# Towards future proof ...
## An introduction

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refrigerants delivered by mother nature

# Starting point

For a sustainable infrastructure, a guidance for “future proof” (quote from several UN documents):

**“Protecting the planet of tomorrow requires the right decisions to be made today”**

# The issue at stake

In how far can we **define** the future, “our” future, i.e., the needs of our society in a broad sense ?
By the way, is that going to be **one** global society ?

Or is it the future that we already have given certain constraints (even if minimal),
**that will come over us**, and where we have to make the best decisions possible NOW … (?)

In order to frame **these constraints** differently, to achieve a “real” non-BAU result by 2030 ?

# SDGs

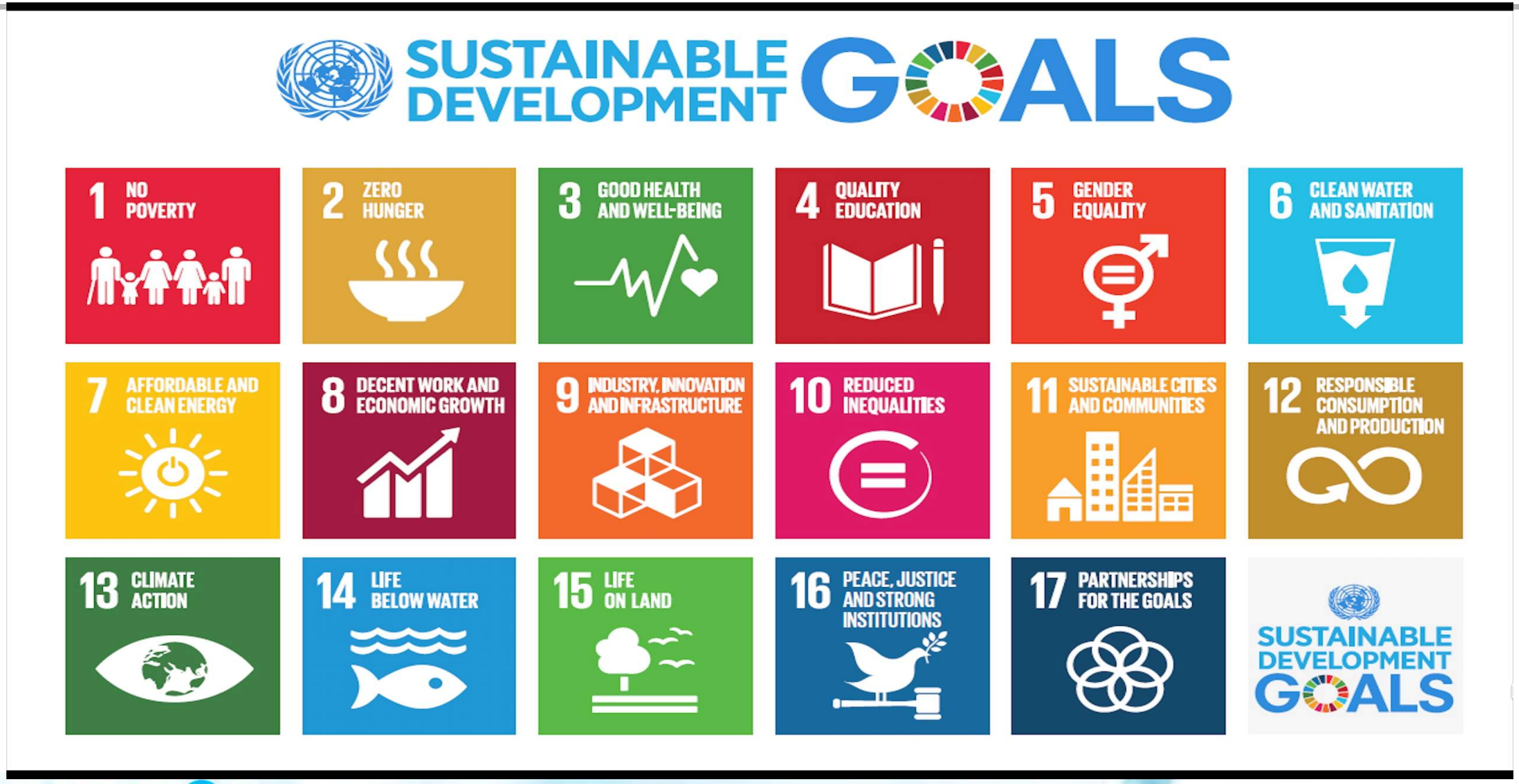
Looking at the **17 Sustainable Development Goals**, each of them presents a perceived necessity to structure a (separate) part of the future world to live in, where “no-one is left behind”,
it is a good way of paving the path towards the future, but the whole “set” of SDGs cannot just simply result in the future **“one global”** world “we want”, even not with SDG 17, there are so many subitems !

So, what could be done additional to that, regionally, nationally .. to be convincing, leading ? *

* In fact, one should mention that this is generally true, but that this meeting specifically deals with the SDGs if related to HVACR

* One normally agrees that the SDGs applicable to HVACR are SDGs 3, 4, 5, 7, 9, 11, 12, 13 (and 17)

# SDGs


SUSTAINABLE DEVELOPMENT GOALS
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS

# So

Will current and near future actions **planned** still follow **"today's intent"** of giving more to all, to proceed with current economic structures, maybe in a modified form, for both developed and developing countries, without major limitations to today's patterns, to not derail societal practices too much ? *

Would not be the right message …..

But the **"voluntary"** aspect in climate matters is important to note ….

* On a finite planet, infinity cannot exist. Even humans prefer (and act) as if infinity could exist …..
* Greatest shortcoming of humanity is its inability to understand the exponential function (Albert Bartlett)

# When

The world talks about total **"decarbonization"** as a necessity and a "belief" and considers this as THE solution, however, the carbon cycle is an essential one in nature, in human society

Making additional use of the carbon cycle in several ways cannot be excluded, and makes a lot of sense *if it were sustainable* (part of a cycle …)

# Where

Where one talks about sustainability in energy production and consumption, in how far is all this actually sustainable in relation to the use of (material) resources ?

Which aspects may put **limitations** to already planned, new (future) “techno-patterns” ?

Which next years’ issues (e.g., natural gas Russia, renewed nuclear interest, trade (tariff) issues, eco-taxes) are already **shaping the (near) future** ?

# Towards

With all future **"e-things"** considered as the ("renewable") path for all countries, a completely new (more complex) electricity grid will have to be **the basic** solution in many countries

This kind of development over the next "XX" years will not be able to cope with the rapid growth predicted for many developing countries -- because it will come after many developments that will have taken place in a BAU way

What is the consequence of electricity as the essential element in the future ? *

* Actually, for HVACR here

# Towards

What is to be defined as future proof, or how does one go **towards** something that is future-proof in a future that we need, we want, (we should) or **can have** ?

Is it a one way, done-deal at some stage,

or a “back and forth” one, trying to find the best way ?

# Now to

Now going to the sector of refrigeration and air conditioning. The one we are talking about here. What is future-proof here, where we see an **ever-expanding food chain** requiring adequate refrigeration and cooling of products, where we expect a super **large growth** of the total number of smaller **air conditioners** in the world (which is in principle not really “future-proof”)?

# Whatever society ..

Whatever society wants, with a “decarbonized” and probably still partly fossil driven energy supply, it will be clear that **limits will have to be set**, within which current patterns may still expand or will have to be re-considered

Which are the real **basic elements** to be considered for (“eco”?) future-proof R/AC solutions? *

***Eco-economics***

*Reduce*
*Recycle*
*Reuse*
*Repair*
*Refurbish*
*Repurpose*
*Redesign*
*R&D for new*
*Reskill*
*Reverse supply chains*

# First

A first thing is low energy consumption in manufacture and operation, low emissions, minimizing peak (renewable) electricity grid loading, low use of resources as a result of recycling. This will ask for high efficiency, low consumption, multi-targeted operations, lots of storage etc. etc.

Energy input needs minimizing, not from the point of view of a single unit, but in relation to the use of equipment in “infrastructures”, via coupling of the required demand and using excess capacity in the best way possible

# However,

In principle nothing is future-proof, since one cannot predict future society structures with all the possible expansions and limitations required – using today's (finite) horizon

However, ways and methods, and also equipment and everything around it, they are essential parts to be considered and required now –

# That is …

That is, with natural refrigerants and others to be optimized for the needs, in single applications or in combined “connected”, “netted” structures that can “do the complete job”, which specific advantages can bring natural refrigerants, to respond to all these complicated future demands,
what is then future-proof ?

Will this objective be --is it ?-- **a global “common” perception** ?

# So

So, is the following correct ???

Future-proof is all that fits in the (natural refrigerants) development of low charges, good heat exchangers, storage capacities, intelligent coupling of systems via various control elements, also to be applied at high efficiency, low use of resources and at affordable costs, and this in both developed and developing countries

# And in the end ..

In conclusion, with the various drivers discussed,
the next 1½ day will demonstrate what is perceived to be possible with reduced charges, newly developed components, optimized ways of operation, coupling of supermarket systems …
and all further issues to be taken up within the broader context as outlined …..

Towards a future proof HVACR society, for you to judge ..

**Thank you !**

*Nature doesn't need people*
*People need nature*

# Contacts

**Presentation on a personal basis**

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