

ideas to impact.

# LPG CYLINDER PRIZE

EVALUATION REPORT

Cheryl Brown  
ITAD  

---

JULY 2017

## ACKNOWLEDGEMENTS

The author would like to thank colleagues in the Ideas to Impact Evaluation team for their advice and feedback on the planning and implementation of this evaluation, and especially Chris Barnett and Jessica Roberts for their support with quality assurance and data analysis.

Thanks, also, to Simon Collings, Mathieu Dalle, Jonty Slater, Renato Vasconcelos, Michael Loevinsohn and Bryony Everett of Ideas to Impact; to Magdalena Banasiak, Andrew Shaw and Anthony Morris (DFID); to InnoCentive; and to the winners and judges of the LPG Cylinder Prize, for their contributions to the evaluation and this report.

## RECOMMENDED CITATION

Brown, C. Ideas to Impact LPG Cylinder Prize: evaluation report, Itad, Hove, UK. (2017).

## DISCLAIMER

The views expressed in this report are those of the evaluators. This material has been funded by UK aid from the UK government as a part of the Ideas to Impact Programme; however, the views expressed do not necessarily reflect the UK government's official policies, nor those of any of the individuals and organisations referred to in the report. 'Itad' and the tri-colour triangles icon are a registered trademark of ITAD Limited.

## Table of contents

Summary.....	4
Did the Cylinder Prize work?.....	5
Glossary.....	10
1. Introduction.....	11
2. Purpose and Objectives of Evaluation .....	12
2.1. The Cylinder Prize.....	13
3. Methodology.....	13
3.1. Methodological approach.....	15
3.1.1 Website statistics, prize data and documentation .....	16
3.1.2 Qualitative data from solvers, prize team and judges .....	16
3.1.3 Limitations and challenges .....	17
4. Findings.....	19
4.1. Prize process quality: how do we know the Cylinder Prize delivered what was required? (EQ 1).....	19
4.1.1 What was the reach and uptake of the prize? (EQs 1.1 and 1.6).....	19
4.1.2 How diverse were the solvers for the Cylinder Prize? (EQ 1.5).....	25
4.1.3 Were potential solvers given sufficient time and information to participate? (EQs 1.2 and 1.3) .....	28
4.1.4 Were the prize’s incentives sufficient to attract suitable solvers? (EQ 1.4) .....	32
4.1.5 Was it possible to identify acceptable alternatives to smelting through the prize? (EQs 1.7 and 1.8) .....	35
4.2. Prize effectiveness: To what extent did it deliver the results anticipated? (EQ 2) .....	37
4.3. Prize added value: To what extent did the prize itself offer something different or complementary to other modalities? (EQ 3) .....	38
4.4. Likely longer term impacts: To what extent will the prize lead to societal benefits for ‘bottom of the pyramid’ consumers? (EQ 4) .....	44
5. Intended and unintended prize effects.....	45
6. Conclusions and Recommendations .....	49
6.1. Recommendations .....	50
References.....	52
Annex 1: Evaluation Framework Summary Table .....	54
Annex 2: Questions for use in interviews with Cylinder Prize winners .....	57
Annex 3: Analysis of whether potential solvers were given sufficient time and information to participate (Evaluation Questions 1.2 and 1.3).....	59

## Summary

The Cylinder Prize ran for two months from July 2015, and was one of three<sup>1</sup> prizes designed to support the planned reform of Liquid Petroleum Gas (LPG) distribution in Ghana. Upon adoption of the new policy, millions of old and potentially dangerous gas cylinders would need to be recovered and re-purposed or disposed of, to be replaced by new, safer cylinders. The objective of the Cylinder Prize was to generate ideas that could be implemented immediately, from a global pool of solvers, on how to maximise the value of the old gas cylinders recovered, as part of the cylinder exchange policy that would provide a better financial/environmental/social option than cleaning the cylinders and sending them to the smelter. The Cylinder Prize was run on the strong expectation of the Prize Team that the Government of Ghana would soon be implementing reforms to LPG and facing an urgent question of how to dispose of millions of old gas cylinders. Any alternatives to smelting would need to be available in advance if they were to be taken up. After the Cylinder Prize was awarded, the reforms met with opposition from incumbent businesses involved in LPG supply and did not go ahead.

The evaluation of the Cylinder Prize was carried out by Itad, the evaluation partner for Ideas to Impact and is the smallest of the prize-level evaluations for the programme. The purpose of these evaluations is to make learning about innovation prizes and challenges tested by the programme available to key stakeholders. The primary objective of this evaluation is to analyse and report on the success or failure of the Cylinder Prize to achieve its intended results. The prize's pathway to success is illustrated in Figure 1; however, prize failure is understood by Ideas to Impact to mean either or both of: non-awarding of the prize (may not automatically be a failure if intended outcomes were achieved); failing to contribute effectively to outcome indicators (may be classed as a failure even if prize was awarded).

---

<sup>1</sup> The other two prizes were regarded as higher risk, being more acutely dependent upon the timing of the LPG policy, and were not launched.

## Did the Cylinder Prize work?

### KEY FINDINGS

- The prize failed to achieve one of its intended effects, i.e. to find a solution that satisfactorily met all criteria, particularly being able to be immediately implemented at scale (EQ 2).
- Seven awards were made for partial solutions (solutions that would require further prototyping or testing before being able to be implemented at scale) of which three different but complementary solutions related to a single idea of turning cylinders into improved cookstoves. (EQ 1).
- The Cylinder Prize succeeded in attracting new entrants; while data were unavailable for non-winning applicants, at least 71% of Cylinder Prize winners were new to donor funding (five winners out of seven, with one not participating in interviews), (EQ 1, Prize effects).
- There is evidence of the Cylinder Prize encouraging participation in further innovation prizes and interest in prizes with a development focus. (EQ 1, Prize effects).
- Lack of progress with the energy access policy in Ghana prevents some further effects from taking place but if resources are available, the Prize Team could take action that may lead to other effects occurring. (Prize effects).

Figure 1 summarises what success looks like for the Cylinder Prize, and the associated assumptions, and has been annotated to highlight the main conclusions of the evaluation. Overall, the evaluation finds that the Cylinder Prize succeeded in the first two stages of the prize process (receiving applications and making awards), but failed to deliver a solution that the Government of Ghana (and other stakeholders) were willing or able to implement immediately.

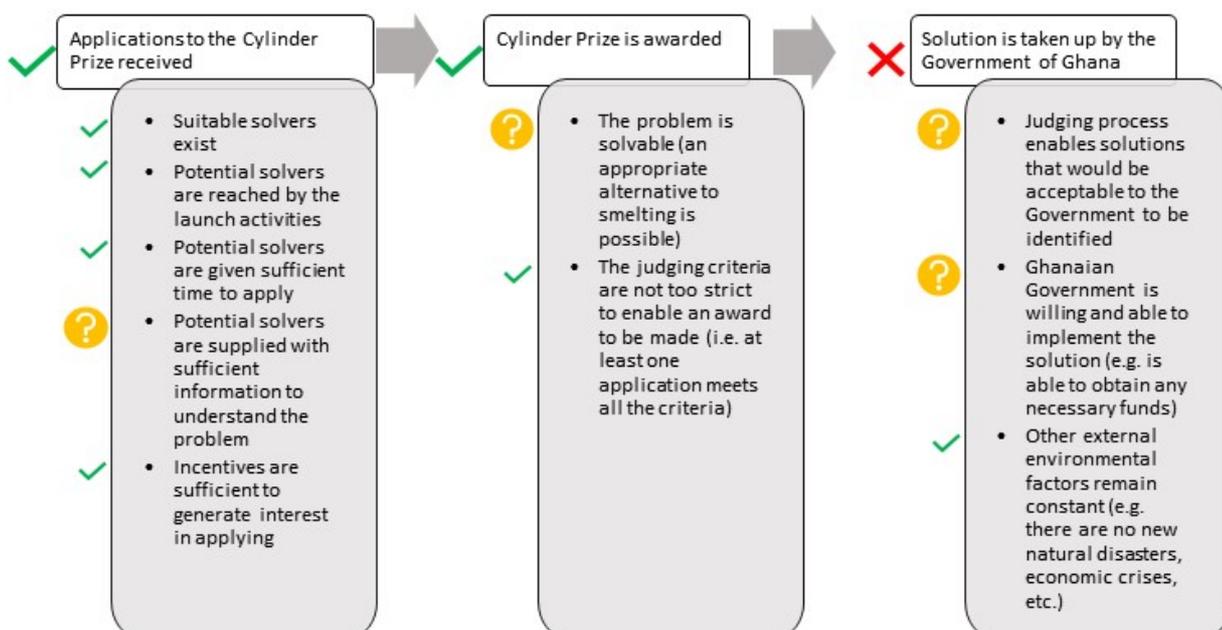


Figure 1: Intended results of the Cylinder Prize

Based on the data available to the Evaluation Team, four of the assumptions did not hold up:

1. *Potential solvers are provided with sufficient information to understand the problem.*
2. *The problem is solvable; an appropriate alternative to smelting is possible.*
3. *Judging process enables solutions that would be acceptable to the Government to be identified.*
4. *The Ghanaian Government is willing and able to implement the solution.*

The first three assumptions are inter-connected: the evaluation findings suggest that the lack of full solutions delivered by the Cylinder Prize can be explained either by no better existing alternative to smelting the cylinders, or a series of information gaps. Solvers were not provided with details of the country context of the challenge: they only received technical information about the cylinders after the prize was launched, and the Prize Team did not communicate to potential solvers or judges its definitions of “innovative” and “new”. Some of this could have been pre-empted but the Prize Team was unable to share information about the country with solvers at the time of running the prize, and the view from the Prize Experts is that too much information can stifle creativity.

Even if full solutions had been obtained, the assumption that the Ghanaian Government and other stakeholders in Ghana would be able to implement any of them is questionable, given the lack of progress with the policy since the awards were made (millions of cylinders are not yet available), and their willingness to implement the solutions cannot be tested until that point.

## What went well?

- All seven solutions awarded were made available to the Government of Ghana, and those relating to stoves shared with the stove manufacturing industry in Ghana. (EQ 2).
- In the opinion of Innovation Prize Experts, the number of applications for the Cylinder Prize was above average for an InnoCentive prize of this type. (EQ 1).
- The Prize Team successfully exposed a global pool of solvers from a range of backgrounds to information about the prize and one in every 11 people that expressed active interest in the Cylinder Prize were based in sub-Saharan Africa. (EQ 1).
- Among winners, the Cylinder Prize attracted good quality submissions from people that DFID would have been unlikely to reach through their usual channels of procuring research. (EQ 1).
- The unusual focus of the challenge prompted at least one winner to participate in an InnoCentive challenge for the first time. (EQ 1).
- The length of the challenge period does not seem to have presented a barrier to solvers participating, indeed the Cylinder Prize received more submissions than anticipated by the Prize Team. (EQ 1).
- The financial award was acceptable to solvers – all seven winners agreed to license their solution to Ideas to Impact in exchange for the award they were offered. (EQ 1).
- Judges were positive about the process and while some of them made constructive comments for minor improvements, no major issues were identified. (EQ 1).

## Where could things have gone better?

- No full solutions were identified through the judging process (i.e. alternatives that could be immediately implemented at scale without prototyping or testing). (EQ 2).
- To date, none of the solutions shared with the Government of Ghana or stove manufacturers have been taken up. (EQ 2).
- Solvers and Prize Experts had different views on how much/what information should be made available; the Prize Team's inability (for political reasons) to disclose information about the prize's context created problems for some solvers. (EQ 1).
- Even winners did not score highly on all the criteria, which may support other findings: that solvers wanted more contextual information and that some winners felt they were being asked for something (market information) that they felt they were not best placed to deliver. (EQ 1)
- The Prize Team had limited success in promoting the prize directly to African audiences. (EQ 1).
- Sub-Saharan African solvers appear to have had less success at being shortlisted for further judging than solvers from the rest of the world, despite having been more likely to submit an application after opening a Project Room. (EQ 1).

## What else is interesting about the Cylinder Prize?

- While it was not reasonable to forecast its impact, in the absence of progress on the policy, the Prize Team estimated the potential for 176,000 poor or very poor people in Ghana to benefit from the Cylinder Prize by 2025 if the policy had gone ahead as expected and improved (fuel efficient) cookstoves had been produced for people on low incomes to purchase. (EQ 4).
- Cost comparisons between the Cylinder Prize and consultancy were difficult to estimate reliably and not always directly comparable but the exercise was useful for identifying some of the issues involved in assessing Value for Money of the prizes. (EQ 3).
- In comparison to procuring expertise from a consultant, a prize modality appears to be significantly more expensive; however, the Cylinder Prize offered several advantages over a typical consultancy including: reduced financial risk to the donor, increased number of solvers and reaching new entrants. (EQ 3).
- The prize's failure to identify a better immediately-implementable solution to sending cylinders to the smelter suggests that the Government of Ghana's original proposal was still the most appropriate approach. (EQ 2).
- There often appears to be a set of factors that combine to make a prize attractive to a solver, e.g. having the opportunity to earn money while applying one's theoretical knowledge to a practical problem and improving people's lives. (EQ 1).
- About two thirds of the shortlisted solvers included an altruistic reason for taking part in the Cylinder Prize (16 out of the 22 that provided information on their motivation) and for many of these it was given as the only reason. (EQ 1).
- Several of the winners reported that non-monetary rewards from winning, or even just participating, were a stronger incentive than the financial reward on offer. (EQ 1).

## Recommendations

**1. Prizes need to be viewed as part of a portfolio-based approach** that offsets success and failure in a managed way and considers the increased reputational risk of failure that applies to prizes, due to their higher profile. This applies to portfolios of prizes, and where prizes are used within a portfolio of other funding approaches (payment-by-results contracts, grants, etc.) that each present different levels of risk.

**2. Be clear on which objectives are viewed as key to judging "success"** – is success judged by the number of solutions obtained? Is success searching the widest possible range of solutions and discovering that there are no clear alternatives?

**3. Check that the right "crowds" will be reached by a prize through platform choice and prize design.** Given the Prize Team would have rewarded existing solutions from another context, a more overtly desk-based research challenge might have had more success if global networks of professionals working in development could have been accessed.

**4. Consider running a point solution prize as well as consultancy.** Paying for a research helpdesk report<sup>2</sup>, might have been better value for money than a prize, given that the Prize Team could not make public any information about the context of the prize; the prize could then have been run if the helpdesk failed to identify a solution. If resources only allow for a point solution prize or a consultancy, then consider the full risks and benefits offered by each when comparing likely cost-effectiveness.

**5. Adapt the design of point solution prizes to increase the probability of success.**

Winners were keen to see their ideas implemented but two of them commented on their lack of capacity to do so without technical support, or introductions to a local company with whom they could work to develop the idea further. Point solution prizes could achieve more of their potential value if they were blended with other mechanisms, such as follow-on grants, match-making with funders and companies, etc.

**6. Pre-test prize information before launch.**

When a potential solver visits a prize information page on InnoCentive, it signals that the prize has caught their attention and that they are interested in finding out more; opening a “Project Room” signals that the prize page has maintained this interest in the potential solver. To encourage more conversions from visits to Project Rooms, Prize Teams could pre-test the summary information with potential solvers in order to check that sufficient incentives are in place and that there are no unnecessary barriers to entry. Similarly, it is worth checking that the expectations of the Prize Team are communicated effectively in the detailed information and criteria of the prize.

**7. Consider what would be appropriate rewards for solvers motivated by altruism.**

Altruistic solvers prepare and submit solutions because they believe that doing so might help others, even if they themselves are not fully or partly rewarded for their efforts. In this context, large financial awards might be counter-productive while assurance that solutions would become a public good, with the solvers’ consent, might be more attractive. This could also address wastage of multiple solvers investing their resources into developing a solution (possibly the same/similar ones) when only a limited number of prizes are to be awarded.

**8. Include definitions of terms in prize information for solvers and judges.**

The Cylinder Prize highlights the importance of ensuring that “innovation” or “innovative” is defined and shared with solvers as part of the challenge details, and for this to be the same definition used by the judging panel. Ideas to Impact defines innovation as: The application of new or improved products, processes, technologies or services that are either new to the world (novel), either new to a region or business (imitative) or new to the field of endeavour, that is, repurposed (adaptive). The definition of ‘innovation’ suggested by the OECD in its Background Paper (2014), may be another useful reference:

- *Novelty: innovations introduce new approaches, relative to the context where they are introduced.*
- *Implementation: innovations must be implemented, not just an idea.*
- *Impact: innovations aim to result in better public results including efficiency, effectiveness, and user or employee satisfaction.*

---

<sup>2</sup> The GSDRC offers a desk-based research helpdesk service that includes contact with experts, see for example <http://www.gsdrc.org/docs/open/hd631.pdf>

## Glossary

**Applicant:** a solver that has submitted an application in response to the challenge description and criteria.

**Application:** the written proposal and supporting material submitted by a solver to the person seeking the solution (in this case, the Cylinder Prize Team via the InnoCentive platform) in response to the prize problem statement. A single application may contain more than one solution.

**Innovation:** the application of new or improved products, processes, technologies or services that are either new to the world (novel), either new to a region or business (imitative) or new to the field of endeavour, that is, repurposed (adaptive).

**Innovation prize/s:** An Innovation Prize (also known as an inducement prize) offers a reward (often financial, but sometimes additional support, such as technical assistance) to whoever can first or most effectively solve or meet a pre-defined challenge. It acts as an incentive to encourage new and additional innovation, rather than rewarding past achievement (prizes that do this, such as the Nobel Peace Prize, are referred to as 'recognition prizes').

**New entrants:** In the context of the Cylinder Prize, a new entrant is a solver (individual, organisation, team or partnership) that is either new to the field of endeavour represented by the prize and/or new to the donor.

**Open innovation:** the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively<sup>3</sup>.

**Point solution:** a solution to a highly-specified problem that has been broken down to a component part, for example, a new product or process.

**Shortlisted applicant:** an applicant that has had at least one of their applications shortlisted; in the case of the Cylinder Prize, 39 applications were shortlisted, submitted by 34 different applicants.

**Solution:** in the context of the Cylinder Prize, a single answer to the problem statement.

**Theory of Change:** In the context of Innovation Prizes, this is a detailed description of how and why the prize is expected to lead to the desired change in a given context<sup>4</sup>.

---

<sup>3</sup> See Open Innovation.org for further explanation <http://openinnovation.net/about-2/open-innovation-definition/>

<sup>4</sup> A more detailed explanation of Theory of Change is available from <http://www.theoryofchange.org/what-is-theory-of-change/>

# 1. Introduction

This report presents the findings of the evaluation of the Liquid Petroleum Gas (LPG) Cylinder Prize, the smallest of five **innovation prizes** delivered through the DFID-funded Ideas to Impact programme ([www.ideastoimpact.org](http://www.ideastoimpact.org)). One of the expected outcomes of Ideas to Impact is that the programme will inform and enhance future programming, and that its learning will be taken up by the innovation prize communities of practice. Ideas to Impact is running from 2014 to 2019, and the evaluation and learning activities operate in parallel, led by Itad, the Evaluation Team for the programme. The primary goal of the Evaluation Team is to make available to key stakeholders, learning about innovation prizes and challenges tested by the programme; this final evaluation report is a deliverable of that output.

A final evaluation report will be produced for each of the prizes after the final awards have been made, and their collective findings will be synthesised for sharing at the end of the programme. The focus of these reports is on identifying what can be learned about innovation prizes for development (rather than accountability).

The Cylinder Prize was launched in July 2015; awards were made at the end of 2015, with post-award activities running to July 2016. Data were collected by the Evaluation Team throughout this period and added to during the analysis where necessary. The Cylinder Prize was awarded before the other prizes, so collection, coding and analysis of some qualitative data were paused while standard interview questions and coding framework could be developed and tested for application across all the prizes. Prior to this report being produced, interim findings of the Cylinder Prize have been shared within Ideas to Impact to inform the design and implementation of other prizes.

Running for fewer than six months from prize launch to prize award, the Cylinder Prize was a small-scale prize compared to others in the Ideas to Impact portfolio; its budget for prize awards (prize purse), for example, was less than 0.5% of the prize purse of the total Ideas to Impact programme, and less than 4% of the prize purse of the next smallest prize, Adaptation at Scale. This evaluation reflects that size, with primary data collection limited to interviews with six prize winners, judges, prize experts and the Cylinder Prize team. Nevertheless, analysis of the prize has produced lessons that are expected to be of use to other Prize Teams in Ideas to Impact, and to those outside the programme.

This report is organised into five further sections: Sections 2 and 3 summarise the approach taken to evaluating the Cylinder Prize; Section 4 forms the bulk of this report, and presents and discusses the evaluation findings; Section 5 summarises what can be learned about the effects of prizes from the Cylinder Prize and Section 6 presents a set of conclusions and recommendations.

## 2. Purpose and Objectives of Evaluation

Resources for evaluating the Ideas to Impact prizes were distributed between the prizes, based on their comparative sizes, complexity and opportunities for learning. Consequently, the evaluation of the Cylinder Prize, a single stage, **point solution** prize, is the smallest of the prize-level evaluations in terms of scope and resources. However, the evaluation still shares the same purpose and overarching evaluation questions as those of the larger prizes. The purpose of the evaluation is to make available to key stakeholders, learning about innovation prizes and challenges tested by the programme. The primary objective is to analyse and report on the success or failure<sup>5</sup> of the Cylinder Prize against the following overarching evaluation questions (EQs):

EQ1: How do we know the Cylinder Prize delivered what was required? (Prize Process Quality);

EQ2: To what extent did it deliver the results anticipated? (Prize Effectiveness);

EQ3: To what extent did the Cylinder Prize itself offer something different from, or complementary to, other aid modalities? (Prize Added Value); and,

EQ4: To what extent did the Cylinder Prize lead to societal benefits for 'bottom of the pyramid' consumers? (Likely Longer Term Impacts).

Annex 1 provides a table taken from the Cylinder Prize Evaluation Methods Note (Itad, 2016) that summarises how the evaluation proposed addressing the above headline questions for the Cylinder Prize and the sub-evaluation questions (EQs) for each one.

Being one of a set of prizes, the secondary purpose of the Cylinder Prize evaluation, as outlined in the evaluation framework for Ideas to Impact (Itad, 2016), is to contribute to programme-wide evaluation and learning, particularly:

- understanding more about the potential effects of innovation prizes<sup>6</sup>;
- reporting to the Ideas to Impact Programme Results Framework outcome indicators; and
- exploring a set of wider learning themes that cross-cut all five prizes – good practice in design and implementation, ethics and equality issues, etc.

Finally, due to the timing of the Cylinder Prize (awarded earlier in the Ideas to Impact programme lifetime than other prizes), the evaluation findings and recommendations have the opportunity to inform the implementation of Ideas to Impact prizes that run later in the programme.

---

<sup>5</sup> Prize failure is either or both of: non-award of prize (may not automatically be failure if intended outcomes achieved); fails to contribute effectively to outcome indicators (may be classed as failure even if prize awarded).

<sup>6</sup> A summary of prize effects is presented in 'Innovation prizes: a guide for use in a developing country context', John Ward and Charlie Dixon, Vivid Economics, (April 2015), available at: <http://ideastoimpact.net/report-publication/innovation-prizes-guide-use-developing-country-context>. This set of effects has since been redefined by Ideas to Impact and will continue to be reviewed as more is learnt about the results that prizes can achieve.

## 2.1. The Cylinder Prize

The Cylinder Prize was one of three prizes designed to support the planned reform of LPG distribution in Ghana<sup>7</sup>. In this context, the Energy Access team in Ideas to Impact planned to use innovation prizes to help the Government to solve critical issues around implementation of the policy. Upon adoption of the new policy, millions of old gas cylinders would need to be recovered and re-purposed or disposed of. At the time of the prize being launched the Government had not determined what the best approach to this issue would be.

The objective of the Cylinder Prize was to generate ideas that could be implemented immediately, from a global pool of solvers, on how to maximise the value of the old gas cylinders recovered as part of the cylinder exchange policy that would provide a better financial/environmental/social option than cleaning the cylinders and sending them to the smelter. Options were then to be made available to the Government of Ghana to inform decisions on how best to deal with the returned cylinders. After the Cylinder Prize was awarded, reforms to LPG did not go ahead in Ghana because they met with opposition from incumbent businesses involved in LPG supply.

## 3. Methodology

For prizes that have their own specific **Theory of Change** (ToC), the Ideas to Impact prize evaluations are collecting, and reporting upon, evidence of results delivered against this ToC, including evidence of trajectory towards some of the intended higher-order outcomes and impacts that are expected to become evident after the programme has ended. The Cylinder Prize does not have its own ToC, rather it was conceived as one of a set of three prizes to support the LPG policy.

Figure 2 shows the location (in shaded boxes) of the intended outcome of the Cylinder Prize (an alternative to smelting cylinders being identified and accepted by the Government of Ghana) within an overview of the change process assumed to be necessary for LPG uptake to increase. The diagram indicates where the Cylinder Prize's results were expected to contribute, but it was not expected that the prize would be the cause of effective removal of scrap cylinders; if the Cylinder Prize had not run, this was still anticipated to happen through smelting. The purpose of the Cylinder Prize was to identify an alternative to smelting that represented better value for the Government of Ghana – if such an alternative existed.

The locations of the two other original Energy Access prizes (Distribution and Public Engagement – subsequently cancelled when the policy did not proceed as anticipated) are also highlighted.

---

<sup>7</sup> The other two prizes were regarded as higher risk, being more acutely dependent upon the timing of the LPG policy, and were not launched.

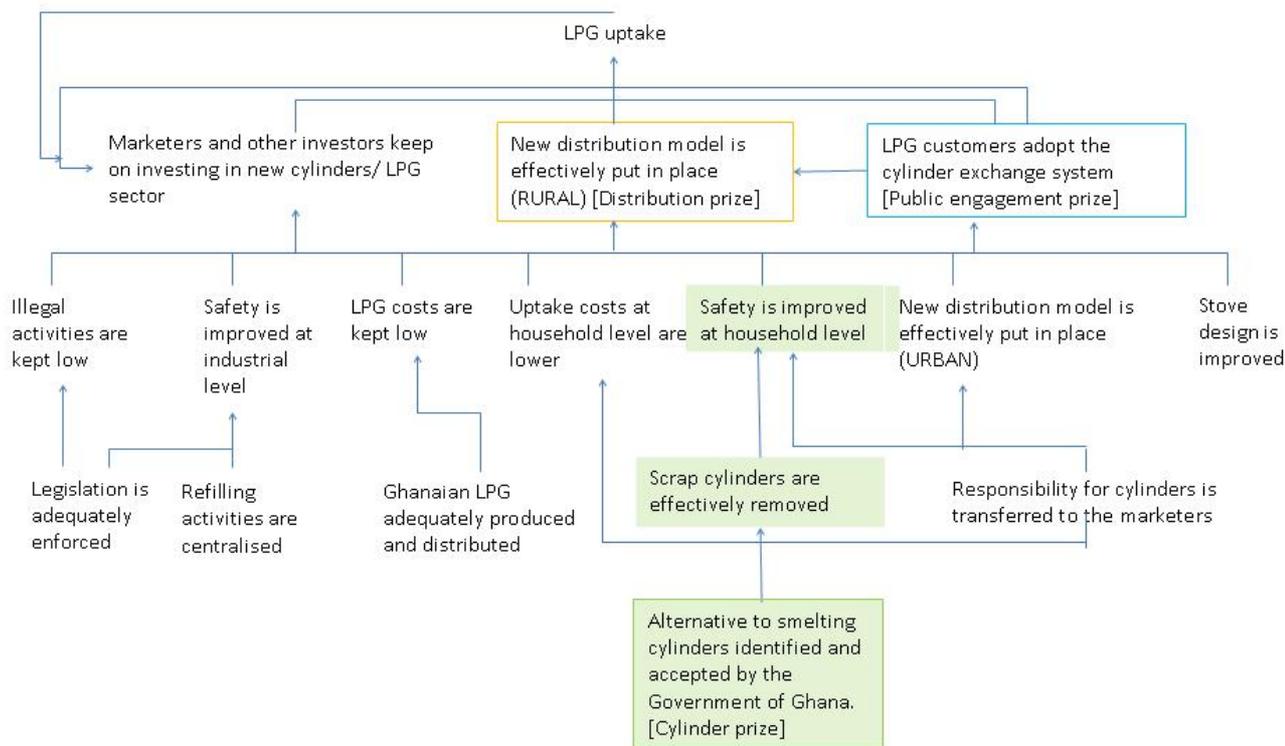


Figure 2: Location of Energy Access prizes within wider process of increased LPG uptake

As the Cylinder Prize is part of this broader process of change in the energy access environment – and delivering primarily at an output / ideas level - the focus for the evaluation is on the prize process (including post-award activity by the Prize Team), the crowding-in potential to involve **new entrants**, and its effectiveness to quickly<sup>8</sup> obtain innovative solutions<sup>9</sup>. Figure 3 illustrates the three key results areas for the Cylinder Prize that were examined during the evaluation, with the underlying assumptions for each stage.

<sup>8</sup> The Cylinder Prize ran via the InnoCentive platform for 62 days from launch to closure.

<sup>9</sup> Although a small amount of post-award activity was planned, the bulk of the Prize Team’s efforts took place up to, and including, the point of making an award.

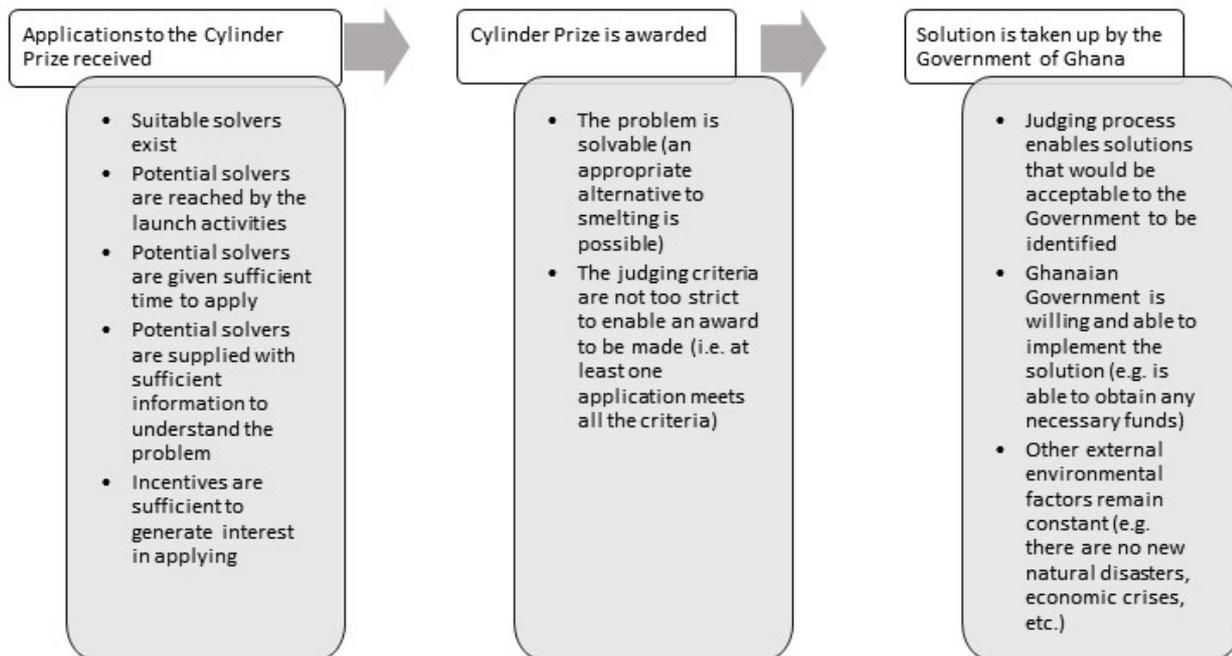


Figure 3: Intended results of the Cylinder Prize Process

The Cylinder Prize is a point solution prize, i.e. it is a type of innovation prize that is expected to solve a challenging, well-defined problem requiring innovation. Among alternative funding models, this makes it most similar to contracting a consultant/researcher to source solutions to a problem. The Cylinder Prize therefore presented an opportunity to test the value offered by an innovation prize as compared to issuing a tender for a consultant, e.g. number and diversity of ideas obtained, comparative costs, etc. and the extent to which it reached new entrants.

The longer-term impact of the Cylinder Prize is highly dependent upon the Ghanaian policy environment and the response of the Government of Ghana to the winning solutions. As the Prize Team observed in an Ideas to Impact blog post (Ideas to Impact, 2016), rather than an immediately implementable solution that would work at scale, the Cylinder Prize identified concepts that would need to go through prototyping. Several of these were related to wood and charcoal stoves, and were shared with manufacturers in Ghana. At the time of producing this evaluation report, the planned reform of LPG distribution in Ghana was not progressing and the supply of cylinders could not be guaranteed so the Prize Team did not pursue this any further with potential implementers of the winning solutions. For this reason, the evaluation focuses primarily on the shorter-term effects the prize has had and draws largely on monitoring data obtained by the Prize Team and interviews with the Prize Team and winners.

### 3.1. Methodological approach

Primary and secondary data have been used to answer the evaluation questions for the Cylinder Prize, but restrictions on access to solvers means the evaluation draws heavily on data supplied by entrants at the point of submitting their applications and on prize platform statistics.

### 3.1.1 Website statistics, prize data and documentation

The Prize Team supplied website statistics provided to them by InnoCentive about activity on the prize platform (e.g. information about visits to the Cylinder Prize webpage), and provided access to all applications submitted in full (anonymised), and judging scores for shortlisted applications. A report on communications activity by the Prize Team was supplemented with online research by the Evaluation Team to examine the reach of the prize promotion. These data were reported using ratios, disaggregated by region where possible. Published research on previous InnoCentive challenges was used to benchmark findings about Cylinder Prize solver behaviour although benchmarks were not available for all findings, such as visits to the prize webpage and proportion of solvers based in sub-Saharan Africa.

The Evaluation Team had access to detailed quarterly reports about the prize, the prize design statement, notes from meetings and other documents produced by the Energy Access Team about the Cylinder Prize and its results. The Prize team also supplied data on costs and estimates of time spent working on the prize, which were used to aid calculation of added value (see Section 4.3), supplemented by online research for typical costs of comparable consultancy assignments (particularly government databases and procurement policies). The Evaluation Team worked with the Prize Team to develop estimates of the beneficiaries of the prize, drawing on Government census data and expert opinion on the cookstove market.

### 3.1.2 Qualitative data from solvers, prize team and judges

The Evaluation Team was aware that, as a condition of using the InnoCentive platform, InnoCentive would only be able to provide the Prize Team with contact details of the winning solvers and therefore the Evaluation Team's access to solvers would be restricted to these winners. All **solvers** were therefore asked to provide information about their background and motivation for entering the prize as part of their application. This was not mandatory, however, and the quality and amount of data supplied varied between solvers.

The Evaluation Team invited all seven **winners** of the Cylinder Prize to participate in a semi-structured interview in order to investigate their experience of the prize process and the prize effects at a solver level. The interview questions were reviewed by other members of the Evaluation Team and revised prior to first use. Five interviews were carried out by Skype or telephone and one winner requested to be sent the questions by email (see Annex 2 for list of questions typically used in the semi-structured interviews). The interviews lasted between 30 and 45 minutes, recorded (with prior permission from participants), transcribed and then sent to participants for checking and amending prior to analysis. The list of codes used for coding the qualitative data (or coding framework) used was built on a set of common *a priori* codes used by the Evaluation Team for all Stage 1 evaluations. The coding framework was tested on an interview from each of four prizes that had been awarded at that stage, including the Cylinder Prize, and then refined before full coding commenced on transcripts and email correspondence, with new codes added during this stage. All interviews with winners were carried out by the Lead Evaluator; coding was carried out by a different member of the Evaluation Team (and reviewed by the Lead Evaluator) for reasons of economy and to reduce bias. The Evaluation Team for the Cylinder Prize worked together to compare the findings from secondary data with those from the interviews with winners.

After prize launch and prize award, the Lead Evaluator carried out an After Action Review with members of the **prize team**, typically the Energy Access Theme Leader, Prize Manager and Prize Designer. The notes from these reviews were shared with the participants for them to edit and correct. The prize team also provided answers to questions about the prize process and the data by email and telephone calls, and shared their reflections on the prize through periodic reports. The prize team collected reflections from all the **judges** on the prize process and its added value based on a set of questions provided by the Lead Evaluator. Finally, a set of questions was sent to innovation prize experts, Jonty Slater (Prize Expert at The Blue Globe Consultants and Prize Design Advisor to Ideas to Impact, formerly at InnoCentive) and Renato Vasconcelos (Principal, Challenge Design and Development at InnoCentive) to validate findings from the primary and secondary data about solver behaviour.

### 3.1.3 Limitations and challenges

The main challenges of the evaluation and the limitations of the findings are summarised below; more details are included in the relevant parts of Section 4.

**Use of InnoCentive Prize Platform:** The Prize Team ran the Cylinder Prize via the InnoCentive Prize Platform rather than managing the prize process themselves. This offered the team several benefits including access to the InnoCentive solver community and expert support in handling questions from solvers. The conditions of use of the InnoCentive Platform restricts access to just the winners of a prize (contact details of other solvers are confidential). The Evaluation Team was, therefore, only able to approach the seven that won an award, of whom six agreed to participate in interviews. Furthermore, while all applicants were asked to provide information about themselves and their reasons for submitting a solution (to compensate for this lack of direct access), this was not mandatory. Although some applicants provided useful data, many did not; thus, a major limitation of this evaluation is that the perspectives of non-winners and potential solvers that registered interest but failed to submit a solution, are not represented. There were also some gaps in the website statistics that could be obtained; however, running the prize through InnoCentive did enable the Evaluation Team to gain expert opinion from InnoCentive on the solvers' behaviour as compared to other challenges run on the same platform.

**Dependence on external timelines:** Another major limitation stems from the lack of progress with the energy policy in Ghana. In the absence of this, the Evaluation Team could not investigate the Government of Ghana's response to the results of the Cylinder Prize or adequately answer the evaluation question about likely long-term impacts. The interviews with prize winners were planned to take place in early 2016 (shortly after awards were made) but were delayed to May/June 2016 while a common set of questions was developed to pose to solvers across all prizes. While this would enable prizes' evaluation data to be synthesised later and meant the Evaluation Team could examine the post-award effects of the prize, it was at the risk of winners being less able to recall their experience of the prize process.

**Reach of Prize Promotion:** Information was not publicly available about the readership for many external channels that were used to promote the Cylinder Prize to potential applicants; this limited the amount that could be reported about reach of communications. Furthermore, it was not possible to calculate the extent to which different promotional activities were seen by the same people.

**Numbers of solvers and solutions:** The Evaluation Methods Note assumed it would be possible to report the number of solutions submitted and the number of solvers. This turned out to be harder than expected: some solvers submitted more than one application; some applications submitted contained several solutions in their written proposals; some of the solvers were acting on behalf of a team; some teams of solvers distributed in different countries submitted more than one application (but each submitted by a different member of a team)<sup>10</sup>. This problem was exacerbated by the conditions of use of the InnoCentive platform, which meant that personal data about the non-winning applicants could not be made available to the Prize Team. For these reasons, it is not possible in the evaluation to state reliably the exact number of solutions or solvers that the Cylinder Prize attracted, only the number of submissions and winners.

**Obtaining data on costs:** While some costs for running the Cylinder Prize were straightforward to obtain (prize platform GBP £37,500 and prize award USD \$37,000 (equivalent to £23,784<sup>11</sup>), reasonably estimating how much staff time to attribute to the prize, in the context of a research programme, such as Ideas to Impact, was harder. There were also difficulties in obtaining comparative costs of a “typical” consultancy in terms of consultant’s fees and management fees for contracting a similar piece of work. To compensate for these difficulties, recent literature on prizes was reviewed to enable a broader analysis of added value of benefits of innovation prizes as compared to consultancy, beyond return on investment (ROI). While the financial calculation demonstrates the challenges in directly comparing ROI of a point solution prize with other ways of obtaining a solution, when used alongside a consideration of the different risks and benefits offered by each method, it provides a useful starting point for judging whether a point solution prize would be appropriate. Alternatively, it can draw attention to where more careful consideration of prize design, risk management and post-award strategy would be needed before using a point solution prize over other ways of sourcing a solution.

---

<sup>10</sup> This is supported by a survey of InnoCentive solvers (Jeppeson & Lakhani, 2010), in which 11% of respondents reported working in teams to solve the problem and that the average team size was three members.

<sup>11</sup> Conversion into £ sterling, based on exchange rate at time of prize award being announced (July 2015) <http://www.ukforex.co.uk/forex-tools/historical-rate-tools/monthly-average-rates> Based on exchange rates around the time of awards being paid (January 2017) this would have increased the cost of award to £29,482.

## 4. Findings

### 4.1. Prize process quality: how do we know the Cylinder Prize delivered what was required? (EQ 1)

#### 4.1.1 What was the reach and uptake of the prize? (EQs 1.1 and 1.6)

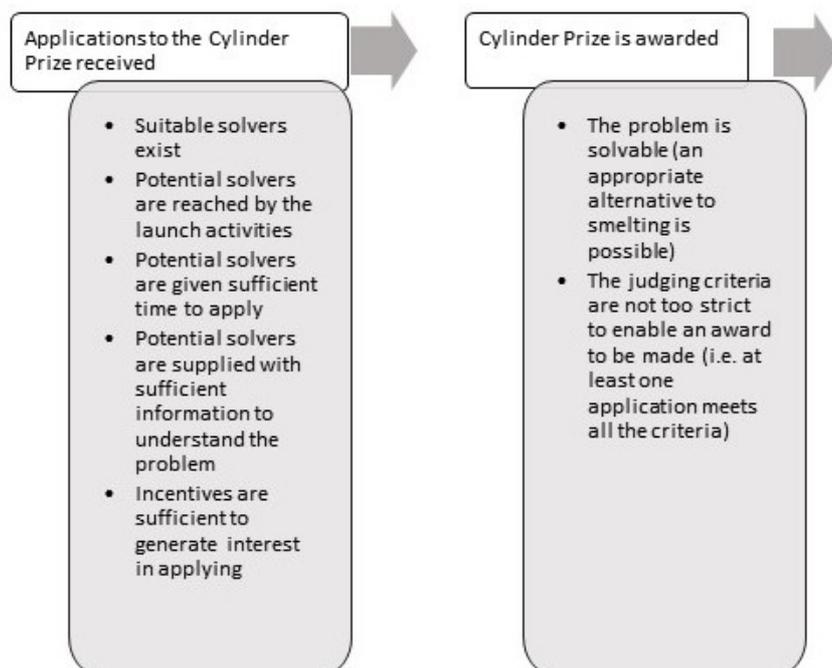
##### KEY FINDINGS

- In the opinion of Innovation Prize Experts, the number of applications for the Cylinder Prize was above average for an InnoCentive prize of this type.
- The Prize Team successfully exposed a global pool of solvers from a range of backgrounds, to information about the prize.
- Limited success in promoting the prize to African audiences and the focus on promoting to the clean cooking sector (over other sectors) is slightly at odds with the idea of open innovation and reaching new entrants.
- The prize's advertisements (as part of using the InnoCentive platform) in 'Scientific American' and 'Nature' websites generated the greatest number of visits to the prize webpage (64%).
- One in every 11 people that expressed active interest in the Cylinder Prize was based in sub-Saharan Africa.
- Sub-Saharan African solvers appear to have had less success at being shortlisted for further judging despite having been more likely to make a submission after opening a Project Room.

This part of the evaluation examines the first two key results areas of the Cylinder Prize and the associated assumptions about effective prize process design and implementation (see section of Figure 3 reproduced here), starting with potential solvers being reached by launch activities.

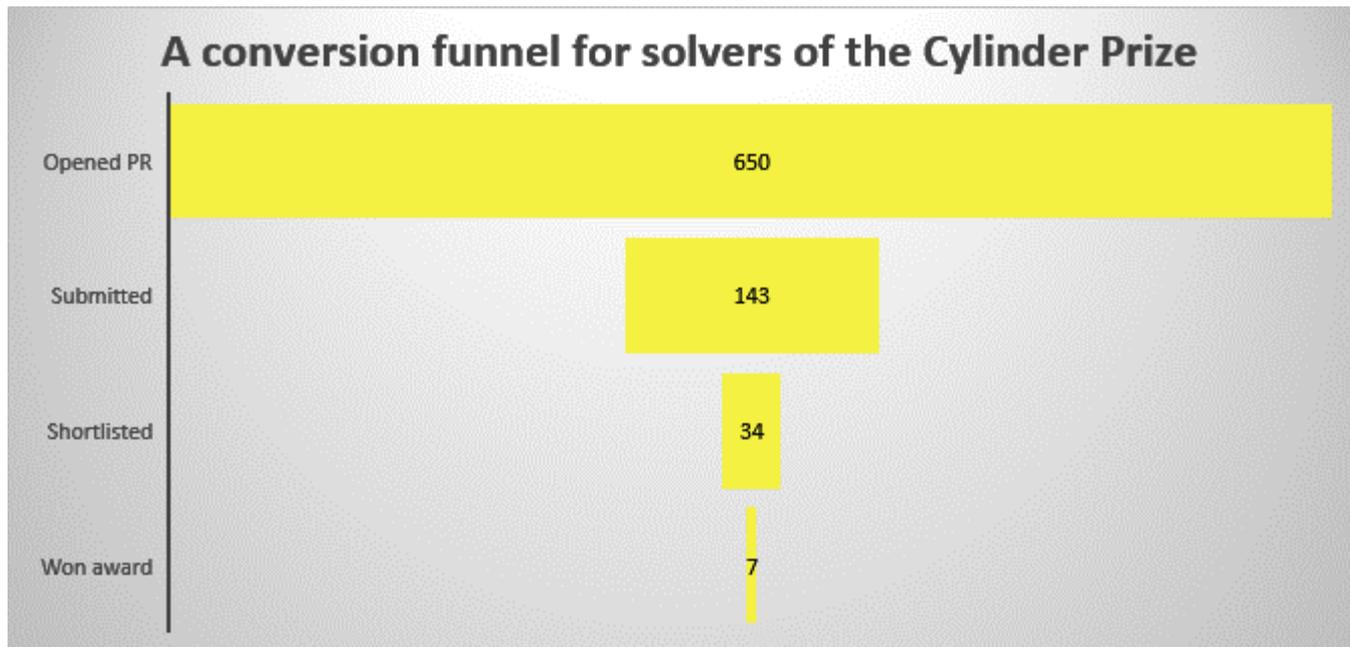
While the Cylinder Prize's design and process follows many of the conventions of point solution prizes, the Prize Team had certain expectations related to the focus of the challenge (solving a problem in a developing country context). These expectations informed some of the prize process decisions, e.g. the Cylinder Prize was expected to engage Africans among its solvers and some communications were, therefore, targeted specifically at reaching potential solvers in Africa.

In online marketing and sales, a **conversion funnel** is sometimes used to help identify opportunities for converting more potential customers



to actual customers, e.g. from visiting a website homepage through to putting items into a “basket” and completing their order. When planning the evaluation, it was envisaged that this tool could be used in the context of the Cylinder Prize to identify the attrition of potential solvers from visiting the prize webpage, to winning a prize, and especially how sub-Saharan Africa was represented at different stages in the process based on the indicators above.

Reliable data were not available for all indicators and there are difficulties in being precise about numbers of solutions and solvers (as explained in Section 3) so a revised set of indicators is presented below from which we can explore whether the Prize Team was successful in attracting good quality submissions from sub-Saharan Africa. The first conversion funnel (Chart 1) illustrates how many people progressed from the point of opening a Project Room (Opened PR), to submitting one or more applications (Submitted), to having one or more solutions shortlisted (Shortlisted), to being a winner (Won award).



*Chart 1: Conversion funnel for all solvers for Cylinder Prize*

These numbers tell us little in themselves, unless benchmarked against other prizes. Recent and directly comparable research on previous InnoCentive challenges was unobtainable; however, in the opinion of Innovation Prize Experts, the number of applications for the Cylinder Prize was above average for an InnoCentive prize of this type (see Section 4.1.3).

#### **Proportion of solvers from sub-Saharan Africa.**

The Evaluation Team hoped to be able to identify the proportion of visits made to the Cylinder Prize webpage on the InnoCentive platform from Africa but this is not one of the website statistics included in the reports that InnoCentive provides to clients; however, in order to access full details of the Cylinder Prize challenge, potential solvers had to open a Project Room (a private online space for submitting their solution/s) and accept a set of Terms and Conditions related to the prize. As part of this process, the country in which the solver is based is added to the Project Room statistics.

The Evaluation Team was given access to Project Room statistics that allowed analysis of geographical location of the solver and the route by which the solver arrived at the Project Room. This data source overcomes the problems associated with relying on IP addresses to identify the geographical location

of a person visiting a website. Chart 2 shows that of the 650 Project Rooms opened for the Cylinder Prize, 9% were by solvers based in sub-Saharan Africa.

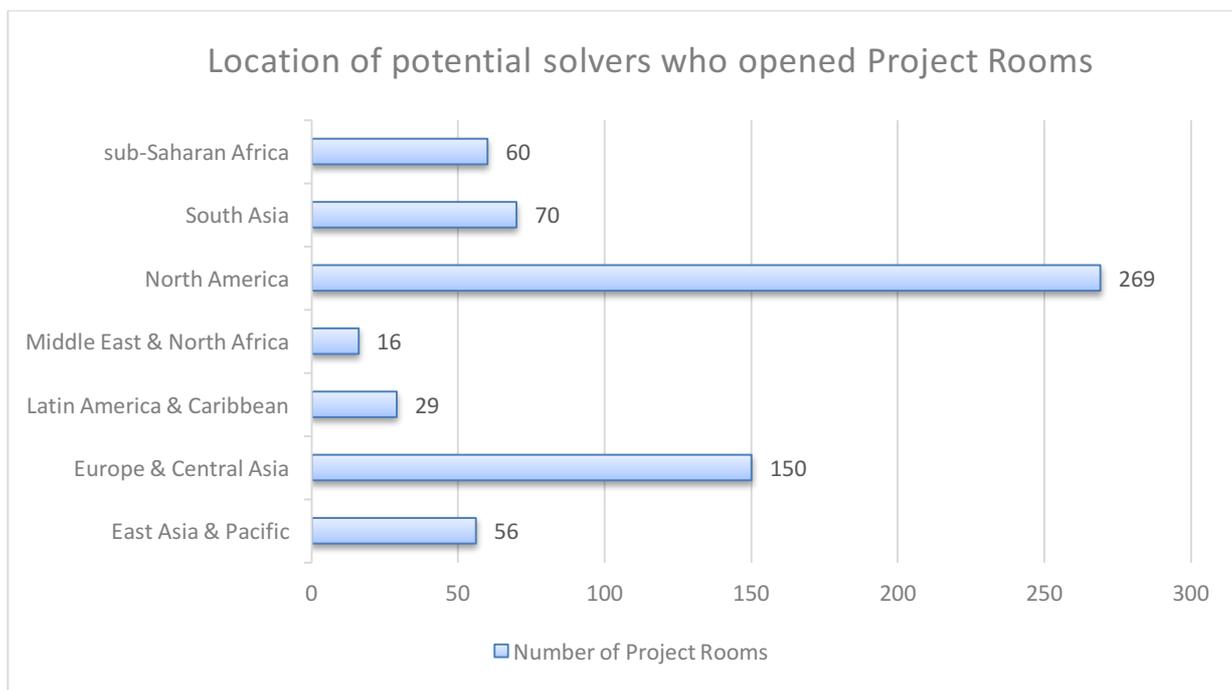


Chart 2: Regional distribution of solvers that opened Project Rooms for the Cylinder Prize

143 Project Room owners submitted one or more applications (which contained at least one solution) making a total of 182 submissions. Of these applicants, 23 (16%) were located in sub-Saharan Africa<sup>12</sup>. 34 applicants had one or more applications shortlisted for further judging (39 shortlisted applications in total) of which five applications (15%) were from solvers located in sub-Saharan Africa (Ghana, Kenya, Nigeria, South Africa and Zambia). Seven solutions were awarded, none of which were from solvers located in sub-Saharan Africa. No benchmarks were available with which to compare these statistics. The conversion funnel below (Chart 3) presents the data available about solvers based in sub-Saharan Africa (there were no winners based in sub-Saharan Africa):

---

<sup>12</sup> There are several problems with assigning geographical locations to solvers. The country (and thus region) is based on where the solver said they were located but they may represent solvers in other countries. Some solvers were working as a geographically distributed team and applications were submitted by different members of the team (rather than one member submitting them all). This type of solver behaviour makes it more difficult to define the number of solvers and to report on where solvers are based.

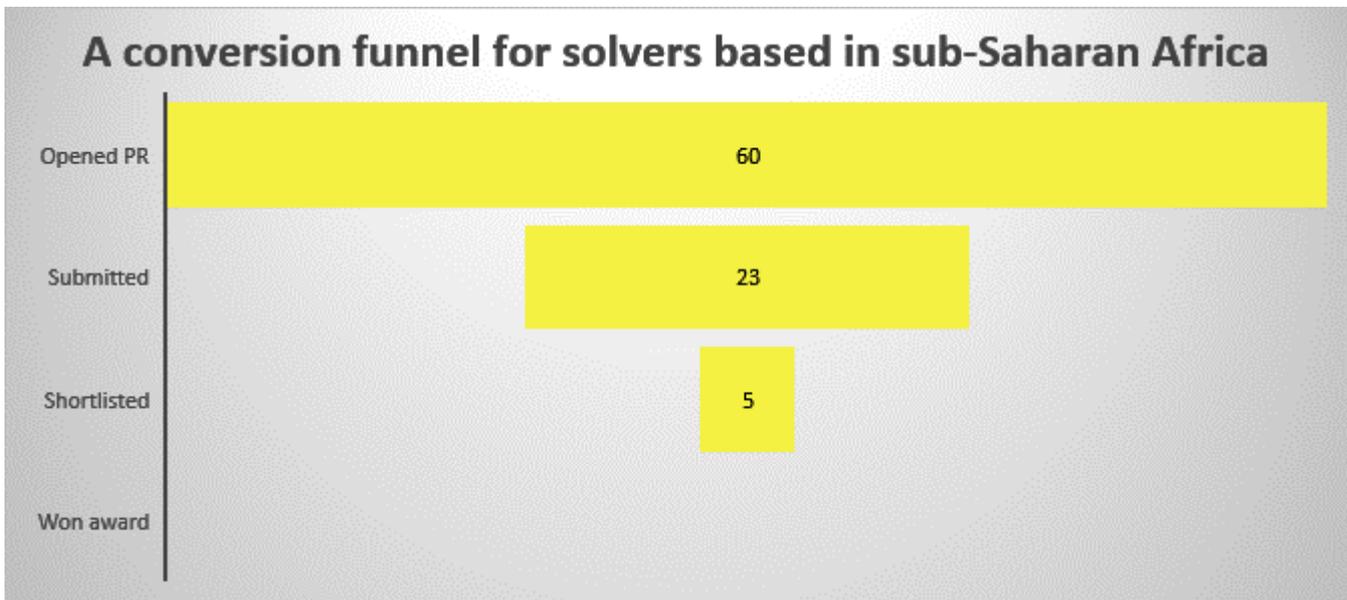


Chart 3: Conversion funnel for solvers based in sub-Saharan Africa only

The differences between the two funnels are made clearer using the following approximate ratios (Table 1):

Table 1: A comparison of the success of applicants globally and in sub-Saharan Africa alone

	Global (approximate ratios)	Sub-Saharan Africa only
Having opened a project room, submitted 1+ application(s)	1 in 5	1 in 3
Having submitted an application, had at least one submission shortlisted	1 in 4	1 in 5
Having had a solution shortlisted, was offered an award.	1 in 5	No winners from sub-Saharan Africa

The numbers involved are too small to draw firm conclusions but sub-Saharan African solvers appear to have had less success at being shortlisted for further judging despite having been more likely to make a submission after opening a Project Room. Without access to solvers based in sub-Saharan Africa (that were all non-winners) the Evaluation Team was unable to investigate this further through interviews.

### Promotion of the Cylinder Prize

5,443 visits were made to the Cylinder Prize webpage<sup>13</sup> on the InnoCentive platform, which is the initial point for the process of starting and submitting a solution to the prize. Chart 4 illustrates where these visitors came from and shows that the single largest source of potential solvers was *Scientific American* (45% of visits). Almost two thirds of visits (64%) came from being featured in journal websites (*Scientific American* and *Nature*) as part of the service provided by InnoCentive. The 23%

<sup>13</sup> <https://www.innocentive.com/ar/challenge/9933755>

direct visits were all solvers that came to the page from sources that InnoCentive could not track, thus including the Prize Team’s efforts through their own channels and other non-paid for channels, plus browsers of the InnoCentive website. This highlights the benefit of including paid-for prize promotion activities that access large communities of potential solvers.

Source of visits to the Cylinder Prize webpage

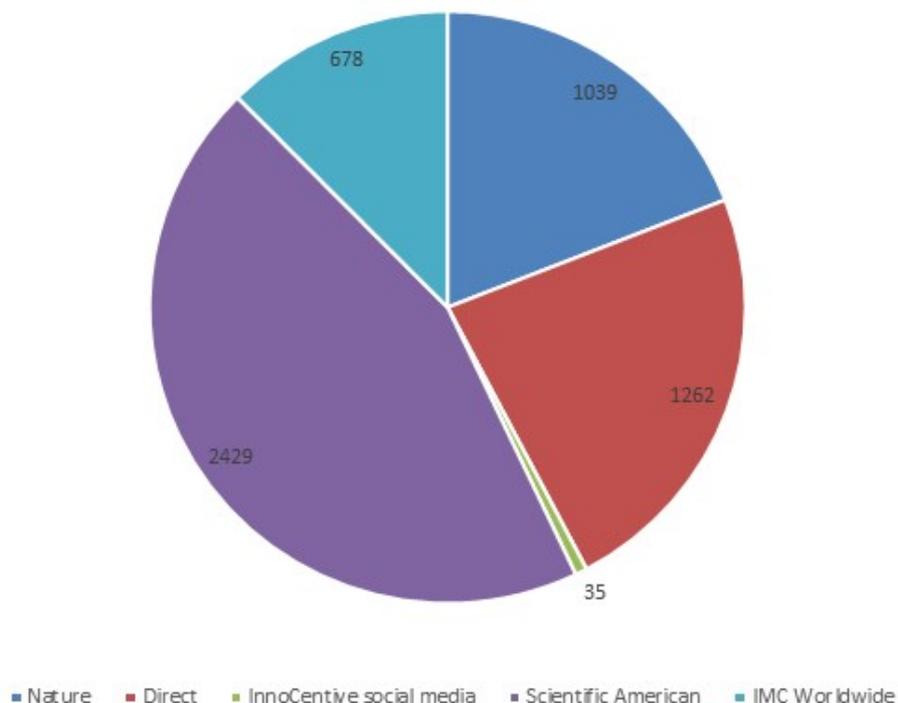


Chart 4: Sources of traffic to the InnoCentive webpage for the Cylinder Prize

The launch of the Cylinder Prize was intended to reach a global pool of potential solvers from a range of backgrounds and the Prize Team used a combination of paid-for and free advertising, and their own social media channels and contacts, to try to achieve this. In the context of the Cylinder Prize, reach can be understood as the total number of individuals that were exposed at least once to an announcement about the prize prior to the closing date.

The Prize Team’s attempts to reach a global pool of solvers from a range of backgrounds appears to have been successful given its visibility on several large channels with a global reach (see Table 2). It was not possible to calculate the exact total number of people reached by the Cylinder Prize launch due to lack of information about readership for some channels and not being possible to calculate the extent to which different promotional activities were seen by the same people. A visitor to the Scientific American website that happened to see the announcement may also have been a member of the IISD Energy-L website, for example.

However, the advantage of this overlap is that repeated exposure to a message reinforces it and increases this likelihood of response (the response rate to a single exposure to an advert is typically

low<sup>14</sup>). There is also an important distinction to be made between reach and reading; being exposed to an announcement about the prize is not the same as reading it.

The prize was promoted directly through InnoCentive (the platform used to run the prize) to people known to be interested in innovation prizes (350,000+ InnoCentive community members) and through the Scientific American and Nature websites. The Prize Team was particularly keen to ensure potential solvers in Africa were reached (that were likely to be poorly represented in "global" promotional channels), but the team had limited success in doing so and were unable to find paid-for advertising options among African organisations that clearly represented value for money. A focus was also placed during prize promotion on reaching potential solvers in the clean cooking sector, which is slightly at odds with the goal of open innovation and reaching new entrants. The Prize Team succeeded in gaining free promotion for the Cylinder Prize through the websites, discussion lists or social media channels of several organisations allied to development, Ghana, energy access and engineering. The readership of these websites and newsletters is often not known. Internet research shows that the Prize Team's promotional work was picked up by other organisations, thus extending the potential reach of the announcement<sup>15</sup>. Some of the visitors to the Cylinder Prize Challenge on the InnoCentive site forwarded the challenge on through social media (76 shares via Facebook, 12 via LinkedIn and seven via Google+). The table below summarises what is known about the reach of the prize launch activities but does not cover the full reach obtained through onward promotion (other websites and discussions lists re-posting the announcement of the prize).

Table 2: Reach of Cylinder Prize launch activities

Promotion Channel	Geographical reach	Sectoral reach	Potential reach
InnoCentive community of solvers via email bulletin, Facebook and LinkedIn	Global	Varied – have expressed interest in InnoCentive challenges	375,000+ individuals
Scientific American	Global	Unspecified – website states readership to be "affluent, forwardthinking, solution- seeking readers who cement trends and set agendas that others follow"	Advert could be viewed by 3.5 million website visitors
Nature.com	Global	Sciences	Advert could be viewed by 2.5 million website visitors
<a href="#">ECOWAS Network on Gender Mainstreaming in Energy Access</a>	West Africa particularly	Gender and/or energy access	Unavailable

<sup>14</sup> Research presented by Chaffey (2017) indicates this is typically fewer than two click throughs for every 1,000 impressions of an online advert.

<sup>15</sup> For example, the prize featured on Innovation Link <http://innovationlink.com/needs/innocentive-ideas-to-impact-recycling-liquid-petroleum-gas-cylinders-across-sub-saharan-africa.1342/> and the Young Professionals for Agricultural Development <http://www.ypard.net/opportunity/innocentive-proposals-recycle-lpg-cylinders-1>

Engineers Without Borders – various channels e.g. Engineers Without Borders, <a href="#">Burundi's Facebook page</a> .	Global, including specific developing countries	Engineering	Unavailable; believed to be disseminated through network.
African Renewable Energy Alliance members' website	95 countries	Policy-makers, business, civil society and academia interested in uptake of renewable energy in Africa	Approx. 2,000
Global Alliance for Clean Cookstoves website	Global	Development & energy access	Unavailable
BUNI – Tanzania-based innovation hub website	Tanzania	Technological innovation	Unavailable
IISD Energy-L discussion list	Unavailable	Sustainable energy and policy	Unavailable
UK Collaborative on Development Sciences website	UK	UK Government departments and research funders	Unavailable
Sustainable Energy For All Practitioner Network	Global	Sustainable energy	1,000+ members

The Cylinder Prize was also promoted using the channels available to the organisations involved in the Prize Team, including the IMC Worldwide website, GVEP Facebook, and GVEP and Ideas to Impact Twitter accounts. The limited information available indicated that this additional promotional activity increased the reach of the announcement: for example, the GVEP Facebook article on the prize received 825 views.

#### 4.1.2 How diverse were the solvers for the Cylinder Prize? (EQ 1.5)

##### KEY FINDINGS

- Geographical: shortlisted submissions came from people based in 19 different countries across six regions, with winners based in six countries.
- Technical: Engineering and Technology was the main technical area of expertise represented by shortlisted applicants and winners; however, other areas of expertise were represented including organic chemistry and software development.
- Among winners, the Cylinder Prize attracted good quality submissions from "new entrants"; i.e. people that DFID would have been unlikely to reach through their usual channels of procuring research.
- The unusual focus of the challenge prompted at least one winner to participate in an InnoCentive challenge for the first time.

One of the assumed benefits of an **Open Innovation** prize (Everett et al, 2011; McKinsey and Company, 2009), such as the Cylinder Prize, is that it will be able to call on a global pool of solvers across a range of sectors. Within Ideas to Impact, the hypothesis is also that using innovation

inducement prizes for development can enable donors to reach “new entrants” - people that are either new to innovation prizes or new to development funding. Thus, the four aspects of diversity reviewed under this evaluation question are: geography, sector/discipline, experience of prizes and experience of development funding. In our analysis, we focus on geographical and sectoral diversity of shortlisted applicants (as opposed to number of solutions, applications or solvers<sup>16</sup>) and winners, as these were numbers that could be obtained accurately and represent solutions that matched the Cylinder Prize criteria most closely. The Evaluation Team was not able to find any suitable benchmarks with which to compare this geographical or sectoral diversity.

### Geographical diversity

The 34 shortlisted applicants came from 19 different countries with the United States, France and Spain being the most common (six, four and three respectively). Chart 5 illustrates the regional distribution.

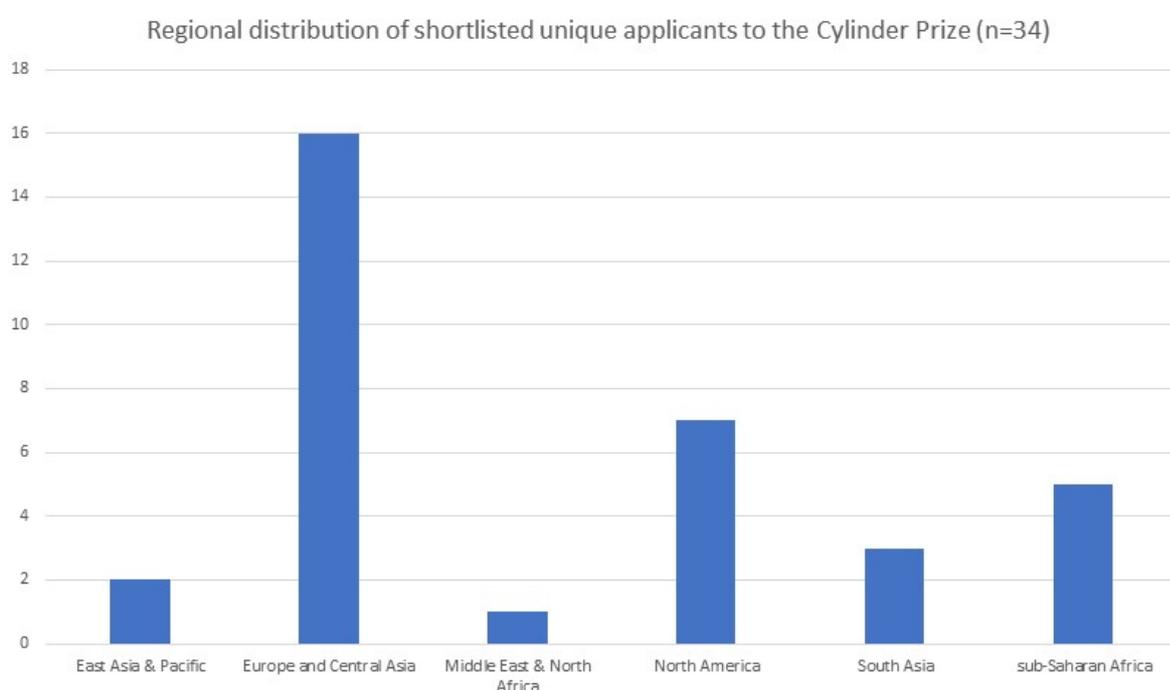


Chart 5: Regional distribution of shortlisted applicants

The seven winners of the Cylinder Prize, were based in six different countries: two in Spain, and one each in Egypt, Ireland, Japan, United States and France.

### Sectoral diversity

Among the seven winners (five individuals and two teams), engineering of some kind was the dominant area of expertise with R&D, science education, medical research and construction also represented (see Chart 6). Only 26 of the 34 shortlisted applicants provided sufficient information about themselves through their applications or interviews to enable their technical area of expertise to

<sup>16</sup> We distinguish between solvers and applicants, as an applicant being the solver that submitted the application, which may be on behalf of several solvers.

be analysed. The categories in the OECD Frascati Manual (2007) were identified as a useful framework for this classification. Even so, the limited information provided only made it possible to classify most of the applicants using the six top-level categories:

1. Natural sciences;
2. Engineering and technology;
3. Medical and health sciences;
4. Agricultural sciences;
5. Social sciences;
6. Humanities.

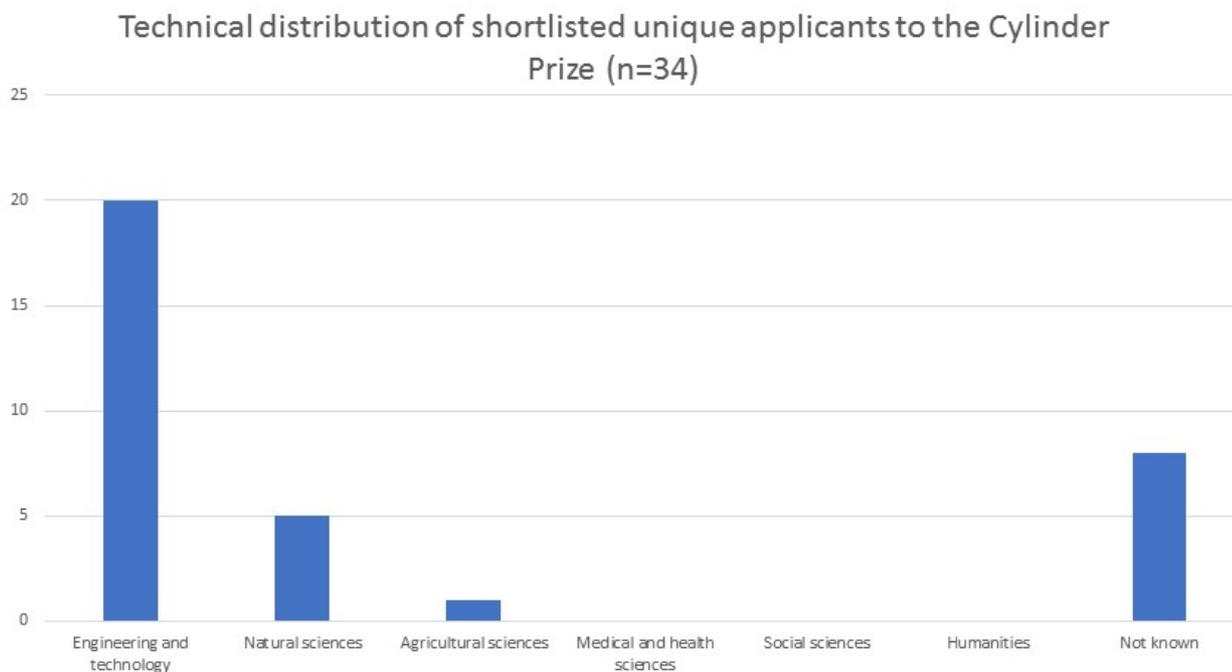


Chart 6: Main technical background of shortlisted applicants

On the face of it, the Cylinder Prize seemed to attract many of its shortlisted applications from solvers whose background aligns with the subject matter of the prize (engineering and technology). However, as stated above, it was only possible to categorise at a high level for this group of applicants. Some applicants gave more precise information and from this we can see that within the largest category of Engineering and Technology, applicants' specialisms were varied and included: mechanical engineering, nuclear engineering, electrical engineering, construction and petroleum downstream.

Within the other categories, this set of 34 shortlisted applicants also had expertise in organic chemistry, software development, water treatment and agribusiness. One of the winners, with experience of innovation prizes, commented on the need for solvers not to wait until they see a challenge that matches their specific interests:

*"If you do that you answer one competition in your whole life...I would say that the most important thing is to accept that you can provide valuable answers even on topics where you don't really know much at the beginning." Interviewee 004.*

### New entrants

Six of seven winners provided the Evaluation Team with details of their previous experience of innovation prizes, international development and donors, and of the subject area of the prize (energy access and recycling); it was not possible to obtain the same information about the shortlisted

applicants. From the data available, the Cylinder Prize attracted good quality submissions from people that DFID would have been unlikely to reach through their usual channels of procuring research, and the focus of the challenge (public good, practical problem-solving rather than lab work and prototyping) drew new solvers to innovation prizes.

For two of the six winners interviewed, the Cylinder Prize was the first innovation prize competition they had entered (one of whom had browsed InnoCentive challenges before, but this was the first one that they felt motivated to participate in because of their experience of developing countries and the lack of lab-work required). The other four winners interviewed all had experience of winning innovation prizes, for example: *“I have read more than 100. I have sent submissions for maybe, I don’t know, 40 and won nine.” Interviewee 001.*

Only one of the six winners interviewed was identified as having previously worked for a donor-funded organisation (non-DFID). One of the winners interviewed stated that they had previously thought about recycling a different material for the same purpose as the solution they submitted to the Cylinder Prize; another winner reported that they had already considered what happens to LPG cylinders after use.

### 4.1.3 Were potential solvers given sufficient time and information to participate? (EQs 1.2 and 1.3)

#### KEY FINDINGS

- The length of the challenge period does not seem to have presented a barrier to solvers participating; indeed, the Cylinder Prize received more submissions than anticipated by the Prize Team.
- The central tendency among solvers was to open a Project Room and submit an application on the same day (46 out of 182 applications).
- Comparing the behaviour of winners to all entrants, there is no evidence of a connection between the period available to spend on the application, or the time submitted, and success in the Cylinder Prize.
- The most common type of question from solvers related to technical information about the cylinders, which was later made available to all solvers.
- Solvers and Prize Experts had different views on how much, and which, information should be made available; the Prize Team’s inability (for political reasons) to disclose information about the prize’s country context frustrated some solvers and caused one to raise questions about the prize’s purpose.

As described above, 143 solvers went on to apply to the Cylinder Prize by the closing date, (22% of those that had opened Project Rooms). The evaluation explored whether this attrition rate was typical among innovation prizes and investigated (primarily through secondary data) whether the prize duration and information available to solvers might explain why solvers opened a Project Room but then failed to submit one or more solutions. This section of the report summarises the detailed analysis in Annex 3.

The period available to a solver to work on applications was obtained by comparing the date that each solver’s Project Room was opened and the date that the solver submitted their application(s). This ranged from 0 (application submitted the same day as Project Room created) to 62 days (the full extent of the challenge period). The mean average duration was 19 days and the central tendency was for solvers to open a Project Room and submit an application on the same day (46 out of 182 applications). Chart 7 locates approximately when the winning solutions were submitted among all applications received.

From these comparisons, there seems to be no strong relationship between the period available to work on the application, or the time submitted, and the degree of success in the Cylinder Prize. While the mean average duration was higher for winners (29 days compared to 19 days for non-winners) the period available to them ranged from one day (solution submitted the day after opening a Project Room) to 59 days. There may be a relationship between the type of prior effort, time submitted and degree of success in the Cylinder Prize. As noted previously, two winners reported having thought about an aspect of the prize beforehand. The winner that submitted their solution a day after opening their Project Room had previously thought about the *solution* (recycling a different material) and received \$3,000. The winner that reported having thought about the *problem* previously (how to make use of empty gas cylinders) submitted their solution 25 days after opening their Project Room and received \$10,000. Winners submitted their applications between 10<sup>th</sup> July and 7<sup>th</sup> September, and the three winners that had approximately the same period to work on their solution won awards ranging from \$3,000 to \$10,000.

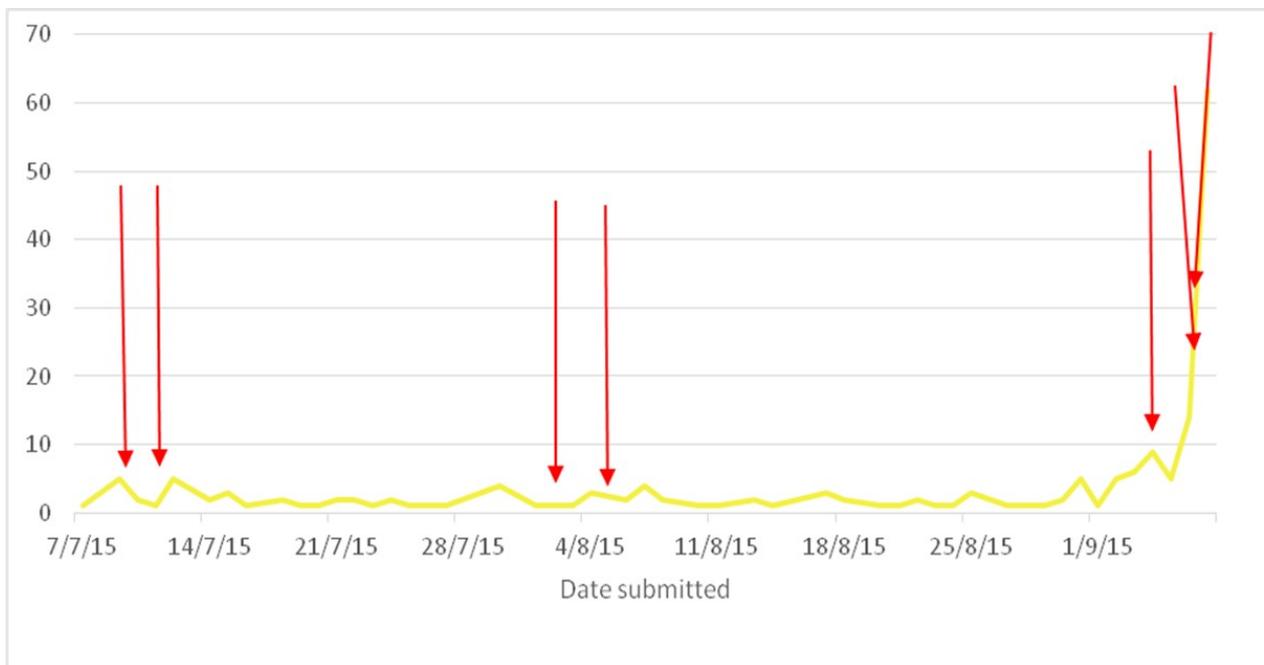


Chart 7: Date of submissions of solutions for the Cylinder Prize (7th July to 7th September, 2015) with winners marked by the arrows.

Innovation prize experts<sup>17</sup> considered the pattern of distribution to be usual (with the majority of applications submitted during the last week of the challenge period) and felt that the number of applications for the Cylinder Prize was higher than the number they considered typical for this type of challenge. Prize Team reports (2015) show that the team (including one of the experts interviewed) anticipated receiving around 80 to 100 submissions (the prize achieved 143). The length of the challenge period, therefore, does not seem to have presented a barrier to solvers.

### Number and types of questions asked by solvers

At the time of launching the Cylinder Prize, the Prize Team could not name Ghana as the country for which the solution was intended so solvers initially had limited information about the cylinders and context. More than one winner commented on the problems this caused for them and this is reflected in the types of questions InnoCentive received from potential solvers about the prize.

As part of the service provided by InnoCentive, the InnoCentive Prize Manager for the Cylinder Prize received and handled any questions from solvers. Any that could not be answered by InnoCentive were forwarded on to the Prize Team. The Evaluation Team had access to this second set of questions only; the exact number of questions asked was not clear to the Evaluation Team as some of the questions passed on to the Prize Team were representative of questions asked by more than one solver.

Several questions were received from solvers shortly after the prize launched and the most common questions related to the dimensions and construction of the cylinders, for example:

- Is there a coating on the inside of the cylinders?
- What is the size and threading of the connection into the storage bottle?

The Prize Team subsequently provided the InnoCentive Prize Manager with dimensions and drawings of the cylinders (available in Ghana), which were added to the Challenge description online to answer the solvers and to pre-empt similar questions in the future. Those that had opened Project Rooms were then sent an email by InnoCentive to alert them to the new information.

Another information gap for at least one solver was contextual information about “Country A” (a hypothetical example country, given in the Challenge) and sub-Saharan countries in general to meet two of the requirements of the challenge:

- “The proposed solution must be adapted to the social, economic and cultural contexts of sub-Saharan African (SSA) countries”
- “The solution should rely on technical and human resources that are available in SSA and use African countries equipment and labor force (nice to have)”.

It was not an option for the Prize Team to provide this information, given that they were not able at that time to reveal Ghana as the country for which the solution was intended. In this case, InnoCentive responded directly by email with a link to aid solvers’ research into the social, economic and cultural

---

<sup>17</sup> Jonty Slater (Prize Expert at The Blue Globe Consultants and Prize Design Advisor to Ideas to Impact, formerly at InnoCentive) and Renato Vasconcelos (Principal, Challenge Design and Development at InnoCentive).

realities that are typical of sub-Saharan African countries, the expectation being that solvers would either know the information already or seek it out themselves rather than provide it to them. Even among winners, this was observed as difficult: three winners commented on the challenge in providing market information (of an unspecified country), two of whom felt that they should not be expected to provide that information (implying that the seeker is better placed to do that):

*“You probably had a much better understanding of the market than anyone else who participated in the competition so maybe you...it could have been better if you had given all the information that you had on the market.” Interviewee 004.*

While investigating the effect that the information provided to solvers had on submissions, evidence emerged from interviews with winners that information about the prize (or lack of it) had some negative effects on solvers. The Cylinder Prize was observed by more than one winner to be noticeably different to other prizes that they had experienced. One winner felt more was demanded of solvers than usual as they were required to solve two problems with the Cylinder Prize: to find a way to recycle the cylinders (that represented better value for the Government and met safety issues), and to identify a problem experienced in developing countries for which the solution would be a match.

For another winner, the judging decisions and prize communications (and lack of any information to disconfirm this) caused them to question the purpose of the Cylinder Prize, concluding that it might be allied to an energy company and designed primarily to find cookstove solutions (three winners having been awarded for complementary variations of the same idea). After Action Reviews with the Prize Team show that at least one member of the Prize Team was surprised by this outcome of the judging: that the winning solutions promoted an option that competes in some way with the LPG sector. From the prize communication that the judging panel would be “composed of LPG and Energy Access experts”, the same winner assumed that the prize team anticipated only LPG/Energy Access solutions and that local stakeholders were not represented on the panel. This was not the case, but the Prize Team was unable to make public at that time information that might have avoided these misunderstandings.

### Comparison with similar challenges

In the opinion of the prize experts, the number of questions received from solvers was “relatively high”, but appropriate for this type of InnoCentive Challenge, particularly given the comparatively high level of engagement from solvers. They also estimated that about half of the questions came from the same five solvers. Although not possible for this evaluation, it would be interesting for future evaluations to explore if there is a relationship between asking questions and success in an innovation prize. The experts confirmed that it is common to supply additional information when it becomes clear that it is needed by the solvers. The experts were in agreement that solvers should be provided with the minimum amount of information necessary to solve the problem; “too much information is a hindrance to creativity and can bias solutions”.

One solver (not a winner) correctly identified the country in their application “According to Ideas to Impact website, Country A is Ghana” and then used that as their working assumption. While being unable to provide contextual details was recognised by the Prize Team and experts as not being ideal and a potential limitation to sourcing solutions that could be used by the Government of Ghana, they felt it also allowed for solutions to emerge that could apply to other countries in sub-Saharan Africa.

Without access to other (non-winning) solvers, it is not possible to establish how strong an effect the lack of information about the context had on the prize's success in obtaining a solution that would work at scale; however, it would seem worth considering in risk assessments for any prizes that seek to operate in a similar situation.

#### 4.1.4 Were the prize's incentives sufficient to attract suitable solvers? (EQ 1.4)

##### KEY FINDINGS

- The financial award was acceptable to solvers – all seven winners agreed to license their solution to Ideas to Impact in exchange for the award they were offered.
- About two thirds of shortlisted solvers included an altruistic reason for taking part in the Cylinder Prize (16 out of the 22 that provided information on their motivation) and for many of these it was reported as the only reason.
- Several of the winners reported that non-monetary rewards from winning, or even just participating, was a stronger incentive than the financial reward on offer.
- There often appears to be a set of factors that combine to make a prize attractive to a solver.

Solvers of innovation prizes are typically motivated by a range of financial and non-financial incentives (Ballantyne, 2014) and these are necessary to offset the investment that solvers make in preparing a solution. This evaluation question considers whether the financial incentive offered by the Cylinder Prize was sufficient to attract the types of solvers (and solutions) that the Prize Team intended. It also considers whether a prize focused at improving lives of people in developing countries would be an additional motivating factor for potential solvers (or compensate for a lower monetary reward than that offered by other prizes). Attempts to answer this evaluation question are limited by the data available.

##### Acceptance rate among winners

All winning solvers that were offered an award for their solutions, accepted the amount offered to them (this ranged from USD \$1,000 to \$10,000<sup>18</sup>). By accepting the award, solvers granted Ideas to Impact a non-exclusive licence to practice their solution (meaning winners still retained the right to pursue their solution themselves).

Acceptance, therefore, only tells us that the financial value that solvers placed on licensing their solution was equal to, or less than, the prize money offered to them. It does not tell us what the optimal amount would have been to advertise to potential solvers as the prize purse for the Cylinder Prize; however, interviews with winners strongly suggest that the monetary reward of prizes is often secondary to the benefits that the solver obtains simply from participating, i.e. while winning money is nice, the benefits that the solvers obtain from winning, or even just participating, are stronger incentives.

---

<sup>18</sup> The value of each award was decided by the judges, based on their assessment of the level of innovation and localisation of the submitted idea.

One of the six winners interviewed commented that the level of the award was lower than other prizes, but that this was acceptable given the public good nature of the prize:

*"I find it a little low ... for the amount of work related ... but it's OK ... If it's for public good I don't mind that the prize be lower but if it's for a private company, which is going to make a lot of money out of it, I think it's fair to get a better payment."* Interviewee 001

### Reference to an altruistic motivation

More than two thirds of the shortlisted solvers that provided information on motivation (16 out of 26) gave an altruistic reason for submitting one or more solutions, including five of the seven winners. For many of these (12 out of 16), altruism was the only reason they gave. Solvers were motivated by the opportunity to help others, regardless of whether they themselves were based in a developing country; however, two winners had first-hand experience of developing country problems that drew them to the Cylinder Prize, and when interviewed, both talked passionately about the advantages they had and the duty they had to try to help others that were poor or disadvantaged:

*"I always think that we have so many things in developing countries that nobody is thinking about...it becomes really easy to relate [to] yourself when you are from a developing country because you understand the need ... you are actually working in a way that will help your people."* Interviewee 003

*"When I got the challenge, I was excited - not because of the money; I don't need the money. I was excited because it was about Africa, the poor part of Africa ... I had the opportunity to get a fantastic education ... with a scholarship ... so why not use this to help the poor [Africans] that I know, I see every day."* Interviewee 002

All solvers for the Cylinder Prize were asked to provide information about their motivation for submitting a solution and to describe their background (see Box 1); however, this information was not mandatory and many solvers did not provide it or when they did, lacked sufficient detail. It also appears that some solvers interpreted "motivation" to mean the purpose of the solution rather than what incentivised them to participate.

The Evaluation Team focused on analysing incentives among the solvers of the 39 submissions that were shortlisted for the Cylinder Prize judges to assess in detail (as these tended to provide more information) which, naturally, included the winners, six of whom were asked about incentives during interviews. The 39 shortlisted submissions came from 34 different solvers of whom 25 provided supplementary information (on their submission or in interview) specifically about their motivations.

The data available, therefore, provide a partial view and could suffer from the bias of social

"Supplementary information (NOT FOR EVALUATION): The Ideas to Impact programme is committed to learning about how Challenges can provide solutions for developing countries. Solver should please include a short statement:

- a. Explaining their motivation for submitting a solution for LPG cylinder recycling in Africa.
- b. Describing their background - the sector in which they are based, whether they are applying as an individual or on behalf of an organization and how they heard about the Challenge.

This supplementary information is NOT an eligibility requirement and will be kept separate from the judging process and from any personal data, and only used for learning."

*Box 1 Extract from Cylinder Prize challenge information*

desirability: solvers may have knowingly or unconsciously ascribed different motivations to their behaviour than the true underlying reasons<sup>19</sup>.

There often appears to be a set of factors that combine to make a prize attractive to a solver, e.g. having the opportunity to earn money while applying one's theoretical knowledge to a practical problem and improving people's lives. The following extracts from submissions are useful to illustrate how multi-faceted motivation can be:

*I was first made aware of InnoCentive as a possible way for an individual to earn some extra income. Upon reviewing the challenges I wanted to try to solve some of them to test my creativity; however, when I researched and studied on the various challenges, especially this one, I realized that I was being given a chance to improve peoples' lives in another part of the world. Being asked to think globally to improve lives is a strong motivator.* Extract from submission #020

*I also believe that it is our social obligation to use skills and education that are the privilege and blind luck of being born in a relatively stable country, to help people who never had that privilege.* Extract from submission #142

Reiss's research into the multi-faceted nature of intrinsic motivation, often known as Reiss's Theory of 16 Basic Desires (Reiss, 2004), finds that there are 16 fundamental motives for human behaviour - the satisfaction of which brings a degree of joy (reward) to the person. Individuals will prioritise the motives differently, often in relation to the prevailing norms in their context.

All the motives reported by Cylinder Prize solvers fall under one of the 16 basic desires. A desire for money is not included within Reiss's theory (he argues that financial rewards are a means to another desire such as status, independence, tranquility or saving). Reiss's theory goes some way to helping us understand why the financial reward of the prize was dismissed or not mentioned as a motivating factor by the majority of solvers (and yet is still considered an important incentive to include in a prize). It also can aid prize designers to reflect upon how prize design, rewards and prize communications might be adapted to attract more solvers by considering a fuller range of motives.

Reiss's Theory of Basic Desires could provide a useful analytical framework for subsequent prize evaluations and to understand whether different motives are more prominent in different stages of multi-stage prizes, and among different solver communities.

If the full range of incentives identified among shortlisted solvers for the Cylinder Prize were assumed to apply to other development prizes then, when promoting the prize to potential solvers, prize designers could consider communicating (in addition to the financial award):

- how solving the problem would help disadvantaged people;
- an appeal to their sense of obligation to help solve a global problem or to their duty to "give back";
- the need for creative solutions;
- the opportunity to develop their learning through feedback from the seeker;

---

<sup>19</sup> This bias, however, may have a minimal affect; validation research by Reiss (2004) on fundamental motives of human behaviour produced significant evidence that what people say motivates them is consistent with how they behave in the "real world."

- the novelty of the problem (where it applies);
- the opportunity to raise one’s profile;
- the opportunity to connect with others (where applicable).

#### 4.1.5 Was it possible to identify acceptable alternatives to smelting through the prize? (EQs 1.7 and 1.8)

##### KEY FINDINGS

- Judges were positive about the process and, while some of them made constructive comments for minor improvements, they identified no major issues.
- 39 solutions scored highly enough to be considered “in scope” and shortlisted for further assessment.
- Even winners of awards did not score highly on all the criteria, which may support a previous finding that solvers wanted more contextual information and that some winners felt they were being asked for something (market information) they felt they were not best-placed to deliver.
- No full solutions (alternatives that could be immediately implemented at scale) were identified through the judging process.
- Seven awards were made for partial solutions (solutions that would require further prototyping or testing before being able to implement at scale), of which three related to improved cookstoves.

The Prize Team had hoped to obtain good quality alternatives to smelting the cylinders, to pass on to the Government of Ghana – solutions that were immediately implementable at scale (millions of cylinders) with no prototyping required. Several assumptions underpinned this goal, including the fact that suitable solvers would participate in the prize, that an acceptable alternative to smelting existed, and that the judging process would enable these solutions to be recognised and awarded. The first of these assumptions (solvers) has already been tested (see 4.1.1 to 4.1.4); this section focuses on the solutions themselves and the judging of them.

Six experts in LPG and energy were selected for the Cylinder Prize judging panel (from academia, government, and industry), five of whom were based in Ghana. Judges were positive about the process and, while some of them made constructive comments for minor improvements, they identified no major issues.

Of the 182 applications received, 139 met the challenge criteria and were passed on by InnoCentive to the Prize Team for shortlisting, using a set of judging criteria including gateway criteria, e.g. if the solution did not make sure scrap cylinders could not be recycled back into the market then it was to be considered out of scope. After this round of scoring, 39 of the applications were considered to be ‘in scope’ and thus became the shortlisted applications referred to earlier in this report that were sent to the panel of judges. Each shortlisted application was then assessed by two judges that had been provided with criteria for assessment, requiring them to award scores of 0 to 10. The scores varied widely across all criteria. This variation was also seen in the total scores for applications: the average

combined score (from two judges) for a shortlisted application was 84 but the scores for each application ranged from 23 to 141.

Among the shortlisted solutions, no solution achieved full marks for all criteria, and as there was no mention of a threshold in the judging guidance, it is not possible to assess whether these criteria were 'met'. Even winners did not score highly on all the criteria. This may support the earlier finding that solvers wanted more contextual information and that some winners felt they were being asked for something – market information – which they felt they were not best-placed to deliver.

Judges were asked to give their view as to whether a solution merited an award, assuming that the proposed project was: a good alternative use proposition; would provide a high value alternative use for the majority of the cylinder inventory; was innovative; could be successfully delivered and exploited by the African population or organisations; and was adapted to the social, economic and environmental context of Africa. On this basis, six of the shortlisted solutions were recommended by both of their judges to merit an award. The judges' scores were normalised and those achieving the highest scores were sent to all the judges to determine the winning applications. Final selection of the winners was made at a meeting with the judges, where consensus was reached about scoring through discussion. Judges were empowered to challenge and debate each other's initial views and could argue for inclusion of applications not previously identified as winners in the first round of judging, for example, through identifying the added value that a solution offered to the prize outcomes.

The Prize Team expected the prize to help them answer 'Yes', or 'No' to the Government of Ghana's question, "Is there an appropriate alternative to smelting that is immediately implementable at scale, that we can include in the regulations?" The answer appears to be 'No'. Although awards were made to seven applicants, none of these were considered by the Prize Team to be full solutions<sup>20</sup>; rather, they have been described as a set of interesting concepts that would need to be prototyped and market-tested to establish if they are a viable means of recycling old gas cylinders. In email correspondence and interviews with the Prize Team after the awards were made, the team shared the view that there was value in being able to inform the Government of Ghana that no better alternative to smelting had been identified that could be immediately implemented at scale. This seems a reasonable assumption but cannot be confirmed without consulting the Government of Ghana, if and when the policy goes ahead.

*"What came through were earlier stage ideas than we wanted. People haven't been thinking about this problem, it's on nobody's radar...we have learned there doesn't seem to be anyone out there that has a solution that can be implemented at scale...when the consultants draw up regulations, they'll have to make some provision about what happens to disposal of cylinders...they'll have to do that knowing there's no commercially viable alternative to scrapping them."* Extract from After Action Review with Cylinder Prize Team.

---

<sup>20</sup> For details of the awards made, see <http://ideastoimpact.net/content/winners-announced-ideas-impact-cylinder-prize>

The difference between the Prize Team’s expectations and the results of the Cylinder Prize are explored further in the next section.

## 4.2. Prize effectiveness: To what extent did it deliver the results anticipated? (EQ 2)

### KEY FINDINGS

- The prize failed to identify immediately implementable alternatives to sending cylinders to the smelter, which suggests that the Government of Ghana’s original proposal was still the most appropriate approach.
- All seven solutions awarded were made available to the Government of Ghana, and those relating to stoves shared with the stove manufacturing industry in Ghana.
- To date, none of the solutions shared with the Government of Ghana or stove manufacturers have been taken up.
- Gaps observed between the Prize Team’s expectations and some solvers’ responses to the challenge.

This part of the evaluation investigates whether alternatives to sending returned LPG cylinders to the smelter were identified and taken up by the Government of Ghana, and other stakeholders (EQs 2.1 and 2.2). The Cylinder Prize failed to identify any immediately implementable alternatives to sending cylinders to the smelter, however seven solutions were identified as showing promise, subject to prototyping and market testing, including three relating to cookstoves.

The Prize Team planned to hold a stakeholder meeting after the challenge closed to discuss the winning solutions and make them available to the Government of Ghana and other stakeholders. After learning that the winning solutions were primarily about turning old cylinders into rocket stoves, the Prize Team refocused their post-award strategy to target stove manufacturers as the primary actors for solution implementation. In early 2016, the solutions relating to stoves were shared with active stove-makers in Ghana through the Ghana Alliance for Clean Cookstoves and Fuels. There was interest from some manufacturers in the ideas if a supply of cylinders could be guaranteed and funding provided to cover the costs of product development and testing. All seven solutions awarded were made available to the Government of Ghana, and the Prize Team also plans to make them available to the public. At the time of writing, none of the solutions had been taken up; however, this is in the context of the planned energy policy not proceeding and a guaranteed supply of cylinders not being available.

While Ideas to Impact did not achieve what it had hoped to with the Cylinder Prize, the prize – given its wide reach and number of solvers participating – can be said to have been effective in suggesting to the Government of Ghana that there was no evidence that their original proposal for disposal of the cylinders was not still the most appropriate approach.

It is possible that different understandings of “innovative” contributed to the Cylinder Prize’s failure to obtain a full solution through the InnoCentive platform. The Prize Team observed that while they understood an innovative solution would include one that took what has worked in one context and applied it to the one presented in the challenge, there was a tendency among solvers to produce

pure inventions, i.e. their focus was more on what *could* be done with cylinders, rather than what *has* been done with them elsewhere.

This observation is supported by a comment from one of the winners that expressed surprise that prizes had been awarded for cookstoves, *“The judging panel was confused between imitation and innovation...they went to the wrong address because in InnoCentive we innovate and are not allowed to imitate.”* [Interviewee 002]. There is a possibility, then, that if any solvers were aware of a similar situation in another country, they may not have felt it appropriate to submit it as a solution. This could not be investigated, given the limited access the Evaluation Team had to solvers but does underline the importance of specifying to solvers the type of innovation that is required of them, for example, imitative (i.e. new to a region or business).

### 4.3. Prize added value: To what extent did the prize itself offer something different or complementary to other modalities? (EQ 3)

#### KEY FINDINGS

- Cost comparisons between the Cylinder Prize and consultancy were difficult to estimate reliably and not always directly comparable but the exercise was useful for identifying some of the issues involved in assessing Value for Money of prizes.
- In comparison to procuring expertise from a consultant, a prize modality appears to be significantly more expensive; however, the Cylinder Prize offered several advantages over a typical consultancy including: reduced financial risk to the donor, increased number of solvers and reaching new entrants.

The Cylinder Prize was a point solution prize, a model of prize that aims to find a satisfactory solution to a problem in response to a focused brief for a monetary reward. As a form of Open Innovation (Everett *et al*), the Cylinder Prize was expected to offer: cost savings compared to other financial models, a good rate of problem resolution and the identification of new and diverse solvers. This section analyses the extent to which the Cylinder Prize produced these expected benefits as compared to using an outside consultancy firm/researchers (as the most similar to a point solution prize among the alternative funding models available to governments or donors for seeking solutions). In terms of the conversion funnel previously explored for the Cylinder Prize, the report submitted by a consultant would be equivalent to the application of a single solver, if prior screening had been undertaken of the solvers and their understanding of the problem.

While the financial calculation that follows demonstrates the challenges in directly comparing return on investment of the two forms of funding, when used alongside a consideration of the different risks and benefits offered by each method, it provides a useful starting point for judging whether a point solution prize would be appropriate. Studies of the value for money of innovation prizes are uncommon<sup>21</sup> and there is little consensus on ways to estimate costs and benefits, and how to estimate

---

<sup>21</sup> There have been some studies of Return on Investment of InnoCentive prizes comparing the costs of using internal staff time or deploying external consultants (Bishop, 2009).

and benchmark value for money. As the Cylinder Prize is a point solution prize, and is similar to other InnoCentive prizes (where companies seek solutions to specific technological problems instead of using internal resources or external consultants), then this comparison is seen as an appropriate (though imperfect) way to consider the value for money of this prize in more depth.

### Cost of the Cylinder Prize compared to contracting consultants

Both methods of seeking solutions involve a selection phase and a delivery phase, the difference being that a prize requires full delivery of a report by all interested applicants prior to selection (screening, judging and award) with no judgement about the solver themselves, while a consultancy typically requires selection based on assessing expressions of interest, followed by delivery by a single applicant. Two important distinctions between consultancies and prizes, therefore, are that: a consultancy often results in a single submission of the appointed consultant’s best response to the question(s), whereas the number of submissions to a prize can be unlimited; and in a prize setting, payment will only be made for solutions that meet the client’s criteria, whereas a consultant will require payment (provided they followed the terms of reference) even if they are unable to uncover a good solution.

Government databases and policies were searched for relevant examples and typical rates, and a recent call from Scottish Enterprise for research into the options available regarding wind turbines at the end of their usable life<sup>22</sup> was selected as an appropriate comparator to the Cylinder Prize. Table 3 shows the limitations of this approach: in comparison to procuring expertise from a consultant, a prize modality appears to be significantly more expensive; however, if we divide the costs of the Cylinder Prize by the number of paid-for deliverables (awards made), then the prize outperforms the consultancy study used in the example (£13,379 per award compared to £22,008 for a consultancy report).

Table 3 Comparing the financial inputs of the Cylinder Prize and consultancy

Cylinder Prize		Wind Turbine Consultancy	
General running costs <i>Running the prize from launch to awarding the prize money. Includes promoting the prize, answering technical questions from solvers, judging and making final award decisions.</i>	£30,367	Management fees (23.5% of contract) <i>From selecting three suppliers<sup>23</sup> registered on the Public Contracts Scotland database to reviewing submission of final report from the consultant at the end of the contract. Includes selecting from the three quotes submitted and awarding contract. But EXCLUDES meetings/calls with consultant during research period.</i>	£4,188

<sup>22</sup> [http://www.publiccontractsscotland.gov.uk/search/show/search\\_view.aspx?ID=DEC266062](http://www.publiccontractsscotland.gov.uk/search/show/search_view.aspx?ID=DEC266062)

<sup>23</sup> The Scottish Enterprise call used the ‘Quick Quote’ process typical of procurement under £50,000 in which the buyer selects three suppliers registered with the Public Contracts Scotland website and invites them to submit quotes.

InnoCentive prize platform – includes promotion to, and access to, solver network, and management of questions from solvers.	£37,500	Public Contracts Scotland platform	Free to user (centrally funded)
Prize awarded <sup>24</sup> between seven winners	£23,784	Value of contract to one consultant	£17,820
Judges	£2,000		n/a
Total cost	£93,651	Total cost	£22,008

Several challenges were encountered in making a cost comparison, the first being which costs were appropriate to include. The cost of running a prize like the Cylinder Prize in its simplest form is the sum of: general running costs + prize platform costs + prize purse (which may or may not be awarded). Additional costs can include honoraria or payment to judges, advertising and promotion of the prize to build up a solver network, and post-award activities (awards ceremony, media work, stakeholder meetings, etc.). Depending on the choice of prize platform, the platform cost may include services, such as promotion to networks of potential solvers and management of solvers' questions (as was the case with the InnoCentive platform). The time taken for initial prize design (determining the problem that the prize would seek to solve and what type of prize would be used) and the cost of evaluation were not included. Also, not included in the cost comparisons are the opportunity costs of participating (for solvers) and of tendering (consultancies), although these would be interesting to investigate for future evaluations. The comparison is, therefore, being made between the point at which a donor decides to launch a prize to answer their problem, with the point at which they might instead decide to draft and issue a tender to procure short-term research.

The second challenge experienced in cost comparison was obtaining reliable data. Although the Prize Team kept timesheets and budgets for the Energy Access prizes, it was only possible to provide rough estimates of staff time that could be attributed exclusively to the Cylinder Prize because the prize was designed and managed as part of a group of three prizes. Other costs were straightforward to obtain (e.g. spend on prize platform and prize award). It should also be noted that Ideas to Impact, as a research programme, is trialling prizes in a new context and is likely to have invested more staff time into scoping and engagement with partners than would take place in more familiar settings.

Equally, it was hard to obtain costs of a “typical” consultancy. The research contract for the wind turbine options consultancy was £17,820 and was 107 days in duration, but published data were unobtainable on the costs of procurement to the buyer. A Progressive Equity Research market review of e-tendering (2013) cites findings from an EU evaluation that puts the average cost of running a “lower value tender” as between 18% and 29% of the contract value; 23.5% was used in this example as a midway point.

---

<sup>24</sup> Conversion into British pounds based on exchange rate at time of prize award being announced (July 2015) <http://www.ukforex.co.uk/forex-tools/historical-rate-tools/monthly-average-rates> Based on exchange rates when prize awards were made January 2017 this would have increased the cost of award to £29,482.

A third challenge to calculations is changes in exchange rates. In the Cylinder Prize example, when the prize was launched in July 2015 the total amount that was eventually awarded (\$37,000) was equivalent to GBP £23,784. By the time the awards were paid in January 2016, the exchange rate meant that the total prize amount awarded was now equivalent to £25,667<sup>25</sup>. The comparison uses the value in sterling of the total prize award at the time of the award being launched, as it is assumed that the amount paid to a consultant at the end of a contract remains the same as the amount agreed in that currency at the start, regardless of changes in exchange rates.

The final challenge was deciding the basis on which to divide the total costs. How many outputs did the Cylinder Prize generate: one solution (no better alternative found to smelting), seven partial solutions, or one large partial solution (cookstoves) and four smaller ones? Which of these is equivalent to a consultancy research report? In the Wind Turbine consultancy example, the consultant was required to provide several options and review their feasibility so that their report would contain an unspecified number of solutions. Alternatively, one could argue that the output of the Cylinder Prize was the number of good quality submissions made available to the seeker for them to review (those shortlisted for judging), in which case the Cylinder Prize provided 39 submissions, at a cost of £2,401 per submission, making the return on investment nine times better than that of the consultancy.

### Additional value offered by the Cylinder Prize

A cost comparison on its own proved to be a crude tool with which to judge the return on investment of the Cylinder Prize, given the many ways in which the data could be challenged and interpreted, e.g. the Public Contracts Scotland platform was free for Scottish Enterprise to use, but has been paid for by the taxpayer and should thus be included in the cost of consultancy.

However, there are further sources of added value that might be considered when comparing prizes to consultancy. These are being researched by Ideas to Impact at a cross-prize level, and initial investigations into recent literature on prizes suggest several benefits a donor may gain from use of a prize over other forms of funding, including consultancy and research grants. Those that apply to point solution prizes, are summarised in Table 4, with notes on the extent to which they are supported by the evaluation findings. This analysis suggests that any decision made *ex ante* about whether a prize offers best value for money for any given problem should take into consideration whether the additional potential benefits of a prize (more solvers, diversity of solutions, public profile, etc.) justify any extra expense.

Table 4: Additional value offered to donors by point solution prizes

Added value of Point Solution prizes e.g. Cylinder Prize	As compared to consultancy e.g. Wind Turbine Options
--	--

<sup>25</sup> Based on data available from UKForex.co.uk <http://www.ukforex.co.uk/forex-tools/historical-rate-tools/historical-exchange-rates>

<p><b>Reduced financial risk (Cowen and Tabarrok, 2016; Lee, 2014):</b> payment is only made after delivery, for solutions that meet pre-set criteria. Amount paid was flexible up to point of award; prize purse was “up to \$40,000”; \$37,000 was awarded between seven winners.</p>	<p>Frequently some payment is made before delivery and total amount agreed at the point of contracting (before work is delivered). Risk of awarding contract to supplier that is unable to deliver to the standard required/expected – harder to evaluate excellence prior to seeing the results.</p>
<p><b>Number of solvers and solutions is potentially unlimited (Everett et al, 2011)</b> (assuming incentives, communications, etc. are effective and barriers to entry, such as language, are addressed). Cylinder Prize promotion included 375,000+ members of InnoCentive community and led to 650 Project Rooms being opened; several solvers submitted multiple solutions.</p>	<p>Restricted based on eligibility criteria and those that are known by, or within the reach of, seeker. For smaller consultancies, only a small number of potential consultants are invited to tender, e.g. three suppliers, registered on the government database, in the case of the Wind Turbine Consultancy.</p>
<p><b>Potential for total input by solvers to exceed that of a consultant (Schooner and Castellano, 2015)</b> Data were not available from all winners on exactly how much time they invested in producing their winning solutions (their estimates ranged from a few hours to several people working for a few weeks). However, it is reasonable to assume that the total amount awarded exceeded the total time invested by the winning solvers (including two teams of solvers). Additional time will have been invested by non-winning solvers.</p>	<p>From the limited information available, day rates of consultants to the public sector seem to range from about £500 to £800<sup>26</sup>. Taking the mid-point of these (£650), the Wind Turbine consultancy fee would be equivalent to about 27 days of work. Using the same fee rate, this compares to 37 fee days, available between all solvers, for the Cylinder Prize.</p>
<p><b>Increased diversity of solvers (Gök, 2013):</b> Typically broad, (successful solvers are often on technical and social margins), but depends upon barriers to entry – often assumed in literature to be lower than for grants, but the need to self-fund could be a significant barrier. 16% of Cylinder Prize applicants were based in sub-Saharan Africa (data on gender or technical discipline unavailable/incomplete).</p>	<p>Donors report challenges in enabling Southern organisations and researchers, and other stakeholders, to engage and participate in calls for research due to barriers not experienced by Northern counterparts (UKCDS, 2014).</p>
<p><b>Can contribute to other objectives (Bastos, 2015; Everett et al, 2011):</b> Prize publicity can aid raising awareness of issues among public/stakeholders. Greater opportunity for collaboration/networking between solvers (depending on choice of prize platform).</p>	<p>Awareness-raising would need to be included within Terms of Reference for consultant, and additional budget provided for research communications. Collaboration (if it happens) occurs at the tendering stage.</p>

<sup>26</sup> See for example: <http://documents.manchester.ac.uk/display.aspx?DocID=29173> and <http://www.newburyconsulting.co.uk/this-is-a-simple-but-highly-valuable-reference-of-professional-service-day-rates/>

<i>Although these effects were not specifically investigated in the Cylinder Prize evaluation, the InnoCentive platform enables new partnerships to be formed, but evidence was only seen of solvers in relationships that pre-date the prize.</i>	
--	--

This investigation also highlights several risks of using prizes, that are less likely with consultancy, including:

- increased **reputational risk** from increased media activity around the prize;
- risk of **litigation**; particularly in the US, researchers are concerned about the lack of due process in prizes (Schooner and Castellano, 2015; Burstein and Murray, 2016);
- **wastage** (Bastos, 2015) of multiple solvers investing their resources in developing a solution (possibly the same/similar ones) when only a limited number of prizes are to be awarded (assuming more solvers apply for prizes than potential consultants tender for a contract); this may be a particular challenge for donors using prizes to target developing country solvers (Hemel and Ouellette, 2013);
- risk of **failing to obtain a solution** at the end of the period; prize-winners have the right to refuse an award (and retain exclusive use of their solution).

Although these risks were not observed (or observable, in some cases) with the Cylinder Prize, they need to be borne in mind by prize commissioners.

In the absence of setting both sets of solvers (consultant and prize community) the same problem to solve, it does not seem reasonable to compare consultancy and prizes based on outputs alone. Instead the analysis suggests that the value of a point solution prize could be relative to the trust a donor has in their usual tendering process: do they have access to a sufficient diversity of consultancy firms that are well placed to solve the problem and that are likely to respond to their tender? Are they confident that the tendering process will be effective in identifying a consultant that will submit a good quality solution to their problem on time?

Prizes increase the number of minds that are working on solving a problem and for those that lack direct access to experts that could be asked to research a problem through a consultancy contract, a point solution prize offers the opportunity to seek answers without having to commit to payment until those answers have been evaluated. However, due to the risk of not finding a satisfactory solution, a donor should pay particular attention to how to mitigate this risk, by using staged prizes, offering appropriate financial and non-financial incentives and providing support for proto-typing, etc.

#### 4.4. Likely longer term impacts: To what extent will the prize lead to societal benefits for 'bottom of the pyramid' consumers? (EQ 4)

##### KEY FINDINGS

- Not reasonable to forecast in absence of progress on policy; however, Prize Team estimated potential for 176,000 poor or very poor people in Ghana to benefit from the Cylinder Prize by 2025, if policy had gone ahead as expected and improved (fuel efficient) cookstoves had been produced for people on low incomes to purchase.

As noted in section 4.2, the planned energy policy has not proceeded and without a guaranteed supply of cylinders being available, it is not reasonable to expect the solutions awarded through the Cylinder Prize to have been taken up in Ghana. However, in March 2016, the Cylinder Prize Team, working with the Evaluation Team, produced estimates of beneficiary numbers if improved cookstoves (based on old gas cylinders) were successfully developed in the future.

These estimates assumed that the solution was taken up by two manufacturers in Ghana and that by the end of 2018 they had achieved sales of an average 5,000 each, per annum, to new customers (there would also be sales to those replacing their stoves over time). Based on this, with reference to Ghana's census data on household size, and adjusting for Ideas to Impact's contribution (the need for financial support to come forward from other organisations), the Prize Team estimated that by 2025, 176,000 poor or very poor people in Ghana could have benefitted from the Cylinder Prize by having access to improved cookstoves. Improved cookstoves are more fuel efficient and, therefore, the benefits to owners include reduced trips to collect fuel and reduced production of harmful smoke.

## 5. Intended and unintended prize effects

### KEY FINDINGS

- The Cylinder Prize has been successful in attracting new entrants and there is evidence of encouraging participation in further innovation prizes, and interest in prizes with a development focus.
- The prize failed to achieve one of its intended effects, namely to find a solution that satisfactorily met all criteria.
- Lack of progress with the energy access policy prevents some further effects from taking place but if resources are available, the Prize Team could take action that may lead to other effects occurring.

In advance of launching its first prize, Ideas to Impact published (Ward and Dixon, 2015) a set of nine outcomes or effects that prizes can achieve, often in combination. Since the Cylinder Prize evaluation commenced, and based on its learning to date, Ideas to Impact has reviewed and updated the definitions of these prize effects and identified which of these are intended effects of each prize. Table 5 presents the latest version of the prize effects (from October 2016), indicates which effects were anticipated by the Prize Team to be likely to occur because of the Cylinder Prize, and records any evidence from evaluation that supports this (bearing in mind limitations previously highlighted). Any evidence of effects that were not intended or expected is also recorded and illustrates the multiple outcomes that a single prize has the potential to achieve.

From the evidence available, the Cylinder Prize has been successful in attracting new entrants and there is evidence of encouraging participation in further innovation prizes and interest in prizes with a development focus. However, the prize failed to find a solution that satisfactorily met all the criteria (Point Solution). Furthermore, the lack of progress with the energy access policy prevents further effects from taking place (e.g. Market Stimulation and Altering the Policy Environment). While waiting for the policy to progress, and if resources are available, it is still within the control of the Prize Team to take action that could lead to more evidence of effects including making the winning solutions more widely available and connecting winning solvers to other parties that may be able to help them to develop their solutions further. Two winners reported being interested in being more involved in developing their solutions further themselves but felt unable to due to lack of resources or connections, and in one case, being unclear if this was allowed:

*“The problem of open innovation [is] that sometimes you do not know how to get involved in this project but if you have resources, if you have money, you have time, it's very easy...you solve the problem and it's very difficult then to get involved or to do something by yourself”. Interviewee 006.*

Table 5: Evidence of prize effects occurring as a result of the Cylinder Prize

Prize Effect and Definition (The intended effect a prize aims to have)	Intended effects within the Cylinder Prize	Evidence of the effect occurring as a result of the Cylinder Prize
<p><b>Raise Awareness</b></p> <p>Either brings something to someone's/some people's attention or increases their understanding of something.</p> <p>Often about increasing awareness and knowledge of an issue (especially one that is neglected or previously communicated to that group of people).</p>	<p>Not an intended effect for the Cylinder Prize but may raise awareness of the safety issues involved in cylinder disposal.</p>	<p>One winner reported the prize had prompted them to think about how this problem might be solved in their home country. Another winner has taken an aspect of their solution and adapted it for another prize.</p>
<p><b>Promote best practice</b></p> <p>A prize can do this by:</p> <p>Identifying best practice in a certain field (through solutions submitted) and encouraging adoption (through publicising the winning solutions) OR making potential solvers aware of current best practice as part of the prize application process.</p>	<p>Not an intended effect for the Cylinder Prize.</p>	<p>The winning solutions have been shared with the Government of Ghana and (those relating to cookstoves), with the stove manufacturing industry in Ghana but not made public to date.</p>
<p><b>Facilitate and Strengthen Partnerships and Networks</b></p> <p>Raises visibility and brings those also working in the space to the attention of others, helping to establish new networks and strengthening partnerships towards a common goal.</p> <p>Some prizes may require new partnerships through criteria or conditions.</p>	<p>Not an intended effect for the Cylinder Prize.</p>	<p>Winning solvers were publicised by Ideas to Impact. None of the winners gave raising their profile as a reason for participating in the prize. Two winners commented on having an interest in developing the idea further but lacked the resources and contacts that would enable this.</p>
<p><b>Maximising participation towards the sponsor's aims.</b></p> <p>Benefits to the sponsor are provided by all effective participants not just by the winners.</p>	<p>Not an intended effect for the Cylinder Prize; a single full solution was required for the prize to be successful.</p>	<p>Unobtainable as unable to contact non-winning participants.</p>

<p><b>Community Action</b></p> <p>Incentivising communities (broadly defined as people living in the same place/sharing a communal interest*), to take action, encouraging ownership of the problem and solution.</p> <p>*Each prize to define 'communities' for its own purposes.</p>	<p>Not an intended effect for the Cylinder Prize.</p>	<p>No evidence of communities, networks or groups engaging with the prize.</p>
<p><b>Point Solution</b></p> <p>Finding a solution to a problem that has been broken down to a component part. For example, a new product or process. Problem is highly specified.</p>	<p>Intended effect for the Cylinder Prize: clearly defined solution was expected, if prize was successful.</p>	<p>No full solution (alternatives that could be immediately implemented at scale) identified through the judging process<sup>27</sup>.</p> <p>Seven awards were made for partial solutions (solutions that would require further prototyping or testing before being able to implement at scale).</p>
<p><b>Open Innovation</b></p> <p>Open innovation enables new solvers to enter the field of endeavour. For some prizes this could include local and grassroots innovators, e.g. small community organisations, students, etc.</p>	<p>Intended effect for the Cylinder Prize: new entrants were expected.</p>	<p>Based on interviews with winners, the Cylinder Prize attracted good quality submissions from people that DFID would have been unlikely to reach through their usual channels of procuring research - at least 71% of winners are new to donor funding. The focus of the challenge drew new solvers (among the winners) to innovation prizes, one of whom reported looking for more challenges since applying to the Cylinder Prize.</p>
<p><b>Market Stimulation</b></p> <p>Helps to increase economic activity in an existing market or starts a new one for a particular good or service through a high value prize that, as a</p>	<p>Not an intended effect for the Cylinder Prize.</p>	<p>The prize resulted in three solutions relating to cookstoves but, to date, none of the solutions shared with the stove manufacturers have been taken up.</p>

<sup>27</sup> According to the Ideas to Impact prize expert, for some sectors, de-contextualising prizes can produce solutions, which do not require further testing and can also attract greater interest from people outside the sector, but the findings from applicants in this case (p28-9) suggest that more contextual information would have been advantageous to improve the quality of solutions.

<p>result of all of the other effects, results in a changed market.</p> <p>Can also be to open up a new market.</p>		
<p><b>Altering The Policy Environment</b></p> <p>Raised awareness, market stimulation, etc. can lead to corresponding policy change in reaction to the other prize effects.</p>	<p>Not an intended effect for the Cylinder Prize</p>	<p>The prize has some value in being able to suggest to the Government of Ghana that their original proposal was still the most appropriate approach; however, without the policy progressing, the prize cannot have an influence.</p>

## 6. Conclusions and Recommendations

Failure is an integral part of innovation and this is recognised within Ideas to Impact's own results framework, which anticipates a level of failure among its prize portfolio but more importantly, requires that learning from failure is captured and shared. However, failure that leads to learning is only acceptable in this context if due care has been taken to identify and mitigate the risks of failure. The Cylinder Prize was successful in many areas of implementation, such as reaching out to a broader range and larger number of solvers than DFID would normally expect to reach through a tender process; however, it ultimately failed to deliver the result it had hoped to achieve: that is, to obtain a solution that the Government of Ghana (and other stakeholders) would be willing or able to implement immediately. As such, what can be learned from the prize?

The Cylinder Prize was run in anticipation of a policy being introduced in Ghana that would have seen the Government needing to dispose of millions of old LPG gas cylinders safely. From its consultation with the Government of Ghana and other stakeholders (through the prize's steering committee), the Prize Team was aware that the timing of the policy could not be predicted; however, the Cylinder Prize needed to run in advance of the policy to some extent as alternatives to smelting would need to be available to the Government in advance if they were to be taken up.

This situation presented the Ideas to Impact programme with an opportunity to test the value of running a point solution prize on an established innovation prize platform that would be familiar to the innovation prize community, and which had the potential of reaching a large number of solvers that development donors would not normally be able to access. It also brought to the Prize Team, the challenge of weighing up risks, costs and potential benefits of running prizes linked to external processes.

There were risks to running the Cylinder Prize due to its reliance on the successful signing of a policy: these were known to the Prize Team at the time of deciding to run the prize. In making their decision, the Prize Team judged that the policy was likely to be signed off at some time in the future and that, given the investment already made in the design of the prize, the extra expenditure in running the prize was relatively small (0.5% of the total prize purse for the programme); however, the Prize Team decided to hold back the other, higher cost, Energy Access prizes, which were contingent on the policy being in place, and to explore lower-risk alternatives in this area instead.

The Cylinder Prize is the source for several lessons for policy-dependent prizes:

- The policy did not go ahead as anticipated, which raises a question as to whether a more detailed political economy analysis might have led to a different assessment of the risk.
- The Cylinder Prize was run in advance of a problem being present (although one was highly anticipated) and this had an impact on how the prize could be run, e.g. the amount of information that could be shared, which risks attracting lower quality solutions than those submitted in other circumstances.
- In development, policy change-linked prizes are particularly high risk. Mitigation, therefore, needs to include clear decision points about phasing how much of a prize purse should be put at risk (as demonstrated here with the Energy prizes).

Setting aside political events beyond the control of the Prize Team, this evaluation of the Cylinder Prize highlights the significant challenges presented by point solution prizes when used in development:

- a) multiple stages may be necessary to find solutions that can be implementable at scale (from ideas and inventions, to prototyped and piloted solutions, to being adapted for implementation at scale in a specific context).
- b) the real risks in trying to find point solutions for which there are no clear or obvious alternatives; the innovation that the Cylinder Prize sought depended less on creativity and more on reaching solvers that knew of an existing solution that could be re-purposed to the context of the prize and were able to think through how to adapt it.
- c) the complexity (and necessary supporting factors) required to realise development effects from point solutions; recycling cylinders (should they become available) into improved cookstoves, for example, would require the co-operation of several stakeholder groups beyond the Government.
- d) the many variables that need to be considered when assessing cost-effectiveness; the outputs of prizes are not directly comparable and prizes are associated with different risks and benefits to alternative forms of financing that may make them more or less attractive depending on a donor's priorities.

## 6.1. Recommendations

**1. Prizes need to be viewed as part of a portfolio-based approach** that offsets success and failure in a managed way and considers the increased reputational risk of failure that applies to prizes, due to their higher profile. This applies to portfolios of prizes, and where prizes are used within a portfolio of other funding approaches (payment-by-results contracts, grants, etc.) that each present different levels of risk.

**2. Be clear on which objectives are viewed as key to judging “success”** – is success judged by the number of solutions obtained? Is success searching the widest possible range of solutions and discovering that there are no clear alternatives?

**3. Check that the right “crowds” will be reached by a prize through platform choice and prize design.** Given the Prize Team would have rewarded existing solutions from another context, a more overtly desk-based research challenge might have had more success if global networks of professionals working in development could have been accessed.

**4. Consider running a point solution prize as well as consultancy.** Paying for a research helpdesk report<sup>28</sup>, might have been better value for money than a prize, given that the Prize Team could not make public any information about the context of the prize; the prize could then have been run if the helpdesk failed to identify a solution. If resources only allow for a point solution prize or a consultancy, then consider the full risks and benefits offered by each when comparing likely cost-effectiveness.

---

<sup>28</sup> The GSDRC offers a desk-based research helpdesk service that includes contact with experts, see for example <http://www.gsdrc.org/docs/open/hd631.pdf>

## **5. Adapt the design of point solution prizes to increase the probability of success.**

Winners were keen to see their ideas implemented but two of them commented on their lack of capacity to do so without technical support, or introductions to a local company with whom they could work to develop the idea further. Point solution prizes could achieve more of their potential value if they were blended with other mechanisms, such as follow-on grants, match-making with funders and companies, etc.

## **6. Pre-test prize information before launch.**

When a potential solver visits a prize information page on InnoCentive, it signals that the prize has caught their attention and that they are interested in finding out more; opening a "Project Room" signals that the prize page has maintained this interest in the potential solver. To encourage more conversions from visits to Project Rooms, Prize Teams could pre-test the summary information with potential solvers in order to check that sufficient incentives are in place and that there are no unnecessary barriers to entry. Similarly, it is worth checking that the expectations of the Prize Team are communicated effectively in the detailed information and criteria of the prize.

## **7. Consider what would be appropriate rewards for solvers motivated by altruism.**

Altruistic solvers prepare and submit solutions because they believe that doing so might help others, even if they themselves are not fully or partly rewarded for their efforts. In this context, large financial awards might be counter-productive while assurance that solutions would become a public good, with the solvers' consent, might be more attractive. This could also address wastage of multiple solvers investing their resources into developing a solution (possibly the same/similar ones) when only a limited number of prizes are to be awarded.

## **8. Include definitions of terms in prize information for solvers and judges.**

The Cylinder Prize highlights the importance of ensuring that "innovation" or "innovative" is defined and shared with solvers as part of the challenge details, and for this to be the same definition used by the judging panel. Ideas to Impact defines innovation as: The application of new or improved products, processes, technologies or services that are either new to the world (novel), either new to a region or business (imitative) or new to the field of endeavour, that is, repurposed (adaptive). The definition of 'innovation' suggested by the OECD in its Background Paper (2014), may be another useful reference:

- *Novelty: innovations introduce new approaches, relative to the context where they are introduced.*
- *Implementation: innovations must be implemented, not just an idea.*
- *Impact: innovations aim to result in better public results including efficiency, effectiveness, and user or employee satisfaction.*

## References

- Ballantyne, P., 2014. *Challenge Prizes: A practice guide*. 1st ed. [ebook] Nesta: Centre for Challenge Prizes. Available at: <http://www.nesta.org.uk/publications/challenge-prizes-practice-guide> [Accessed 8th May, 2017].
- Bastos, Y.B., 2015. *Leveraging Learning Experiences in Sustainability-oriented Challenge Prizes* (Doctoral dissertation, Blekinge Institute of Technology).
- Bishop, M., 2009. *The Total Economic Impact™ Of InnoCentive Challenges*. Available at: <https://www.innocentive.com/files/node/casestudy/total-economic-impacttm-innocentive-challenges-sca-case-study.pdf>
- Burstein, M.J. and Murray, F., 2016. Innovation prizes in practice and theory, *Harvard Journal of Law & Technology*, Vol 29, No. 2, p402.
- Chaffey, D., 2017. *Display advertising clickthrough rates*. [online] (8<sup>th</sup> March, 2017) Available at: <http://www.smartinsights.com/internet-advertising/internet-advertising-analytics/display-advertising-clickthrough-rates/> [Accessed May 8th, 2017]
- Cowen, T. and Tabarrok, A., 2016. A Skeptical View of the National Science Foundation's Role in Economic Research, *The Journal of Economic Perspectives* 30.3, p.235.
- Daglio, M., Gerson D. and Kitchen H., *Building Organisational Capacity for Public Sector Innovation*, Background Paper prepared for the OECD Conference "Innovating the Public Sector: from Ideas to Impact", Paris, 12-13 November 2014 Accessed from: <http://www.oecd.org/innovating-the-public-sector/Background-report.pdf>
- Dalle, M., 2016. *Feedback after visit to Ghana*, [unpublished internal document].
- Everett, B., Barnett, C. and Verma, R., 2011. *Evidence review – environmental innovation prizes for development* [technical report]. Available at: <https://www.gov.uk/dfid-research-outputs/evidence-review-environmental-innovation-prizes-for-development-dew-point-enquiry-no-a0405> [Accessed 8th May, 2017].
- Gök, A., 2013. *The Impact of Innovation Inducement Prizes* (No. 13/18). Nesta Working Paper.
- Hemel, D.J. and Ouellette, L.L., 2013. Beyond the Patents-Prizes Debate, *Texas Law Review*, Vol. 92, No. 2, p.303.
- Ideas to Impact, 2015. *LPG Cylinder Recycling Across Sub-Saharan Africa*, [unpublished internal document].
- Ideas to Impact, 2016. *The Cylinder Prize: what happened next?*, [blog post] 23<sup>rd</sup> August, 2016. Available at <http://www.ideastoimpact.net/content/cylinder-prize-%E2%80%93-what-happened-next> [Accessed May 8<sup>th</sup>, 2017].
- Itad, 2016, *Ideas to Impact Evaluation and Learning Framework, Workplan and Budget – Implementation Phase Note* [internal unpublished document].
- Itad, 2016, *LPG Cylinder Prize: Evaluation Methods Note* [internal unpublished document].
- Jeppesen, L.B. and Lakhani, K.R., 2010. Marginality and problem-solving effectiveness in broadcast search. *Organization science*, 21(5), pp.1016-1033.
- Lee, P., 2014. Social Innovation, *Wash. UL Rev.*, 92, p.1. Available at: [http://openscholarship.wustl.edu/law\\_lawreview/vol92/iss1/5](http://openscholarship.wustl.edu/law_lawreview/vol92/iss1/5) [Accessed 8th May, 2017].

McKinsey & Company, 2009. "And the winner is ..." *Capturing the promise of philanthropic prizes*. Available at: [http://www.mckinseysociety.com/downloads/reports/Social-Innovation/And\\_the\\_winner\\_is.pdf](http://www.mckinseysociety.com/downloads/reports/Social-Innovation/And_the_winner_is.pdf) [Accessed 8th May, 2017].

OECD, 2007. Revised field of science and technology (FOS) classification in the Frascati Manual [report]. Available at: <http://www.oecd.org/science/inno/38235147.pdf> [Accessed 8th May, 2017].

Reiss, S., 2004. Multifaceted nature of intrinsic motivation: The theory of 16 basic desires. *Review of General Psychology*, 8(3), p.179.

Schooner, S.L. and Castellano, N.E., 2015. *Eyes on the Prize, Head in the Sand: Filling the Due Process Vacuum in Federally Administered Contests*.

UKCDS, 2014. *The engineering for development research base: a mapping to underpin the RAG discussion* [online]. Available at: [http://www.ukcds.org.uk/sites/default/files/content/resources/UKCDS\\_Mapping\\_Infrastructure\\_Research\\_for\\_Dev\\_May\\_2014\\_0.pdf](http://www.ukcds.org.uk/sites/default/files/content/resources/UKCDS_Mapping_Infrastructure_Research_for_Dev_May_2014_0.pdf) [Accessed 8th May, 2017].

Ward, J. and Dixon, C., 2015, *Innovation prizes: a guide for use in a developing country context* [report]. Available at: <http://www.ideastoimpact.net/report-publication/innovation-prizes-guide-use-developing-country-context> [Accessed on May 8th, 2017].

## Annex 1: Evaluation Framework Summary Table

Evaluation questions	Detailed questions	Indicators	Source of evidence	Proposed analysis
1. Prize process quality: how do we know the Cylinder Prize delivered what was required?	1.1 Were potential solvers reached by the prize launch activities?	Geographical and sectoral reach of the prize launch activities (broken down by channel). Number of visits made to the Cylinder Prize webpage on the InnoCentive platform. Proportion of visits made to the Cylinder Prize webpage on the InnoCentive platform from Africa.	Prize team communications activity reports. InnoCentive platform website statistics.	Summary figures will be presented in charts, and ratios calculated between reach and visits where possible.
	1.2 Were potential solvers given sufficient time to apply?	Comparison of distribution of Cylinder Prize submissions during the submission period with typical distribution.	InnoCentive platform website statistics. Key Informant Interviews <sup>29</sup> and After Action Reviews with prize team (including the prize designer).	Measures of dispersion of Cylinder Prize submissions and central tendencies. Content analysis of qualitative data <sup>30</sup> .
	1.3 Were potential solvers provided with sufficient information to understand the problem?	Comparison of number and type of questions submitted by potential solvers with what is typical.	Questions received by InnoCentive. Key Informant Interviews and After Action Reviews with prize team (including the prize designer).	Frequency and percentage summaries. Content analysis of qualitative data.
	1.4 Were the prize's	Number of solvers making reference to	Applications submitted by solvers.	Coding of applicants.

<sup>29</sup> Key Informant Interviews and After Action Reviews will be used to triangulate and explain, or add context to, findings obtained from the secondary data sources. In cases where benchmarks are not available, expert opinion (e.g. of Prize Designers) will be particularly valuable.

<sup>30</sup> Content analysis for the Cylinder Prize will involve manually reviewing documents (application forms, transcripts, prize reports) etc., highlighting and synthesising recurring themes in a consistent manner. We will endeavour to use standard coding frameworks across the evaluations where possible, e.g. a set of standard anticipated prize effects.

	incentives sufficient to attract suitable solvers?	an altruistic ambition as reason for applying. Acceptance rate among winners of the award offered to them.	Key Informant Interviews with winners about motivation for applying. Key informant interviews with prize designer and prize team.	Content analysis of qualitative data.
	1.5 How diverse were the solvers for the Cylinder Prize?	Regional distribution of solvers and winners. Sectoral distribution of solvers and winners. Number of winners that are new to the field of endeavour, DFID or other donor funding.	Website statistics. Applications submitted by solvers. Key Informant Interviews with winners about background and previous experience.	Summarising website statistics visually. Coding of applicants and winners, and summary of frequency of sectors and regions.
	1.6 What was the take-up rate of the prize among solvers?	Ratio of number of people that accepted the prize T&Cs to visits made to prize webpage. Ratio of solutions submitted to number accepting the prize T&Cs. Ratio of solutions submitted by eligible solvers to solutions submitted. All three ratios disaggregated by region.	Applications submitted by solvers. Prize platform website statistics.	Ratios presented as a "conversion funnel" – globally and for Africa only.
	1.7 Was the problem solvable? (Is there an appropriate alternative?)	Number of awards made for full solutions (immediately implementable at scale). Number of awards made for ideas of possible solutions	Awards data. Qualitative data from judges and prize team.	Summary of awards made. Content analysis of qualitative data.

	1.8 Did the judging criteria enable an award to be made (i.e. at least one application meeting all the criteria)?	Number of solutions that met all the judging criteria.	Judging scores for applications.	Ratio of solutions meeting all criteria compared to total submitted.
2. Prize effectiveness: To what extent did it deliver the results anticipated?	2.1 Were alternatives to sending returned LPG cylinders to the smelter identified and shared with the Government of Ghana and other stakeholders?	Number of solutions identified through the prize that are made available to the Government of Ghana.	Prize team activity reports. Key informant interviews with Prize Team.	Content analysis of qualitative data.
	2.2 Were one or more solutions, identified through the Cylinder Prize, taken up by the Government of Ghana or other stakeholders?	References made to prize solutions by Government of Ghana. Stove manufacturers develop prototype stoves based on prize solutions.	Desk-based review of public communication by Government of Ghana and other relevant stakeholders about gas cylinder removal (official publications, media, speeches, press releases, etc.). Key informant interviews with Prize Team. Prize team report on engagement with stove manufacturers.	Content analysis of qualitative data.
3. Prize added value: To what extent did the prize itself offer something different or complementary to other modalities?	3.1 To what extent did the Cylinder Prize produce the expected benefits of an Open Innovation prize?	Cost savings of the Cylinder Prize compared to using outside consultants. Number of awards made for full solutions (immediately implementable at scale).	Financial data from Prize Team on Cylinder Prize administration and awarding. Estimates of contracting costs for equivalent work.	Ratio of cost of Cylinder Prize compared to consultancy.

		Number of awards made for ideas of possible solutions. Regional distribution of solvers and winners. Sectoral distribution of solvers and winners. Number of winners that are new to the field of endeavour, DFID or other donor funding.	Prize M&E data on solvers and awards made, previously obtained.	
4. Likely longer term impacts: To what extent will the prize lead to societal benefits for 'bottom of the pyramid' consumers?	4.1 How many poor people are benefiting from more efficient cooking as a result of the Cylinder Prize?	Number of poor people owning a new fuel efficient stove (based on the Cylinder Prize solution). Number of people directly benefitting from the use of the new fuel efficient stoves.	Sales data and projections from stove manufacturers that have adopted the Cylinder Prize solution. Ghana national census data.	Beneficiary calculation approach as used by all Ideas to Impact prizes for regular reporting to DFID; using census data to estimate household size.

## Annex 2: Questions for use in interviews with Cylinder Prize winners

### Ideas to Impact: Cylinder Prize Evaluation

#### 1. Background of Participant

Could you please tell me something about your background: the type of organisation you work for, the sector in which you work and your role, in which country you are based?

Were you the only solver for this challenge? If not, could you please provide some brief details about your colleagues (occupation, type of organisation, location, gender, etc.)?

#### 2. Previous experience with innovation prizes and/or international development

- Was this the first time you applied for an innovation prize or taken part in open innovation? If not, could you please tell me a bit about your previous experience and if you have used InnoCentive before?
- Have you ever applied for funding from, or worked on a programme funded by, the UK's Department for International Development or other development donors?

#### 3. How you came to submit a solution

- Could you talk me through how you took part in the prize from the beginning? How did you hear about it, what attracted you to it initially? And why you pursued the prize (perhaps even over other prizes on offer at InnoCentive? In which case why did you pick this one?)
- Had you ever thought about the problem before?
- If this was not your first time with innovation prizes, was there was anything particularly appealing about this compared to other prizes?
- How long do you think you spent working on this? (Was it more or less than expected?)
- If you have previously entered innovation prizes, how did this one compare?
- Is there anything the seeker could have done to make the prize more attractive or rewarding (some people have mentioned hearing about what happens next, for example)?

#### 4. Your experience of this particular challenge

- Did you experience any challenges/surprises in using the InnoCentive platform?
- Did you experience any obstacles when preparing your application (e.g. responding to the criteria in the challenge, were there any criteria you did not understand or were not able to answer)?
- Did you submit any questions during the process; if so, were the responses helpful?
- What did you think about the feedback you got back from judges?
- What, if anything, would make the process easier, or more appealing?
- If you have previously entered innovation prizes, how does this one compare?

#### 5. What has happened since?

- Have you done anything to develop the idea further? Do you plan to?
- Who have you shared (or plan to share) your solution with?
- If you have done anything since the award, what has the response been?

**6. Recommendations for future prizes:** the evaluation is to help others learn how and when to use prizes for solving issues in developing countries and we will be sharing recommendations and findings from our evaluation. Do you have any final comments about how the prizes could be made more attractive, successful or enjoyable for solvers?

## Annex 3: Analysis of whether potential solvers were given sufficient time and information to participate (Evaluation Questions 1.2 and 1.3)

As seen above, 143 solvers went on to apply to the Cylinder Prize by the closing date, or 22% of those that had opened Project Rooms. The evaluation investigated (primarily through secondary data) whether the duration of the prize and the information available to solvers might explain why solvers opened a Project Room but then failed to apply (i.e. submit one or more solution(s)). The evaluation also explored whether this attrition rate was typical among innovation prizes.

The Cylinder Prize was a Premium Challenge<sup>31</sup>, a type of InnoCentive Challenge that runs for 30-90 days. The Cylinder Prize ran for a two-month period from 7<sup>th</sup> July to 7<sup>th</sup> September, 2015. One reason for not submitting a solution could have been that solvers were given insufficient time to produce and submit a solution. Evaluators could only contact solvers that won an award; however, data were available on when all applications were submitted and the number of days between opening a Project Room and applying (as shown in the charts below). Chart 1 displays when the 182 applications were submitted to InnoCentive and clearly shows that although submissions began shortly after the Challenge launched, the bulk of submissions occurred in the final few days.

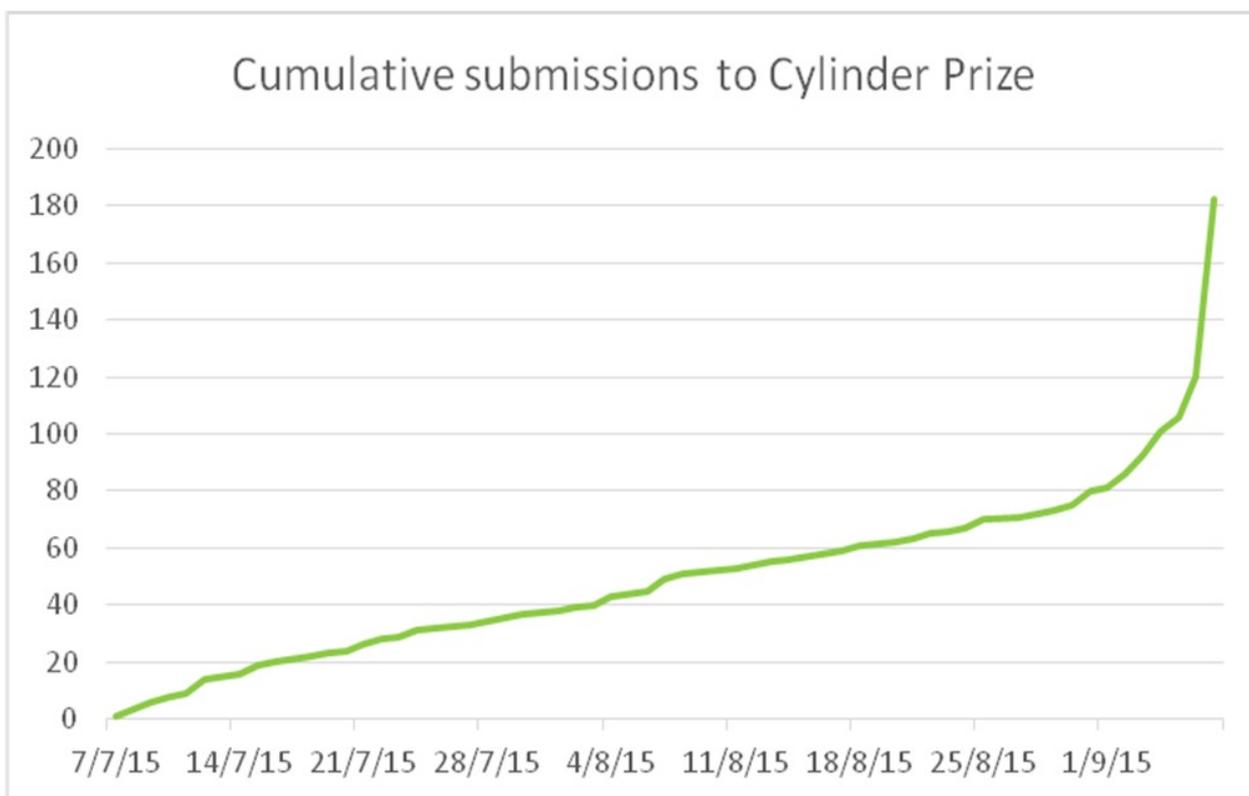


Chart 1: Cumulative submissions to Cylinder Prize (7th July to 7th September, 2015)

While it was not possible to obtain data on the actual time spent by each solver to produce each application or how much free time they had, the period available to a solver in which to work on

<sup>31</sup> <https://www.innocentive.com/offering-overview/premium-challenges/>

applications could be obtained by comparing the date that each solver’s Project Room was opened and the date that the solver submitted their application(s). This ranged from 0 (application submitted the same day as Project Room created) to 62 days (the full extent of the challenge period). The mean average duration was 19 days and the central tendency was for solvers to open a Project Room and submit an application on the same day (46 out of 182 applications). There is little that can be concluded from these statistics about solver behaviour, particularly as some solvers applied more than once and some applications included more than one solution. What is more useful, perhaps, is to look at the winners and to compare their behaviour with other solvers. Table 1 below summarises the seven winning solutions in terms of timing, whilst Chart 2 locates approximately when the winning solutions were submitted among all applications received.

From these comparisons, there seems to be no strong relationship between the period available to work on the application, or the time submitted, and the degree of success in the Cylinder Prize. Whilst the mean average duration was higher for winners (29 days compared to 19 days for non-winners) the period available to them ranged from one day (solution submitted the day after opening a Project Room) to 59 days. Winners submitted their applications between 10<sup>th</sup> July and 7<sup>th</sup> September, and the three winners that had approximately the same period to work on their solutions, won awards ranging from \$3,000 to \$10,000.

*Table 6: Summary of winners in Cylinder Prize*

Date solver’s Project Room opened	Date application containing winning solution submitted	Difference in days	Prize award amount (USD)
9/7/15	10/7/15	1	3,000
9/7/15	12/7/15	3	1,000
7/7/15	3/8/15	27	3,000
10/7/15	6/8/15	27	5,000
8/7/15	5/9/15	59	10,000
10/7/15	7/9/15	59	5,000
3/8/15	7/9/15	25	10,000

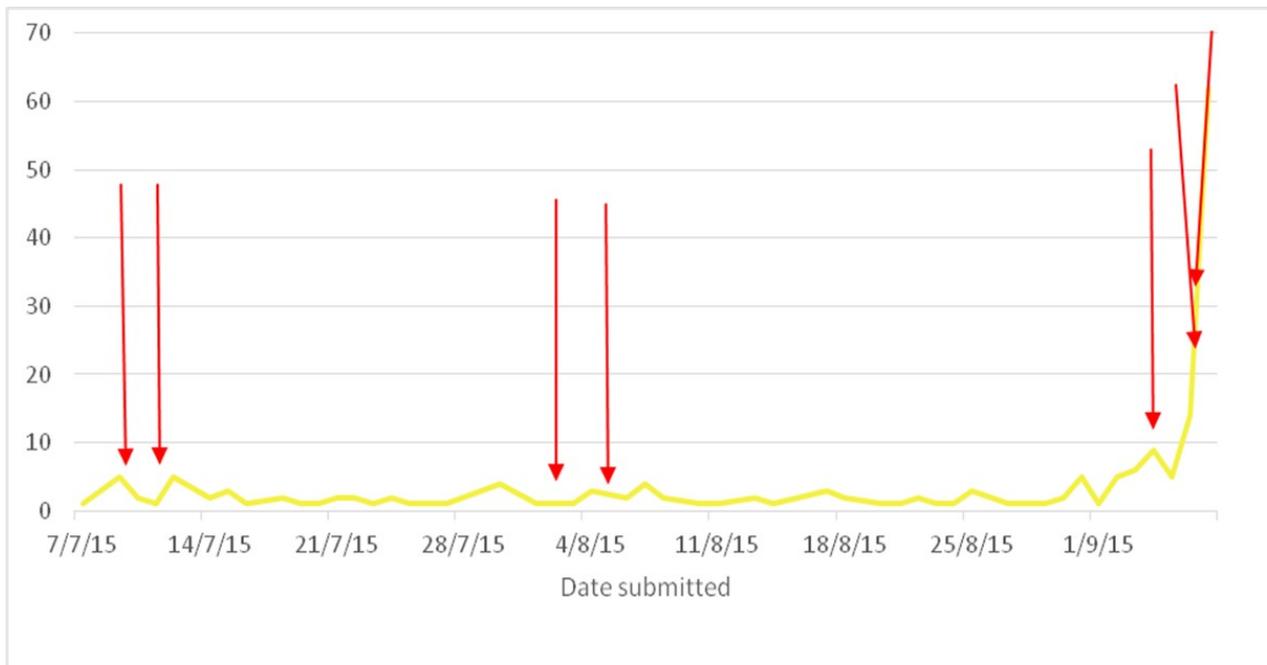


Chart 2: Date of submissions of solutions for the Cylinder Prize (7th July to 7th September, 2015) with winners marked by the arrows.

Innovation prize experts<sup>32</sup> were also asked for their viewpoints on the distribution and number of applications as compared to previous similar prizes managed through InnoCentive. The experts interviewed considered the pattern of distribution to be usual (with the majority of applications submitted during the last week of the challenge period) and felt that the number of applications for the Cylinder Prize was higher than the number they considered typical for this type of challenge. Prize Team reports (2015) show that the team (including one of the experts interviewed) anticipated receiving around 80 to 100 submissions. The length of the challenge period, therefore, does not seem to have presented a barrier to solvers.

### Number and types of questions asked by solvers

At the time of launching the Cylinder Prize, the Prize Team could not name Ghana as the country for which the solution was intended and, therefore, solvers lacked information about the context for the Challenge including technical details of the gas cylinders that would be available for recycling, should Ghana implement its policy. More than one winner commented on the problems this caused for them and is reflected in the types of questions that InnoCentive received from potential solvers about the prize.

As part of the service provided by InnoCentive, the InnoCentive Prize Manager for the Cylinder Prize received and handled any questions from solvers. Any that could not be answered by InnoCentive were forwarded on to the Prize Team. The Evaluation Team had access to this second set of questions only; the exact number of questions asked was not clear to the Evaluation Team as some of the questions passed on to the Prize Team were representative of questions asked by more than one solver.

<sup>32</sup> Jonty Slater (Prize Expert at The Blue Globe Consultants and Prize Design Advisor to Ideas to Impact, formerly at InnoCentive) and Renato Vasconcelos (Principal, Challenge Design and Development at InnoCentive).

Several questions were received from solvers shortly after the prize launched and analysis of these shows two areas of information that the solvers felt they needed in order to submit a solution. The most common questions related to the dimensions and construction of the cylinders, for example:

- What are the specifications of the valve?
- What are the respective volumes of the 14.5kg and 6kg bottles?
- Is there a coating on the inside of the cylinders?
- What is the size and threading of the connection into the storage bottle?

Very limited information had been provided to solvers about the cylinders at the beginning due to the diversity of cylinders that would be available across sub-Saharan Africa. The Prize Team subsequently provided the InnoCentive Prize Manager with dimensions and drawings of the cylinders (available in Ghana), which were added to the Challenge description online to answer the solvers' questions and to pre-empt similar questions in the future. Those that had opened Project Rooms were then sent an email by InnoCentive to alert them to the new information.

Another information gap for at least one solver was contextual information about "Country A" (a hypothetical example country, given in the Challenge) and sub-Saharan countries in general to meet two of the requirements of the challenge:

- "The proposed solution must be adapted to the social, economic and cultural contexts of sub-Saharan African (SSA) countries."
- "The solution should rely on technical and human resources that are available in SSA and use African countries' equipment and labor force (nice to have)."

In this case, InnoCentive responded directly by email with a link to aid their research into the social, economic and cultural realities that are typical of sub-Saharan African countries, the expectation being that solvers would either know the information already or seek it out themselves rather than have to provide it to them. Even among winners, this was observed as difficult: three winners commented on the challenge in providing market information (of an unspecified country), two of whom felt they should not be expected to provide that information (implying that the seeker is better placed to do that):

*"You probably had a much better understanding of the market than anyone else who participated in the competition so maybe you...it could have been better if you had given all the information that you had on the market."* Interviewee 004.

While investigating the effect that information provided to solvers had on submissions, evidence emerged from interviews with winners that information about the prize (or lack of it) had some negative effects on solvers. The Cylinder Prize was observed by more than one winner to be noticeably different to other prizes that they had experienced. One winner felt more was demanded of solvers than usual as they were required to solve two problems with the Cylinder Prize: find a way to recycle the cylinders (that represented better value for the Government and met safety issues) and identify a problem experienced in developing countries for which the solution would be a match.

For another winner, the judging decisions and prize communications (and lack of any information to disconfirm this) caused them to question the purpose of the Cylinder Prize, concluding that it might be allied to an energy company and designed primarily to find cookstove solutions (three winners having been awarded for complementary variations of the same idea). After Action Reviews with the Prize Team show that at least one member of the Prize Team was surprised by this outcome of the judging, i.e. that the winning solutions promoted an option that competes in some way with the LPG

sector. From the prize communication that the judging panel would be “composed of LPG and Energy Access experts”, the same winner assumed that the prize team anticipated only LPG/Energy Access solutions and that local stakeholders were not represented on the panel. This was not the case but the Prize Team was unable to make public, at that time, information that might have avoided these misunderstandings.

### Comparison with similar challenges

In the opinion of the prize experts, the number of questions received from solvers was “relatively high” but appropriate for this type of InnoCentive Challenge, particularly given the comparatively high level of engagement from solvers. They also estimated that about half of the questions came from the same five solvers. The experts confirmed that it is common to supply additional information when it becomes clear that it is needed by the solvers. The experts were in agreement that solvers should be provided with the minimum amount of information necessary to solve the problem; “too much information is a hindrance to creativity and can bias solutions”.

One solver (not a winner) correctly identified the country in their application, “According to Ideas to Impact website, Country A is Ghana”, and then used that as their working assumption. Whilst being unable to provide contextual details was recognised by the Prize Team and experts as not ideal and a potential limitation to sourcing solutions that could be used by the Government of Ghana, they felt it also allowed for solutions to emerge that could apply to other countries in sub-Saharan Africa.

Without access to other (non-winning) solvers, it is not possible to establish how strong an effect the lack of information about the context had on the prize’s success in obtaining a solution that would work at scale; however, it would seem worth considering this in risk assessments for any prizes that seek to operate in a similar situation.



info@ideastoimpact.net  
ideastoimpact.net  
@ideastoimpact