SWITCH Demonstrations
Template Instructions

1. **Name :**
   Insert a short (no more than 5 words) descriptive name for the demonstration project

2. **Location**
   Identify the location(s) where the demonstration will take place – cities and country.
   Example:
   Chongqing, China (greywater facility construction)
   Wuhan, Chongqing (monitoring)

3. **Lead workpackage/partner**
   Identify the lead workpackage directing this work and the lead partner
   Example: Workpackage 4.1, Lead partner – Chongqing University (12)

   Identify other workpackages involved
   Example: Workpackage 6.4, Lead partner – Unesco-IHE (1)
   Workpackage 1.1, Lead partner – EPFL (21)

4. **Timeframe**
   Insert the total timeframe for the project from planning through to final reports.
   Example: June 2007 through April 2010

5. **Description of demonstration**:
   Provide a short description of the project including diagrams or flow charts if useful The description should be no more than 1 page in length and should include the main elements of the demonstration. In addition to the description answer the following points separately.

***Innovative features/science**:*
Describe what about the project is novel or innovative from a scientific standpoint .

***Potential impact**:*
In this section you will need to extrapolate what the potential impact could be. This should not be a listing of the deliverables but more a calculation (based on stated reasonable assumptions) of what the project could achieve against specific indicators. It is a justification of why it is important and what difference it can make.
For example,if the Chongqing greywater demo for landscape/aesthetics purposes was replicated at 250 sites in China it would: .

Reduce use of river or groundwater sources by X litres per site or X litres overall – a 5% reduction China wide
Decrease energy use/GGH by X
Increase liveablity (define by an indicator) by X

We realise this is not an easy exercise but it is very important. Just be clear in the rationale for your assumptions.

Relationship to LA – evidence of demand:
Explain the decision making process for this demo with regard to its being demand driven. Has it been identified as a priority by the learning alliance? Has the demonstration been presented to them and what was the response?

Plans/ideas for scaling up:

Explain the plan for replicating the demonstration.
To complete this section we suggest you develop a 5 or 10 year goal for what you would hope to achieve as a result of this demonstration – if you want to see it replicated at 250 sites how would you help that to be achieved.
For example, write a policy briefing paper to be submitted to X, work with the environmental regulator to get the technology/system included as an option that must be evaluated in planning documents, develop training materials that will be disseminated to X local governments.

6. Budget summary
Provide a summary of the budget on a yearly basis including main contributors. All SWITCH demo projects receive 35% funding from the EU and 65% matching funds.

7. Dissemination Plans

Target Audiences/rationale:
Provide details of who the target audience is for this information and how you will provide them with the information. The dissemination should be connected to the "plans for scaling up" the demonstration. For example, if your goal is to have it replicated at 250 sites who would need to be convinced or lobbied for this to happen?

Planned Publications:
What technical publications are planned. For examples – what journals will the results be submitted to?
What other publications are planned. For example, you may want to do a briefing paper on the results of monitoring that is distributed semi-annually as a fact-sheet to relevant Goverrnment agencies
State whether the material will be compiled into a guidance manual

Media:
How will the media be targeted to promote this activity – press releases? ribbon cutting events? documentaries? You-tube internet video? Be creative in getting exposure.

Other (workshops, conferences, etc.):
List targetted conferences and events. Note that dissemination can include scientific conferences but this should not be the sole method of dissemination.
Perhaps a series of workshops in different geographic areas to deliver the results to relevant stakeholders?

8. Training Activities
Explain whether the demonstration will be developed into a training module for SWITCH**.**
Also, whether training will be conducted using the demo and if so, the audiences and expected dates.
Specify whether training funds are currently available. Provide evidence of

9. Other:
If the demonstration uses matching funds from a third-party then an agreement must be in place between the third-party and the partner before commencement of the demonstration. **Provide the CMU with evidence of any third-party agreements.**

This template is a summary document and does not constitute the detailed plan for the demonstration. Additional detail of budgets should be inserted in the SWITCH financial database.

SWITCH DEMONSTRATION PROJECT

1. Name of Demonstration : Short SAT as prefilter for NF of secondary effluents	**2. Location(s):** Dan Region WWTP near Tel-Aviv Israel – Pilot Monitoring: Mekorot Central lab. (Israel), IHE (Holland), TUB (Germany)

3. Lead workpackage/partner:

3.2 WP 3.2 Safe water Reuse
Directing the work: Unesco-IHE (Gary Amy)
Lead partner -Mekorot Israel

Other workpackages involved:

POTENTIAL:
WP0.2 – Dissemination and training - ICLEI (20)
WP3.3 – Urban water supply and other productive uses - HUJI (11)
WP5.2 – Use of urban water (fresh and wastewater) for urban agriculture and others- ETC (3)
WP5.3 – Maximizing the use of Natural Systems in all aspects of the municipal water cycle – IHE (1)
WP 6.2 – Learning alliance – IRC (2)

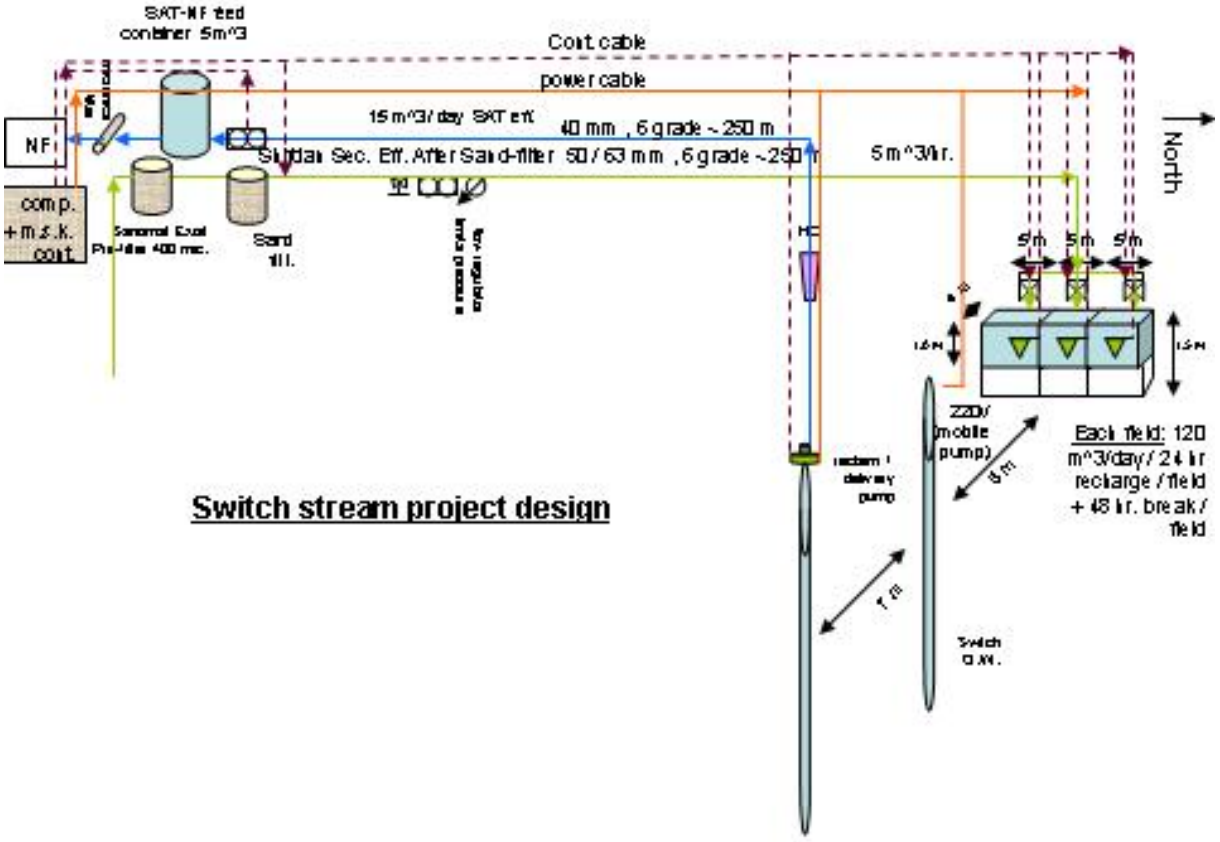
4. Timeframe:
June 2007-September 2007 - Finalization of the DEMO pilot construction (NF-SAT)
Oct. 2007-Oct. 2008 – Run of the SAT-NF pilot and optimization of the parameters. Three sampling campaigns for analyses of standard parameters analyzed in the conventional SAT and micro-pollutants analysis. Start of the demo program including training to LA during the operation of the pilot.
Nov. 2008-Feb. 2009 – Paper on the pilot results. Final data gathering at the completion of the different analyses. Report on the NF-SAT pilot operation
March. 2009-Sept. 2009 – Comparison of data from conventional SAT, data from UF-SAT pilot (Reclaim) and data from SAT-NF pilot (Switch) and a feasibility report for the opted process. Start of the preliminary project for scale –up.
Oct. or Nov. 2009–Workshop in Tel Aviv for the LA and Switch members and other LA members and other SAT experts
Nov. 2009- February 2011 – Dissemination of the project results in Israel and abroad in Conferences, papers and local media (TV reporting on the case.. newspapers..) . Preparation of the scale-up project.
The DEMO and training activities are true also for the DEMO activities not related to the pilot plant: Drinking water distribution system, source of supplied water to the city, quality control, distribution, wastewater collection and treatment and reuse

5. Description of demonstration:
The purpose of the research is to look for alternative technologies that will produce water comparable to the accidental drinking water quality of the Shafdan Water (SW).
The pilot work will involve testing of the SAT in a field site, in the Shafdan, for the removal of microbes and chemicals, both traditional and emerging contaminants that constrain potable reuse.
Analyses will be performed at Mekorot, TUB and IHE. Mekorot will perform the standard chemical analyses and the standard microbiological analyses. The emerging pollutants and other chemical analyses will be performed by IHE and TUB who are organized to perform such analyses.

The field site to be used in demonstration activities is located in Tel Aviv and operated by Mekorot (SHAFDAN), and is the largest existing SAT demonstration site in the European region.

A key aspect of this task will be the demonstration activities; while the Israeli site is an existing one, new concepts will be tested at the demonstration scale. Travel distance/time relationships required for elimination of different contaminants will be defined, pretreatment to reduce infiltration basin clogging will be addressed, and centralized versus de-centralized applications elucidated. Models will be developed for scale-up of the SAT technology to other potential demonstration cities.

SAT will be examined in the pilot, as a pretreatment for membranes, with post-treatment by nanofiltration (NF) membranes defining a SAT-NF hybrid serving as multi-barriers to microbes and chemicals.
In the demonstration stage a comparison will be performed between the RECLAIM project pilot that studies the SAT improvement by first UF filtration and then infiltration by dug wells and short SAT to obtain the same water quality as the conventional SAT today, and the SWITCH project pilot to show the advantages and disadvantages of each process. For comparison purposes the same team Mekorot-IHE-TUB that is performing most of the chemical analyses in the RECLAIM project will cooperate in the SWITCH project too.
The flow sheet of the DEMO pilot is given below:



Different stages of the pilot are:
The proposed alternative process consists of:
1. Preliminary treatment before SAT (sand filter) to minimize clogging of the infiltration field.
2. Operation of a very short retention time SAT (2-10 days) by surface spreading of the pretreated WWTP effluents to minimize the proteins and polysaccharides that are the main precursors for the NF membrane clogging.
3. Polishing of the reclaimed water by Nanofiltration (NF).
4. Comparison of the Short retention time SAT – NF treatment with the conventional SAT by analyzing physico-chemical and microbiological parameters.
5. Comparison of the 10 days SAT –NF process (SWITCH) to the UF-30 days SAT process (RECLAIM).

Innovative features/science:
Preliminary work performed at IHE in the context of the RECLAIM project showed that most of the protein –like material, humic –like material and microbially derived organic matter were effectively removed by the conventional SAT treatment with 6-12 months retention time in the soil.
On the other hand, laboratory experimental results are available on removal of the EPS (protein, humics..) by short Sat (10 days retention time). The EPS is the major cause for fouling of membranes and preliminary work in the RECLAIM project shows the difficulty of cleaning the EPS out of the UF membranes used as pretreatment to short SAT.

In SWITCH the improved SAT technology and mainly the use of SAT as pretreatment for NF membrane to remove the EPS and enable effective use of the NF will be proved at large scale for the first time (as compared to the available lab. results).

Potential impact:
Solving the problem of further expending the Soil Aquifer treatment (SAT) due to lack of available land. A new technology for the improvement of SAT which is a relatively cheap tertiary treatment process and provides excellent quality water for reuse

Relationship to LA – evidence of demand:

The main purpose of this project is to develop effective and sustainable treatment and storage technology into a semi-closed urban water cycle to promote safe wastewater reuse.
In 20-30 years, around Tel-Aviv a high population growth and advanced urbanization is expected. As a result there will be more demand for housing construction and energy demand increase at the same time the agriculture in the south will prevail (as quoted by the southern farmers association) and more and more Shafdan water obtained by the SAT system will be needed.
The SAT system today is in its full capacity and there is gradual clogging of the infiltration fields.
The surface area needed for infiltration is considerably big and the intensive urbanization does not leave much space for new infiltration areas. So alternatives like improved SAT system (short SAT-NF system as in SWITCH) would improve the situation. The preliminary meetings with the Israeli LA proved the essentiality of such Demo-research project.

Plans/ideas for scaling up:
Since the need for new infiltration fields is urgent as soon as the pilot will be completed and if the results will be positive there is a possibility for using the actual infiltration fields as preliminary filters before NF systems and to draw the water instead of the conventional 6-12 months retention time at 5-15 days retention time and convey the water to a NF plant that will specially be built for polishing the water to an almost drinking water quality like the conventional system

6. Budget Summary (overall description of SWITCH and match funding – how 35/65% split will be achieved)

Year	***SWITCH budget (EUR)***	***Matching funds (EUR)***
2006	1750	3250
2007	18600	34400
2008	23800	44200
2009	28000	52000
2010	22400	41600
2011	10500	19500

7. Dissemination Plans

Target Audiences/rationale:

As mentioned before the target audiences will be in different degrees:

1. External to Israel – International. SAT experts, developing countries where SAT as a natural and relatively cheap treatment system can be applied.
2. Internal in Israel – The local LA, the public by training of high- school and university students that normally come in the context of the annual environmental programs to the Shafdan to learn about the WWTP. The SAT-NF and the other SAT alternatives could be part of the training system

Planned Publications:

Papers in journals like Water Science technology. Papers in major conferences on effluent reuse.

Media:

TV reporting, news papers, local environmental engineering journals

Other (workshops, conferences, etc.):

A workshop to be organized at the end of the pilot that will compare the 3 SAT processes (conventional, UF-SAT and SAT-NF).

8. Training activities (activity, location, timeframe)

Oct. or Nov. 2009 –Workshop in Tel Aviv for the LA and Switch members and other LA members and other SAT experts

Nov. 2009- February 2011 – Dissemination of the project results in Israel and abroad in Conferences, papers and local media (TV reporting on the case.. newspapers..) . Preparation of the scale-up project. The DEMO and training activities are true also for the DEMO activities not related to the pilot plant: Drinking water distribution system, source of supplied water to the city, quality control, distribution, wastewater collection and treatment and reuse

_____3.2 Safe water reuse _____Demonstration Project Details

Activity	Tasks	Timeframe for task	Deliverable & due date	Lead partner/workpackage	Comments
Reviews and support studies ***1.Review of SAT systems*** ***2.*** ***3.***	3.2.1	Till end July 2007	July 207	IHE, Mekorot /3.2	
Construction activities	Construction of the SAT, observation well, recovery well, NF membrane	Till end Oct. 207	August 207	Mekorot/ 3.2	Due to technical problems there will be a delay of few months
Monitoring and analysis	Analyses of the main parameters and micro-organics During the pilot run	From Nov. 2007 to Nov. 2008 (the end of the pilot run)	Aug. 2008	IHE, TUB, Mekorot 3.2	Again due to the late start

_____Demonstration Project Budget

Year	Partner	Budget (EUR)	Matching Fund Organization (MEKOROT)	Budget (EUR)	Total Budget (EUR)
2006	Mekorot	1750	3250		5000
2007	Mekorot	18600	34400		53000
2008	Mekorot	23800	44200		68000
2009	Mekorot	28000	52000		80000
2010	Mekorot	22400	41600		64000
2011	Mekorot	10500	19500		30000
		105000	**195000**		