Bureau of Energy Efficiency
Ministry of Power, Govt. of India

Federal Ministry
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on the basis of a decision
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IKI INTERNATIONAL CLIMATE INITIATIVE

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Workshop Report

REGIONAL WORKSHOP ON 'COOLING INDIA'S CITIES'

Hosted by
Bureau of Energy Efficiency,
Tabreed India & Gesellschaft für
Internationale Zusammenarbeit (GIZ)

September 26, 2024
Vijayawada, Andhra Pradesh

Knowledge Partners
REVOLVE & Kubernein Initiative

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About the Workshop:

The workshop was organized by Bureau of Energy Efficiency, Gesellschaft für Internationale Zusammenarbeit (GIZ), and Tabreed India, along with knowledge partners REVOLVE and Kubernein Initiative. It was second in a series of workshops designed as stakeholder-led discussions to:

- Enable knowledge sharing and a deeper understanding of District Cooling and related technologies, including the potential for enhancing energy efficiency, circularity and extending thermal comfort to all sections of society.

- Explore the scope for adoption of District Cooling in Andhra Pradesh, and specifically in development of the capital city of Amaravati, where there is tremendous opportunity to build city-wide eco-friendly cooling systems.

This is an important and timely discussion for India which is seeing a rise in temperatures, contributing to an increase in cooling demand, which in turn is resulting in exponentially higher grid-power consumption. This growth in power consumption from cooling is expected to account for 45% of India's peak energy demand by 2050. The state of Andhra Pradesh, which already faces the highest number of heat wave days in South India witnessed temperatures as high as 47.7 degrees Celsius in 2024. Andhra Pradesh also has ambitious growth targets, which alongside its cooling needs, are likely to translate to high energy demands. In the next 5 years, peak power demand in Andhra Pradesh is anticipated to rise by 57%, and greenhouse gas emissions are projected to rise 90% above 2017 levels by 2050.

Andhra Pradesh's draft Energy Efficiency and Energy Conservation Policy 2023-2028-29 highlights the necessity to "promote the use of new and latest technologies for energy conservation". Innovative technologies like District Cooling have the potential to rapidly contribute to filling this energy gap. In a building for example, District Cooling can help reduce energy consumption by up to 50%. The technology also integrates with other solutions such as Renewable Energy, Sewage Treatment Plants, Waste to Energy plants, and City Gas Distribution networks, leading to optimum resource use.

Key Policy Recommendations for the Way Forward:

1

Cooling-Intensive Clusters

To integrate District Cooling into city infrastructure, high-density urban clusters must be earmarked in the masterplan. These clusters could be commercial and residential areas, data centers, airports, or industrial zones such as the 175 export-focused industrial parks that the Andhra Pradesh government plans to set up in each of the State's constituencies. Through an assessment of cooling loads in these areas it can be validated that standalone systems or business as usual approach consume 20-30% more energy compared to District Cooling. Cities like Singapore have incorporated District Cooling into their zoning laws, and this approach can be replicated in Indian cities to drive efficient energy use in high-growth regions.

2

Techno-commercial assessment for feasibility of District Cooling

Feasibility studies for District Cooling must be made a compulsory part of the planning process for infrastructure projects in identified cooling-intensive clusters. For example, Andhra Pradesh as part of its new industrial policy announced the establishment for 3 industrial corridors with world-class infrastructure with plug and play facilities - such projects should assess the feasibility of integrating District Cooling in early planning which can help in overall electrical and cooling load assessment and water use savings. District Cooling further helps to synergize technologies such as Sewage Treatment, Renewable Energy, City Gas Distribution to provide a circular solution to optimise resource utilization, aligning perfectly with the State's new Integrated Clean Energy policy's objectives.

3

Mandating

Following zoning and feasibility assessments, and given the impetus to carbonisation, District Cooling should be mandated in selected clusters to maximize its economic and environmental benefits. For example, the Hyderabad Pharma City's Bulk Drug Park mandated District Cooling in its land allotment strategy, leading to a 30% reduction in cooling energy consumption and a 15% reduction in infrastructure development costs. Similar mandates should be introduced for other high-density areas to fast-track District Cooling adoption and ensure resource efficiency. As a part of this, educational materials should be provided to allottees on the advantages of the technology, how the connection sign-up will be executed, and a clear, transparent tariff card for cooling as a service.

4

Business Models

The predominant developer approach towards cooling currently is to typically select the most cost effective technology in the short-term, without considering long-term social and environmental impact or even lifecycle costs which look at capital and operational investments comprehensively. If the government takes a long-term systems' approach which analyses associated power demand and costs, water availability for municipality, and climate, health and planet considerations, impact of deployment of District Cooling technology can be truly maximized. This can be facilitated through different business models in line with local needs, policies and climate.

4

Business Models

Andhra Pradesh has had success with Public Private Partnership (PPP) models, such as the Amaravati Government Complex District Cooling project. PPPs facilitate faster deployment of large-scale District Cooling infrastructure, attracts private investment, and alleviates the financial burden on the state. The Andhra Pradesh government's new industrial policy is expected to absorb the PPP (Public Private Partnership) and P-4 (Public Private People Partnership) models that can further support the adoption of sustainable cooling technologies like District Cooling for greenfield projects to systematically reduce power consumption and associated emissions to enable green growth.

Standard ownership models can also be developed with KPI-based incentives to boost investment. Such models have been successful for District Heating in the UK where the Heat Network Efficiency Scheme (HNES) along with the Heat Network Delivery Unit (HNDU) framework allows for grant funding and guidance to local authorities and private players to adopt district heating. Through these mechanisms several universities, government departments and property developers have received not just funding in recent times but also set standards to assess techno-economic feasibility and development costs in detail. Such a policy intervention can be replicated in India with respect to District Cooling.

Private equity could also play a role in the sector, although it is yet unexplored in the Indian context. In-depth studies to understand which business models may be adopted to suit local conditions, including the weather and the environment, can help build investor confidence.

5

Governance

Establishing a governance framework through mechanisms such as District Cooling Tariff Committee can ensure equitable and transparent pricing. For instance, in Hyderabad Pharma City, a tariff committee comprising the Concession grantor, District Cooling service provider, and consumers successfully balanced economic and social goals, leading to cost-effective cooling services while maintaining high reliability. This governance framework could also allow consumers to request tariff adjustments, creating a flexible, adaptive pricing system that reflects real-time energy costs and consumption patterns.

6

Licensing, Service Standards, and Simplified Permitting

A robust licensing system should be introduced to ensure that only qualified entities—both technically and financially—are permitted to operate District Cooling systems. This could involve specific KPIs related to service reliability, energy efficiency, and environmental impact. Tariff controls should cap end-user prices at a reasonable level, ensuring savings while delivering reliable cooling services. Priority permitting for projects adopting District Cooling could reduce approval times by up to 30%, incentivizing developers. For example, Singapore's streamlined approval process for District Cooling projects has cut the time for implementation from five years to three.

7

Utility Status

Cooling is increasingly being seen as a public good, and the need to treat it as a utility is evident. With the recently announced industrial policy that shows Andhra Pradesh's commitment to provide essential infrastructure to encourage genuine entrepreneurs to invest in the State, establishing cooling as a utility is imperative and would require dialogue between state governments, DISCOMs, urban planners, and financiers to build a regulatory framework. The role of DISCOMs is crucial, as their involvement could facilitate the integration of District Cooling into demand-side management (DSM) programs, reducing peak electricity demand by 20-30% in urban clusters. In Copenhagen, treating District Heating as a utility helped reduce heating costs by 15% for residents. A similar approach in India could ensure affordable cooling while driving down power consumption.

8

Knowledge Sharing & Awareness Creation

To drive demand for District Cooling, there must be greater awareness of its long-term benefits. District Cooling lowers greenhouse gas emissions, beyond just carbon emissions, through utilisation of hydrofluorocarbons (HFOs) which have lower global warming potential (GWP) and ozone depletion potential (ODP) compared to refrigerants used by traditional air conditioning systems; it shaves the heightened peak electricity demand resulting from the operational redundant capacities of numerous cooling systems. On average, District Cooling systems provide 20-25% savings in energy costs over their lifecycle, even after accounting for the initial investment. In Dubai's Downtown District, District Cooling reduced annual energy consumption by 50%, demonstrating its potential for India. Launching public awareness campaigns, training programs for urban planners, and workshops for developers would encourage the widespread adoption of District Cooling. Moreover, consumer-facing information on the lifecycle cost savings, environmental impact, and service reliability of District Cooling could boost demand and shift consumption patterns towards more sustainable cooling solutions.

With the State's focus on becoming a hub for green growth by setting in motion policies and action items towards that end, District Cooling along with the policy recommendations captured in this document to aid its implementation will prove to be critical in propelling Andhra Pradesh's leadership in industrial innovation and sustainability.