sustainability performance. The limitations of the intensified process(es) are to be recognized and considered. A practical methodology will be developed to assess PI for the whole process in the context of pharmaceutical processing.	This research project will develop a generic, systematic and practical methodology to evaluate pharmaceutical processes for the feasibility of PI and sustainability benefits in the aspect of whole process. It willprovide the stakeholders with quick guidelines to decide as early as possible if a process is worthwhile to be intensified. Furthermore, the project will also include demonstrations of examples of intensified processing, proposal on the best feasible intensification technology based on sustainability metrics, as well as a proforma of comparisons of sustainability benefits between the existing and the intensified process. In the course of this research project, more people will be trained in the methodology of assessing such processes based on the relevant sustainability metrics, and also scale up of sustainable pharmaceutical manufacturing processes. Furthermore, this project will raise the awareness of evaluating PI with sustainability in the mindset for whole process in early process development or new processes On top of that, this project will produce publications that can raise the profile of the application of PI where they demonstrate benefits.