



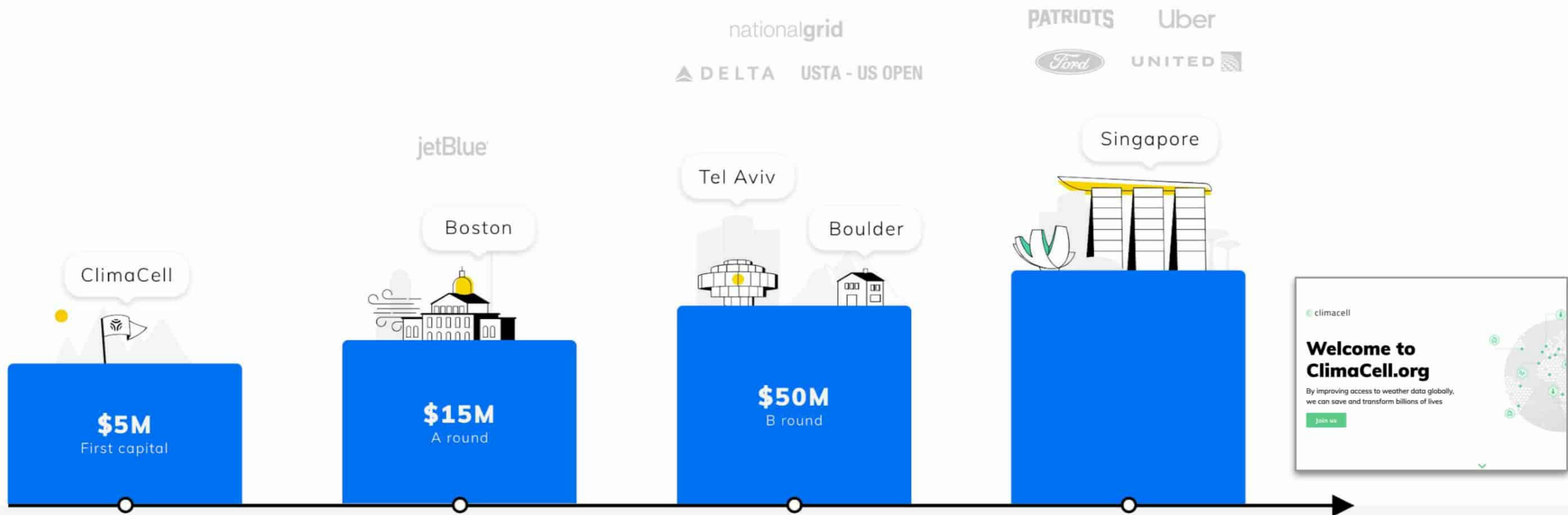
ClimaCell.org

Billions empowered through universal access to reliable and trusted weather forecasts.



Agenda

- Introductions
- Our Motivation / Theory of Change
- ClimaCell.org
- Opportunities for Cooperation: ClimaCell.org <> WMO



2016



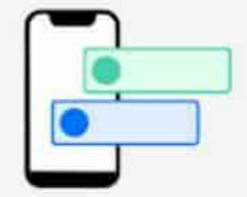
Weather of Things

2017



Microweather Models & Engines

2018



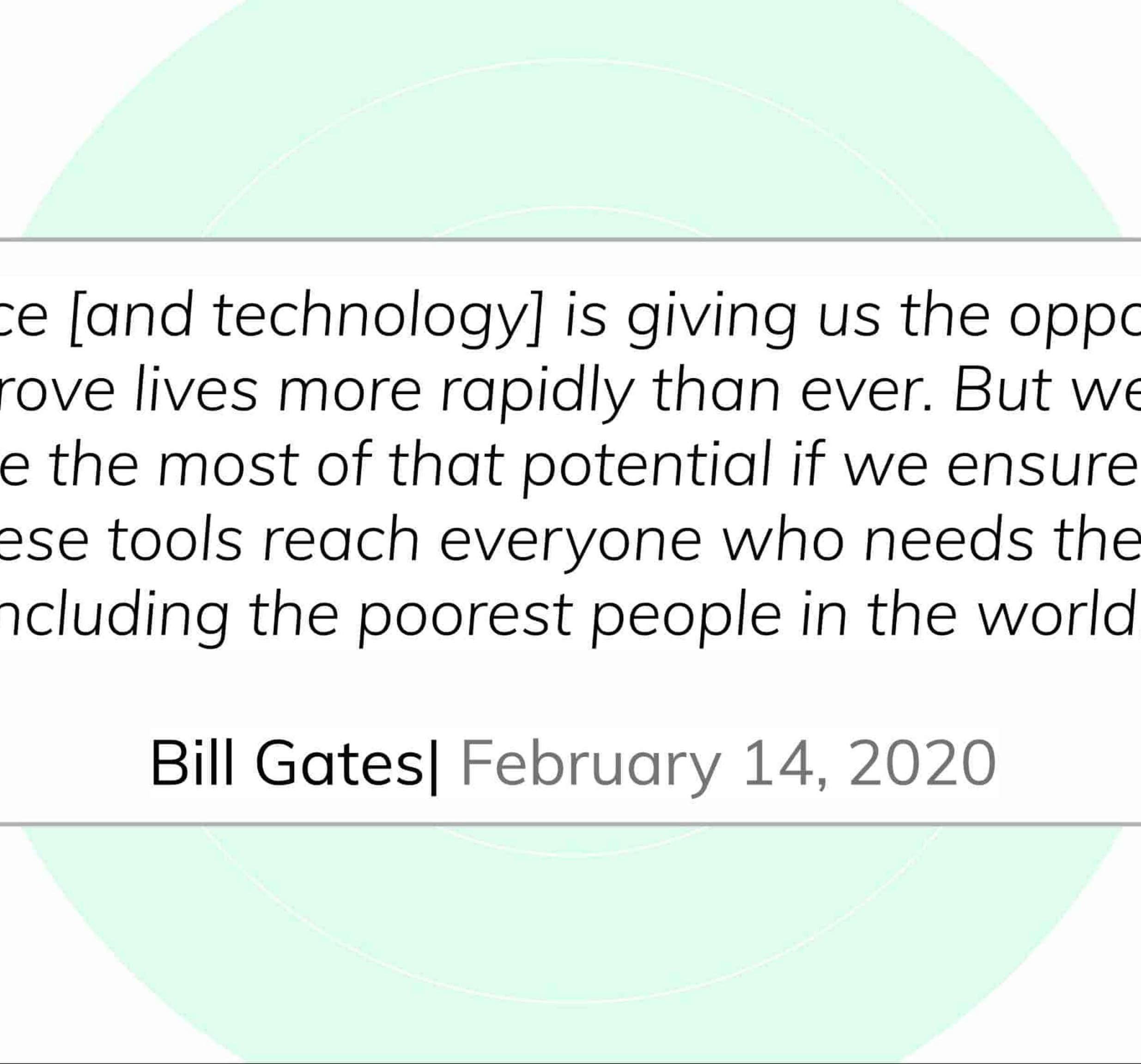
Right Information Unlocks Business Insights

2019



Collaborate and drive actions with personalized insights





“Science [and technology] is giving us the opportunity to improve lives more rapidly than ever. But we’ll only make the most of that potential if we ensure that these tools reach everyone who needs them, including the poorest people in the world.”

Bill Gates | February 14, 2020

Technology Enhancements Have Brought Significant Improvements to Global Forecasts in Recent Years

nature

doi:10.1038/nature14956

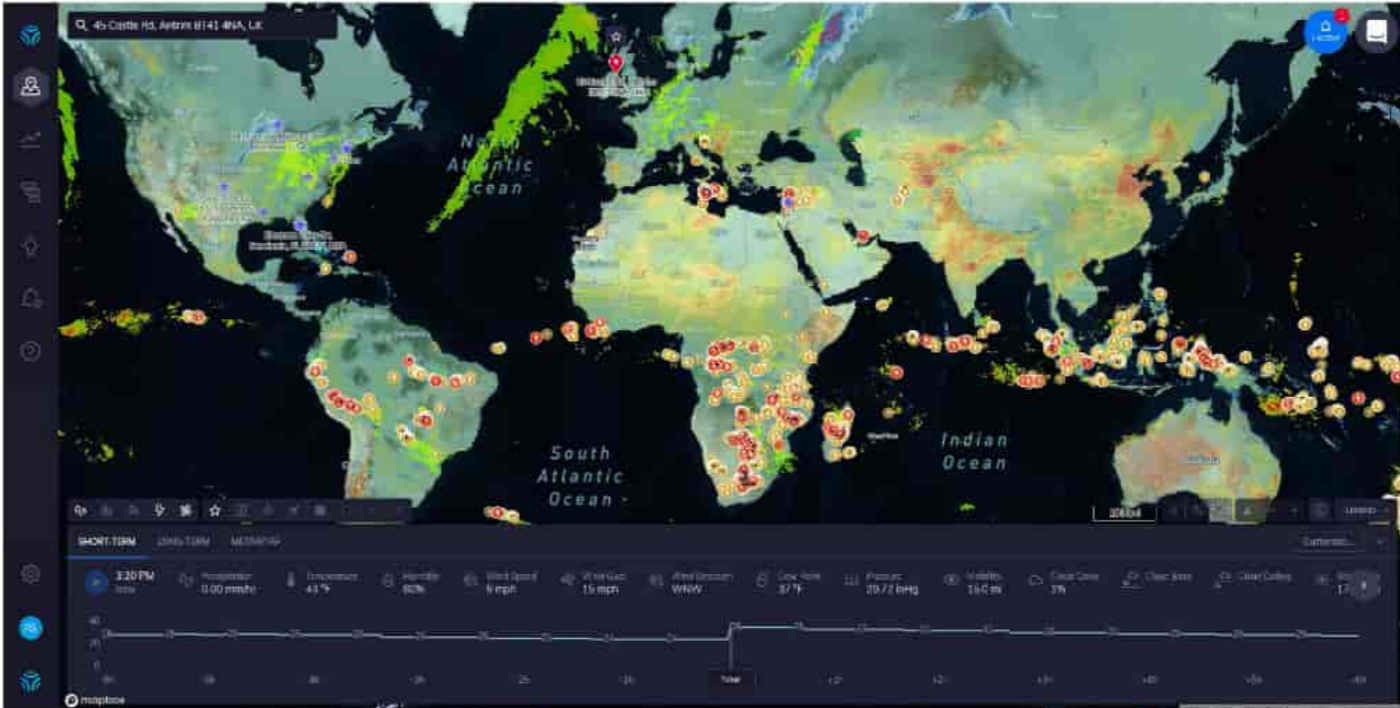
The quiet revolution of numerical weather prediction

Peter Bauer¹, Alan Thorpe¹ & Gilbert Brunet²

Advances in numerical weather prediction represent a quiet revolution because they have resulted from a steady accumulation of scientific knowledge and technological advances over many years that, with only a few exceptions, have not been associated with the aura of fundamental physics breakthroughs. Nonetheless, the impact of numerical weather prediction is among the greatest of any area of physical science. As a computational problem, global weather prediction is comparable to the simulation of the human brain and of the evolution of the early Universe, and it is performed every day at major operational centres across the world.

At the turn of the twentieth century, Abbe¹ and Bjerknes² proposed that the laws of physics could be used to forecast the weather; they recognized that predicting the state of the atmosphere could be treated as an initial value problem of mathematical physics, wherein future weather is determined by integrating the governing partial differential equations, starting from the observed current weather. This proposition, even with the most optimistic interpretation of Newtonian determinism, is all the more audacious given that, at that time, there were few routine observations of the state of the atmosphere, no computers, and little understanding of whether the weather possesses any significant degree of predictability. But today, more than 100 years later, this paradigm translates into solving daily a system of nonlinear differential equations at about half a billion points per time step between the initial time and weeks to months ahead, and accounting for dynamic

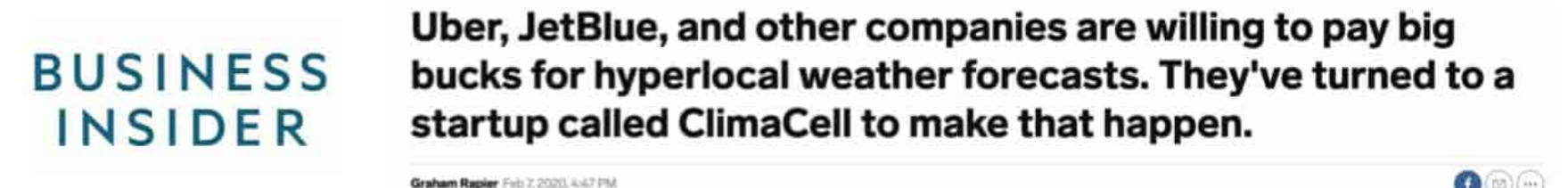
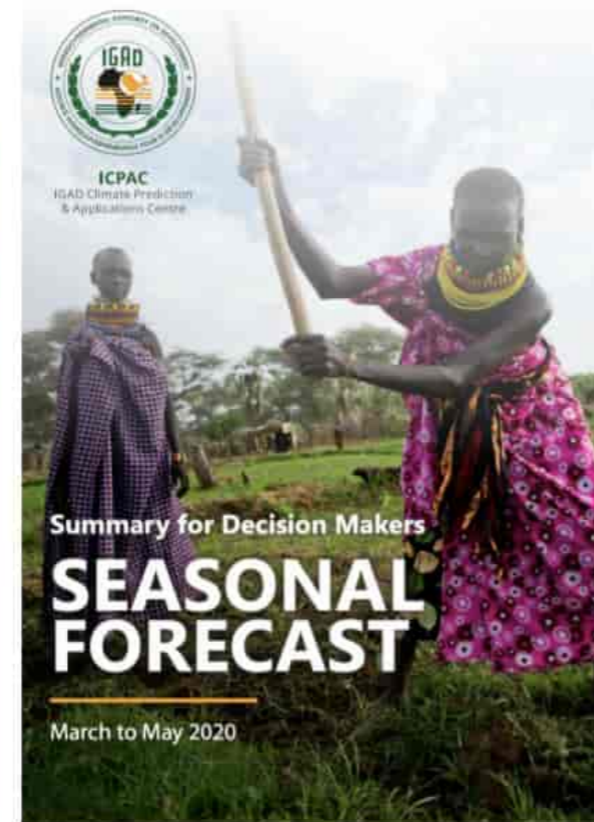
use of observational information from satellite data providing global coverage. More visible to society, however, are extreme events. The unusual path and intensification of hurricane Sandy in October 2012 was predicted 8 days ahead, the 2010 Russian heat-wave and the 2013 US cold spell were forecast with 1–2 weeks lead time, and tropical sea surface temperature variability following the El Niño/Southern Oscillation phenomenon can be predicted 3–4 months ahead. Weather and climate prediction skill are intimately linked, because accurate climate prediction needs a good representation of weather phenomena and their statistics, as the underlying physical laws apply to all prediction time ranges. This Review explains the fundamental scientific basis of numerical weather prediction (NWP) before highlighting three areas from which the largest benefit in predictive skill has been obtained in the past



Leading To Significant Socio-Economic Benefits Globally

Long-term forecasts enable preparedness and resilience

Short-term forecasts enable lifesaving warnings and business optimization



Africa is not fully benefiting from these advancements currently. If the system does not change, Africa will get left behind.

Example: Current State of Weather Products and Services in Uganda

“We now need to move from science to action and reach users so they can apply it”.
Closing remarks, 54th Greater Horn of Africa Climate Outlook Forum, 2020

Data

Limited observation coverage of 17%

Limited real-time data collection

Few, unreliable and poorly maintained weather stations, many disconnected

Models

Accuracy on short-term prediction 40-50%, long-term prediction 70%

Out-of-date models that are inaccessible and not localized, despite various hydro-climatic zones.

On-premise, inflexible compute infrastructure

Products

Delayed transmission, relay, (poor) use of information

Limitations with integration and timely transmission of data and information between mandated institutions and end users

Inability of businesses, communities, governments etc. to translate weather to impact

As Climate Shifts, The Urgency and Need For Better Data Has Never Been More Apparent



Image of ClimaCell's real time lightning tracker. Accordingly to the Journal of Climate American Meteorological Society, an increase in temperatures in Africa over the past seven decades correlates with bigger and more frequent thunderstorms.



The origins of the current locust outbreak can be traced back to the 2018/19 winter along the Red Sea, in Yemen and Oman. Fuelled by the rains brought in by tropical cyclone Luban that produced perfect feeding and breeding grounds for the locusts to flourish into massive populations.

Those Who Are Most Vulnerable Are Suffering The Most



The rule of thumb for a subsistence farmer is “3 days of heavy rains and you plant”. This past season, it rained for 3 days straight, so they planted. On day 4, it went dry for two weeks. This resulted in 30% germination rates and they lost everything.



The water on Lake Victoria gets very rough when it rains. 90% of fishermen do not know how to swim. 3000-5000 people died last year on Lake Victoria as a result.

...And Many Missed Opportunities

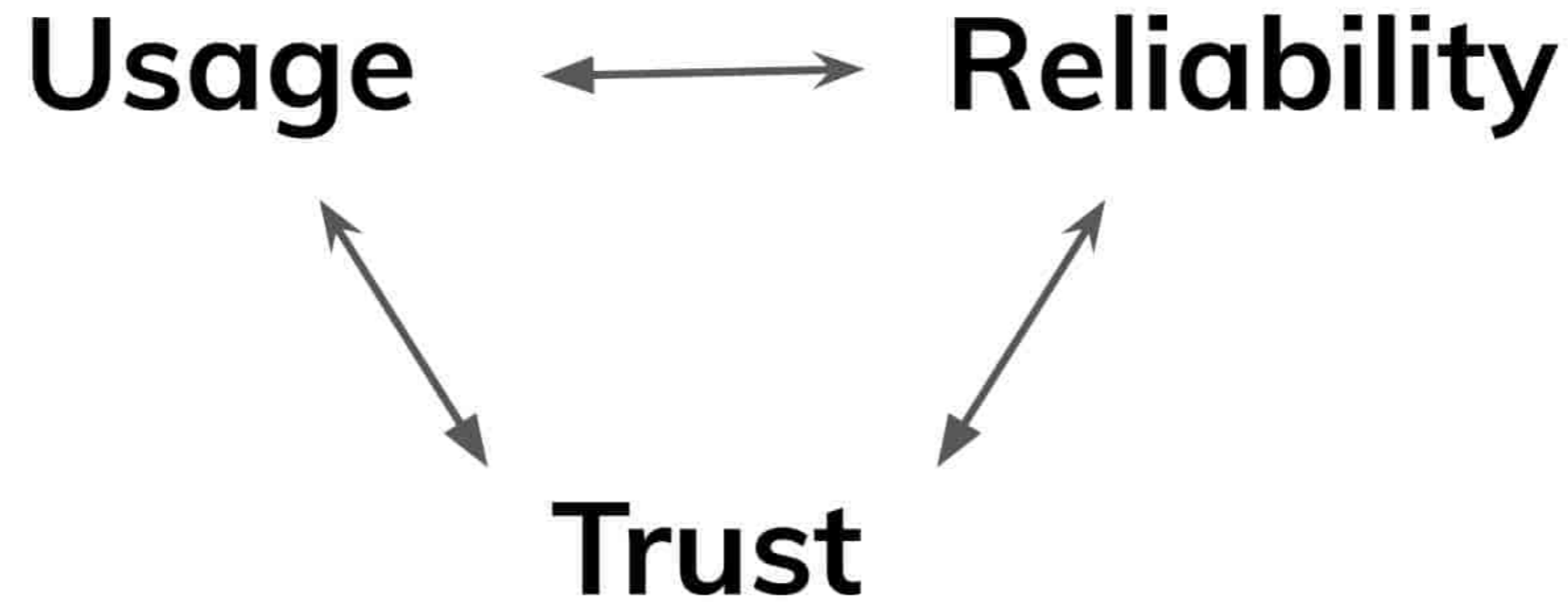


“Our project is running late by 2 months because of the intense rainfall means the roads are not passable to deliver materials to site. Had we known, we would have delivered all materials early and moved up the schedule of works”

**Business Owner, Kenya
2019.**

Barriers to Frontline Progress

“I needed to know when the rains were going to start last week so I could start planning”
Ag. Supplier, Uganda.



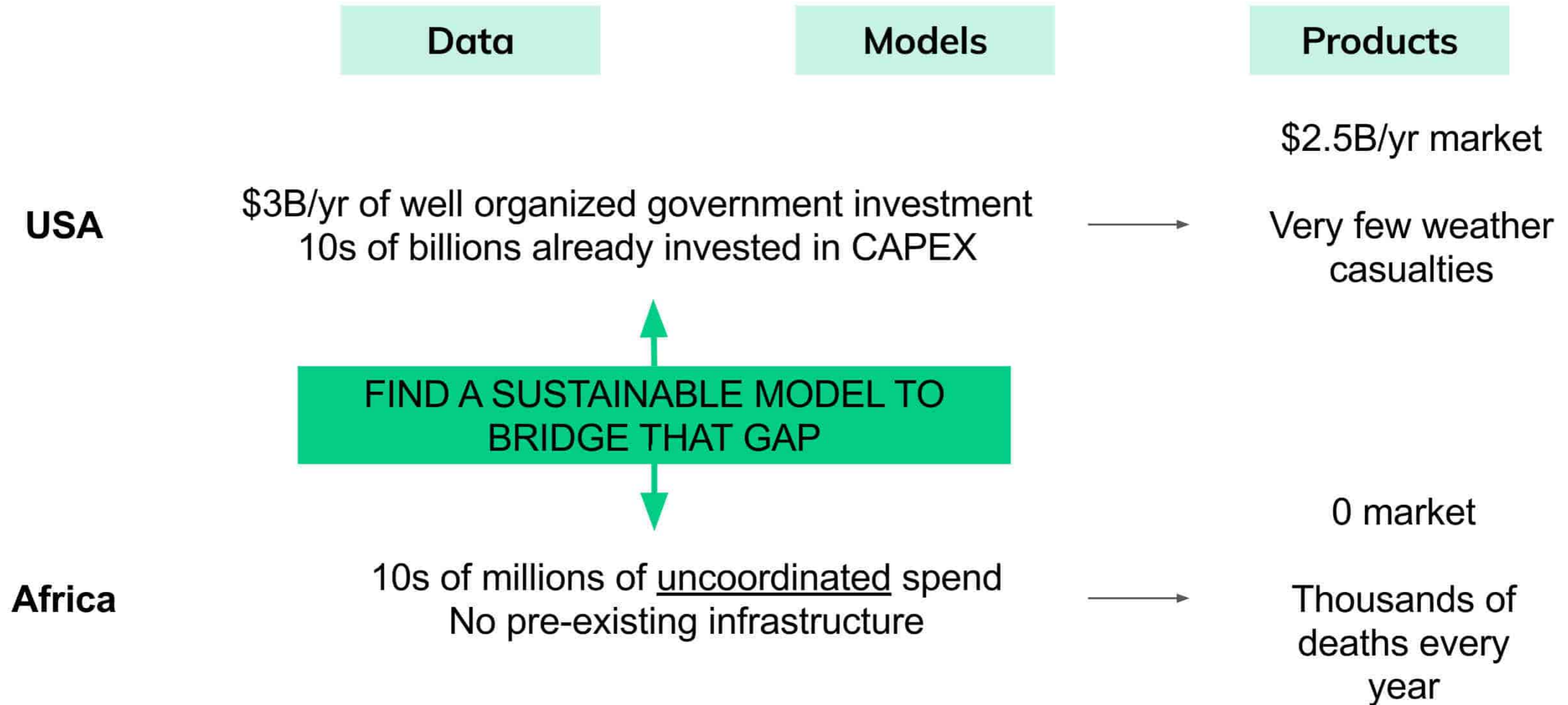
“It matters if it rains 20cm over 10 days or 20cm over 10 hours. General forecasts are not helpful, and especially not helpful when they are wrong”
Farmer, Nairobi, Kenya.

“I wouldn’t know what to do today, even if I had access to forecasts.”
Ag. NGO, Uganda.

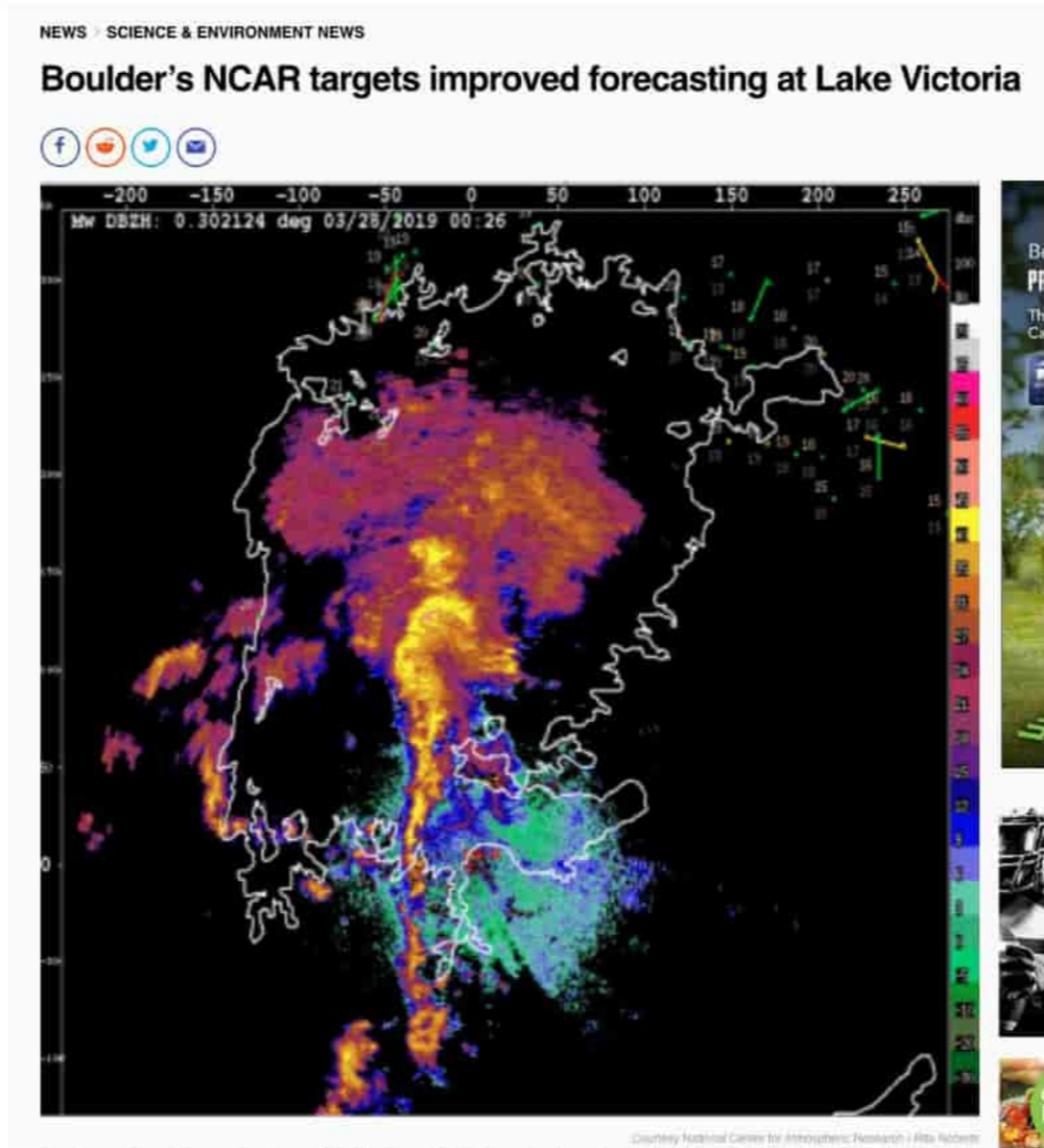
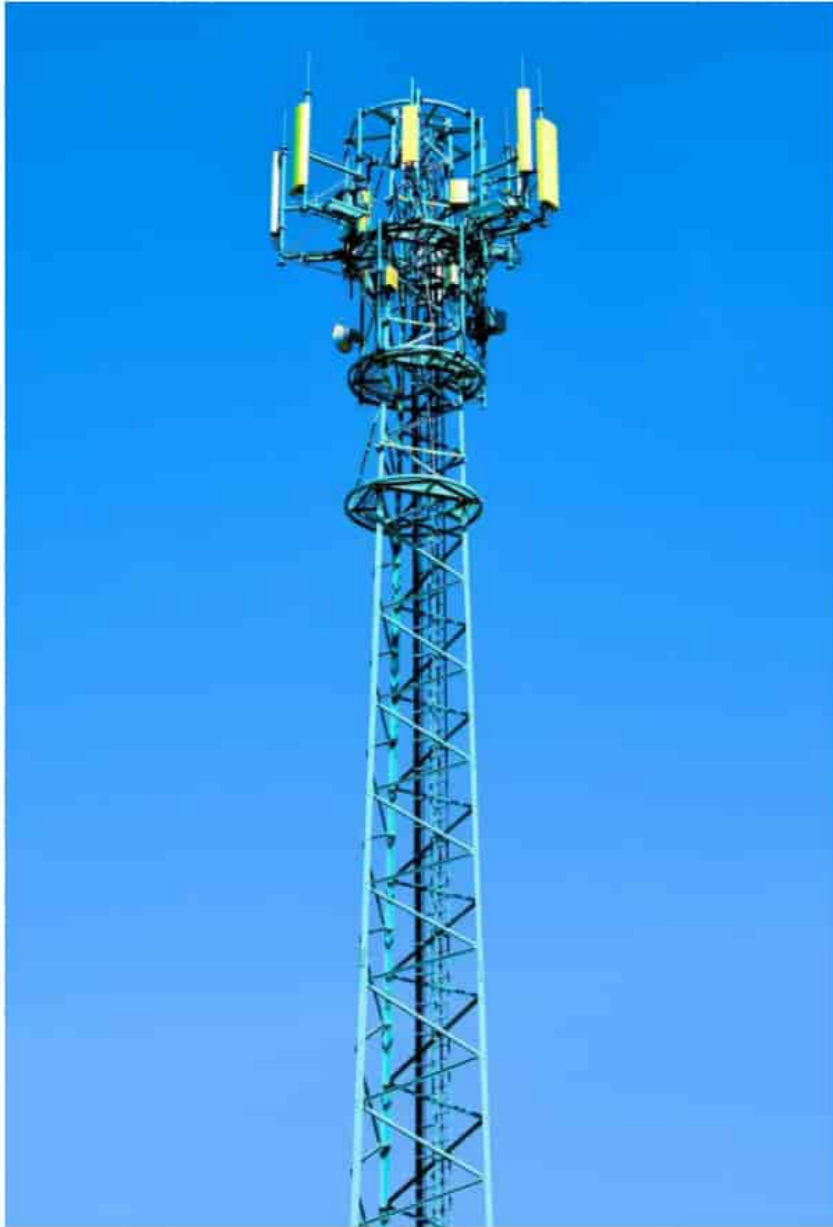
“We now need to move from science to action and reach users so they can apply it”. **Closing remarks, 54th Greater Horn of Africa Climate Outlook Forum, 2020**

“I just stopped trying to look at the weather. It is never right.”
Emergency Responder, Nairobi, Kenya.

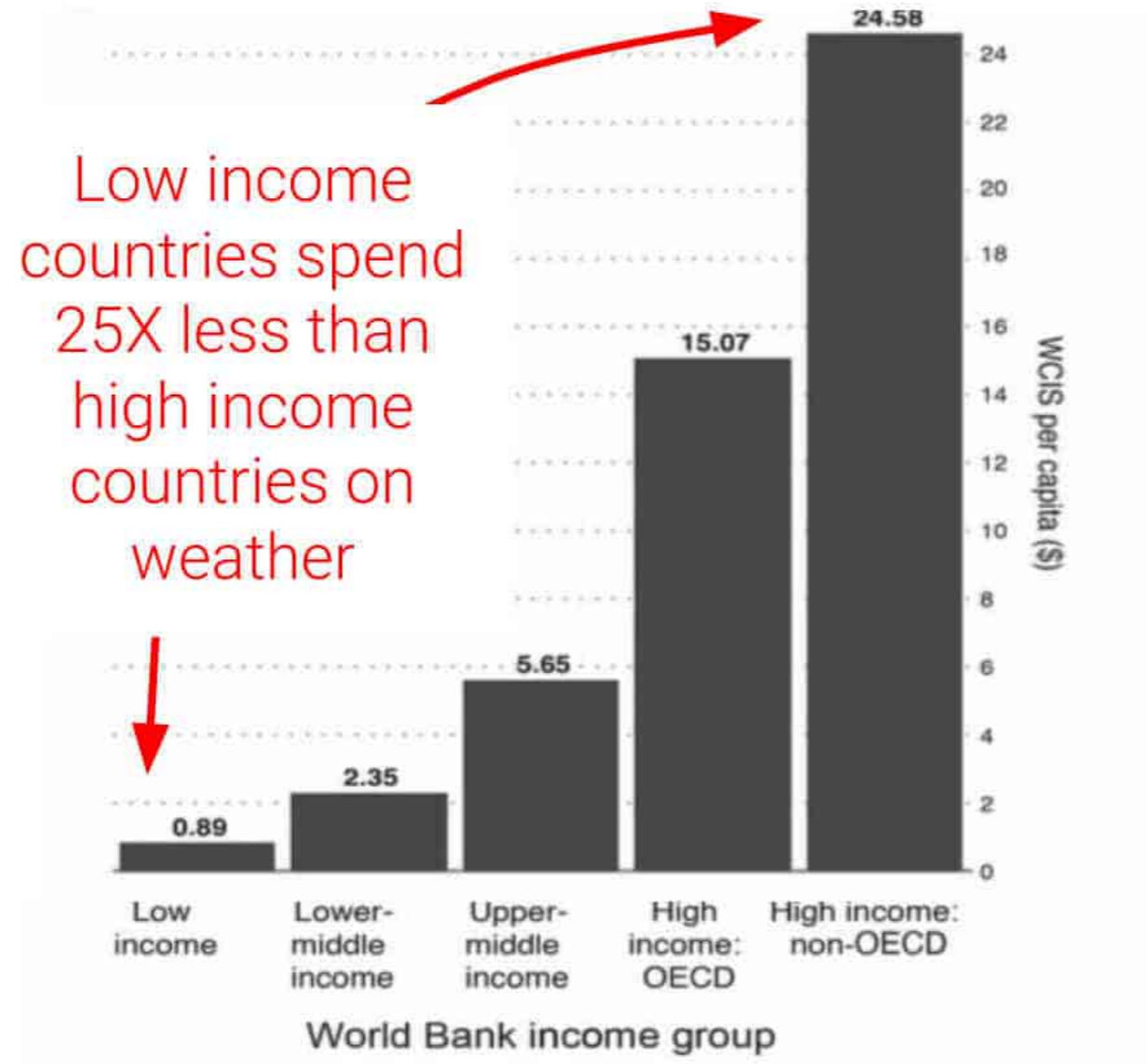
Barriers Within the System



The good news? Novel technologies, new approaches



Ultimately, The System Must Change To Enable Africa To Benefit from Global Tech. And Reach Its Full Potential



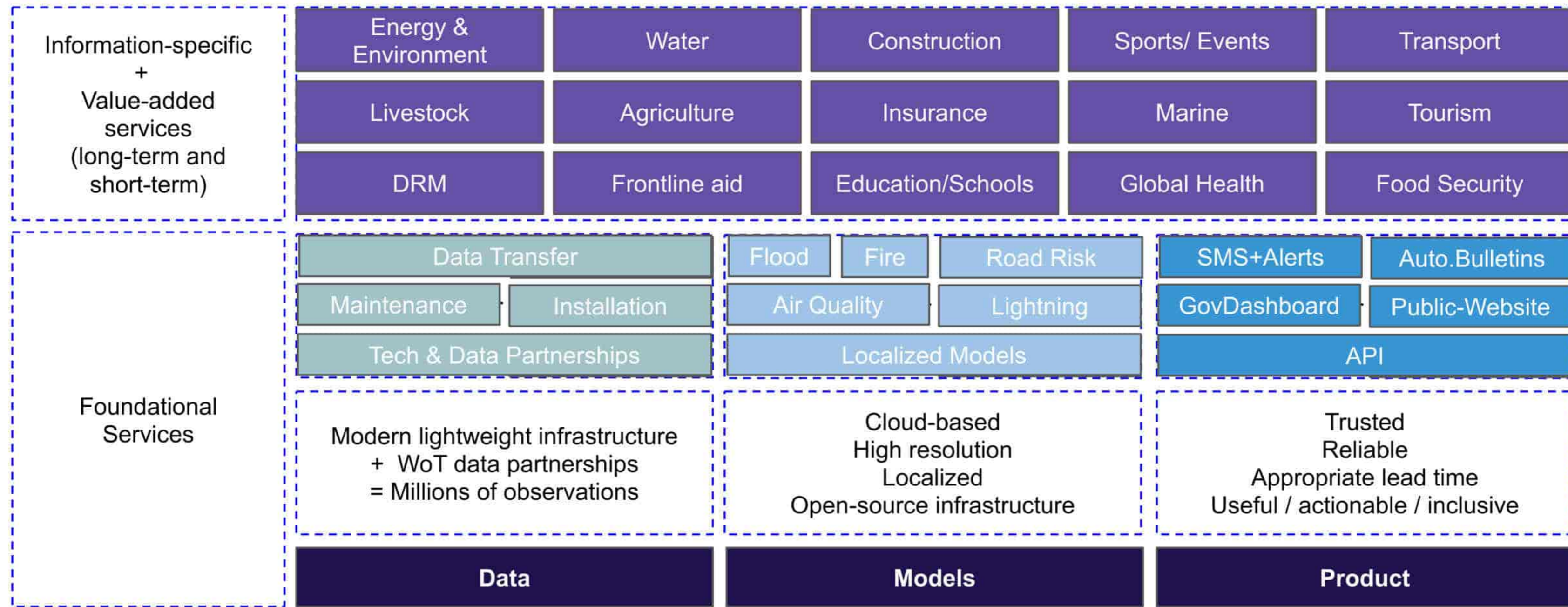
A conservative estimate by the [WMO](#) states that USD\$2 billion is needed to modernise Africa's meteorological services in addition to a minimum of USD\$400 million per year to cover the costs of staff, operations and maintenance.

ClimaCell.org

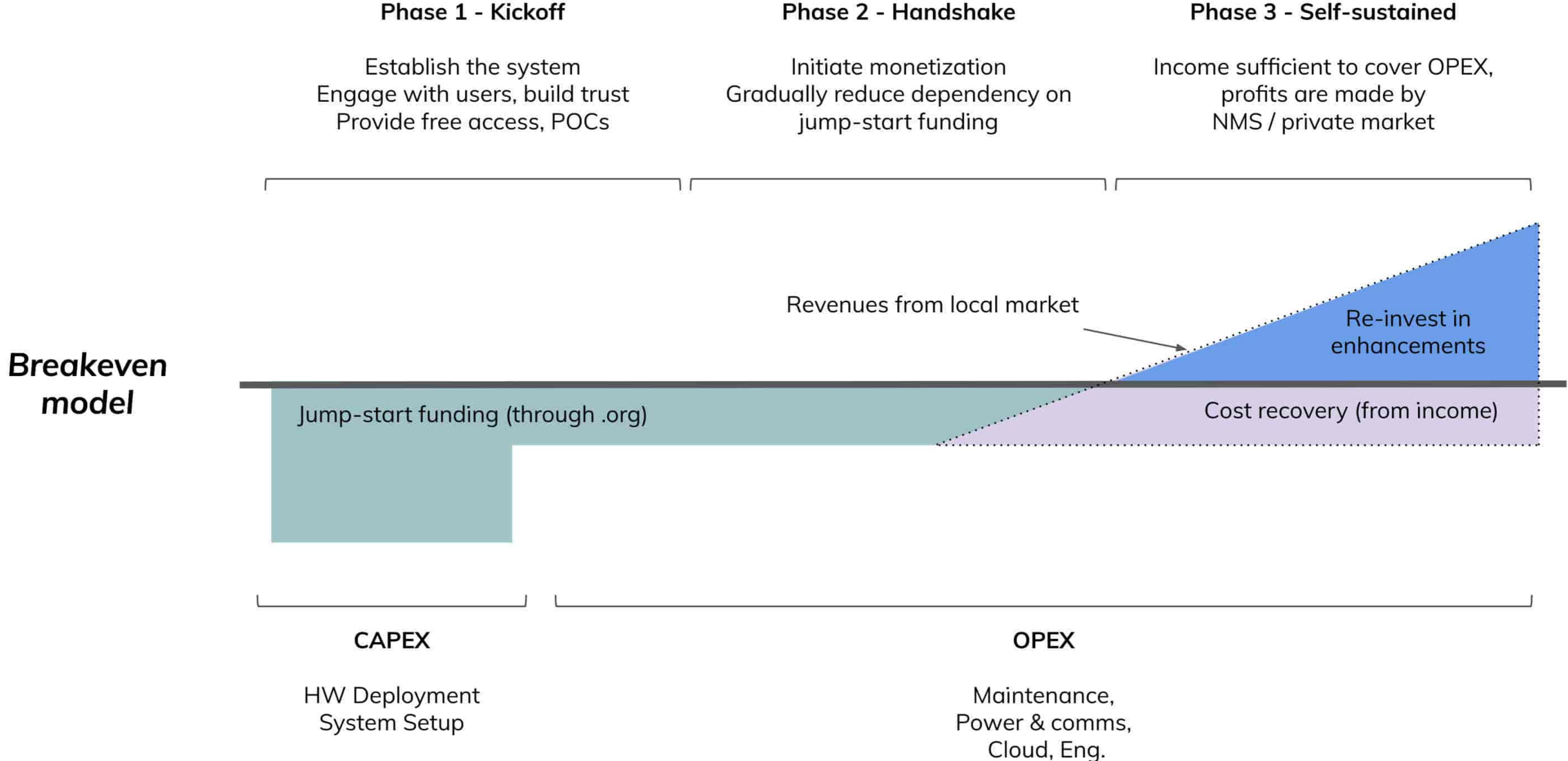
**Enabling a World where EVERYONE Has
Access to Trusted Forecasts**

ClimaCell.org - Our Approach

A self-sustaining weather system with foundational public services and market for value-added services



“Jump Start” Model



What is ClimaCell.org's role in this vision?

Key Objective: Lead jump-start projects that demonstrate that we can drive action and improve lives based on better weather information through sustainable foundational services and public-private partnership.

Raise jump-start funds

- Raise \$1-2M / year to cover ops/ HQ team
- \$100M+ over 10 years in project funds
- Private philanthropy, multi-laterals, corporate giving program

Lead capacity building demo projects

- Lead regional e2e demo. projects with the following components:
- Public-private partnership
- Novel data sources
- Sustainable/ scalable model
- Skills development
- Systems integration
- Clear end-user value

Build and share community-first insights

- Activities that build knowledge of how vulnerable communities benefit from weather data
- Platforms for engaging and sharing community insights with public & private partners
- Co-designed experiments & solutions

Build and promote case for improved weather data

- Targeted campaigns for public and private sector
- Free access to API
- Local trainings and awareness raising workshops (virtual and onsite)
- Partnership building and advocacy

What is ClimaCell.org's role in this vision?

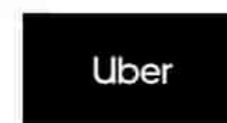
Key Objective: Lead jump-start projects that demonstrate that we can drive action and improve lives based on better weather information through sustainable foundational services and public-private partnership.

Raise jump-start funds

Lead capacity building demo projects

Build and share community-first insights

Build and promote case for improved weather data



Example - Frontline Discovery Workshops

Farmer-first discovery workshops to co-identify existing solutions (and begin co-designing new solutions) to help vulnerable farming communities better access, interpret and act on weather information and build resilience within their communities.

Pre-Workshop

- List of farmer-first assumptions
- Current methods, pain points, opps



Frontline Activity

- Validate assumptions
- Co-build solutions



Post- Action

- Share key learnings, recommendations, opps for future collaboration



Example - Frontline Discovery Workshops

Food Security

Disaster Risk Management & Response

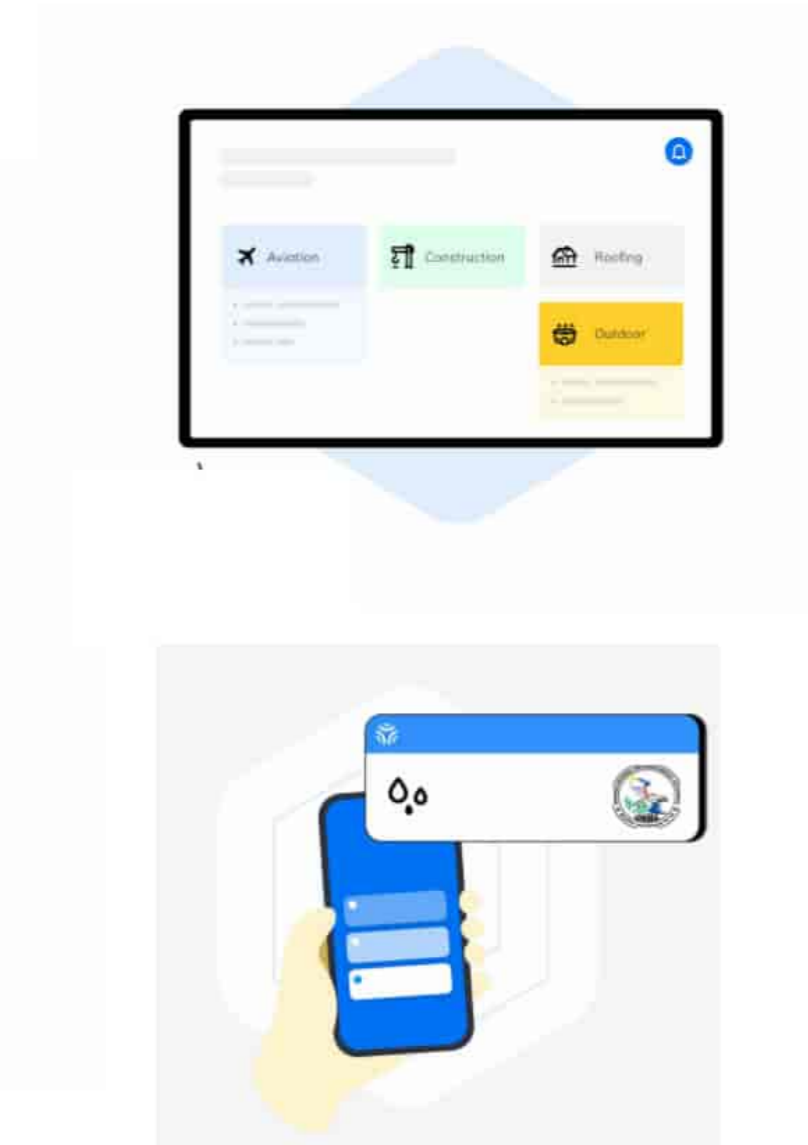
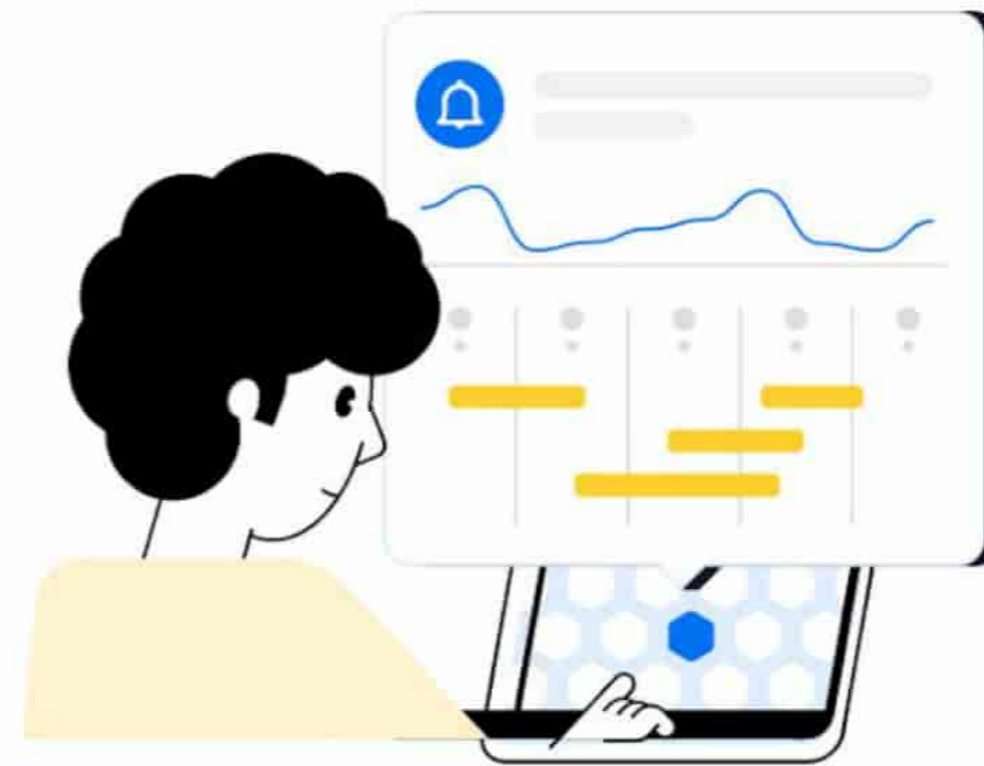
Education



Example - Integrating Technology-Driven Solutions To Improve The Production & Utilization of Weather Services in Uganda



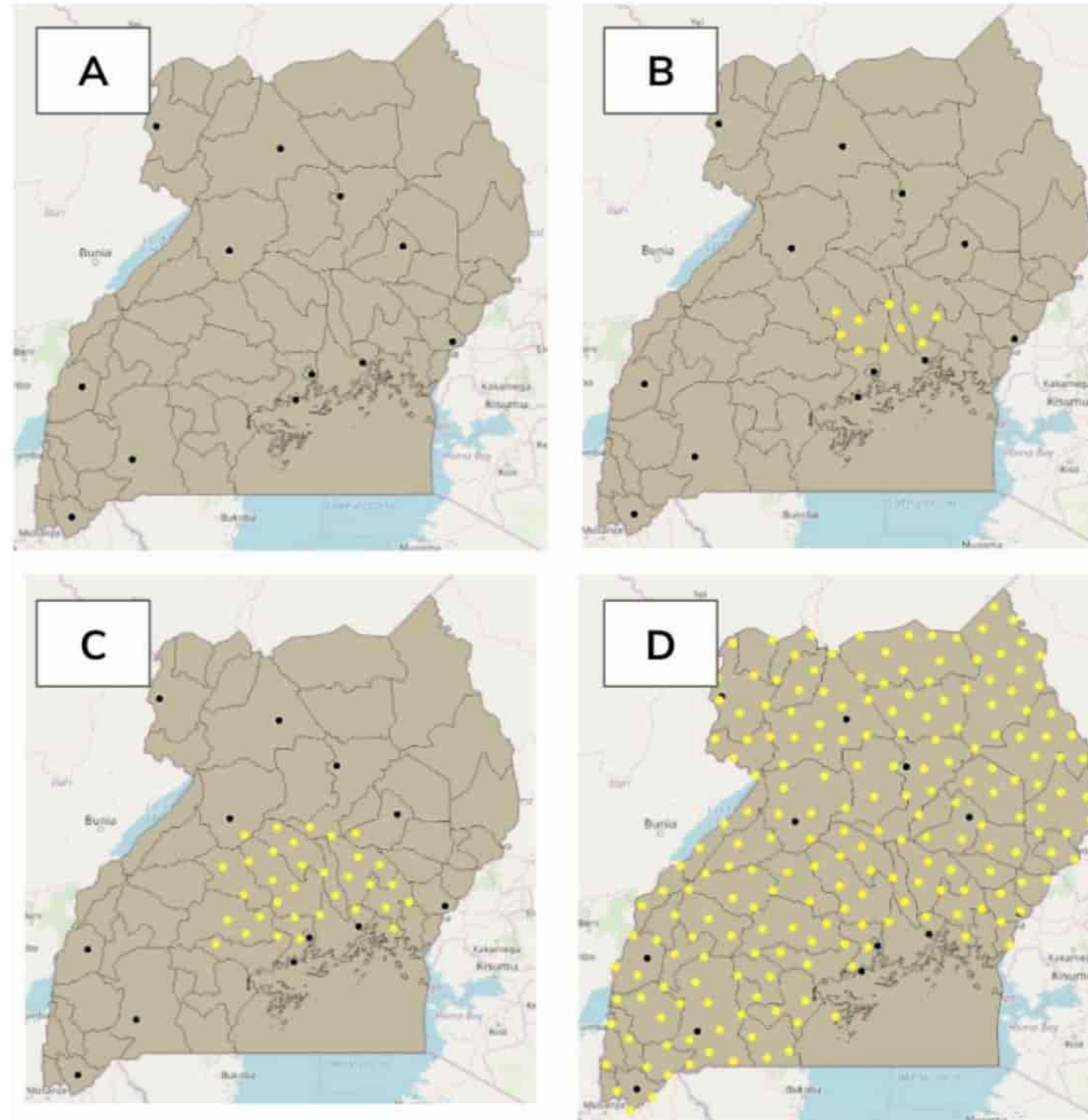
Goal: To enable UNMA to provide a portfolio of foundational services to agencies and citizens and become the regional centre of excellence and reference for improved production and utilisation of weather and climate products through processes like GHACOF.



Example - Weather Stations

Key Takeaways:

- Very limited impact until full scale (the highway example)
- WMO estimates 20K needed in Africa, virtual sensing might reduce that number by 30-50%
- MUST work with telcos / tower owner (real-estate, power, connectivity, deployment and maintenance)
- \$5k/unit + \$5K for installation maintenance (over 15 year lifetime). Can be driven down.



Known AWOS stations in Uganda as reported by WMO ISD;

(B) Example 10 stations in a limited geographic area for Stage 1

(C) Example 25 stations in a climatological zone for Stage 2

(D) Full deployment of ~200 stations in Stage 3



2020 Roadmap for Validated Learning & Partnership Development

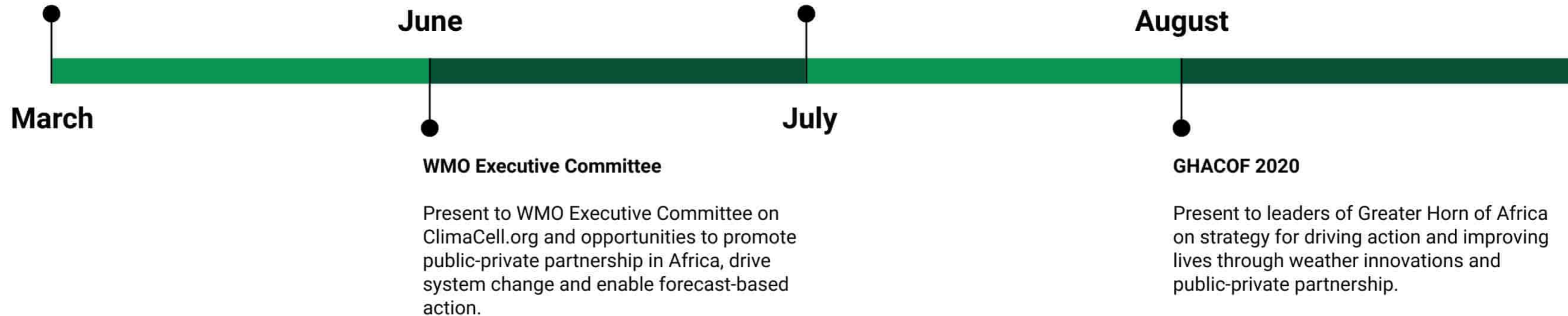
Key Objectives: Raise funds. Test Assumptions. Demonstrate action. Build partnerships. Improve lives.

Frontline Weather Action Labs

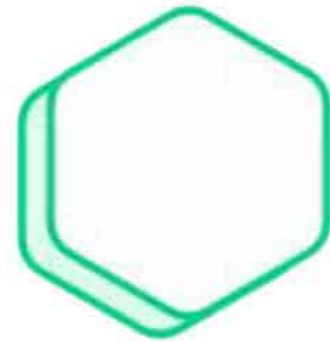
Lead community design workshops on food security, emergency response etc. in Kenya and Uganda. Present @ Uganda National Water & Environment Week.

Data Demonstration Projects

Implement first infrastructure pilot in Uganda, begin building products (dependant on funding).



Why are we different?



Best-in-class technology

We have access to best-in-class tech partners. e.g. Through a 1% pledge program with climacell.co, we can leverage ClimaCell's tech + 110 of the world's best data scientists, meteorologists and product engineers.



We are a sunset fund

We believe in sustainable change and therefore are intentionally designing this fund to have a finite life. Our funds will kick start not sustain change.



We work WITH the system

We aim to enable, not bypass, local governments and equip them with technology-enabled foundational tools and knowledge to best serve their people.

For Discussion/ Opportunities for Cooperation

What are WMO's pain points and where can we be most helpful?

Where do we need help?

- **Endorsement:** WMO support as we solidify local public and private partnerships (letter of support, use of logo on website?)
- **Networks:** WMO support as we build our networks with local governments (introductions, invitations to key events?)
- **Opportunity:** Are there existing/upcoming high-impact projects/proposals where ClimaCell's technology could be helpful today? (API, dashboard, urban flood alerts, air quality etc.)



**Bringing hope to billions through
trusted forecasts**



climacell

So you can take control



Appendix



The Best Weather Intelligence Engine For Your Business

Stop wondering. Get **information**, generate **insights**, and drive **actions**.



70%

70% of businesses are impacted by **weather**

Top
5

Weather **impact** and volatility is mentioned as one of CEOs top 5 concerns

#**1**

#1 frustration is that weather data is not **accurate** enough to become actionable

90% of businesses cannot **understand** what weather data means for them

90%

85% of the people around the globe doesn't have **reliable** real time and forecast weather data

85%

About us

We are powering actionable weather insights around the world.

Our mission is to **help people** and organizations manage weather related challenges with the best information and insights.



About us

Canaan



FONTINALIS
PARTNERS

SoftBank

\$5M

First Capital

Sept. 2016

\$15M

A Round

Oct. 2017

\$60M

B Round

Oct. 2018

4

Offices

Boston - HQ, data
Boulder - Models
Tel-Aviv - Products
Singapore - Strategic

Present



jetBlue



Uber



WHITE CASTLE
ROOFING



UNITED 



AMADEUS

nationalgrid

[intact]

PROCORE

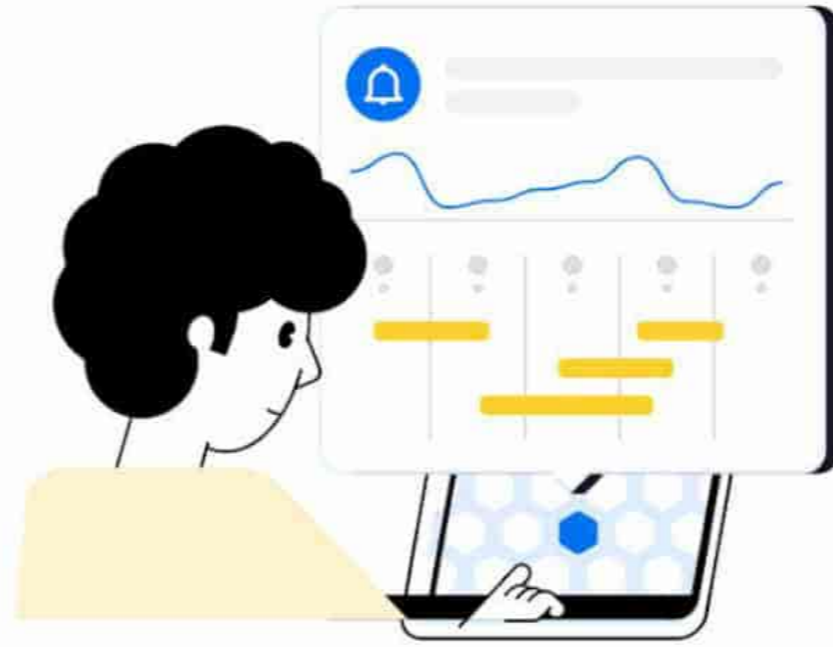
USTA - US OPEN

**What ClimaCell
MicroWeather OS
Does For You**

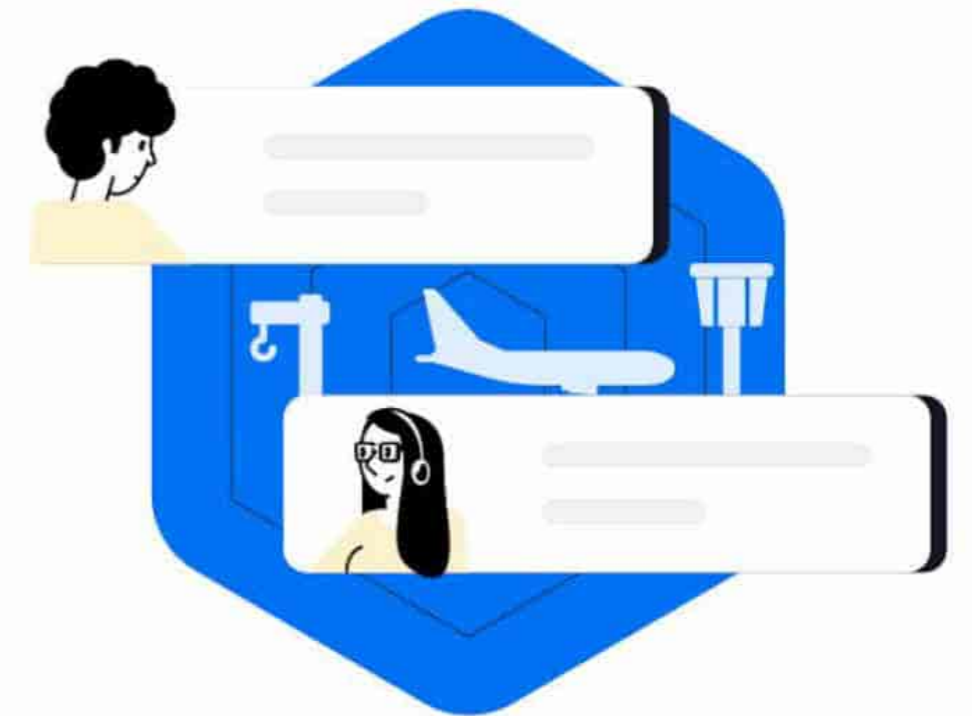




Providing you with the right **information**



Equipping your business with invaluable **insights**



Driving collaboration and **actions**

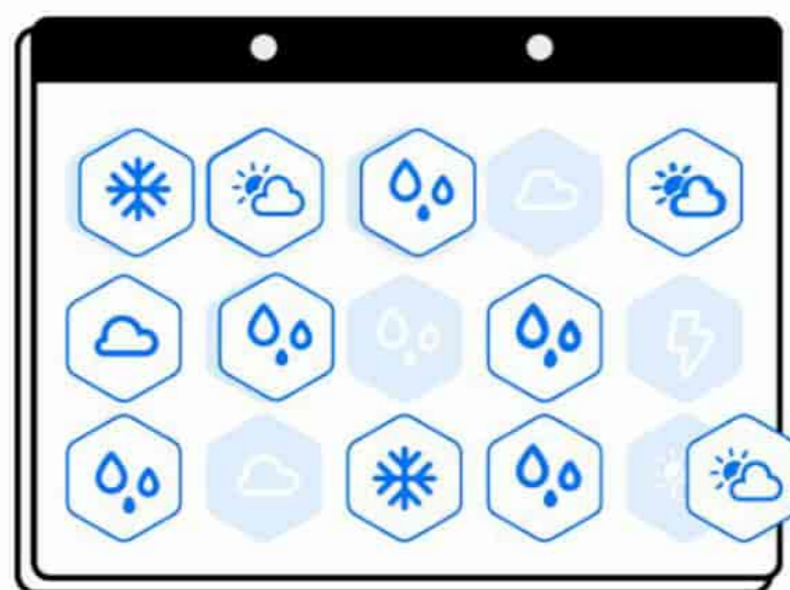


Information



The Right Information

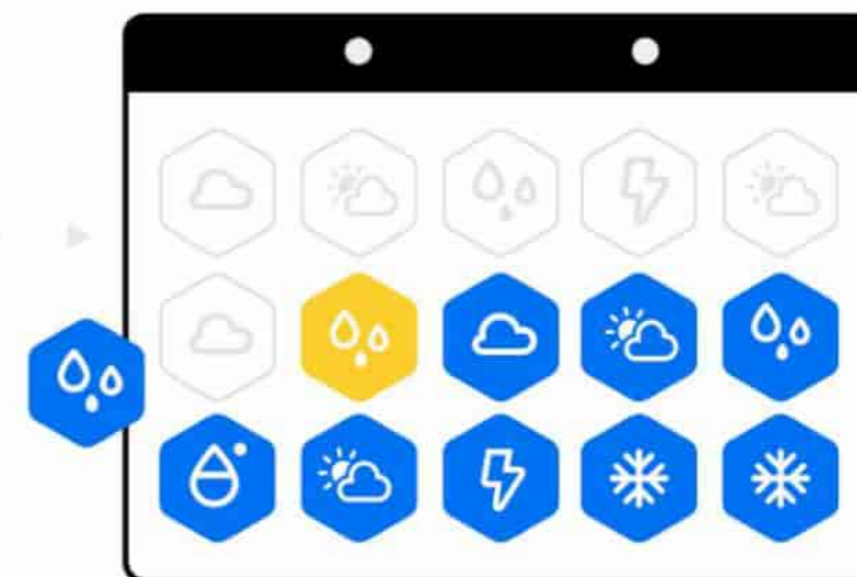
ClimaCell **MicroWeather OS** provides high resolution historical, real time, and forecast **weather data**



←----- **Historical** -----



----- **Real Time** -----



----- **Forecast** ----->



Information

Everywhere

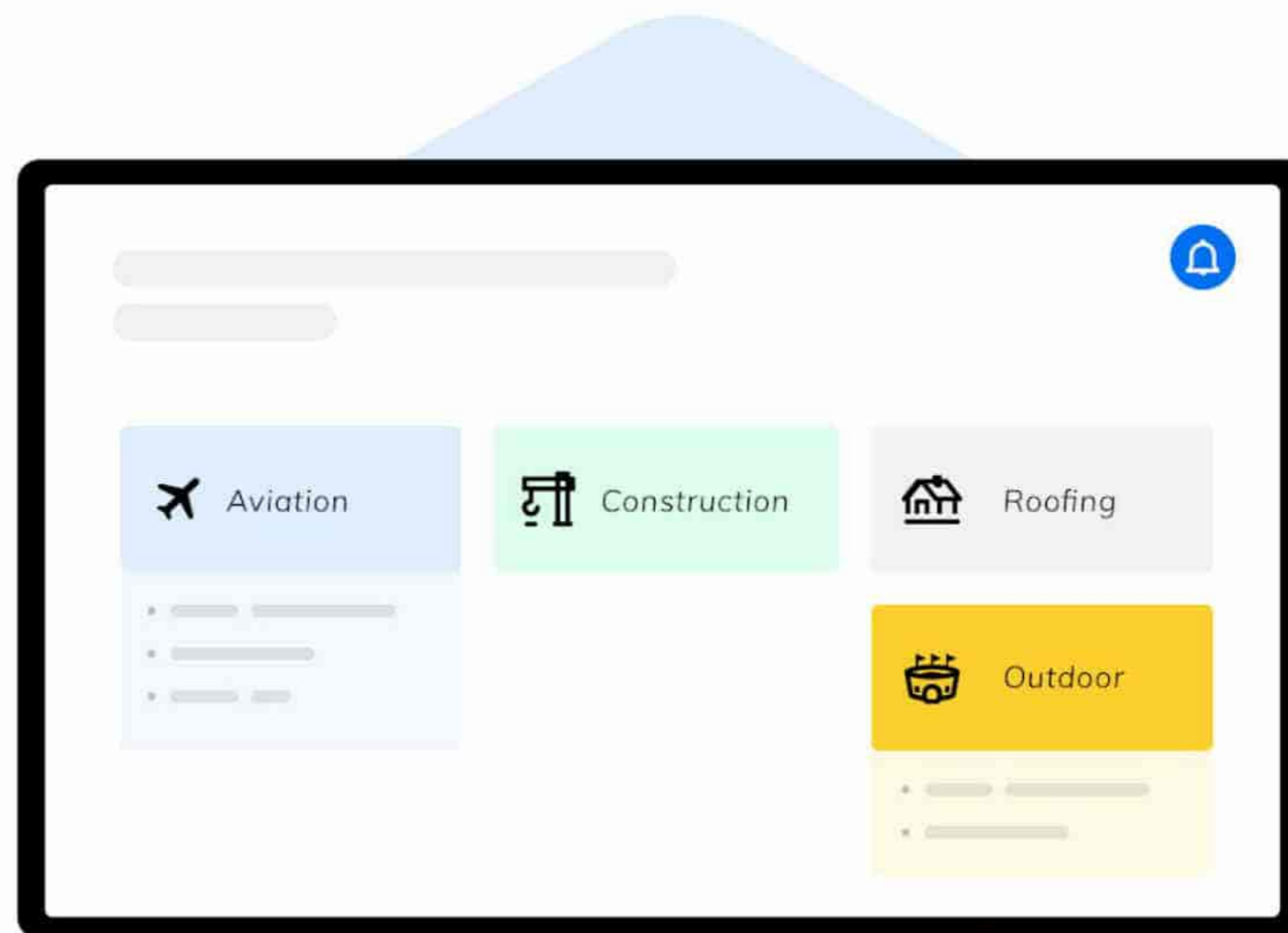
Help people and companies work smarter, making sure that partners, employees, and customers are informed - **globally**





Invaluable Insights

Provide your team with global weather knowledge and the **business impact** it means for them

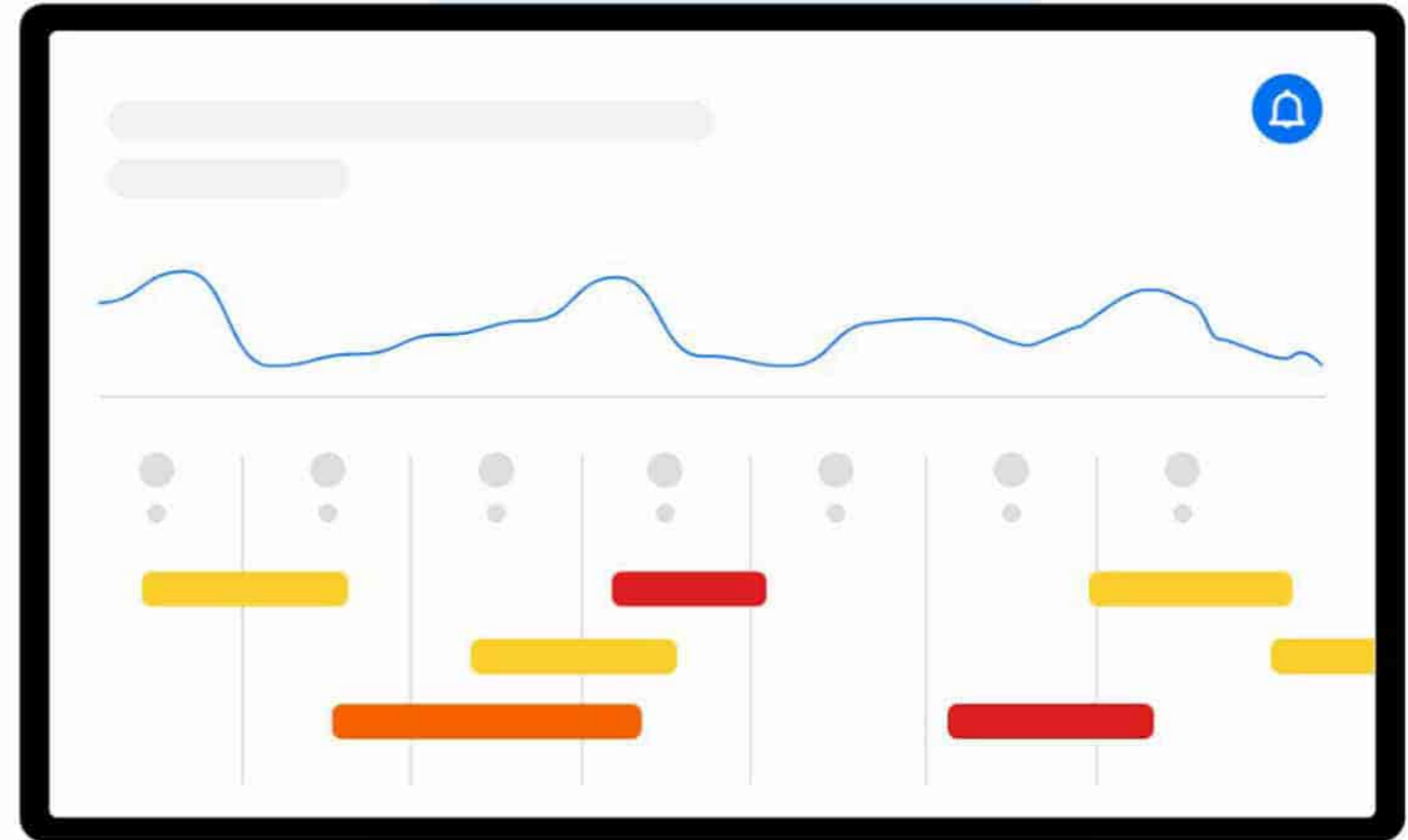


Choose from our vertical-based **insight library**



Insights

Apply insights or create your own **customized insights**



Start watching the **impact** on your business

1

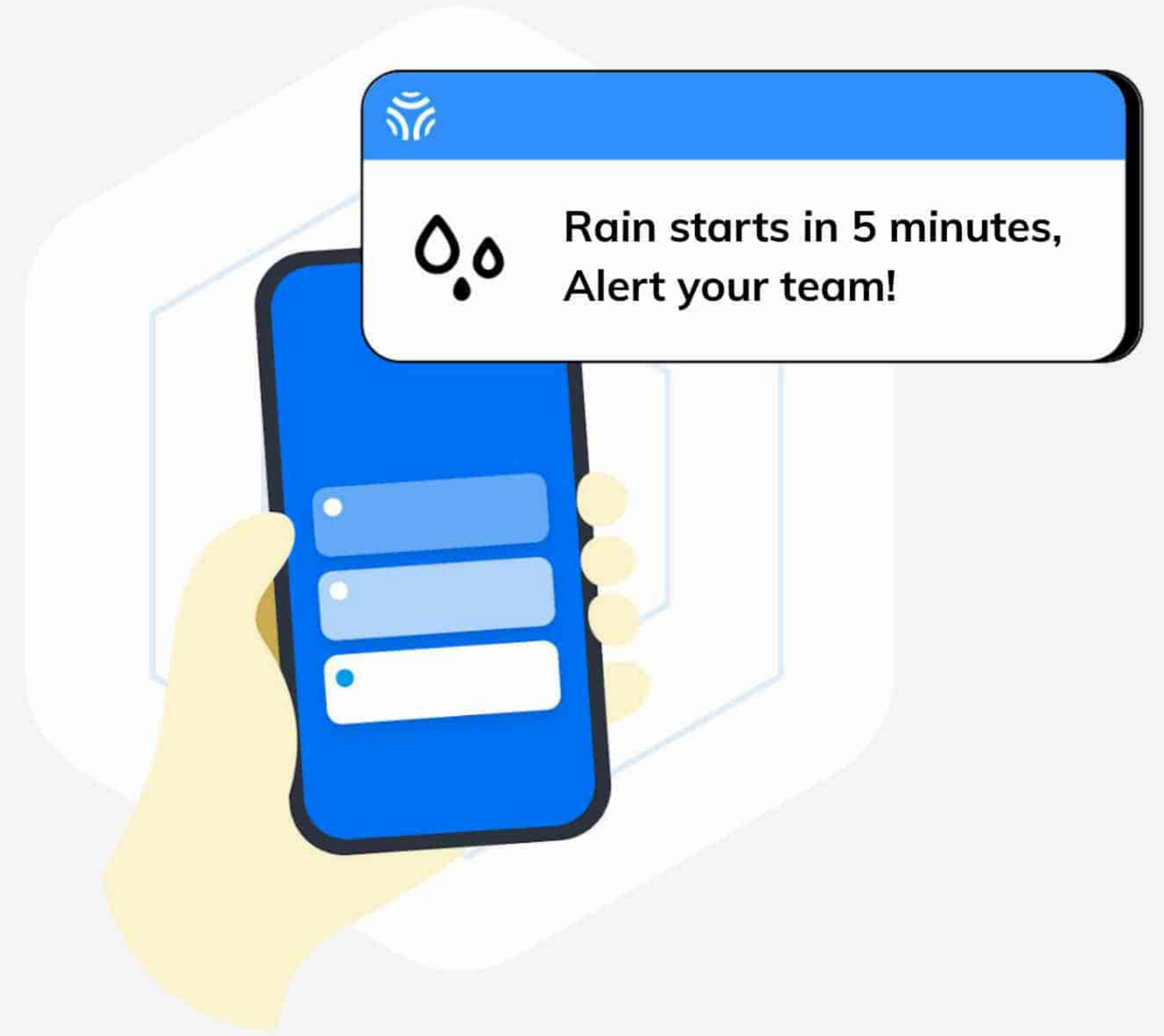
2

3

Actions

Driving Actions

to improve situational awareness and trigger teams to take the best action at the **right location, time and context**



1

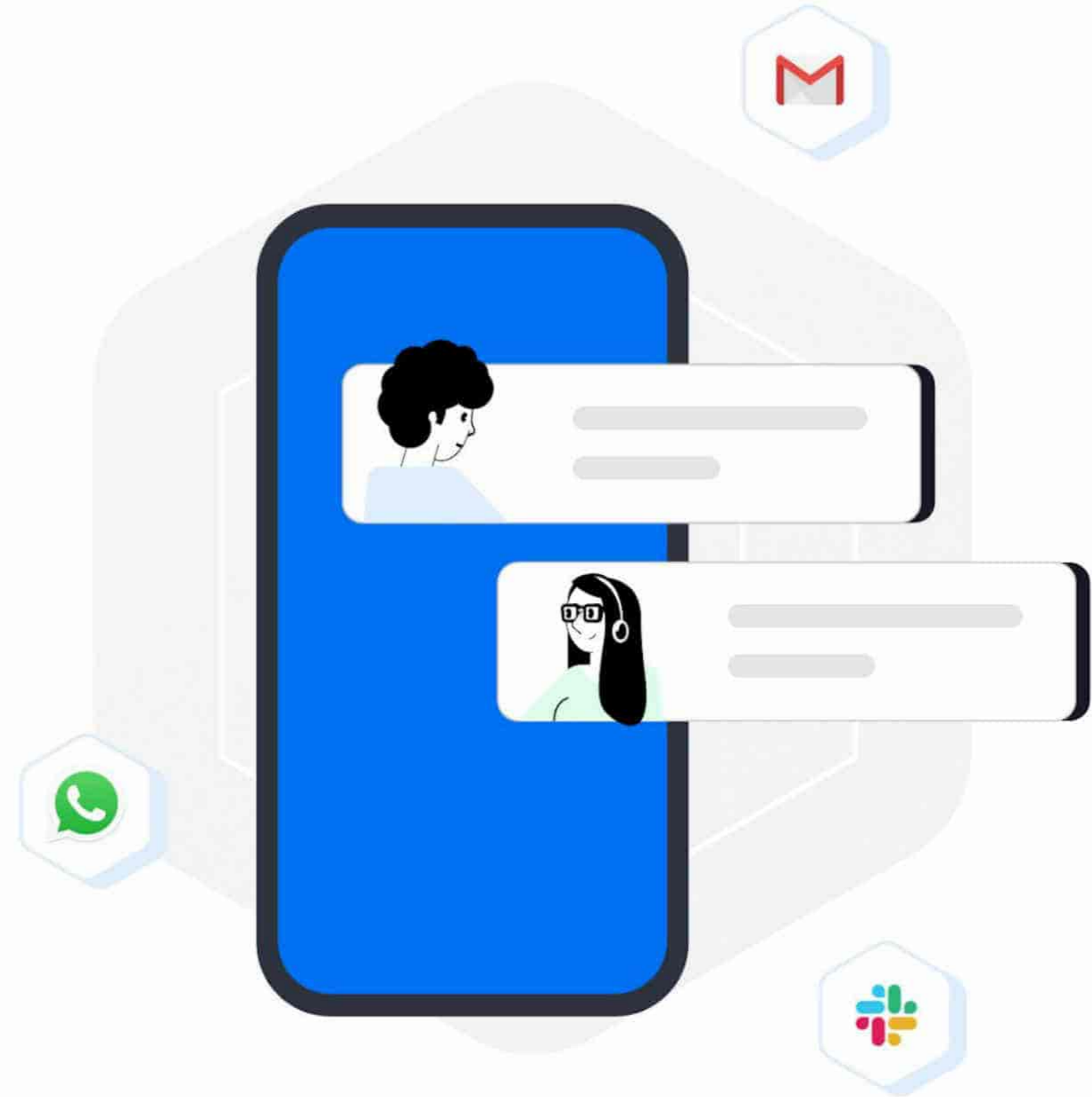
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3

Actions

Collaboration Tools

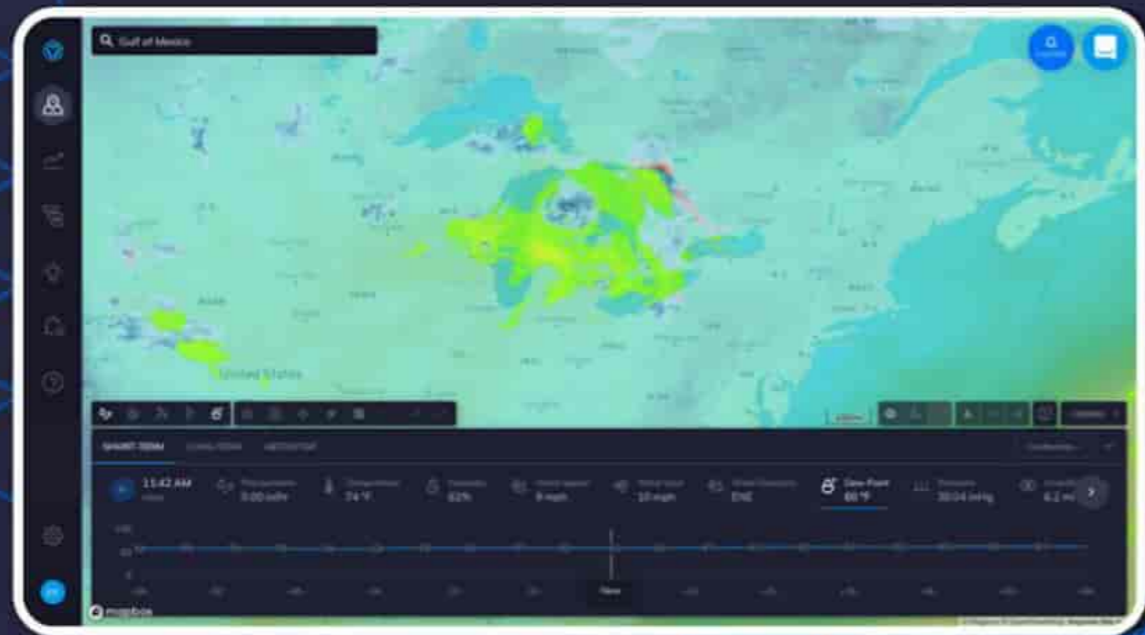
Share information, insights and decisions using ClimaCell's collaboration tools, via emails, apps, text messages, and more



Business Products

HyperCast

HyperCast is the next generation of ClimaCell's revolutionary weather forecasting platform.



API

The modern weather API - providing the most accurate weather and air quality data everywhere in the world.



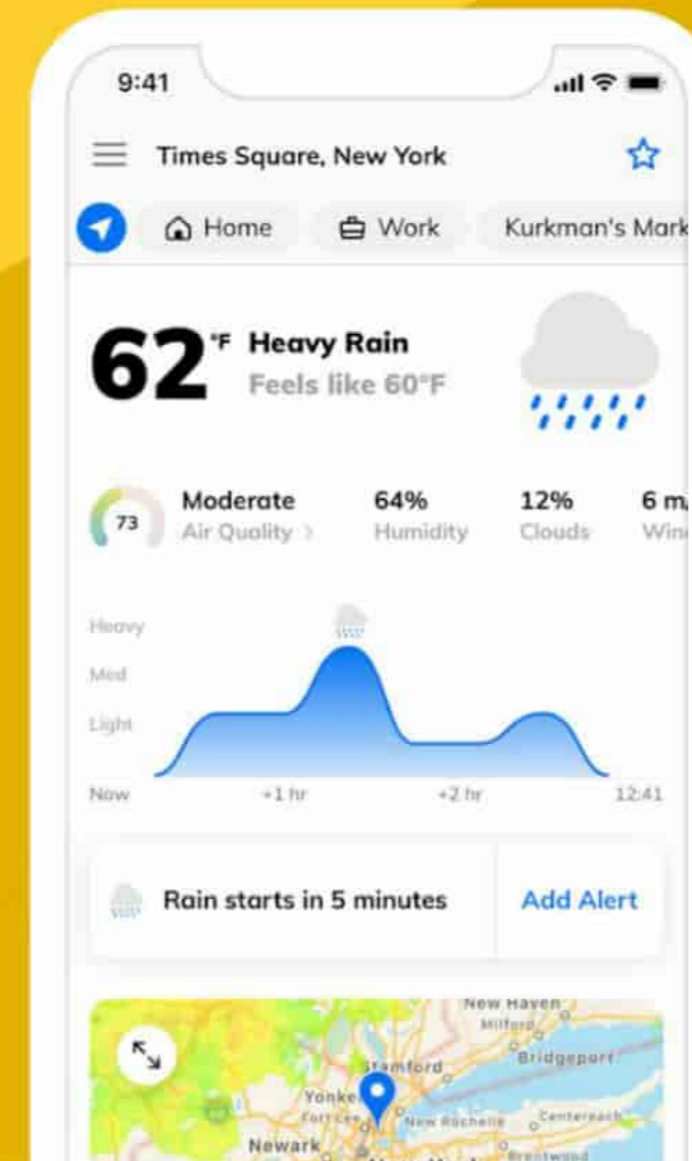
See how HyperCast™ works



Consumer Products

Weather Assistant

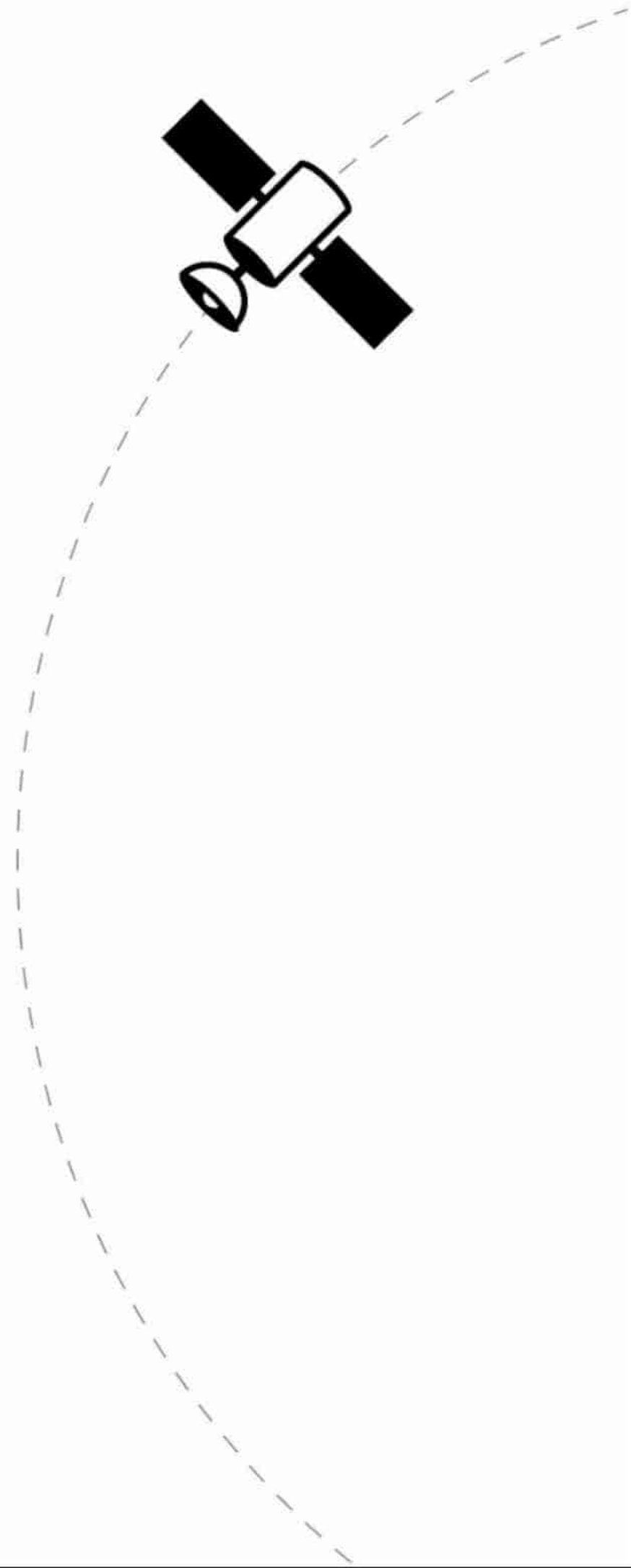
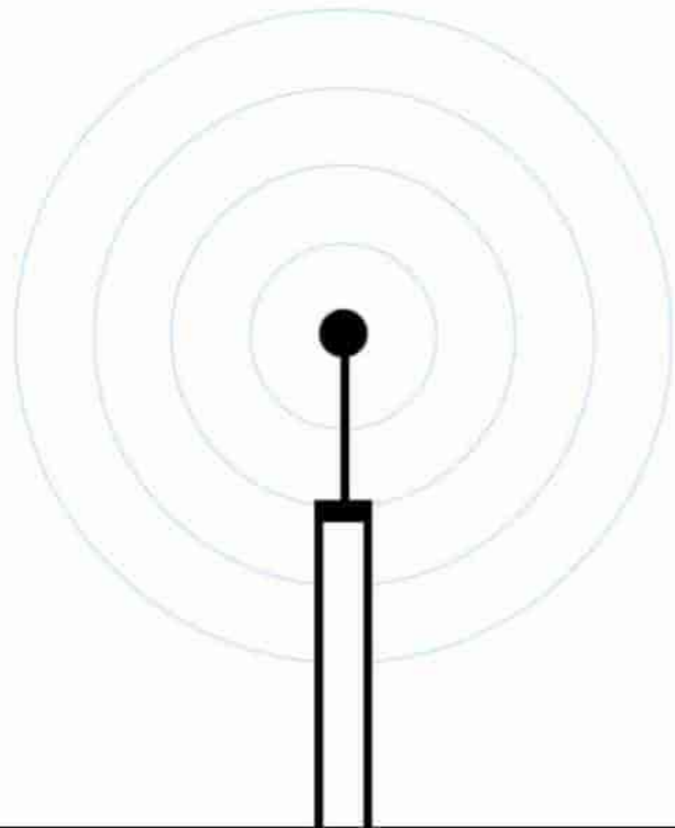
Have you ever cancelled a picnic due to “40% chance of rain” only to have sunny skies? Taken your dog for a walk and gotten stuck in unanticipated rain? Wished you’d left the house 10 minutes earlier to avoid suddenly stormy conditions?



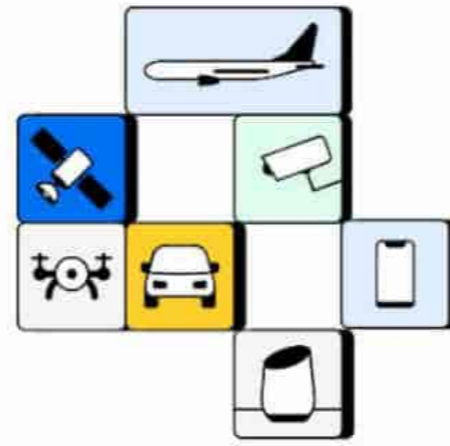
**Why Weather
Forecast is Not
Good Enough**



All weather data and model outputs are
generated by **governments and repackaged
by private companies**



How it Works?



Our Data – Weather of Things

Millions of data points from proprietary sources such as IoT, Drones, Airplanes, Cellular Signals, Sat Com Signals, Cameras, and more, combined with traditional data sources.



Our MicroWeather Models

Proprietary models that are researched and developed in-house, optimized to achieve the highest degree of accuracy in history.



MicroWeather Technology Engine

Optimized for low latency, high accuracy, and integration with our MicroWeather Operating System tools. Weather data optimized to solve complex business problems.

Our Models



Historical
(-20 years)



Real Time



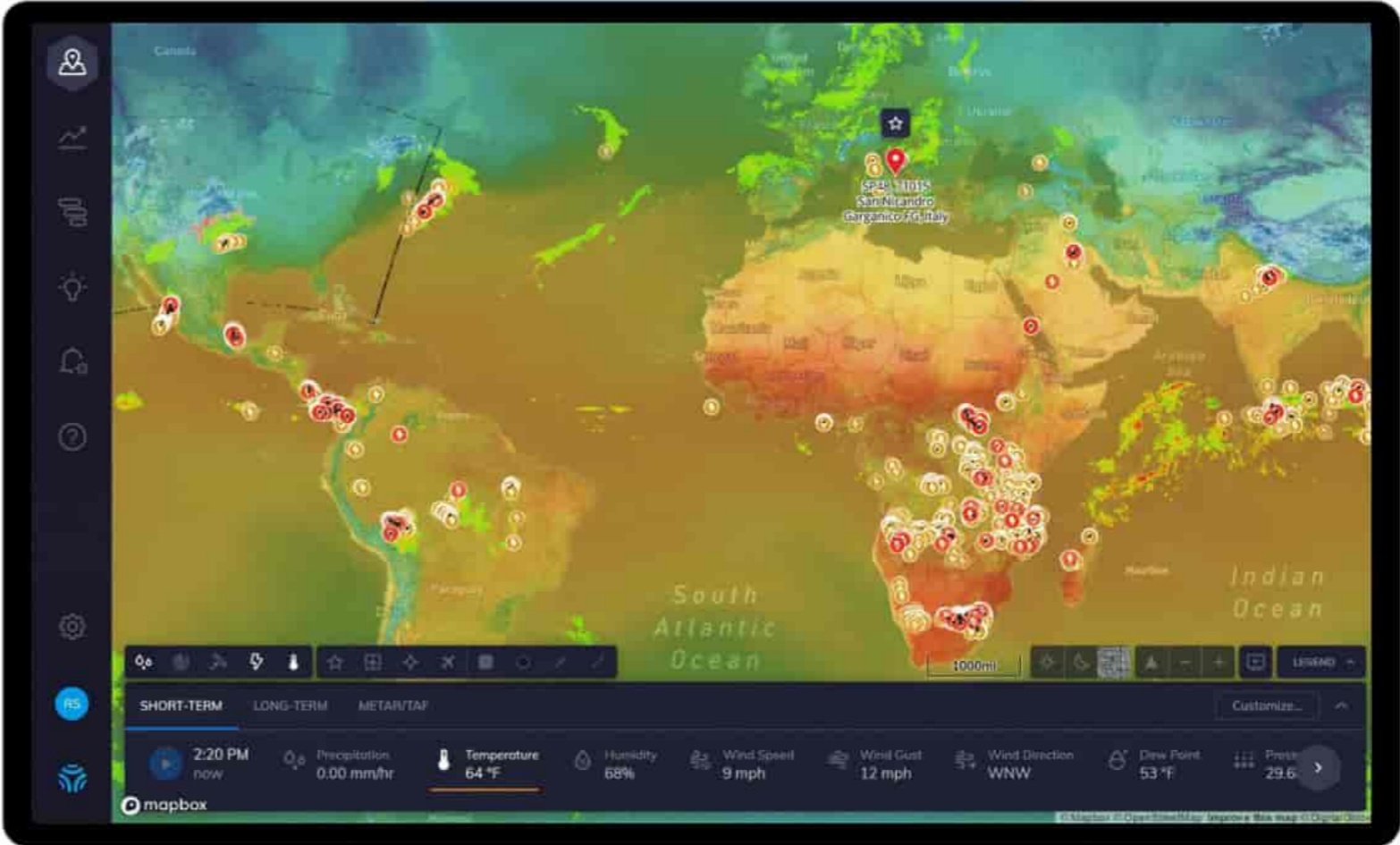
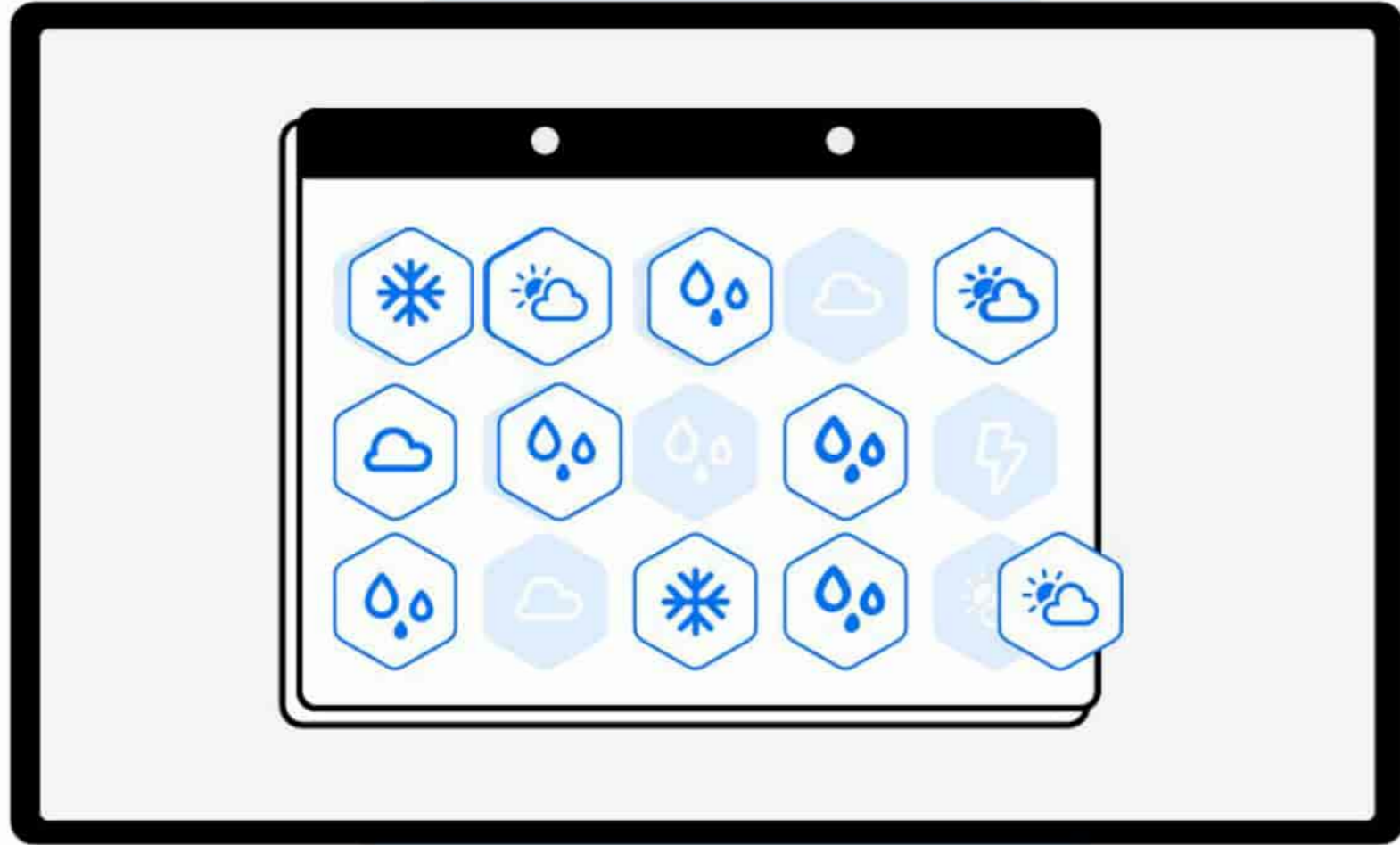
Nowcasting
(+6 hours)



CBAM
(+14 days)

Historical

High resolution historical data sets for **AI model training**



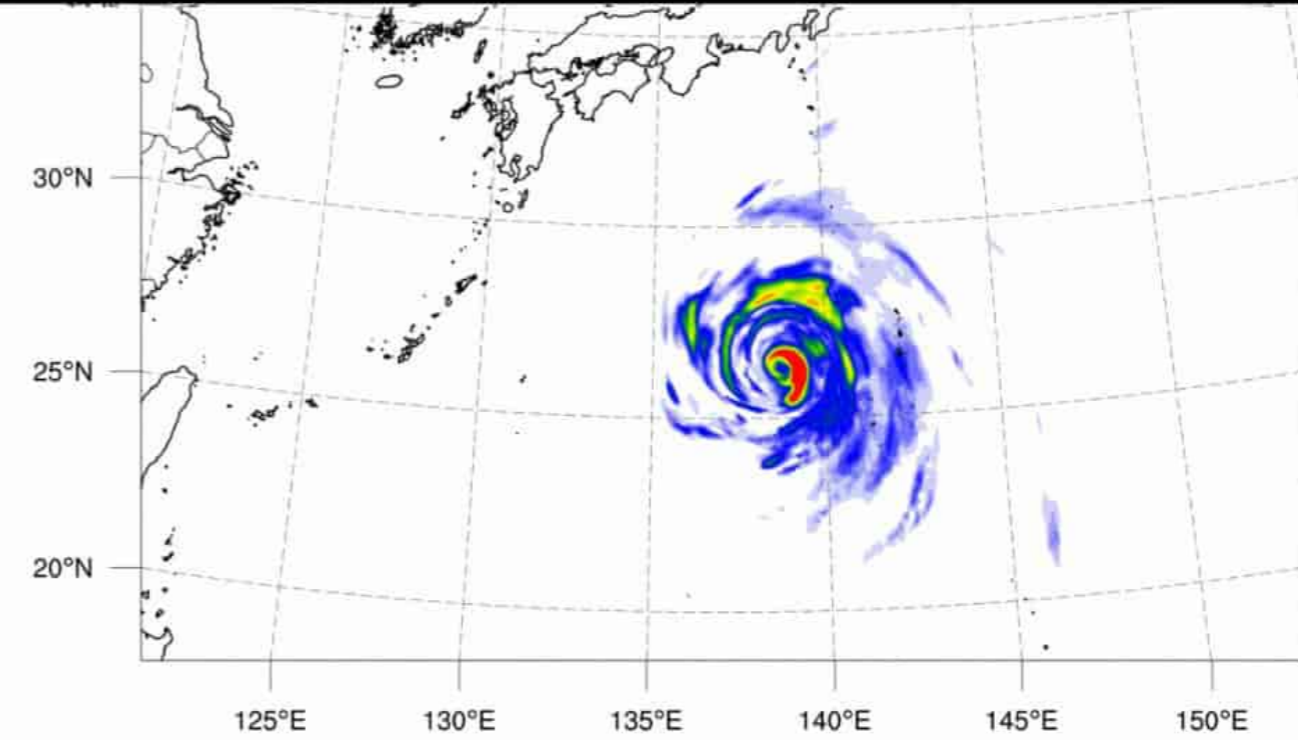
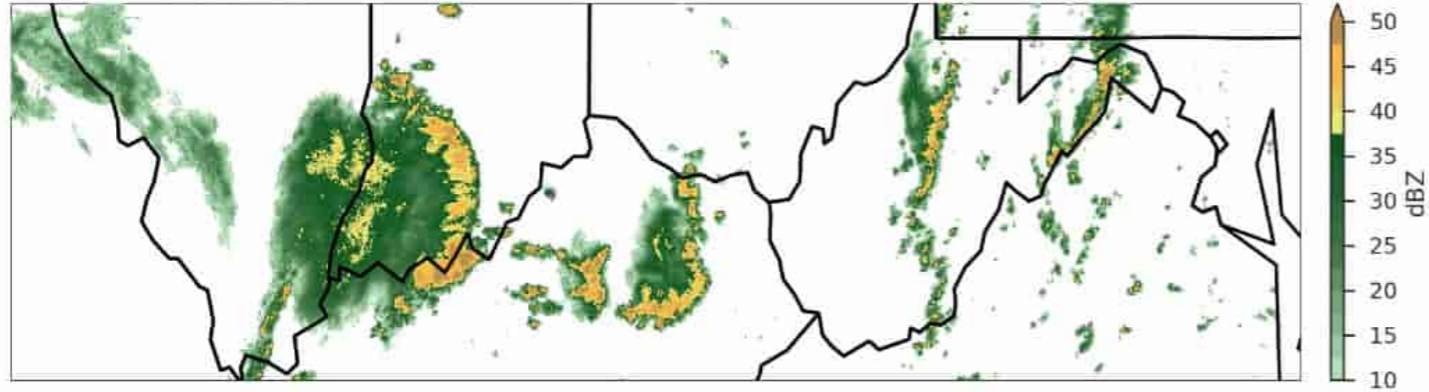
Real Time

Gridded high resolution, high refresh data. **Virtual sensors - everywhere**

Nowcasting

Minute-by-minute precipitation
forecast for **3-6 hours**

2018-05-21T18:00:00

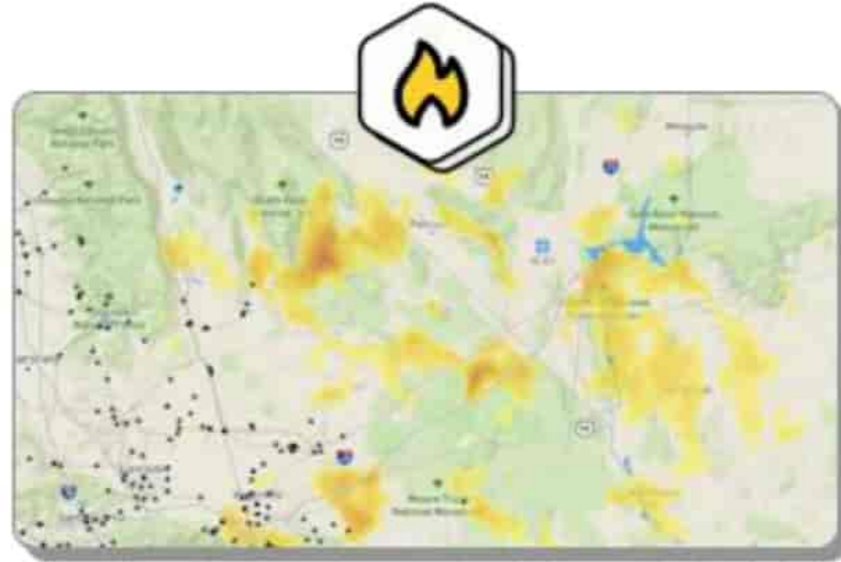


0.25 0.50 0.75 1 1.5 2 3 4 5 6 7 8 9 10 12 14 16 18 20 22 24 26

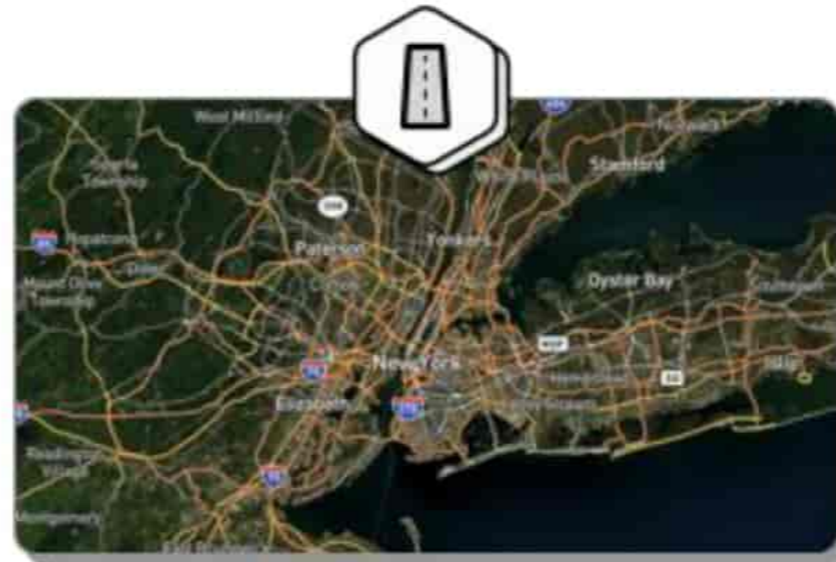
CBAM

NWP platform - **high
resolution forecast**
everywhere you need

Proprietary Global Solutions



Wildfire Risk



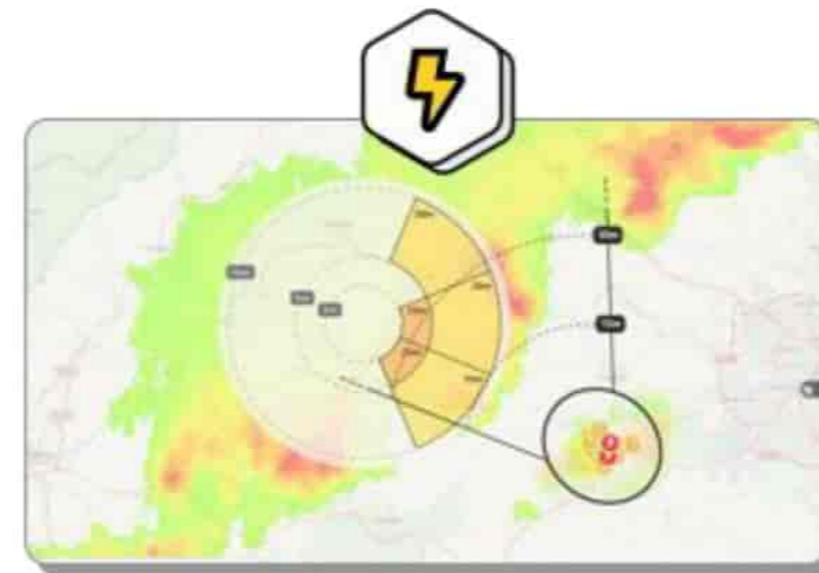
Road Risk



Flood Alerts



High Res Air Quality



Lightning Forecast

What Customers Say About ClimaCell



Aviation

- Improve Safety
- Optimize Operations
- Reduce Flight Delays

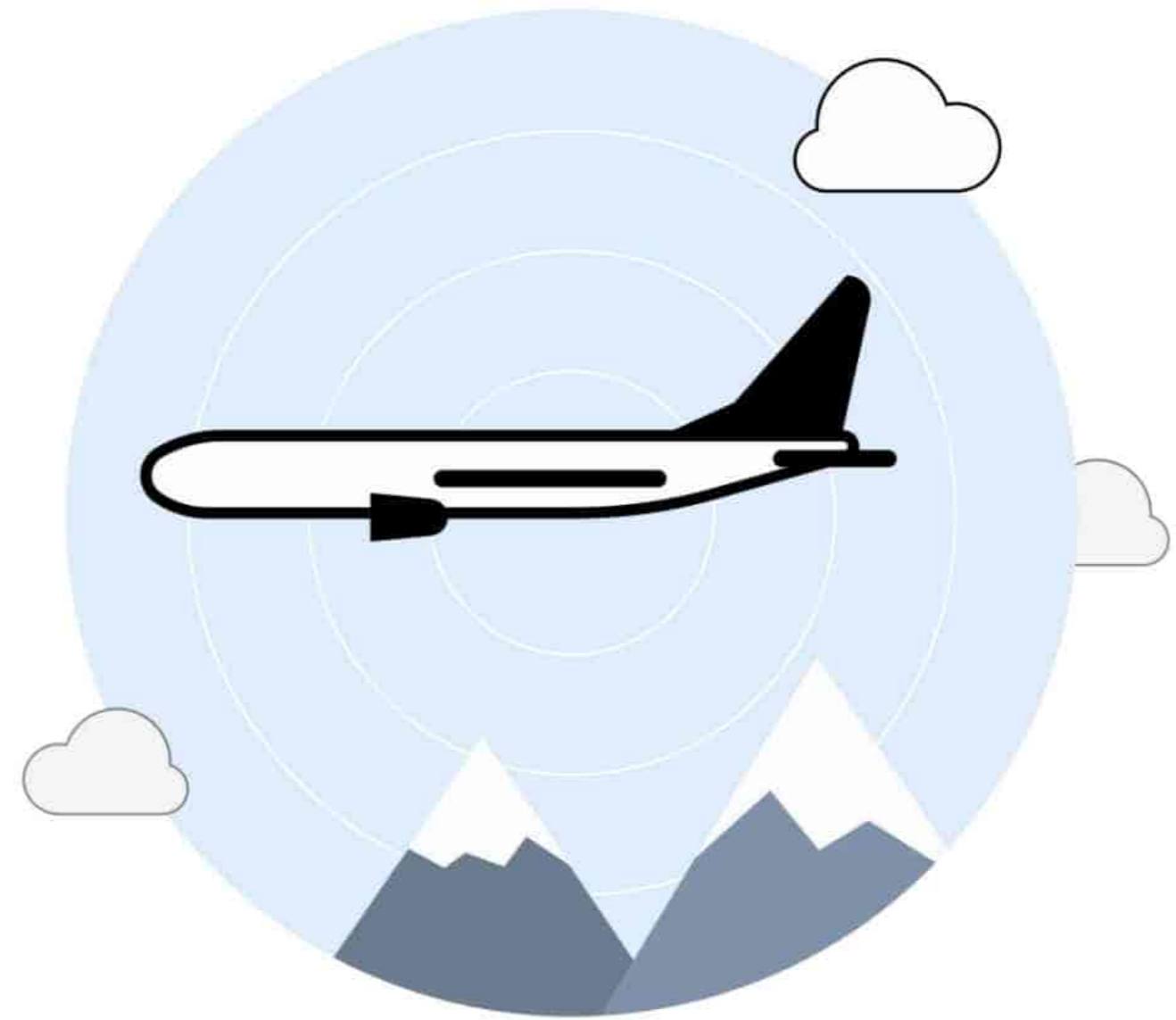
What Customers say about ClimaCell?

“This tool was designed with an understanding of the decision-making pressure airport leaders face every day.”



jetBlue

Ian Deason, SVP Customer Experience



Drones

- Ensure Safety
- Improve Route Planning
- Increase Operational Efficiency

What Customers say about ClimaCell?

“Our goal at UASidekick is to help pilots be safe when they take to the skies. Providing next generation tools, such as ClimaCell’s MicroWeather solution, is essential to moving the UAS industry forward.”



Nathan Ruff, UASidekick CEO



On Demand

- Prepare for Changes in Supply and Demand
- Increase ETA Accuracy
- Protect Assets

What Customers say about ClimaCell?

“ClimaCell forecasts provide accurate, actionable insights in real time. We’ve been very impressed with ClimaCell’s products, which help inform our operational decisions and offer quality service to our users.”



Ari Luks, Operations



Sports & Outdoor

- Minimize Unnecessary Delays and Cancellations
- Reduce Equipment Damage
- Prepare for Extreme Weather Conditions

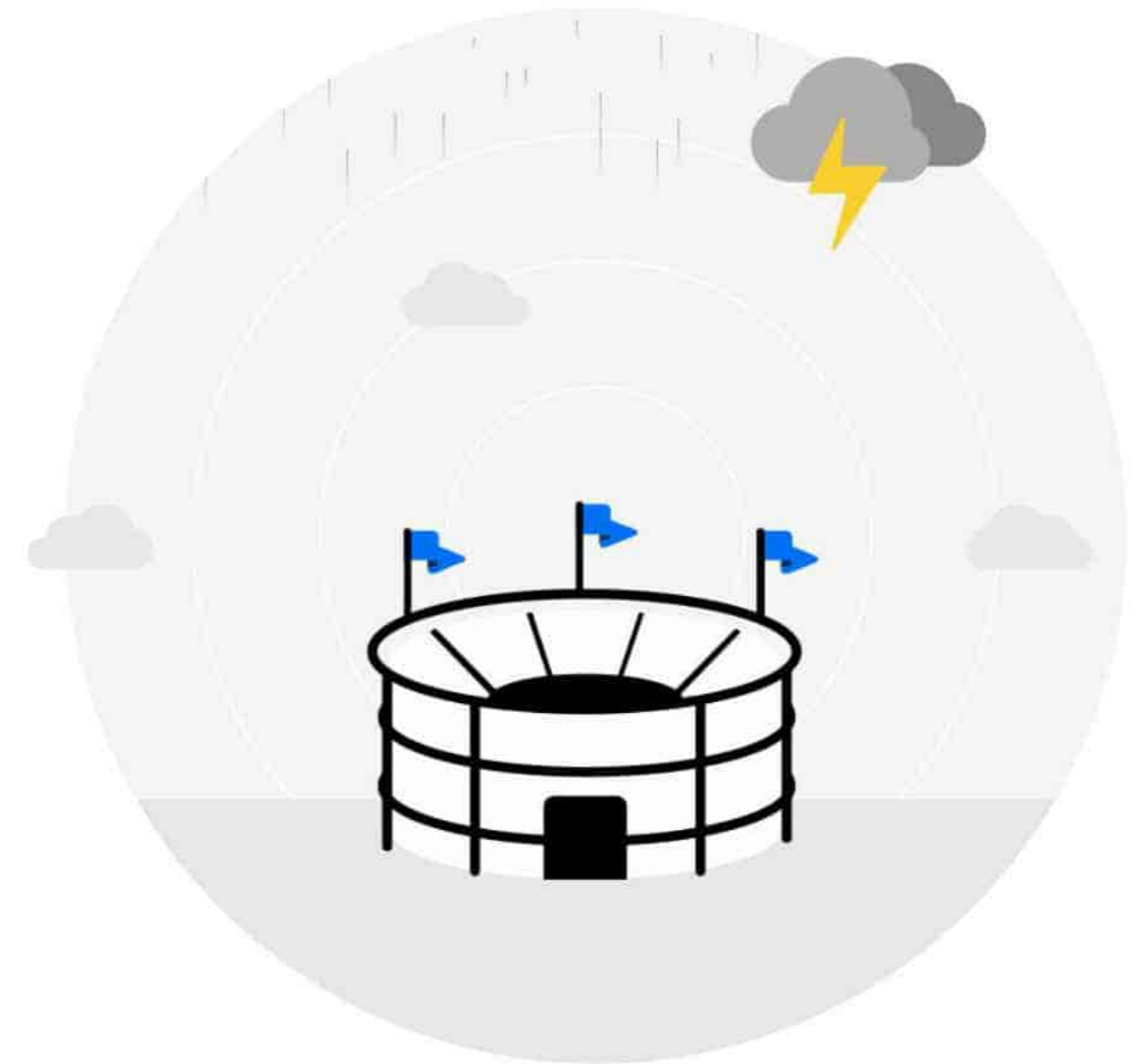
What Customers say about ClimaCell?

“If lightning is going to touch down on the property, we need to know about the threat in advance - we need to get everyone to sheltered areas. ClimaCell’s tools tell us when to expect a weather event and when it will pass us.”



PATRIOTS

Jason Stone, Senior Director of Operations,
Kraft Sports and Entertainment



Construction

- Increase Operational Efficiency
- Improve Crew Safety
- Lightning Forecast

What Customers say about ClimaCell?

"Our biggest problem is when everything suggests that the weather will be good, we send our crews out, and then a thunderstorm hits seemingly out of nowhere. Now, with the alert system, we are automatically informed in advance"



WHITE CASTLE
ROOFING

Zach Clarke, Director of Residential Operations



Energy

- Get Real-Time Data for Asset Utilization
- Up-to-the-Minute Precipitation and Fire Index
- Asset-Specific Weather Insights

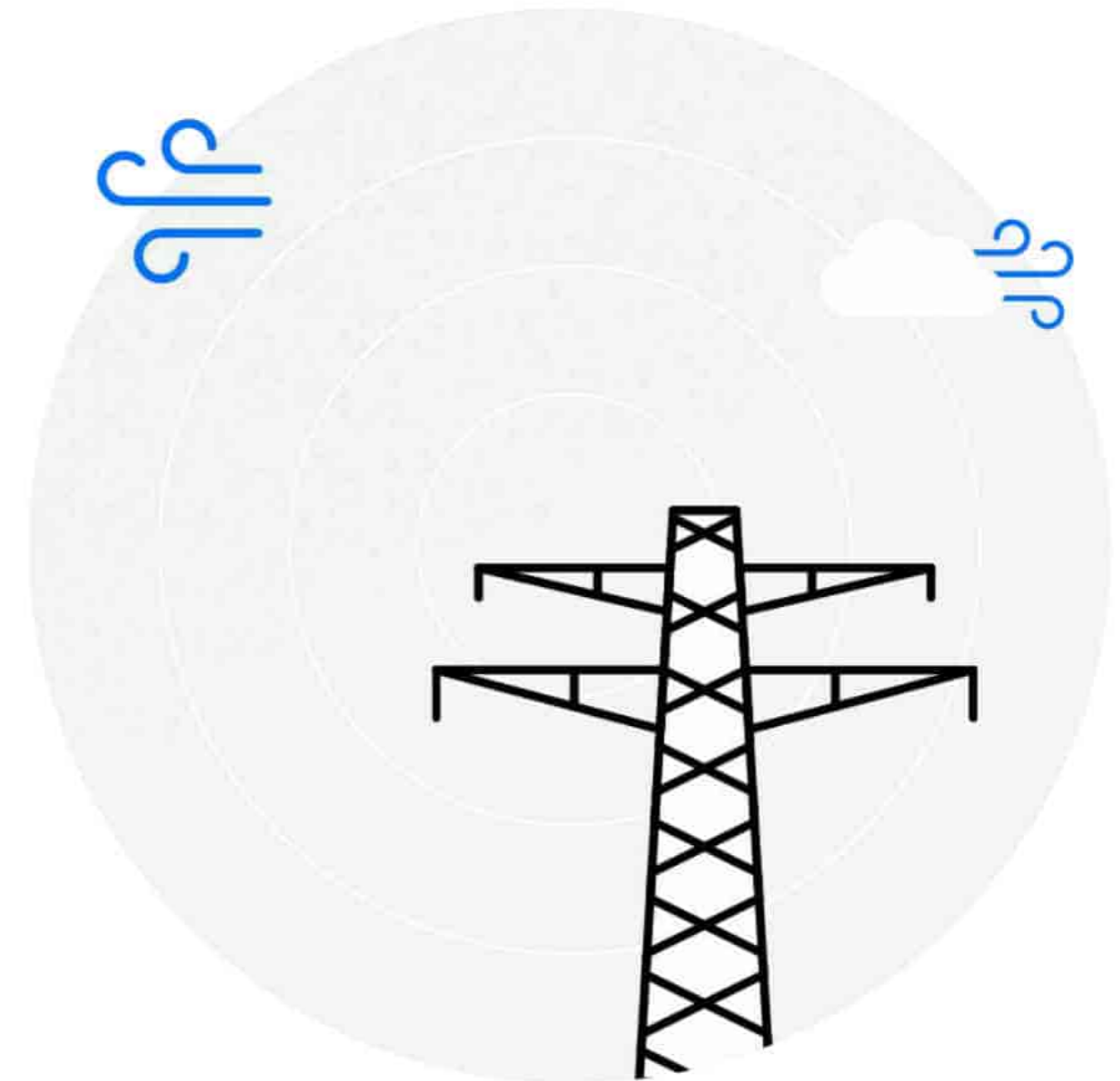
What Customers say about ClimaCell?

“Weather is important to us for disaster planning and for responding and recovering from storms, when we can get precise information about what weather will be doing in an area, we can improve readiness and reduce costs.”



nationalgrid

Lisa Lambert, Chief Technology and Innovation Officer of National Grid plc,
and Senior Vice President of NGP



See What JetBlue's CEO Says About us



What do Others Say?

Forbes

ClimaCell, combines data analytics, traditional inputs and the analysis of signals beamed...

FASTCOMPANY

ClimaCell's weather-of-things approach to forecasting helps city planners to prepare for bad weather...

The Washington Post

Meet the ClimaCell weather app. Alerting you when it's about to rain, down to the minute, all around the world

THE WALL STREET JOURNAL

ClimaCell predicts weather by a few hundred feet. Think about a thunderstorm coming into JFK...

TE

That's where ClimaCell's main innovation comes in. Instead of relying on government sensors...

TIME

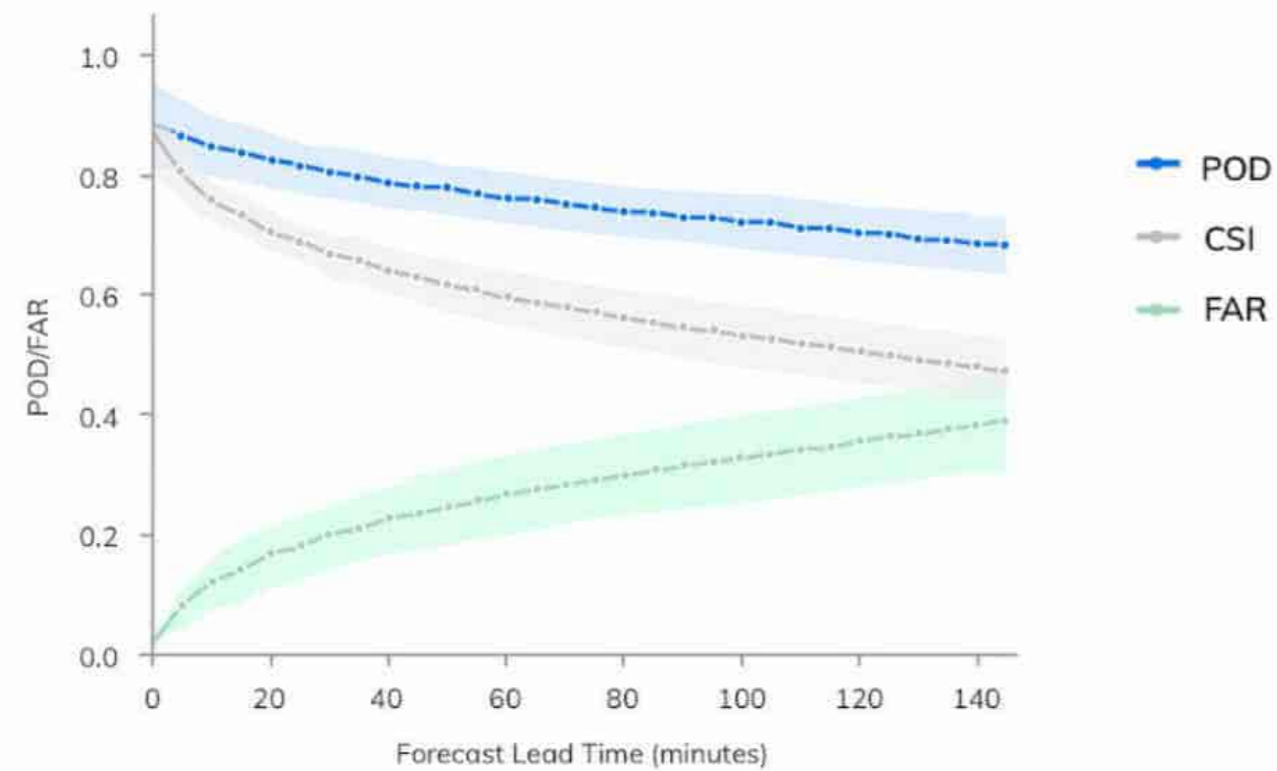
Inside the Weather Wars That May Threaten the Daily Forecast You Depend On...

Bloomberg

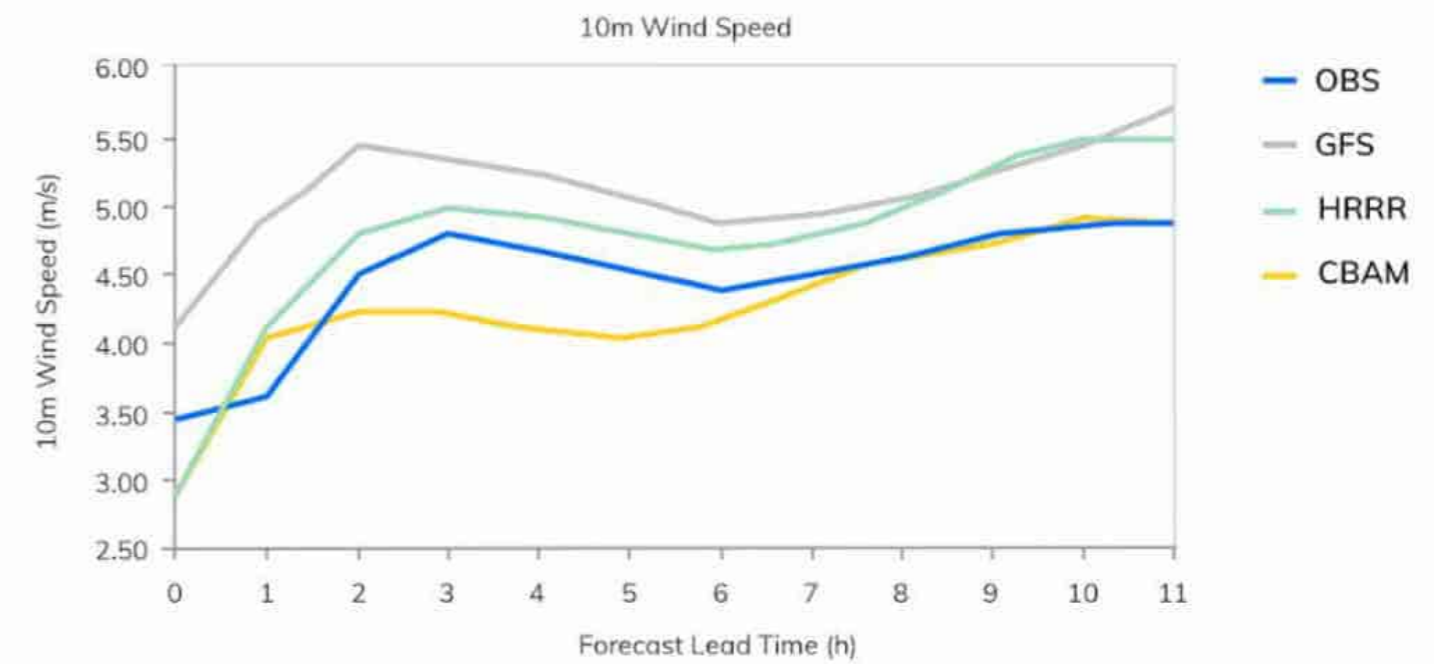
Startup Street: This Ratan Tata-Backed Startup Predicts Floods In India, Days In Advance...

Validation Reports

ClimaCell's NowCast system which boasts over 90% probability of precipitation detection for short lead times



ClimaCell's CBAM forecasts consistently outperforms the leading government models for all variables



"ClimaCell currently is operating innovative short-term forecast systems (NowCast and CBAM). Through testing and verification, both products have exhibited impressive and unique abilities to accurately predict atmospheric variables such as precipitation (NowCast) as well as temperature, cloud cover, and wind speed (CBAM) for locations across the globe. NowCast and CBAM exhibit substantial accuracy and precision advantages over publicly available forecast model data, especially for short-term predictions."



Dr. Shawn Milrad, Associate Professor,
Meteorology



climacell

So you can take control