



# **Smart Pot**

**Template for Proposal Submission**

**PATEL CENTER FOR GLOBAL SOLUTIONS**

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## **INSTRUCTIONS**

1. Your proposal should be submitted on the attached TPS form.
2. **Please make sure** that you include with your TPS form all the additional documents specified in Section 3 of the TPS form.
3. Upload your completed TPS form along with the additional documents on the 'Patel Challenge' website ([www.psgs.usf.edu/patelgrandchallenge](http://www.psgs.usf.edu/patelgrandchallenge)) by March 1, 2012 (midnight EST). Only one TPS per group is required to be submitted by the principal applicant.

**For further details about the rules governing the Patel Grand Challenge, please refer to the document 'Governance of the Patel Grand Challenge' available at ([www.psgs.usf.edu/patelgrandchallenge](http://www.psgs.usf.edu/patelgrandchallenge)).**

# TEMPLATE FOR PROPOSAL SUBMISSION (TPS)

(Complete the TPS form using Arial 12 point, 1.0 line spacing. When scanning to PDFs use no more than 128 DPI (dots per inch))

## SECTION 1: ORGANISATIONAL DETAILS

1. **Applicants Information:** Provide information about the principal applicant. Provide similar information for all of your co-applicants (by copying and pasting the table below).

Principal Applicant		
Affiliation		
Street Address		
P.O. Box No.		
City		
Postal Code		
Country		
Phone (Int. Code / No.)		
Fax (Int. Code / No.)		
Email		

- 2. *Legal Status:*** Provide information about the legal status of your organization. Provide an independent box for each co-applicant (by copying and pasting the box below).

In what country is your organization registered?

What is the legal nature of your organization?

***(Max 50 words)***

What financial audit principles and/or accounting rules are practiced in your organization?

***(Max 50 words)***

3. **Background of Organization:** Provide a brief description of the background of your organization showing that you are qualified for the Patel Grand Challenge. In addition describe the core activities and years of experience of your organization. Provide an independent box for each co-applicant (by copying and pasting the box below).

***(Max 150 words)***

- 4. Technical and Managerial Capability:** Provide a brief description of the technical and managerial capabilities of your organization including, the organizational structure, the number of employees, facilities, equipment etc. relevant for the Patel Grand Challenge. Provide an independent box for each co-applicant (by copying and pasting the box below).

***(Max 250 words)***

## SECTION 2: TECHNICAL PROPOSAL

5. **Description of the Proposed Smart Pot:** Describe each component of your proposed Smart Pot. For each component in: Column 1, provide a sketch of the component; Column 2, describe the component; Column 3, describe the material used for the component; Column 4, describe the dimensions of the component. (Please feel free to expand the number of rows if you have more than four components).

Component Number	Diagram of Component (Column 1)	Description (Column 2)	Material (Column 3)	Dimensions (Column 4)
1				
2				
3				
4				



- 6. *Assembly of the Smart Pot:*** Draw a vertical cross-sectional diagram of the Smart Pot, to show how the components (described in Section 6) are assembled to form the treatment unit. In addition describe how the assembly will be embedded and fitted into the Smart Pot.

Cross-Sectional Diagram

Description of Assembly

***(Max 350 words)***

7. **Stages of the Flow and Treatment Process:** Describe (in up to seven numbered stages), what happens to the water as it flows through the neck of the Smart Pot and passes the key components of the pot. Focus on the flow regimes and treatment mechanisms. In particular describe in detail how microbiological contamination is treated.

**(Max 600 words)**

1.

2.

3.

4.

5.

6.

7.

8. **Treatment Performance:** Describe in detail the performance of the Smart Pot in terms of contaminant removal (in particular microbiological contaminants). Explain the limits (upper and lower) of the removal performance in terms of source water quality characteristics (e.g. turbidity and pH limits within which the treatment system works).

***(Max 350 words)***

9. **Operation of Smart Pot:** Describe how the user will operate the Smart Pot. Explain how the Smart Pot should be filled, how it should be positioned during collection and treatment and the time it takes to treat the water.

**(Max 350 words)**

**10. Maintenance of Smart Pot:** Describe the maintenance requirements of the Smart Pot. Focus on the method and frequency of maintenance and the skill required by the user to do so. In addition, mention whether components of the Smart Pot need to be replaced or if they can be reused.

***(Max 350 words)***

**11. Initial Costs and Running Costs:** Provide an estimate of the initial costs (purchase cost) and running costs of the Smart Pot (running costs should include costs of consumables and maintenance and replacement costs in US\$). Calculate the estimated Equivalent Annual Cost (EAC) of the Smart Pot over its entire lifespan. Please use the EAC formula provided in the Appendix (an example calculation is also provided to assist you).

***(Max 350 words)***

**12. What makes your Smart Pot special?** Describe any unique qualities of your proposal that makes your Smart Pot special.

***(Max 350 words)***

## **SECTION 3: ADDITIONAL DOCUMENTS**

***13. Please submit (as separate attachments) the following additional documents along with your completed TPS form:***

- The appropriate W-8 U.S. Tax Form for your organization and each co-applicant. Submit all forms in one single PDF document.
- Letters of consent from each of your co-applicant. Submit all letters in one single PDF document.
- Curriculum vitae for the principal applicant and each co-applicant. The CV is limited to two pages and must provide following information: professional preparation (undergraduate and graduate education), appointments (all professional appointments beginning with the current appointment), publications (up to five publications most closely related to the Patel Grand Challenge) and synergistic activities (up to five examples that demonstrate the broader impact of the applicant's professional activities). Submit all CVs in one single PDF document.



## **SECTION 4: CONFIRMATION OF RULES**

**14. Has your invention been already patented in any jurisdiction?**

Yes       No

**15. Do you guarantee that no human subjects will be used to develop and/or test the Smart Pot?**

Yes       No

**16. Do you agree to the terms and conditions as stated in the document 'Governance of the Patel Grand Challenge'?**

Yes       No

**17. Do you give permission to the Patel Center for Global Solutions to publish the proposal on its website and official communication channels?**

Yes       No

**18. Signature:** *I am certifying that all information is accurate and truthful and that signing this proposal is within the scope of my powers.*

\_\_\_\_\_  
**Name and Signature**

\_\_\_\_\_  
**Date**

# APPENDIX

## Calculation of the Equivalent Annual Cost (EAC)

Calculate the EAC including the following cost categories:

- initial cost (purchase price) and
- running cost (e.g. consumables like treatment chemicals or filter materials, replacement costs of components with a shorter lifespan than the whole product).

Calculate the equivalent annual costs in US\$ using the equations below with an interest rate of 3% and an annual treatment volume of 5000 L. An example of the calculation is documented below.

$$EAC = \frac{NPV}{A_t}$$

$$A_t = \frac{(1+i)^t - 1}{i * (1+i)^t}$$

$$NPV = \sum \frac{R_{tn}}{(1+i)^{tn}}$$

With:

EAC = equivalent annual cost in US\$

NPV = net present value in US\$

$A_t$  = annuity factor

t = operating lifespan of product in years

$t_n$  = time of the cash flow in years

$R_{tn}$  = net cash flow (initial costs or running costs) in US\$ at year n

i = annual interest rate of 3%

## Example

Consider a smart pot that costs US\$3.00 (purchase cost) and a lifespan of 5 years. For every 1000 L a consumable component has to be purchased at a unit price of US\$ 0.50. Within the lifespan of 5 years and an annual treatment volume of 5000 L the consumable has to be purchased 24 times  $[(5 \times 5000 \text{ L} / 1000 \text{ L}) - 1 = 24]$ . In addition every year a part has to be replaced for US\$ 1.00. The part has to be replaced 4 times  $[(5 \times 1) - 1 = 4]$  during the lifespan of 5 years. The costs during the lifespan are listed in the table below.

Cost category	$R_{tn}$ cost in US\$	$t_n$ in years	$\frac{R_{tn}}{(1+i)^{tn}}$
Purchase cost of the smart pot	3.00	0	3
Operation cost for 1000 L	0.50	1/5	0.049705
Operation cost for 2000 L	0.50	2/5	0.049412
.	.	.	.
.	.	.	.
Operation cost for 24000 L	0.50	24/5	0.043386
Replacement cost of part in the 1 <sup>st</sup> year	1.00	1	0.970874
.	.	.	.
.	.	.	.
Replacement cost of part in the 4 <sup>th</sup> year	1.00	4	0.888487
NPV			US\$17.87

The equivalent annual cost for an interest rate of 3% is calculated:

$$NPV = \frac{3.00}{(1 + 0.03)^0} + \frac{0.50}{(1 + 0.03)^{1/5}} + \frac{0.50}{(1 + 0.03)^{2/5}} + \dots + \frac{1.00}{(1 + 0.03)^4} = US\$17.87$$

$$A_t = \frac{(1 + 0.03)^5 - 1}{0.03 * (1 + 0.03)^5} = 4.5797$$

$$EAC = \frac{17.87}{4.5797} = US\$3.90$$

**The equivalent annual cost of the smart pot is US\$ 3.90.**