# Sustainable cooling & global warming: stakeholder voices from India

## Talanoa Dialogue Questions

The following inputs are provided specifically for the Talanoa Dialogue. Nine interviews were carried out (see list below of stakeholders) along with desk research by first year MBA students of Xavier Institute of Management (XIMB), at Xavier University, India. The class was led by Prof. Subhasis Ray in collaboration with Dr Jenny Lieu within the framework of the TRANSrisk project which has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 642260.

**Stakeholders list contacted:**
End-users: 3 university students, 1 physics teacher, 1 security guard
Electronic retailer: 1 sales person, 1 owner
AC technology provider: 1
International organisation expert: 1

**Secondary/desk research:** Aditi Sharma

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## Question 2- Where do we want to go?

### a) Vision of the future for your organization and/or sector in terms of its possible role in achieving the 1.5/2 degrees' goal and a net-zero emission world by this mid-century

*Note: the visions of the future represent a small group of stakeholders and are not intended to provide an overarching or inclusive perspective. The groups of stakeholders primarily consist of end-users, small businesses and industry experts.*

From the end-user perspective, air conditioners (ACs) are becoming a necessity in India due to increasing temperatures. The vision for households is to have an ambient temperature of around ~24 degrees Celsius. Households who do not currently have ACs (usually the working poor) will have access to funds for energy efficient ACs in the near future, particular in hot and humid conditions. The awareness of climate change will be common household knowledge in the short-medium term (~5-8 years) due to education and public awareness campaigns. Thus households with ACs systems or those who want to upgrade will tend to choose higher energy efficiency options in order to lower electricity costs and to reduce the impact on climate. The ambition is for all AC customers to purchase (or to have access to fund to purchase) and operate 4- to 5-star energy efficient appliance. Grants and other financial support should be provided to those who are unable to afford the more energy efficient appliances. Additionally, ACs should eventually be powered by renewable energy technologies to further reduces emissions. Synergies should also be created with architects and building developers to apply passive cooling technologies in buildings, which is currently a widespread practice.

From the AC technological provider's perspective, ACs will likely be supported by artificial intelligence to optimise cooling and reduce electricity consumption. AC should adapt according to the local climate which includes variations in: ambient in-door conditions, seasons, geographical conditions, and ecological regions. Additionally, the cooling technology built for summers in Europe or US temperate area may not be entirely suitable for India and other climatic regions. Thus, the technological innovation will continue to shift more from developed to developing countries and indigenous technologies will better meet the local needs. There are currently new AC technologies in India ACs supported by artificial intelligence that maintains ambient temperatures, which the current AC technology does not consider. For instance, if an AC is set at 25 degrees Celsius, after several hours the room is much colder because the AC is measuring its return temperature rather than the ambient temperature. These ACs are cited to be around 50% more efficient with a payback period of 5-6 months. The vision is to scale up the use of artificial intelligence in ACs to improve energy efficiency.

From the industry expert perspective, AC technologies has significant synergies with the agriculture sector for food cooling. The industry expert stakeholder interviewed citied that ~40% of food is wasted in India, partly attributed to the lack of storage. But proper storage will prevent food decay and the release of methane. Refrigeration is needed particularly for animal products such as dairy, cheese, and ice creams. The future vision would be to establish a food storage system through cold chain networks to reduce food waste. Currently these networks are not established and funds are required to support technological innovation and networks. Funding is currently provided by UNIDO but more support is needed from the government to provide reassurance from banks and other private investors. Large OEMs (e.g. big multinationals) currently have their own R&D lab. OEM can support low carbon innovations in the food cooling sector by creating synergies with intermediaries, entrepreneurs or innovators. For instance, OEMs can share their state of art facilities to support further innovation and facilitate a much more open ended democratic dialogue to develop the food cooling technological innovation system (e.g. from lab to market).

### b) Possible and potential new commitments and pledges of to achieve the 1.5/2 degrees' goal and a net-zero emission world by this mid-century

New pledges can be made to improve energy efficiency beyond the energy sector and to consider cross-cutting synergies. For instance, energy efficiency goals can be established within the agricultural supply chain (including food cooling). The building sector can further encourage energy efficiency goals by setting specific goals across the supply chain. For instance, this can include building design (passive cooling technologies) and operating appliances (electricity appliances such as smart technologies and artificial intelligence). Additionally, AC technology providers should also pledge to provide quality technology as well as warrantees and sufficient after-sales service support. Currently existing ACs need to be serviced after a season and refilled due to gas leaks in the atmosphere.

### c) Foreseen positive impact of these commitments once they are realized, including contributions to the sustainable development agenda

There are positive synergies in supporting the technological innovations of local energy efficiency technologies. Improving energy efficiency in the AC and food cooling sector helps to address various SDGs: Goal 8: Decent work and economic growth, Goal 9: Industry, Innovation, and Infrastructure and Goal 12: Responsible consumption and production.

Access to energy efficient ACs, particularly for lower-income households through grants, government support and other measures will support adaptation meaures and contribute to SDGs: Goal 3: Good health and well-being for people and Goal 7: Affordable and clean energy, Goal 10: Reducing inequalities and Goal 11: Sustainable cities and communities.