



Reducing Emissions by Increasing the Adoption of ABCs with Behavioural Change Techniques in Vietnam

The Cooking Problem

In Vietnam, almost half of the households use wood and agricultural residues for cooking, which has adverse consequences for especially women and children that usually collect wood and take care of the cooking. Smoke exposure from the burning of biomass severely affects health; 45,000 people die each year in Vietnam from illnesses associated with smoke exposure from traditional cooking. The burning of wood contributes to global warming as well by the emission of climate pollutants.

Our Response

To address this situation, EnDev started a regional project to develop the market for Advanced Biomass Cookstoves (ABC), by improving the quality of local producers, and by introducing an innovative Results Based Finance (RBF) mechanism promoting sales through cash incentives. The level of cash incentives is established at an auction platform where the producer bid for the lowest level. Over less than three years, 33,000 ABC were sold by four producers.

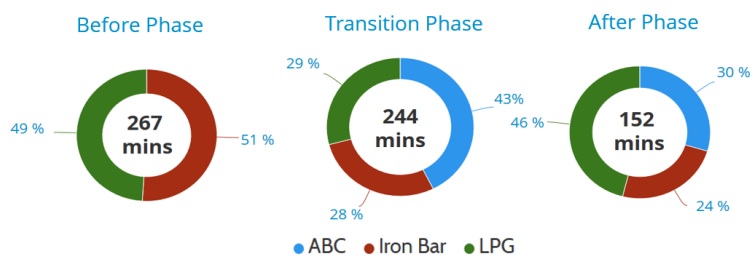
ABC Adoption Study

EnDev's challenge is not just market development but of equal importance is the functionality of stoves over time. EnDev's Cooking Energy System gives context to the stoves stack, fuels and cooks. In support of this comprehensive framework, a unique two-year stove's adoption study was executed by a mix-methods approach with longitudinal and cross-sectional analysis, objective data collection tools like SUMS, and interviews and group discussions.

Usage time was furthermore correlated to laboratory tests that assessed total emissions, which were further factored into cigarette-units equivalent to increase intelligence and the meaningfulness of the findings.

Advanced Biomass Cookstove Usage

The diagram below shows the cooking share of all stoves used throughout the different adoption stages. With a sample of 60 households for the Before Phase, and 17 for the Transition and After Phase, we demonstrated that ABC usage levels on a daily basis reduce over time from 43% right after sales to 30% after one year.



Developing Behavioural Change Techniques

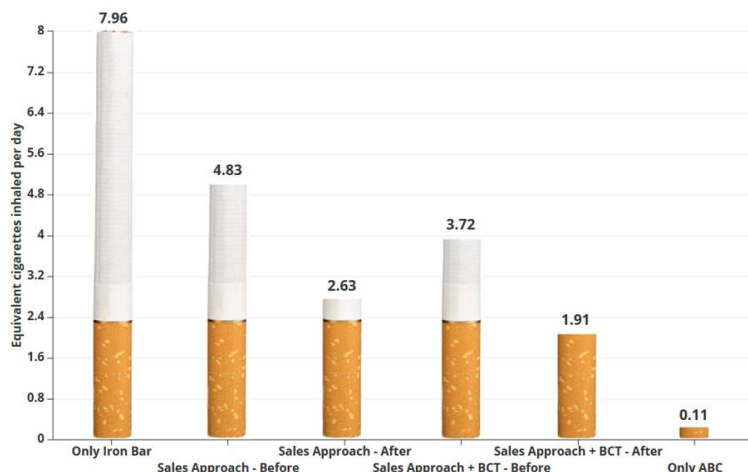
Based on user feedback on the limitations of the functionality of the ABC, in 2018 one group was treated with Behaviour Change Techniques (BCT), namely:

- **Shaping Knowledge:** Developing a cooking guide that illustrates the procedure to operate and maintain their ABC, as well as the benefits achieved by using it
- **Change in Physical Environment:** Introducing a stove frame allowing for cooking with larger pots and pans
- **Peer and Social Impact:** Focus Group Discussions across cooks and households members

The cooking guide aimed to simplify the know-how involved in operating and maintaining their ABC; allowing users to troubleshoot typical setbacks seen throughout the cooking process. The stove frame serves the purpose of transforming the ABC into a larger-pot-friendly stove, by providing support and stability. Finally, focus group discussions present the opportunity for users to share and learn about their other users' experience.

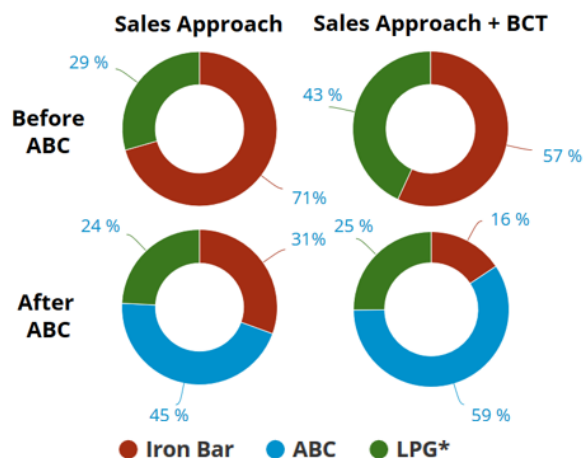


- **Sixth Scenario:** impact on smoke emissions when an ABC fully replaces the traditional stove; indicative of a substantial potential in the reduction of smoke emissions



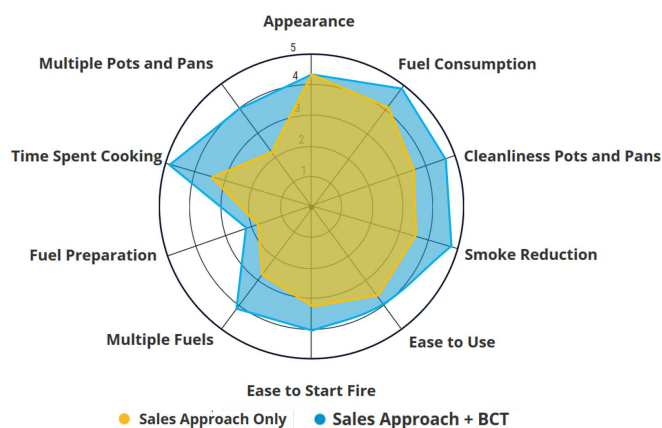
ABC Usage after BCTs

In the graph below, the usage levels are presented for 40 households; 20 of which received the Sales Approach with BCT, while the control group of 20 households in the “Sales Approach” did not. As demonstrated below, the BCT intervention incurred a significant increase in ABC short term adoption from 45% to 59%.



User Satisfaction and ABC Adoption

User satisfaction is a key component for adoption in the short and long term. From high satisfaction (5) to low satisfaction (1), the study showed a significant higher rate of satisfaction among those who were given BCTs compared to the control group, which explains the higher adoption rates.



Impact of ABCs and BCTs on Emissions

In the diagram below, the levels of emissions are presented in cigarette equivalents (15 micro grams PM 2.5 per cigarette) with different scenarios (shown from left to right):

- **First Scenario:** exclusive use of traditional stove
- **Second Scenario:** baseline situation before an ABC is acquired; when Iron Bar (IB) and LPG are used exclusively
- **Third Scenario:** impact on smoke emissions after an ABC is acquired without BCT
- **Fourth Scenario:** baseline situation before an ABC is acquired for the BCT group; IB and LPG used exclusively
- **Fifth Scenario:** impact on smoke emissions after an ABC is acquired with BCT

These satisfaction levels supported the findings of the follow-up phone interviews conducted two months after the intervention concluded. 50% of those who received BCTs from the start have fully replaced the traditional stove with their ABC. In contrast, 60% of those who did not receive BCT from the start were only partially replacing their traditional stove usage.

The **results of BCT-based strategies are promising**. ABC users, who received BCT support, showed higher satisfaction and usage levels compared to those who did not receive them; leading to lower smoke levels and cigarette equivalents. Furthermore, the study identifies that the **impact of BCTs** appear to be **more effective** if **applied from the start** rather than after sales. **Further research needs to assess the long-term effects of introducing BCTs** by measuring sustained adoption and its impact on smoke and cigarette equivalents.