

ГЛОБАЛЬНАЯ СИСТЕМА  
НАБЛЮДЕНИЙ ЗА КЛИМАТОМ  
НЕУСТАЙНО СЛЕДИМ ЗА КЛИМАТОМ

SYSTÈME MONDIAL  
D'OBSERVATION DU CLIMAT  
NOUS VEILLONS SUR LE CLIMAT

النظام العالمي  
لرصد المناخ  
لنضع المناخ نصب أعيننا

全球气候观测系统  
密切监视气候

SISTEMA MUNDIAL  
DE OBSERVACION DEL CLIMA  
SIEMPRE VIGILANDO EL CLIMA

GLOBAL CLIMATE  
OBSERVING SYSTEM  
KEEPING WATCH OVER OUR CLIMATE

# GCOS ECV Rationalization

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**GLOBAL CLIMATE  
OBSERVING SYSTEM**  
KEEPING WATCH OVER OUR CLIMATE



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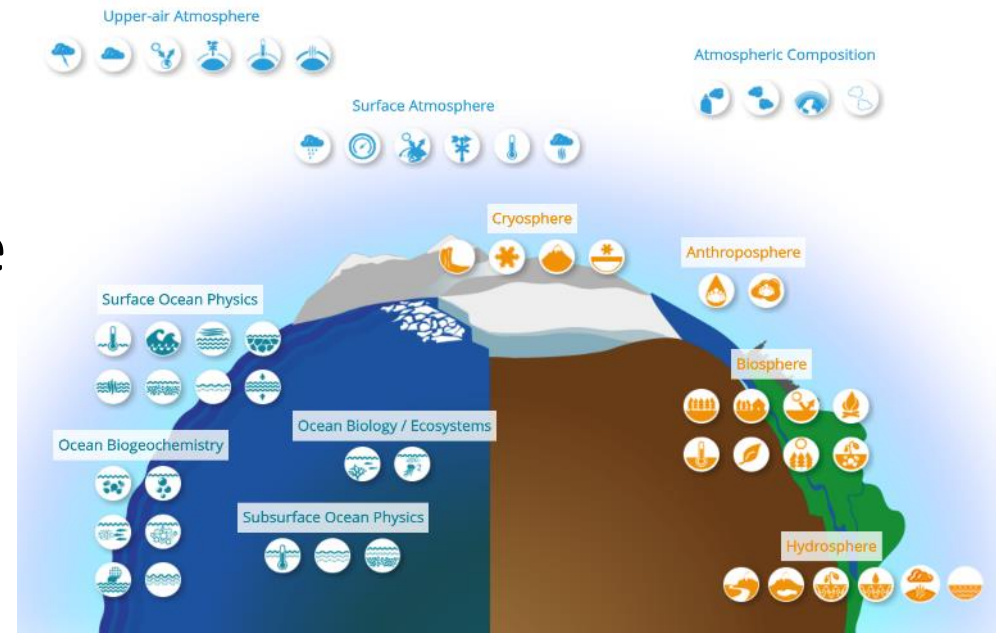


# OUTLINE

- Reminder: ECV concept and framework
- Why the ECV Rationalization is needed and timeline
- Definitions and Governance of the ECV process: Current and Future
- Typology of changes and examples
- Main outcomes

# Importance of ECVs

- Focus **investments** on observational infrastructure and research including international programs
- Evaluate **adequacy** of the observing system for climate
- Establish **standards and practices** for climate monitoring and climate data management
- Mobilise **climate observing communities**
- Develop and implement **international policy frameworks** related to climate (in particular UNFCCC)



# 55 Essential Climate Variables (ECVs)

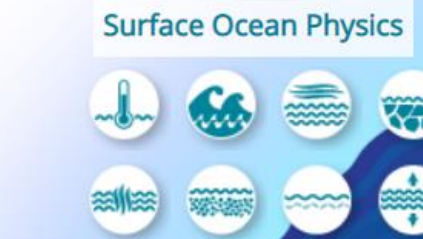


## ECV Criteria

Observation is:

- Feasible
- Cost-effective
- Relevant

## Atmosphere



## Ocean Biogeochemistry



## Ocean Biology / Ecosystems



## Subsurface Ocean Physics



## Cryosphere



## Anthroposphere



GCOS • WCRP

## TOPC

## Land

## Biosphere



## Hydrosphere



GCOS • GOOS • WCRP

## GOOPC

## Ocean



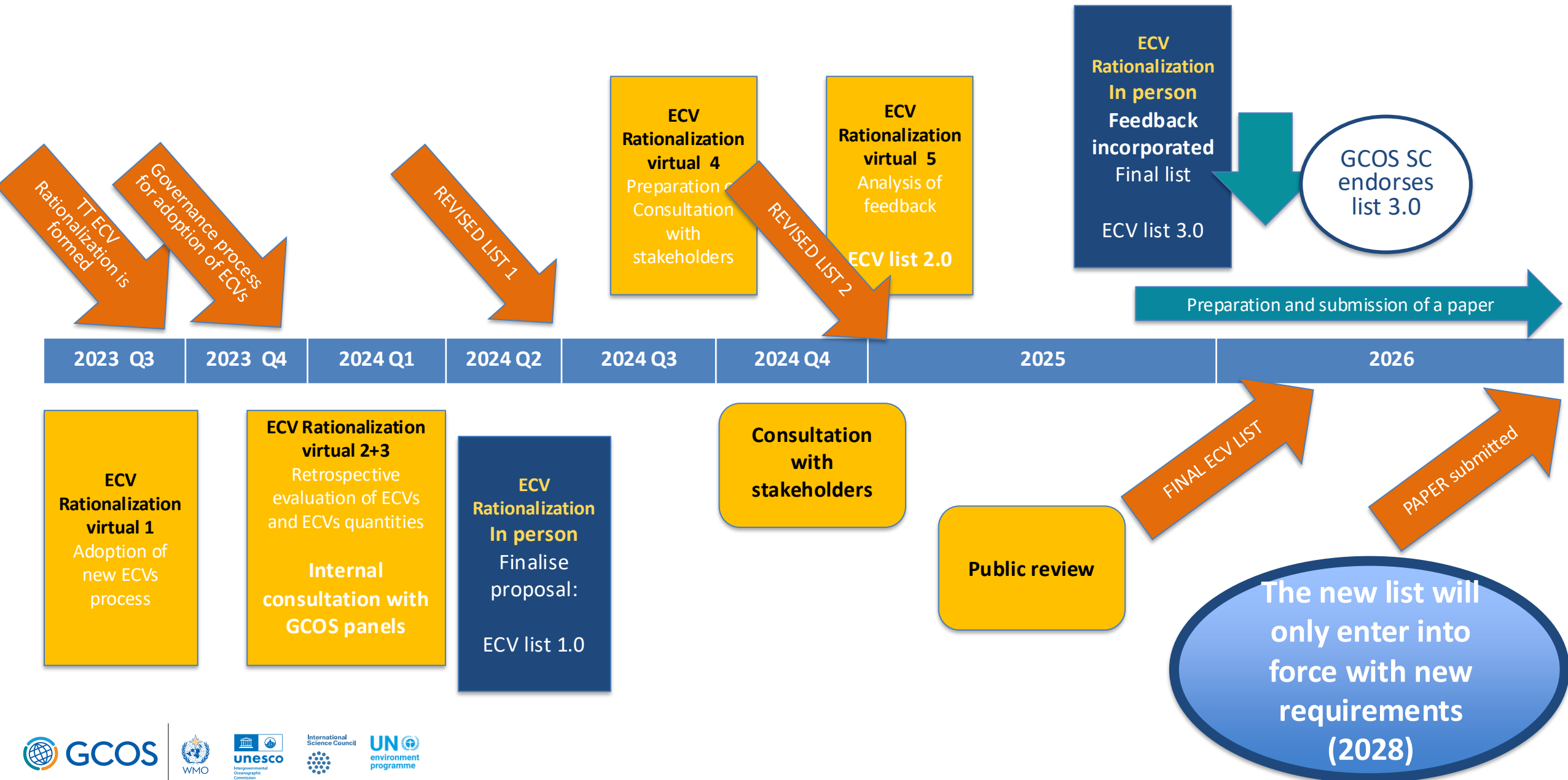
# Why do we need an ECV Rationalization process

*After 20 years of ECV framework:*

- Are all the 55 Essential Climate Variables **still essential**? Are we **missing anything**?
- Is the **current grouping the best possible** one? Is it **balanced**? Is it **consistent** across domains and across earth cycles?
- Is there **enough transparency** and **coherence** in the process that leads to including a new ECV in the list?



# The ECV Rationalization process timeline



# GOVERNANCE: PROCESS TO ADOPT A NEW ECV

## CURRENT

- Only **best practices**, not a formal process.
- Proposals to add ECVs are submitted by groups of experts, and **panels evaluate them** according to the three main criteria: (1) feasibility; (2) cost-effectiveness; 3) relevance.
- **GCOS Steering Committee** takes the ultimate decision (to include or not the new ECV).
- The best practices **only concern the inclusion of new ECVs** to the list (not the ECV products).

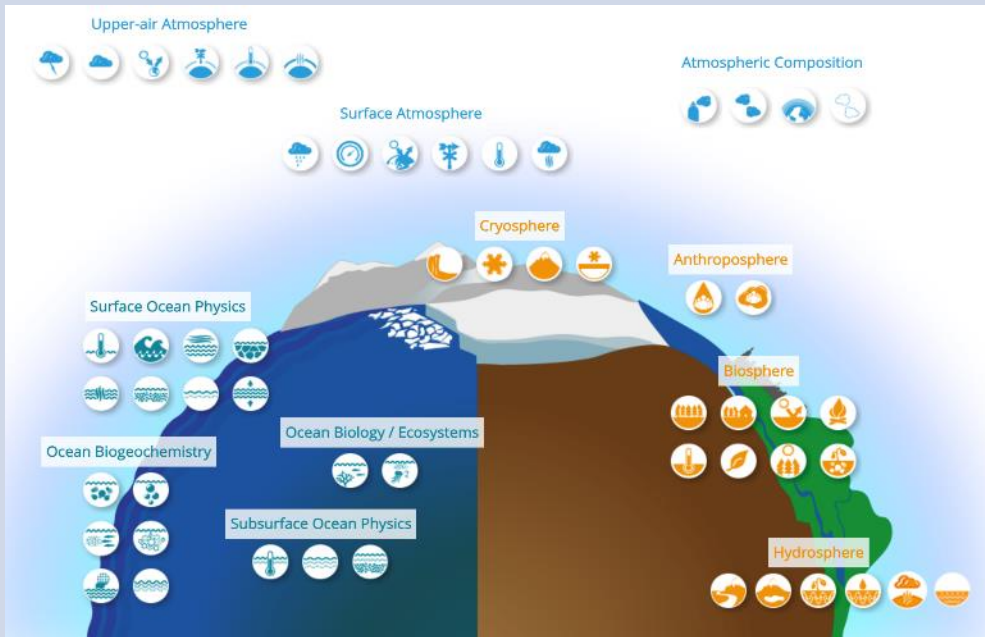
## FUTURE

- **Formal process** designed including:
  - **Bodies involved** and **clear delineation of roles** between the panels, the GCOS Steering Committee, and a cross-panel ECV Board
  - **Instructions** on how to submit the proposal, and how to justify it, including a template
  - **Details** on the evaluation process and evaluation criteria including timeline
- The **process differentiates** between submission of new ECVs and submission of ECV products (now called quantities)

# DEFINITIONS

## CURRENT (GCOS-245, 2022)

- An **Essential Climate Variables (ECV)** is a physical, chemical or biological variable (or group of linked variables) that critically contributes to the characterization of Earth's climate.
- An **ECV product** is a measurable parameter needed to characterize the ECV.



## FUTURE

- ECV products renamed as ECV quantities (to indicate more clearly that these are measurable aspects that can be quantified in some way) and the ECV definition has been modified to show that they can comprise multiple quantities.*
- An **Essential Climate Variable (ECV)** is a set of well-defined quantities that critically contribute to the characterization of Earth's climate
  - **ECV quantity:** A property of phenomenon, body, or substance, where the property has a magnitude that can be expressed as a number and a reference<sup>[1]</sup>. An ECV may be described by one or more such quantities. ECV quantities can be physical, chemical or biological. Categorical quantities are possible (e.g. precipitation type, land cover class).

[1] [International vocabulary of metrology – Basic and general concepts and associated terms \(VIM\)](#)

# OVERVIEW

## ORIGINAL

Number of ECVs (Total = **55**)

**AOPC = 16**   **OOPC = 19**   **TOPC = 20**

ECV products (Total = **177**)

**AOPC = 75**   **OOPC = 44**   **TOPC = 57**

## FINAL PROPOSED

Number of ECVs (Total **41**)

**AOPC = 10**   **OOPC = 12**   **TOPC = 13**   **CD = 6**

ECV quantities (Total = **176**)

**AOPC = 66**   **OOPC = 37**   **TOPC = 46**   **CD = 27**

**2 ECVs removed, 23 of the 55 ECVs remain essentially unchanged**

**Note some ECV quantities appear multiple times in the proposed new structure they as are relevant to 2 or more ECVs (they are counted just once in the above)**

# What are cross-domain ECVs?

- Historically, ECVs have been stewarded by one of the three standing panels
- But some variables we want to observe and quantify exist at the interface (fluxes, physical exchanges) and require input from 2 or more panels
- Cross-domain ECVs recognize this and avoid hiding these important climate system aspects

Surface turbulent heat fluxes	Albedo and reflectance at the surface	Carbon dioxide and other long-lived greenhouse gases
Methane and other short lived greenhouse gases	Temperatures at or near the surface	Surface radiation budget

# What has been achieved

- ✓ **Variables** that refer to the same property **should appear just once**;
- ✓ **ECV quantities** should be the **minimum number** needed to characterize the ECV

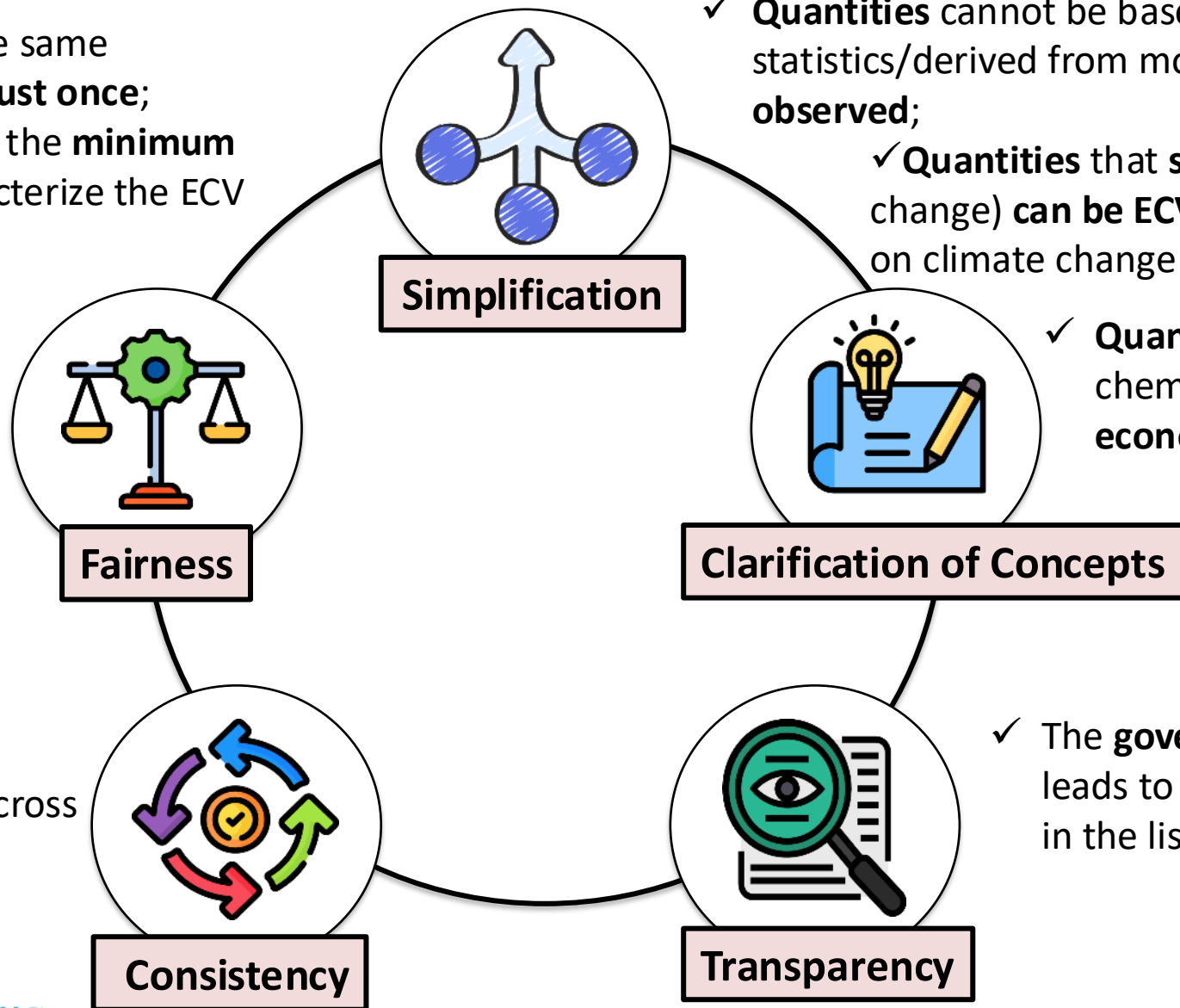
- ✓ The **current grouping** is **more balanced** in terms of the weight given to the ECVs and ECV quantities

- ✓ The terminology is more **consistent** across domains

- ✓ **Quantities** cannot be based exclusively in statistics/derived from models, they **must be observed**;
  - ✓ **Quantities that show impact** (of climate change) **can be ECVs**, as long as they inform on climate change

- ✓ **Quantities** should be physical, chemical or biological, not **socio-economic/human related**

- ✓ The **governance process** that leads to including a new variable in the list **has been defined**



Thank you

Any questions?



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