Digital Monitoring for Remote Settings

Experiences from the SolarChill Project

© Giulio D'Ercole (Canvas Africa Productions)


© Lisa Murray / UN Environment

Webinar Series: G300 and Friends - Digital Innovations in Climate Change, Environment, Infrastructure

7th of August 2019

Agenda

1 Welcome & Introduction

- **Detlef Schreiber**
  Head of Section „Environment Policy, Biodiversity and Forests (G330), GIZ
- **Leon Becker**
  GIZ Proklima

2 Digital Monitoring Solutions

- **David Schmid**
  Competence Center „Change Management“ 4E10), GIZ

3 Digital Monitoring in SolarChill Project

- **Dr. Simon Mischel**
  HEAT

4 Question & Answer Session

giz

Agenda

1 Welcome & Introduction

- **Detlef Schreiber**
  Head of Section „Environment Policy, Biodiversity and Forests (G330), GIZ
- **Leon Becker**
  GIZ Proklima

2 RBM in remote settings

- **David Schmid**
  Competence Center „Change Management“ (4E10), GIZ

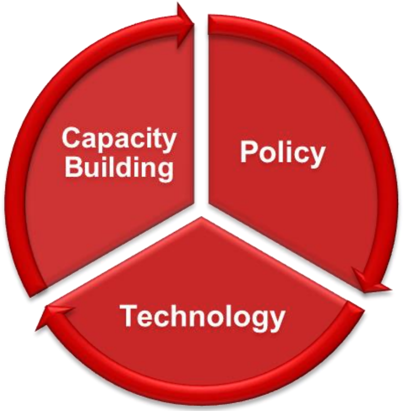
3 Digital Monitoring in SolarChill Project

- **Dr. Simon Mischel**
  HEAT

4 Question & Answer Session

GIZ Proklima

Supporting around 40 partner countries in the field of integrated ozone and climate protection through using and promoting natural refrigerants and energy-efficient appliances in the refrigeration and air conditioning (RAC) sector since 1995.



© GIZ Proklima

On behalf of

Federal Ministry
for Economic Cooperation
and Development

On behalf of:

Federal Ministry
for the Environment, Nature Conservation,
Building and Nuclear Safety

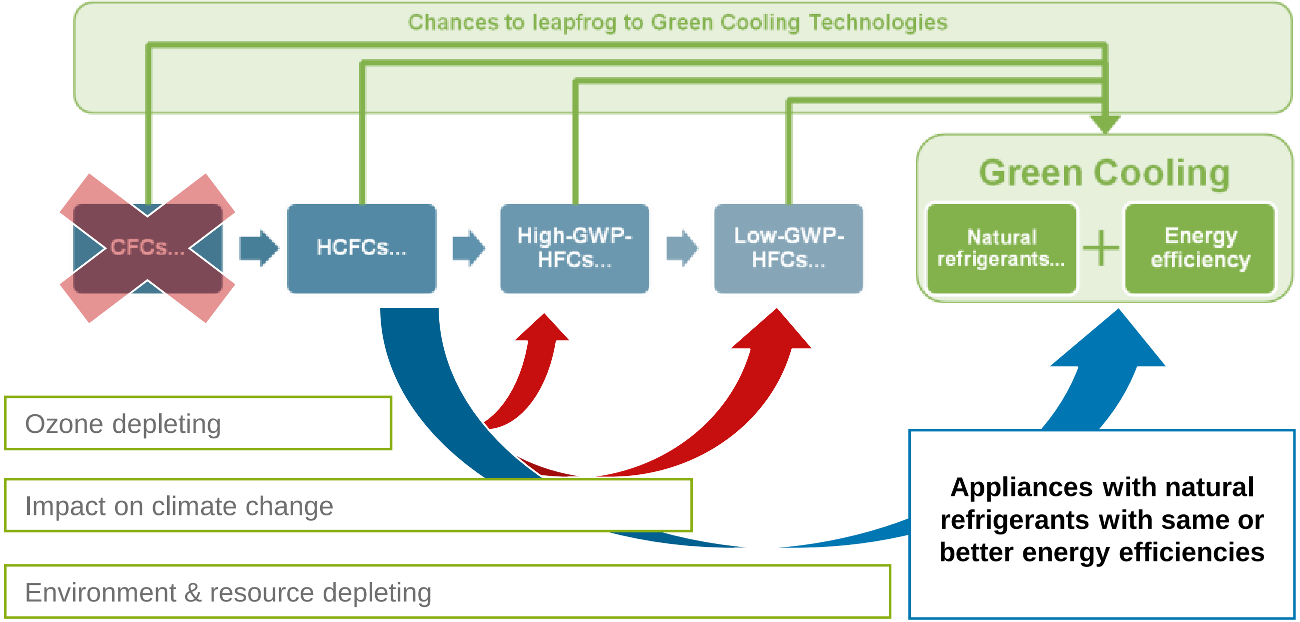
of the Federal Republic of Germany

giz

Refrigeration and Air-conditioning and the International Agenda

Health	Nutrition	Energy	Comfort	Productivity
Storage of medicines and vaccines	**Supply of the population with unspoilt food items**	**Up to 80% of energy related costs in poor households originate from inefficient refrigerators**	**AC's and Cooling technologies increase quality of life**	**Up from 25°C each additional degree leads to loss of productivity of around 2%.**

Leapfrogging: Significant emission and energy savings possible combining energy efficient appliances with natural refrigerants



Agenda

1 Welcome & Introduction

- **Detlef Schreiber**
  Head of Section „Environment Policy, Biodiversity and Forests (G330), GIZ
- **Leon Becker**
  GIZ Proklima

2 RBM in remote settings

- **David Schmid**
  Competence Center „Change Management“ (4E10), GIZ

3 Digital Monitoring in SolarChill Project

- **Simon Mischel**
  HEAT

4 Question & Answer Session

Result-based monitoring in remote settings

David Schmid, Competence Center „Change Management“ (4E10)

M&E in remote settings

- **Increasing number of projects/programmes** being implemented (partly) remotely:
  - Fragile contexts
  - Regional and global projects/programmes
  - Teams working in different areas of a country
- **Digitalization offering a huge range of possible approaches** to meet these challenges:
  - New data sources (big data, open data, citizen-generated data, real-Time data)
  - New technologies and tools for collecting and analyzing data (e.g. apps, databases, data mining etc.)
  - Easier communication (e.g. video conferences, chats, collaborative working on documents)

Six process steps of designing and using a RBM system

The planning, design, implementation and use of an RBM system can be broken down into six process steps. For each step certain aspects of context/conflict sensitivity need to be considered.

Step 1: Examine/adjust the results model

Step 2: Clarify the requirements to be met by the RBM system

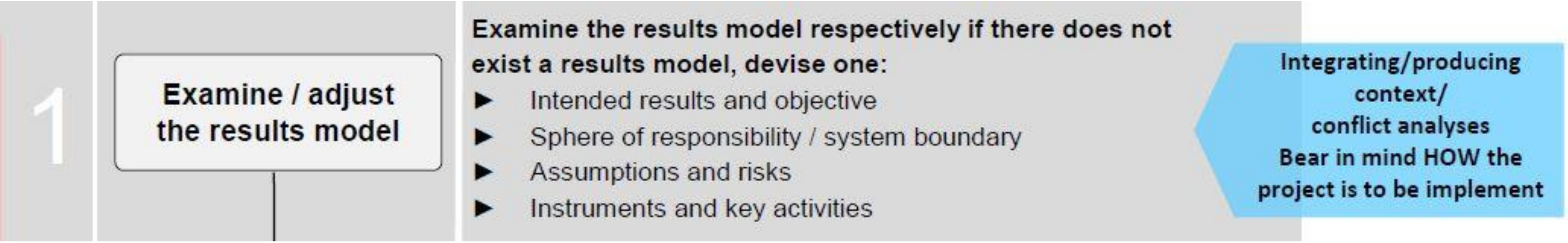
Step 3: Make results measurable

Step 4: Detailed monitoring planning and devise the RBM form

Step 5: Collect and analyse data

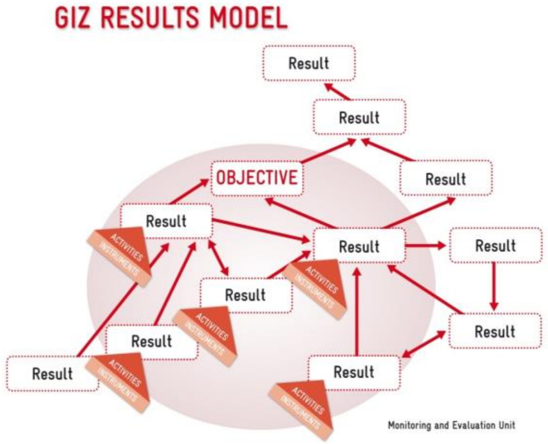
Step 6: Use RBM results

Step 1: Examine/adjust the results model



Specific challenges in remote settings:

- Remote planning/lack of information
- Involvement of partners and stakeholders in planning process
- Instruments and key activities may need to be adapted



giz

Step 2: Clarify the requirements to be met by the RBM system

2

Clarify the requirements to be met by the RBM system

- Identify and involve stakeholders in strategic and steering decisions
- Clarify stakeholders' interests, expectations and need for information
- Examine the partner's system for possible synergies and if necessary adjust RBM accordingly
- Bear in mind the human and financial resources required for RBM

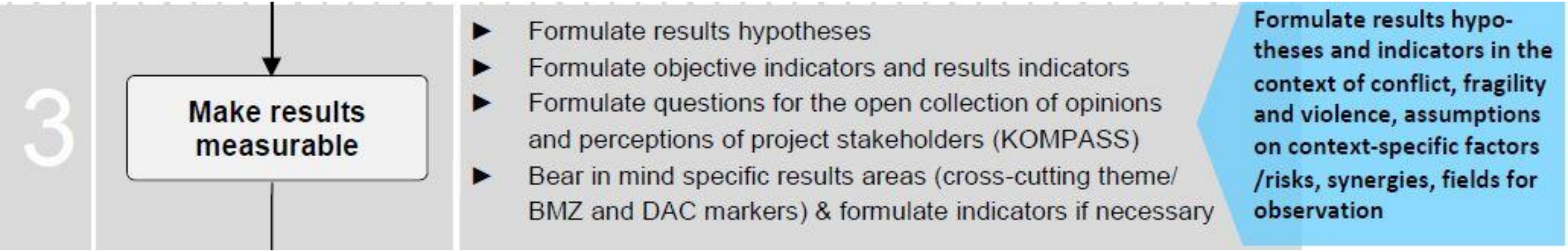
Decide on participants on the basis of stakeholder analysis/ conflict/ context analysis
Analyse interaction between stakeholders

Specific challenges in remote settings:

- Partner involvement in steering decisions
- Different interests in and expectations of monitoring (GIZ/partners)
- No or only weak partner systems available
- Joint establishment of RBM with partners

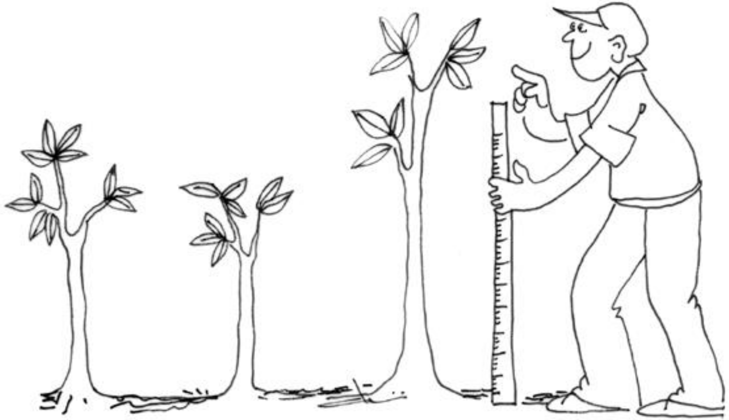
giz

Step 3: Make results measurable



Specific challenges in remote settings:

- Formulation of assumptions regarding context-specific factors and risks, along with results hypotheses.
- Measuring indicators, but also risks and unintended results
- Conducting KOMPASS in a remote setting



giz

Step 4: Prepare detailed monitoring planning and devise the RBM form

4

Detailed monitoring planning and devise RBM tool

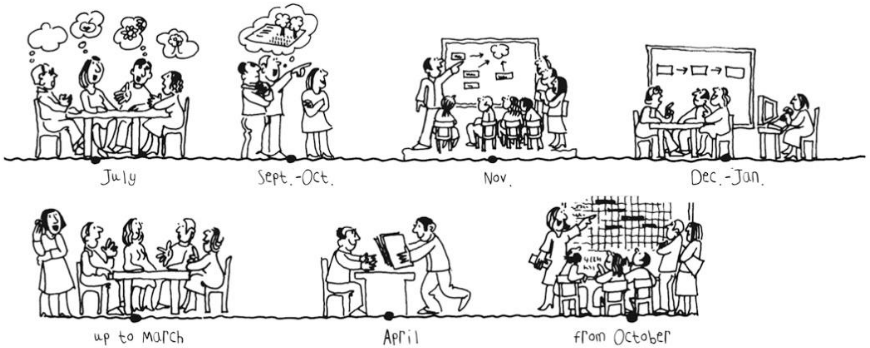
Transfer the results of steps 1 to 3 to an RBM tool (e.g. Excel- or web-based) and add detailed monitoring information:

- ▶ Intended results, objective and indicators
- ▶ If appropriate, activities
- ▶ Results hypotheses, assumptions and risks
- ▶ Responsibilities for monitoring activities
- ▶ Time schedule for RBM / data collection
- ▶ Data collection methods

Stipulate responsibilities and intervals, documentation Context- and conflict-relevant information/ conduct methodical triangulation

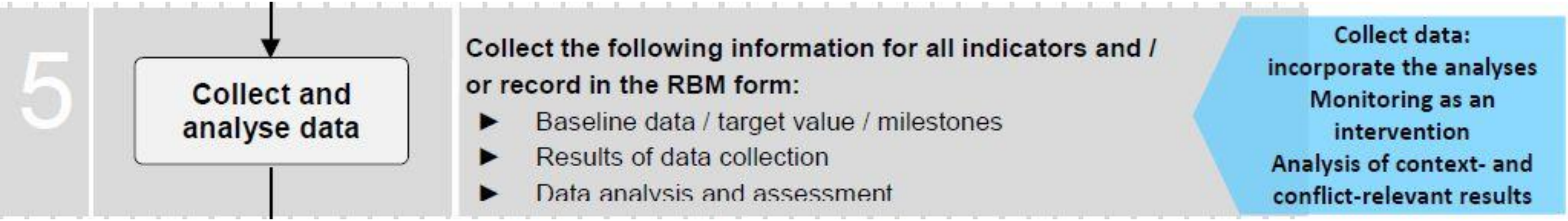
Specific challenges in remote settings:

- Data collection methods
- Triangulation of data
- Responsibilities for monitoring activities



giz

Step 5: Collect and analyse data



Specific challenges in remote settings:

- Availability of Baseline data
- Data collection (monitoring as an intervention)
- Assessment of data

Step 6: Use RBM results

6

Use RBM results

Use RBM results for:

- Steering:
  Strategic, management and budget decisions
  Embedding RBM in the partner's decision-making mechanisms
- Accountability / substantiating results / reporting:
  Evaluation (e.g. PEV)
  Progress report and final report
- Knowledge management / learning:
  Documenting the RBM results
  Communicating and conveying information

Use context monitoring for (re-) steering and strategic alignment
Adjust the results model

Specific challenges in remote settings:

- Taking the "correct" (re-)steering decisions in triangle with BMZ, partners and GIZ
- Reporting
- Internal and external learning

Agenda

1 Welcome & Introduction

- **Detlef Schreiber**
  Head of Section „Environment Policy, Biodiversity and Forests (G330), GIZ
- **Leon Becker**
  GIZ Proklima

2 RBM in remote settings

- **David Schmid**
  Competence Center „Change Management“ (4E10), GIZ

3 Digital Monitoring in SolarChill Project

- **Dr. Simon Mischel**
  HEAT

4 Question & Answer Session

giz

Digital Monitoring in the SolarChill Project

Dr. Simon Mischel, HEAT GmbH

GEF SolarChill Project

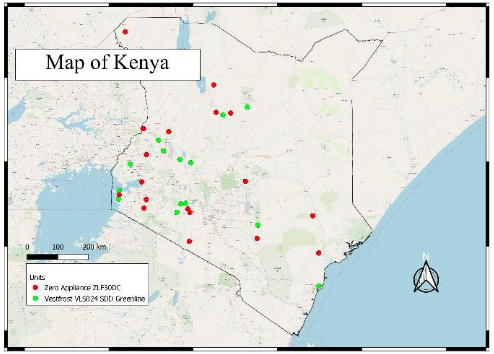
Reliable, Climate-friendly Vaccine And Food Refrigeration Technologies

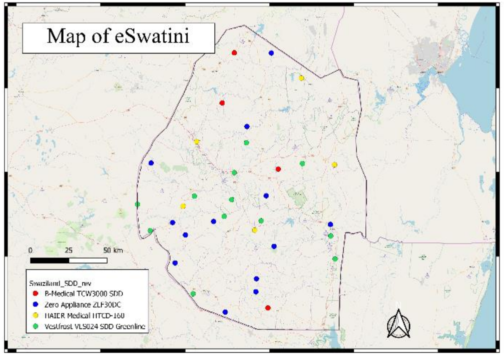
Webinar – Remote Monitoring

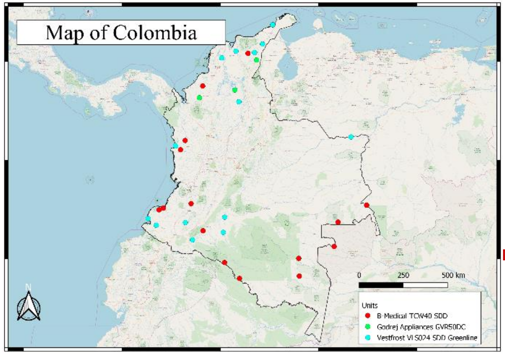
Dr. Simon Mischel*, HEAT GmbH*

Introduction

- Provide vaccines to the people at the last mile
- ~120 health facilities have a SolarChill A unit installed
  - 36 SolarChill A units in Kenya serve a catchment population of more than 230.000 people
- Test the performance by remote monitoring over a variety of manufacturers







SolarChill facts

WHO PQS qualified units

- Solar direct drive units, without batteries
- Independence of electric power supply
- Environmentally friendly
- Temperature autonomy of 5 days
- Temperature range of 2 – 8 °Celsius

→Lab-tested refrigerators

Question: do they work as required in the field?

Lisa Murray / UN Environment

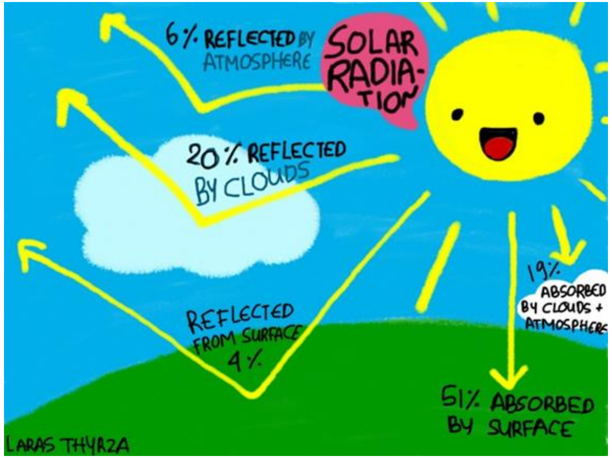
1. Verification of the WM (model)
Performance of the units (hot zone 5/43 °C)

Input – environmental factors

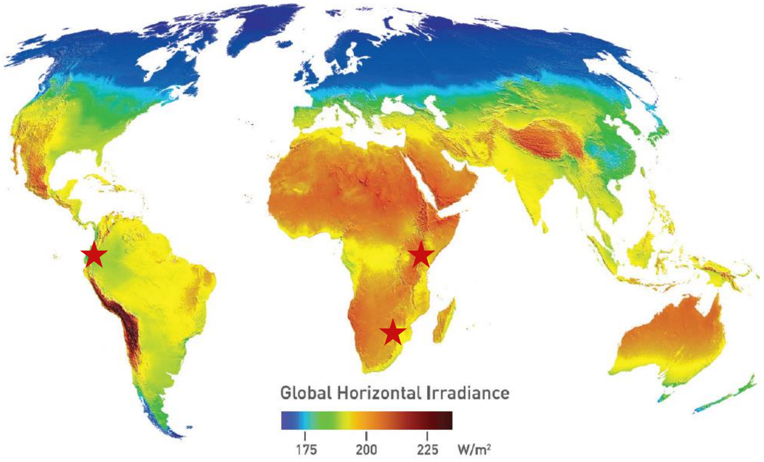
- Ambient temperature
- Solar Radiation
- Human interaction

Output – System behaviour

- Internal temperature
- PV-voltage (in volts)
- Current uptake of the compressor (in ampere)
- Door openings



1. Verification of the WM (model)
Performance of the units (hot zone 5/43 °C)



Assumptions:

- Internal temperature is always between 2 – 8 °C
- Enough Solar Radiation is available

Risks:

- Internal temperature can deviate from the required range of 2 – 8 °C
- Power supply might be insufficient (minimum requirement is 3 days holdover time)
- GSM coverage in remote areas?

With a proper designed remote monitoring system these questions should be solved

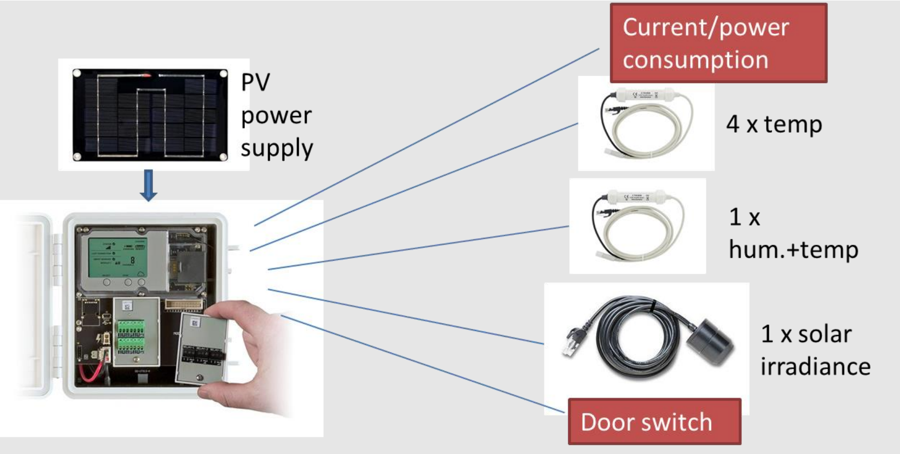
giz

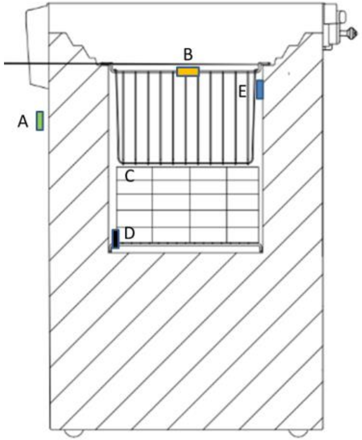
2. Requirements of the equipment

Strategy: Remote monitoring of the performance

- Testing the units in a real world scenario
- Verify the laboratory results

- Equipment: HOBO RX3000





2. Requirements of the equipment

Synergy effects: need to be checked for every monitoring system

- The monitoring system provides an alarm function if the temperature deviates
- → is used to inform the technicians on the ground
- **BUT:** our monitoring system should not interfere with the normal usage of the vaccine refrigerator
- → no temperatures are provided

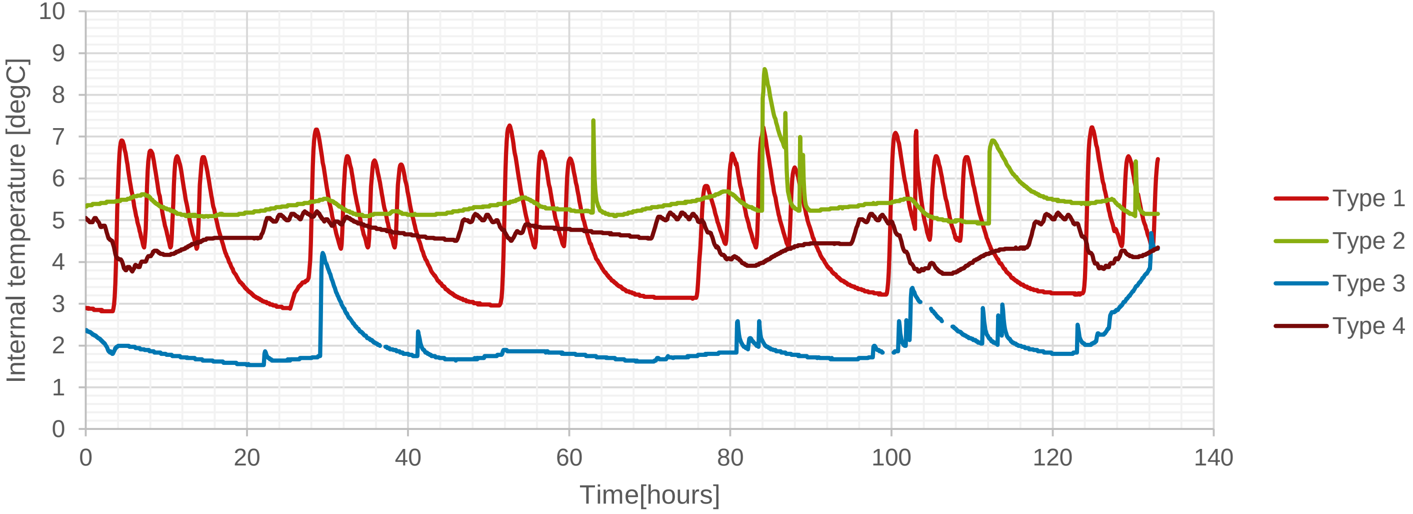
- Results from the monitoring can be shared with the manufacturers
- → insight and real-world feedback with user interaction
- → improve the performance of the units


Lisa Murray / UN Environment

giz

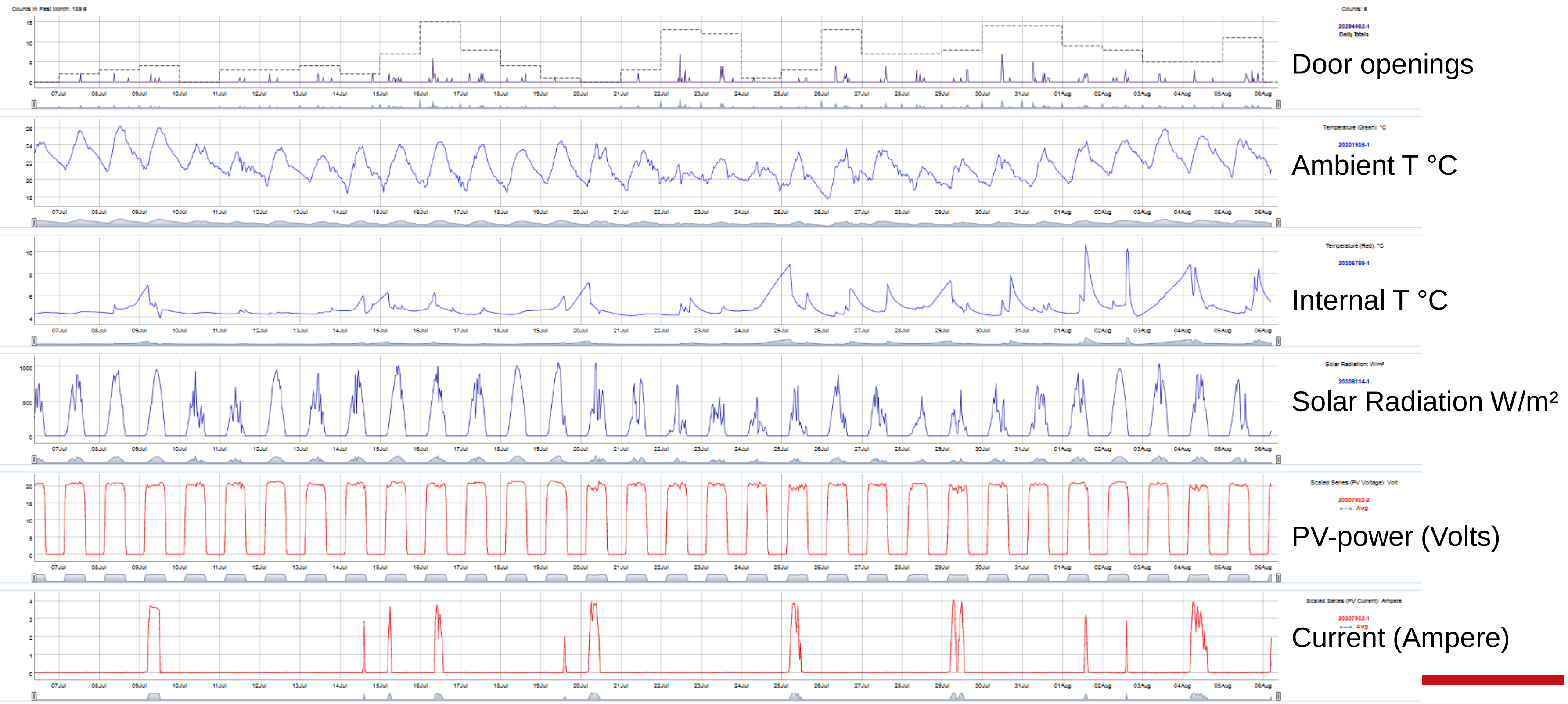
3. Measurement of impact

Internal temperature over 6 days for individual sites

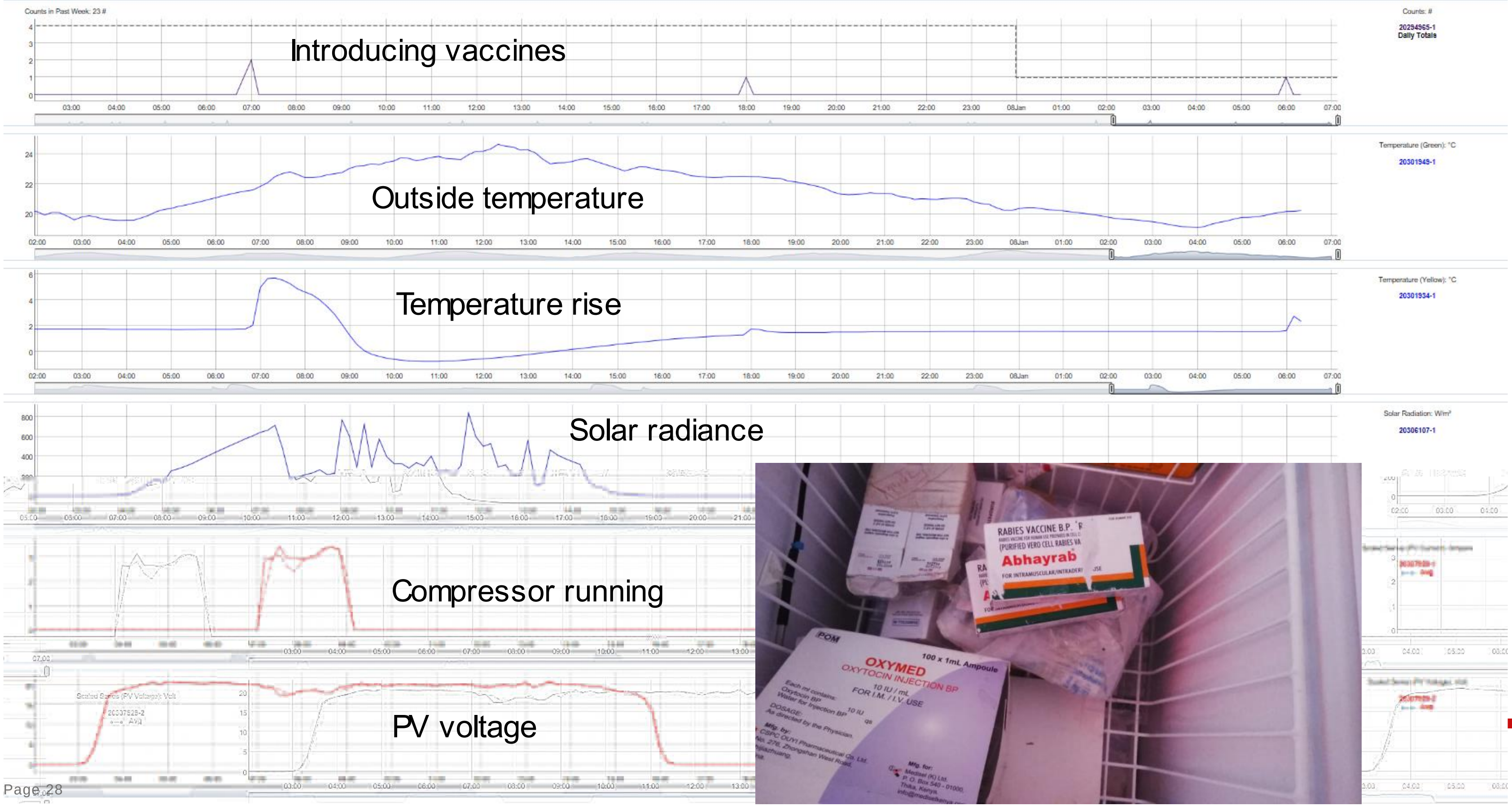


- Each unit type has a typical “fingerprint” depending on control system and different features
- Small deviations occur in both directions

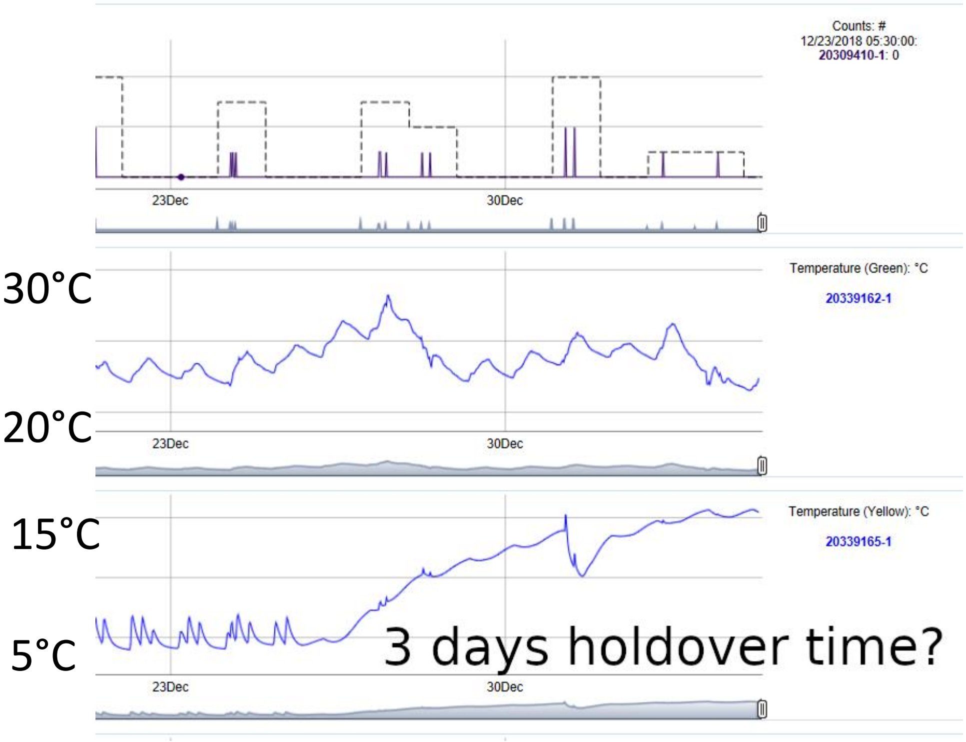
3. Measurement of impact



3. Measurement of impact

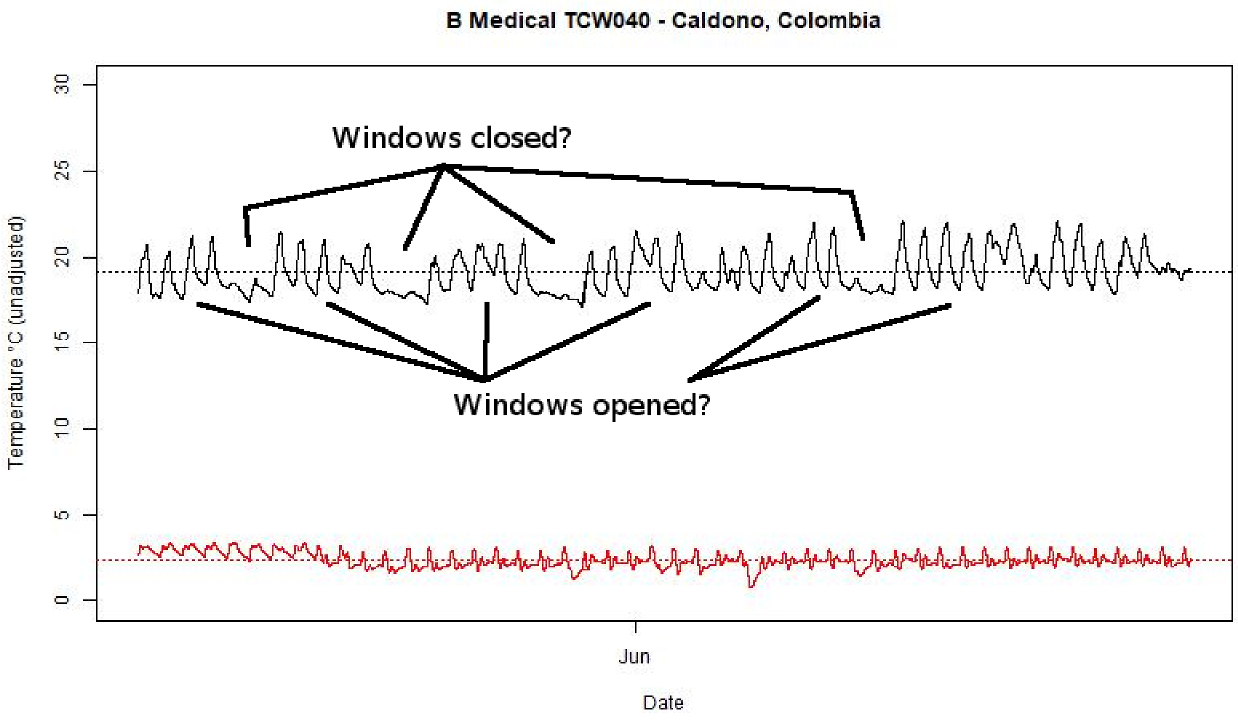


3. Measurement of impact



giz

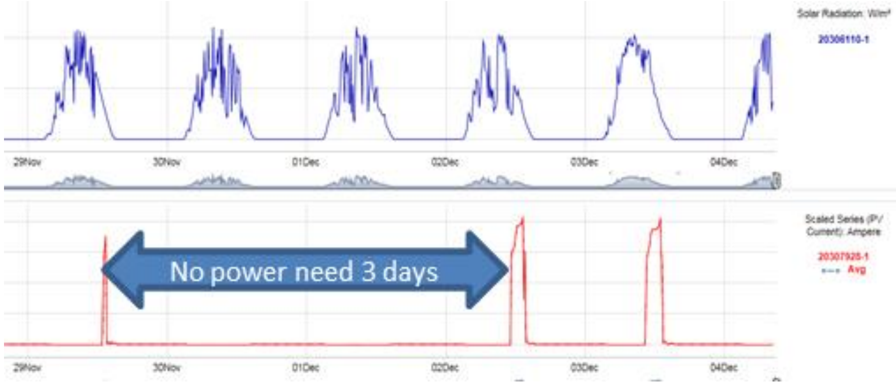
3. Measurement of impact

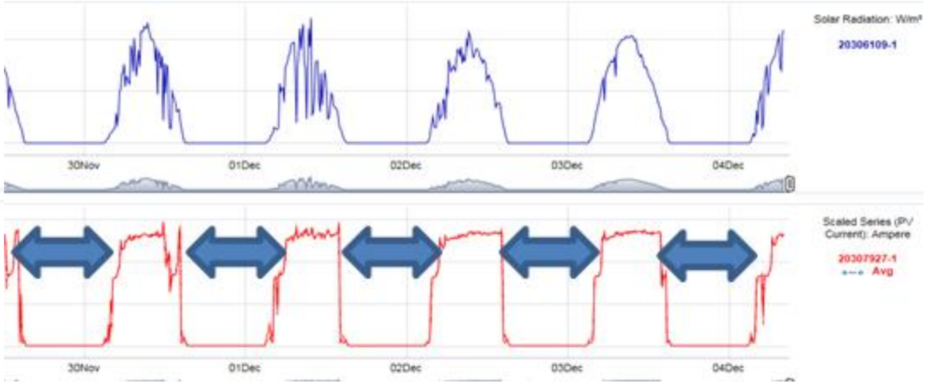


4. Achievements and key take aways (SolarChill related)

Field test results (will be published)

- SolarChill technology works reliable under real use conditions
- Performance stability varies across different SDD technologies
- Excess energy available (potential for additional appliances)
- Power demand varies across different SDD technologies





4. Key take aways

Remote monitoring

- Careful planning is essential
- Wide variety of equipment is available
- Data reduction and interpretation requires knowledge and time
- Proper installation reduces monitoring equipment failure
- Maintenance of the monitoring equipment might be needed

Thank you for your attention

Agenda

1

Welcome & Introduction

- **Detlef Schreiber**
  Head of Section „Environment Policy, Biodiversity and Forests (G330), GIZ
- **Leon Becker**
  GIZ Proklima

2

RBM in remote settings

- **David Schmid**
  Competence Center „Change Management" (4E10), GIZ

3

Digital Monitoring in SolarChill Project

- **Dr. Simon Mischel**
  HEAT

4

Question & Answer Session

Thank you very much for your Participation

For more information, visit:

- Proklima website and Green Cooling Initiative
- SolarChill website
- Result-based monitoring (RBM)
- BMZ Toolkit 2.0 – Digitalisierung in der Entwicklungszusammenarbeit (Remote Monitoring Ch. 4.1)

Or contact us:

- Leon Becker (leon.becker@giz.de)
- Christopher Jäger (christopher.jaeger@giz.de)