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GBA German Business Association

Sustainability Matters

How to approach and implement Sustainable Practices in your Organization

Mathias G. Kothe
Founder and Managing Director, Syntegra Solar Intl. AG

November 3rd, 2022
The Sentry, 2F, Sonatus Building, 15 Le Thanh Ton, District 1, HCMC

October 2022

Overview and Time-Line

Organized as a GBA Members for Members PLUS Event, HCMC, November 3rd, 2022

Details to Format and Content, "Sustainability Matters" Event:

⇨ Welcome	3'	AjD
⇨ Introduction – Setting the Scene	3'	MGK
⇨ Impuls-Referat I: **"The Bigger Picture"** Why Sustainability Matters and why it is without Alternative in doing business!	10'	MGK
⇨ Impuls-Referat II: **"Embracing Sustainability – the "Bosch Journey to CO_2 Neutrality by 2020"** Long Term Thinking and Action towards Sustainable Business Development & Practices	10'	Hung
⇨ 1st Roundtable Discussion (app. 6 participants per table, 6 tables)	20'	All
short brake	*10'*	
⇨ Impuls-Referat III: **"Not because it's easy, but because it's hard: Sustainability as the new Normal"** Approach to Sustainable Action in Heavy Industries - examples of Cement- and Steel-Production	10'	LS
⇨ Impuls-Referat IV **"Financing – Funds – Support Mechanism"** Financing Long-Term Investments: Financing Renewable Energy Projects in Vietnam	10'	LR
⇨ 2nd Roundtable Discussion	15'	All
short brake	*10'*	
⇨ Conclusions & Learnings – roundtable groups to present short summaries, 2' per table	20'	All
⇨ Wrap-up and adjournment	4'	AjD / MGK
Total	**125'**	

Details to the Roundtable Discussion & Exchange Format:

There will be four input-presentations ("Impuls-Referate") about sustainability in business, after which you will discuss in small groups about sustainability trends suitable for your company / industry, and how to react to challenges ahead, which may include to develop a corporate culture of awareness to the needs for "Sustainable Practices and Action", i.e., implementation of green initiatives in your organization, and the progress you and your company have made compared to peers and other industries.

Impulse-Presentation I
"Why Sustainability Matters - The Bigger Picture"

Keynote Presenter: Mathias G. Kothe, Syntegra Solar Intl. AG

Sustainability Matters!
and why Business & Industry are most important adressing Sustainable Action

- It's about Climate change / Global Warming
- Climate change / Global Warming caused primarly by CO_2 emission (all other things equal)
- Origins of CO_2 emmission: Energy, Industries, Transport & Travel, Other
- Origins of CO_2 emissions: by countries and regions

- Vietnam is a top 5 country affected by Climate Change, namely by rising sea levels
- Vietnam a success story – but it's a mixed picture

- Some solutions CO2 reduction are easier to come by and materialize already – Renewable Enrgies – others are a real challenge
- RE – namely Solar PV and Wind – are an important factor in the "Transition to Sustainability" - Vietnam a leading success story
- However, it's a mixed picture when put into perspective with economic growth and political action

- Conclusions: Climate change / global warming is likely the biggest challenge to humankind (all other things equal)
  Climate change / global warming is strongly correlated to greenhouse gas emissions, namely to CO_2 emissions
- "Sustainable Action" however goes way beyond reducing CO_2 emissions: it's about Business Model Innovations, about Technology Innovation, it's about Resource Allocations, and truly important, it's about Financing Solutions

⇒ Examples of firms which lead in implementing Sustainable Practises

Impulse Presentation 1: The BIG picture

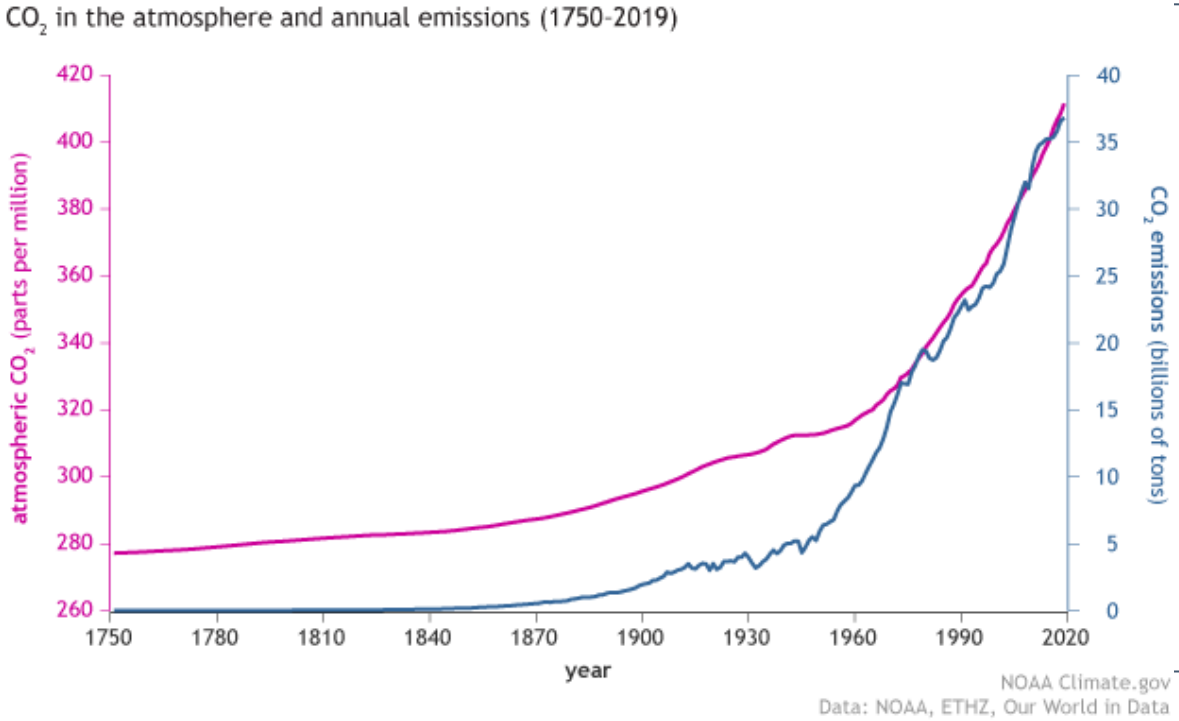
…:

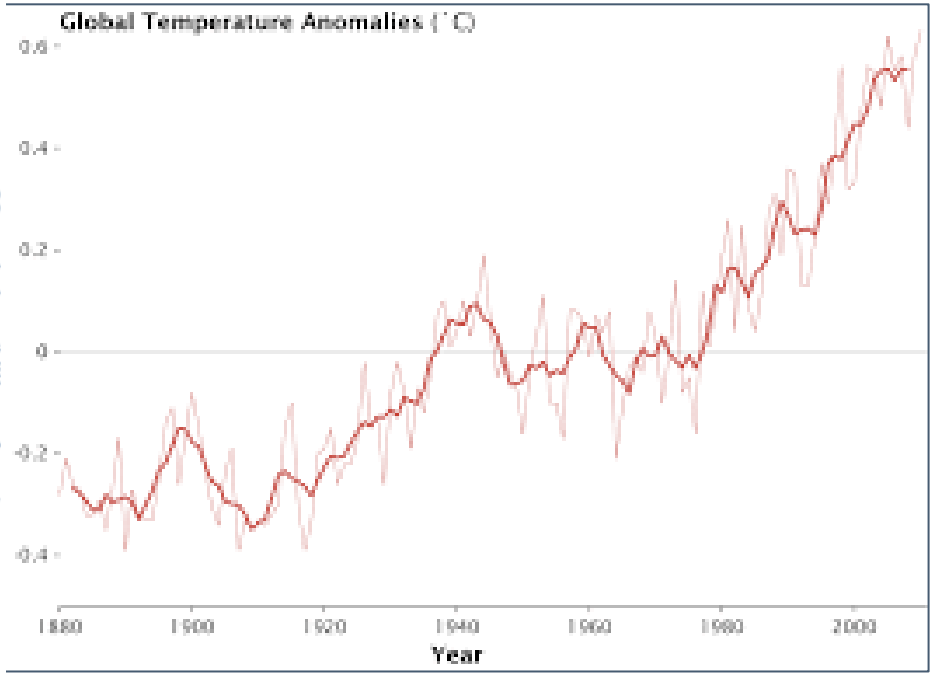
Global Warming / Climate Change is a fact.
It is strongly correlated to Greenhouse Gas Emissions.

The BIG picture:

Climate Change is a fact – strongly correlated to Greenhouse Gas Emissions

Nine of the hottest years ever recorded were in the last 11 years (2010 – 2021)





Highest ever measured CO_2 levels in the atmosphere: 421.2 ppm, May 30, 2022

The BIG picture:

Climate Change is a fact – strongly correlated to Greenhouse Gas Emissions

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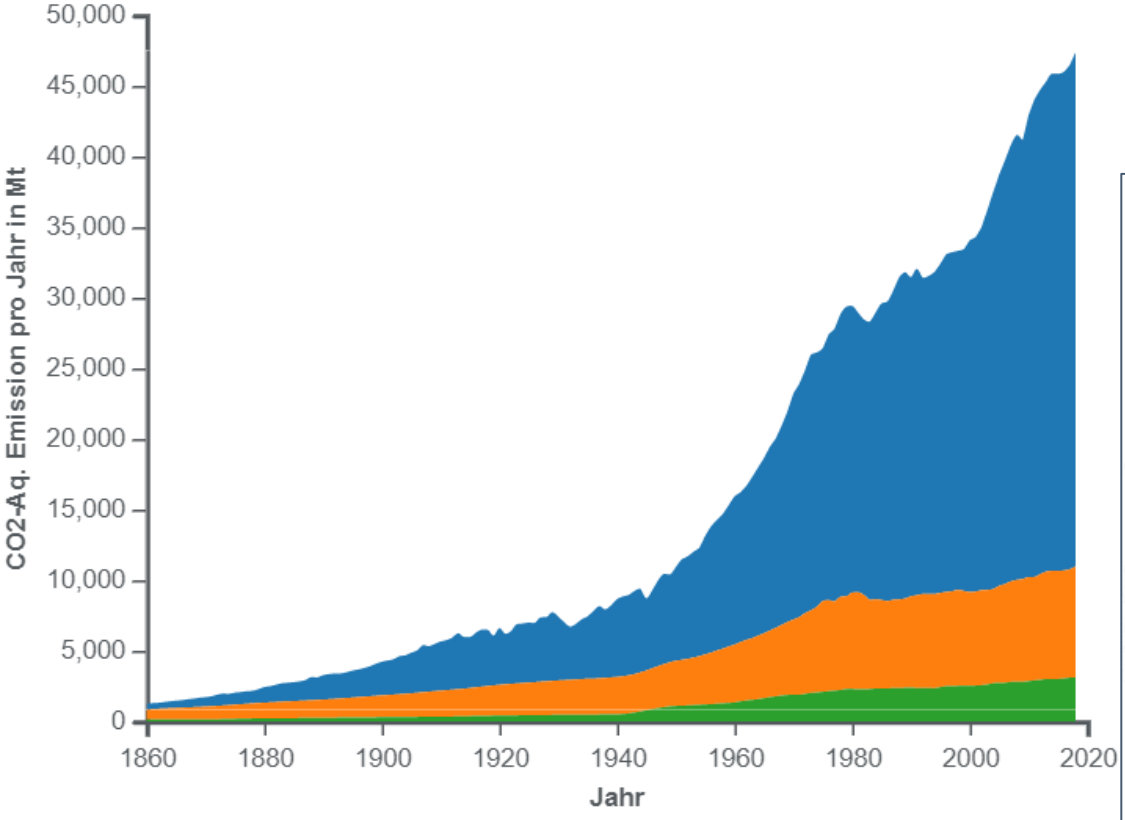
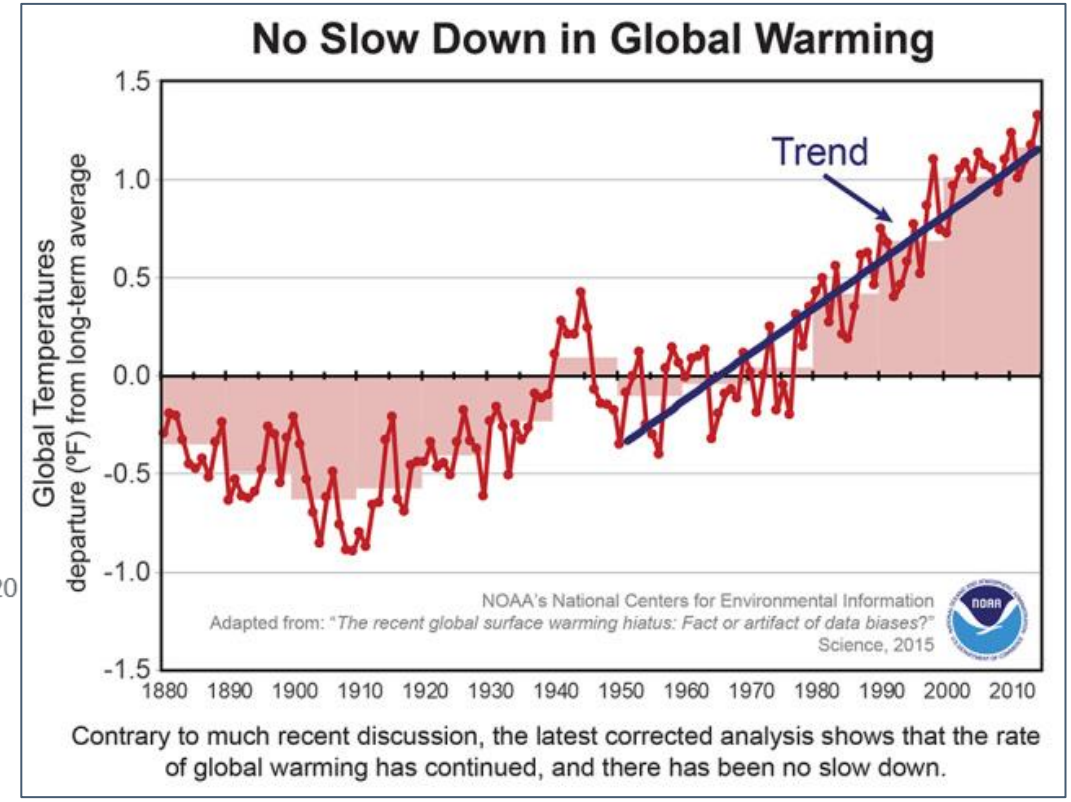


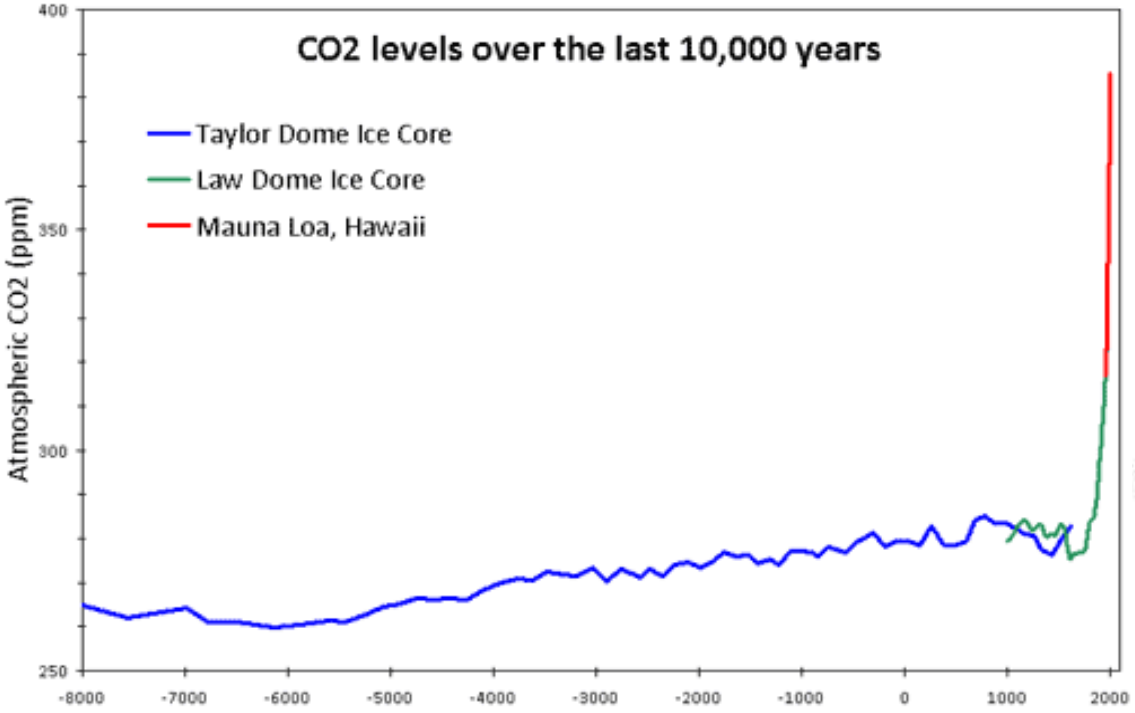


Nine of the hottest years ever recorded were in the last 11 years (2010 – 2021)

The BIG picture:

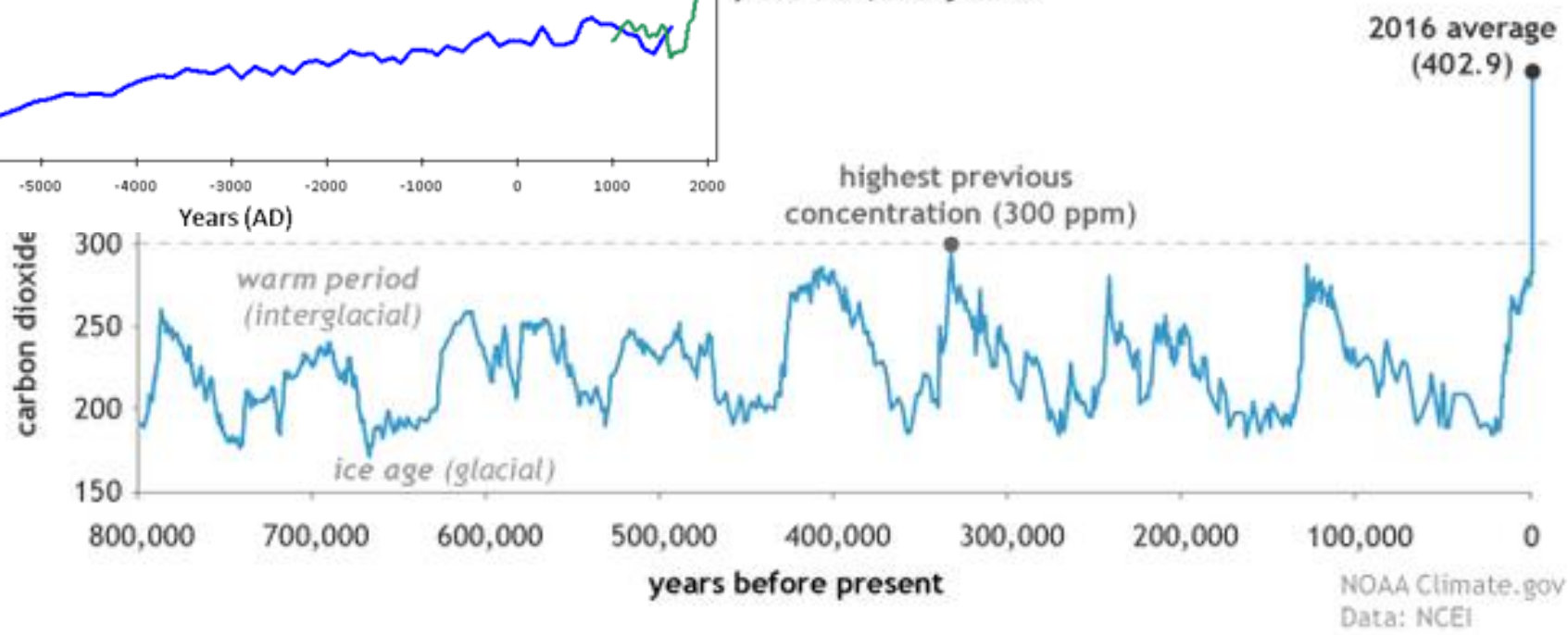
It is a Jump Function! $C0_2$ levels [ppm] measured in the atmosphere.

Highest Concentration of CO_2 levels in the atmosphere in the last 800.000 years – *and rapidly increasing*



May 30, 2022	**421.19 ppm**
1 Year Change	3.37 ppm (0.81%)

CO2 during the ice ages and warm periods, for the past 800,000 years



The BIG picture:
For almost all regions worldwide, highest temperatures ever recorded

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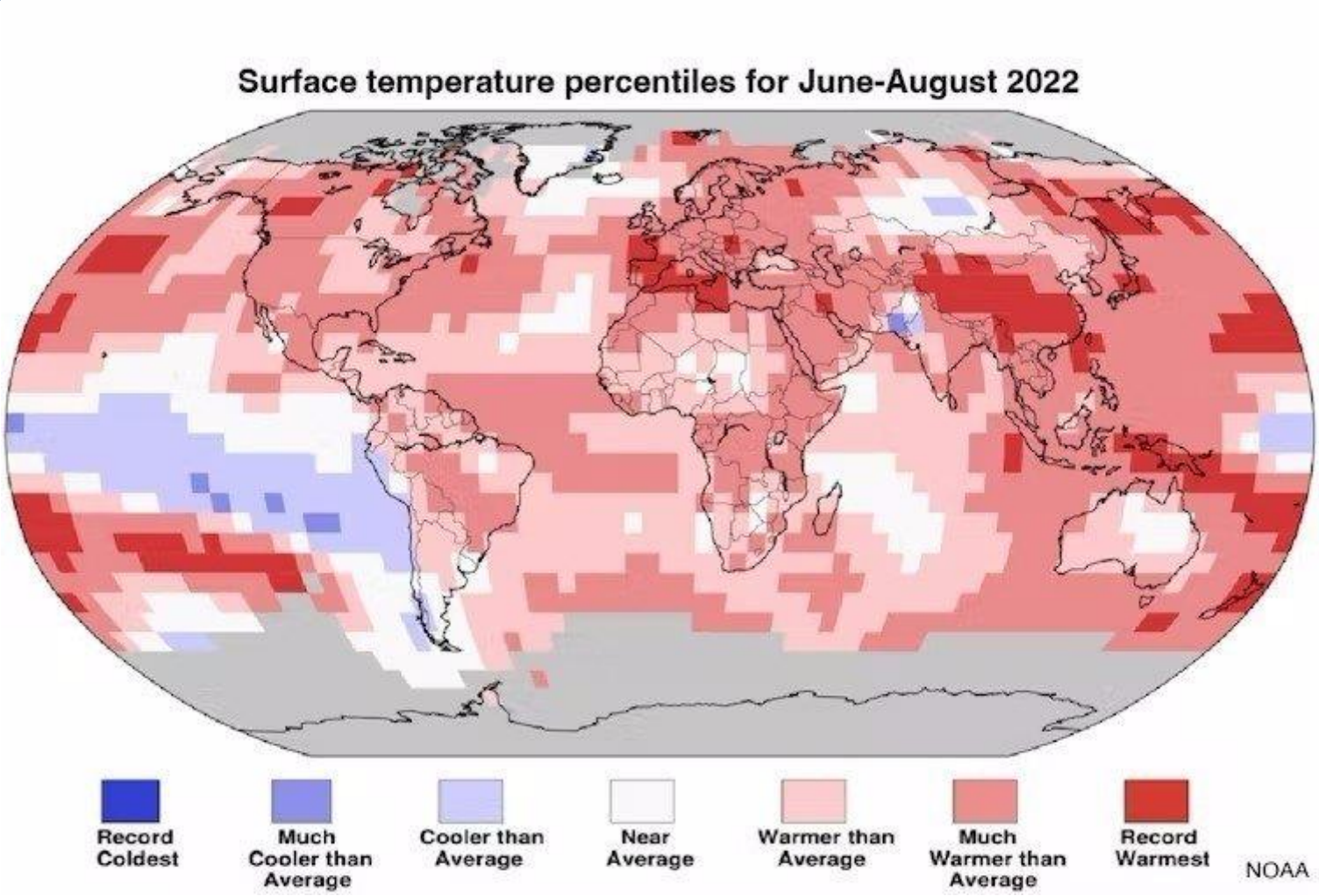

Most recent data: **the June-August 2022 global land and ocean surface temperature was 0.89 °C above the 20th-century average of 15.6 °C - *so much for the 1.5 °C limit***

The BIG picture: $C0_2$ Emmitents by Sector

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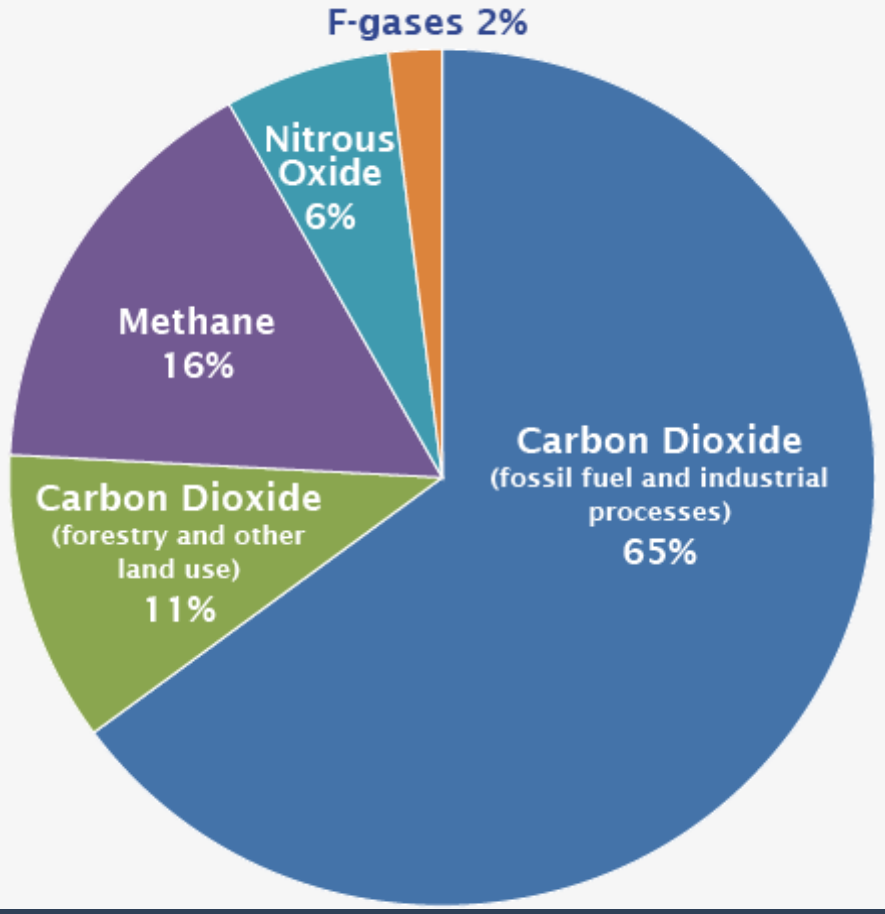
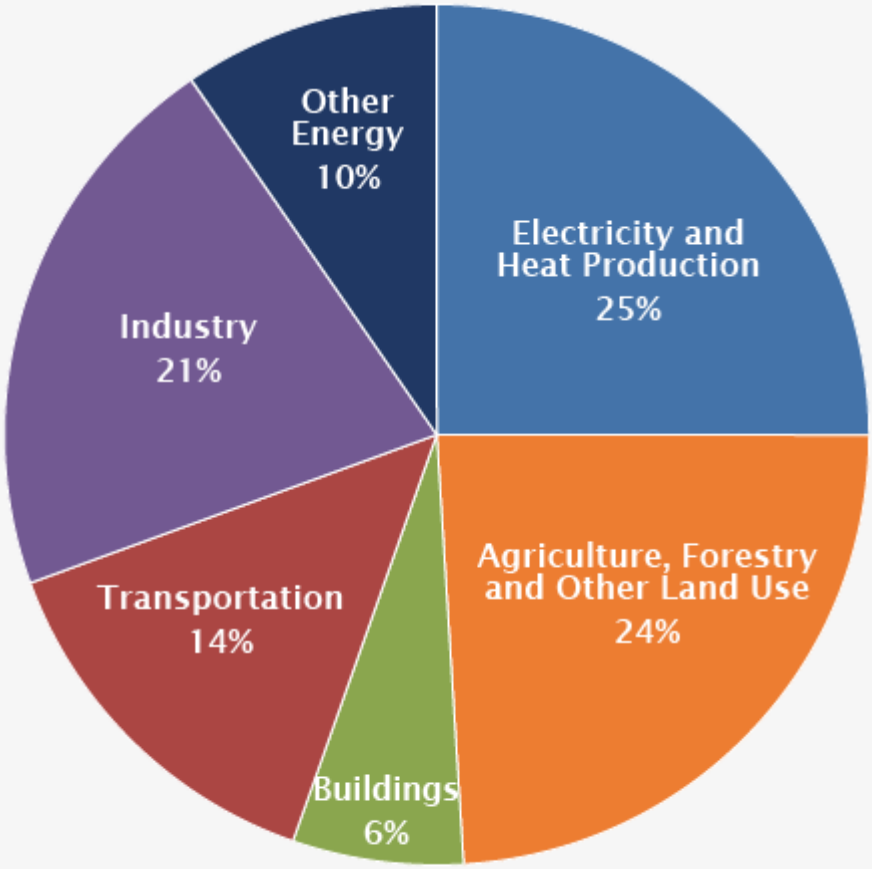
Global Greenhouse Gas Emissions by Gas



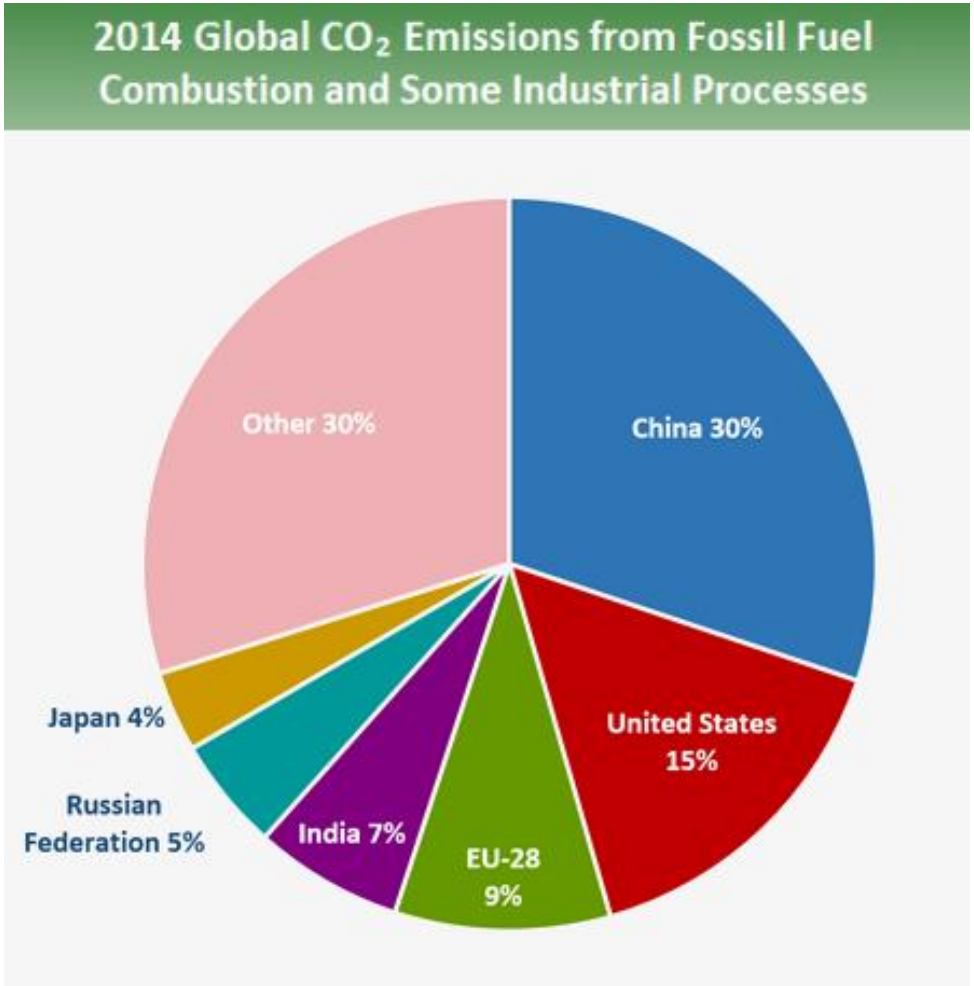
Global Greenhouse Gas Emissions by Economic Sector



Almost 2/3 of Human-Made CO_2 emmissions are generated by the Energy Sector, by Industry at large, and by Transport

The BIG picture: $C0_2$ Emmitents by Country

Electricity demand in China jumped by 10% in 2021,adding the equivalent of the total demand of all of Africa



China is decisive to the effective reduction of greenhouse gases

FIGURE 1

2019 net GHG emissions from the world's largest emitters

Million metric tons of CO_2e, including emissions and removals from land-use and forests and share of global total

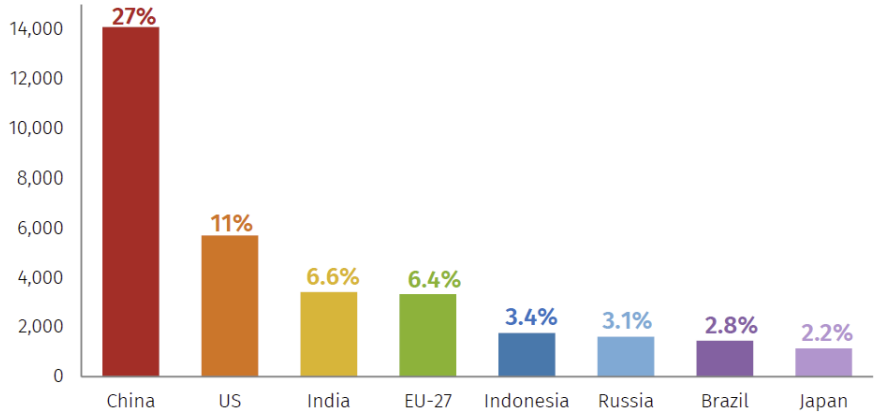
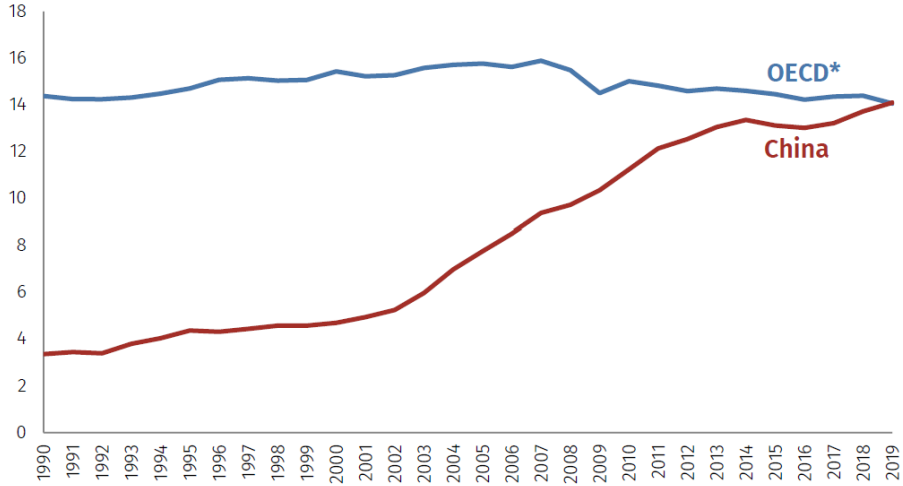


FIGURE 2

Total net greenhouse gas emissions, 1990-2019

Gigatons of CO_2e



Source: Rhodium Group, UNFCCC. Includes emissions and removals of land-use, land-use change and forests (LULUCF). Excludes international aviation and marine bunkers. Includes six Kyoto gases using AR4 GWP values. *OECD includes OECD members as of 2019 and includes all EU member states.

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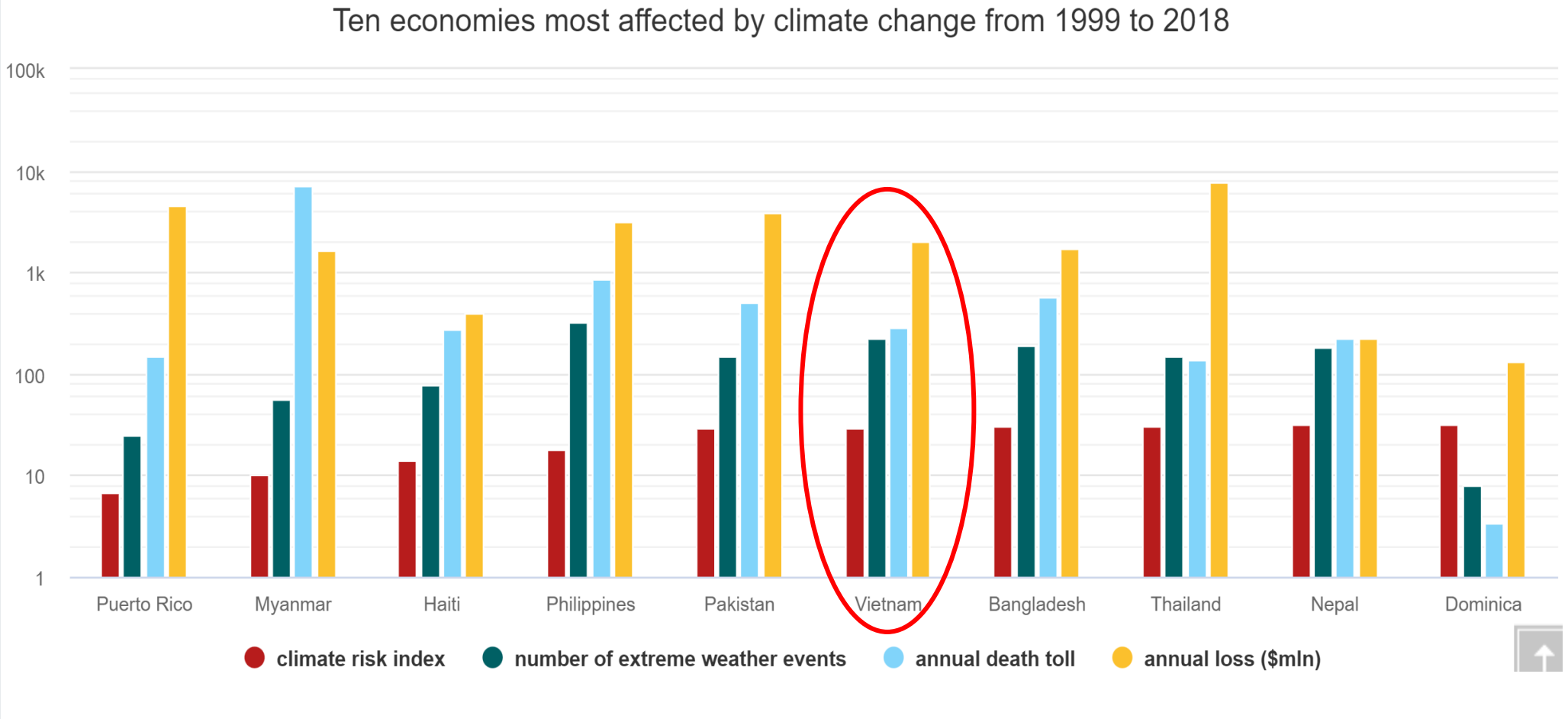
Vietnam is a Top 5 contry affected by Climate Change / Global Warming

The BIG picture

Vietnam a most affected country – ranked Top 5 world-wide

https://unfccc.int/files/adaptation/application/pdf/viet_nam_summary_cca.pdf



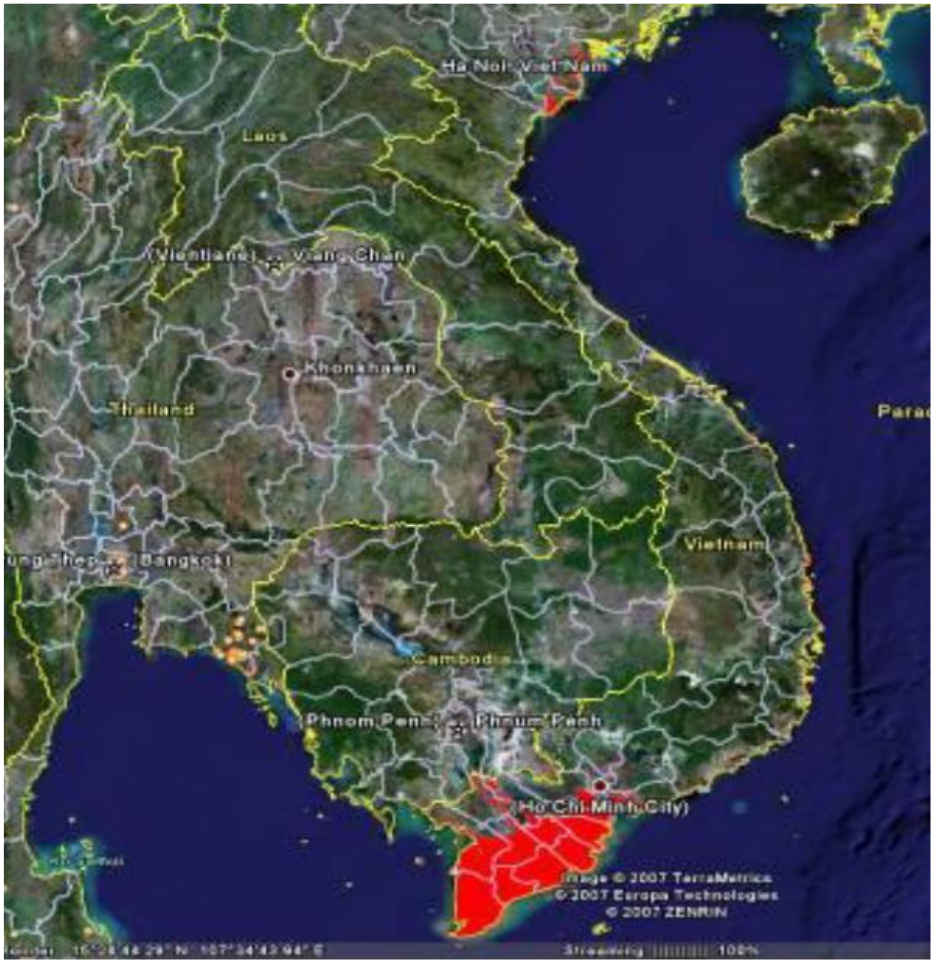
Vietnam: one of the Top 5 countries most vulnerable to climate changes

1m sea level rise translates to 5% land loses, 11% population affected, 7% agricultural activities impacted, 10% GDP reduced

The BIG picture

Mekong Delta including HCMC most affected in SEA Region

Economic costs of Climate Change to Vietnam in 2020 higher than losses due to COVID



WORLD BANK BRIEF - JULY 1, 2022:
Country Climate and Development Report for Vietnam

... Vietnam, with over 3,200 km of coastline and many low-lying cities and river delta regions, is one of the most vulnerable countries in the world to climate change. Climate change impacts – mainly higher and more variable temperatures and sea level rise – are already disrupting economic activity and undermining growth. Initial calculations suggest that Vietnam lost $10 billion in 2020, or 3.2 percent of GDP, to climate change impacts.

Without proper adaptation and mitigation measures, it is estimated climate change will cost Vietnam about 12 percent to 14.5 percent of GDP a year by 2050 and could plunge up to one million people into extreme poverty by 2030.
As Vietnam considers its climate strategy going forward, the CCDR identifies actions and options for both the public and private sector to build climate resilience, achieve the country's pledge of net-zero greenhouse gas emissions by 2050, and advance socioeconomic development, ...
https://www.worldbank.org/en/country/vietnam/brief/key-highlights-country-climate-and-development-report-for-vietnam

"Initial calculations suggest that Vietnam lost $10 billion in 2020, or 3.2 percent of GDP, to climate change impacts" (World Bank BRIEF - JULY 1, 2022)

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Solutions? Solutions! Example in case: Renewable Energies.
Renewable Energies a key factor in reducing human-made CO_2 Emissions

Abundance

For all practical reasons, RE / Solar Energy is unlimited and unexhaustable.

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Abundance

The potential of Solar Energy is enormous – it >> 10.000 times what humankind requires

In app. 1 hour, the surface of the earth receives more solar energy than the world's energy consumption for an entire year.

Fact 1:

There's one simple fact that may just change your thoughts on **renewable** power:
the amount of power from the **sun** that strikes the **Earth** in **a** single hour,
is more than the entire energy humans consuming in a **year**[*)].

Fact 2:

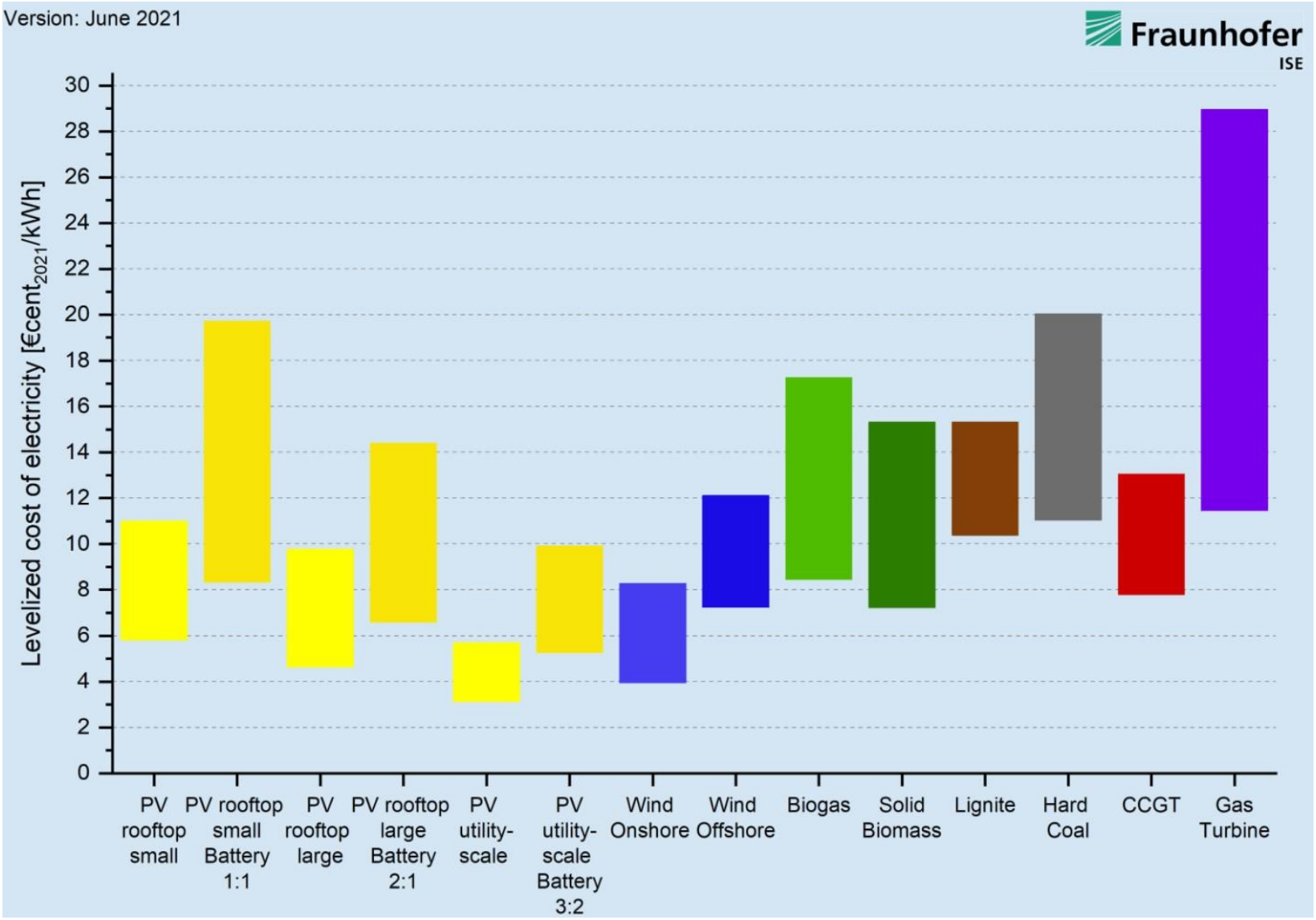
Less than 2% of Vietnams surface is needed to cover for all energy/power used in Vietnam (2021),
with today's avaiable Renewable Energy Technologies (Solar, Wind, Hydro, etc.)

Renewable Energies are a most important factor in the Transition to Sustainability:
(i) Abundant; (ii) Cost-effective; (iii) Mature; (iv) Can be rapidly deployed; (v) Financing available.

Cost-Effectiveness

Wind and Solar are most cost-effective power generation technologies

Full costs of producing Electricity in Vietnam withSolar PV or On-Shore Wind is app. 0,055 $/kWh +/- 0,01 $/kWh



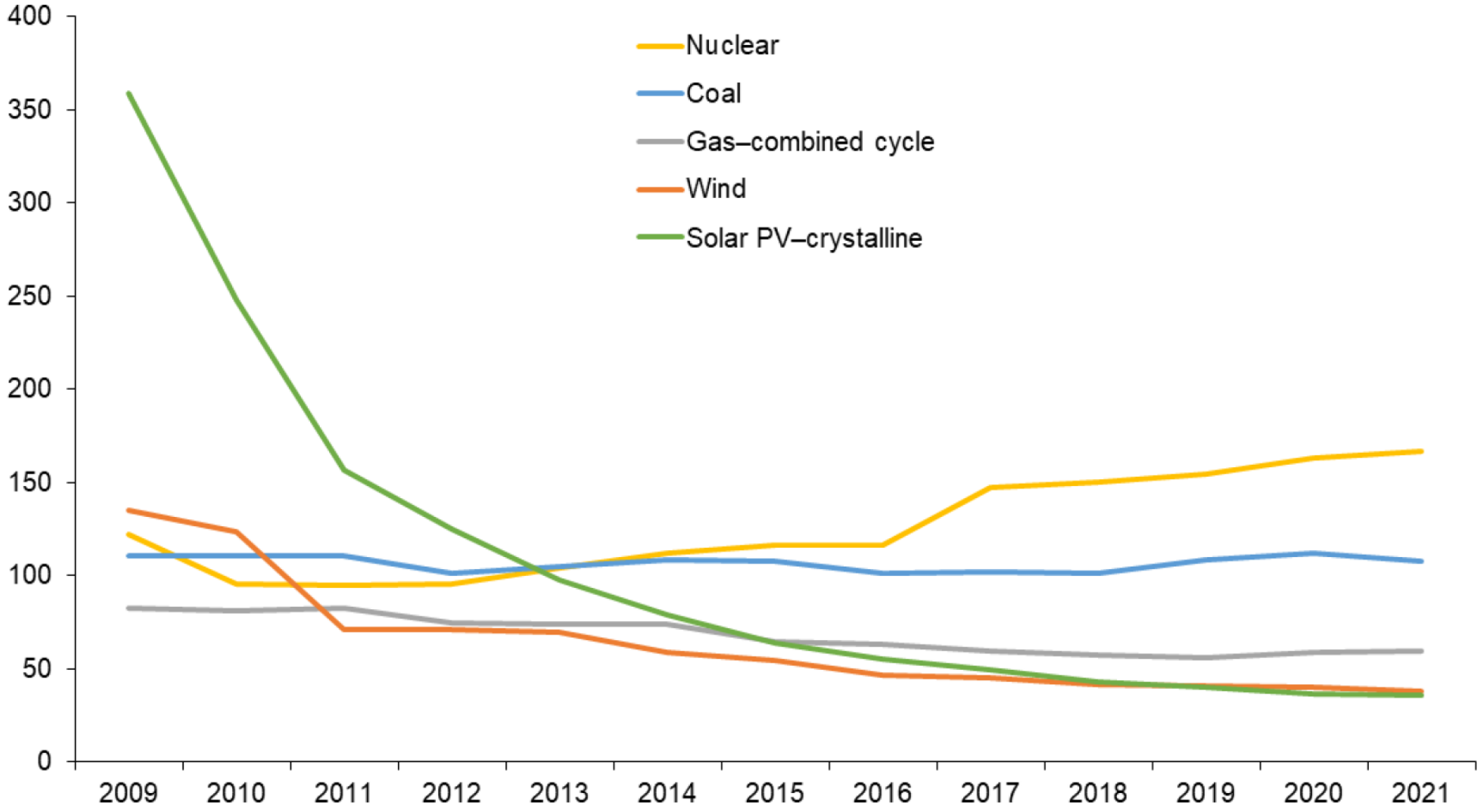
Cost-Effectiveness

Wind and Solar are most cost-effective power generation technologies

RE are most cost-effetive – however they need either complementary Base Load Capacity or Power Storage Systems

Solar Boasts Lowest Levelized Cost of Energy

Mean unsubsidized levelized cost of energy (dollars per megawatt hour)



BIG Business: Dramatic Market Growth

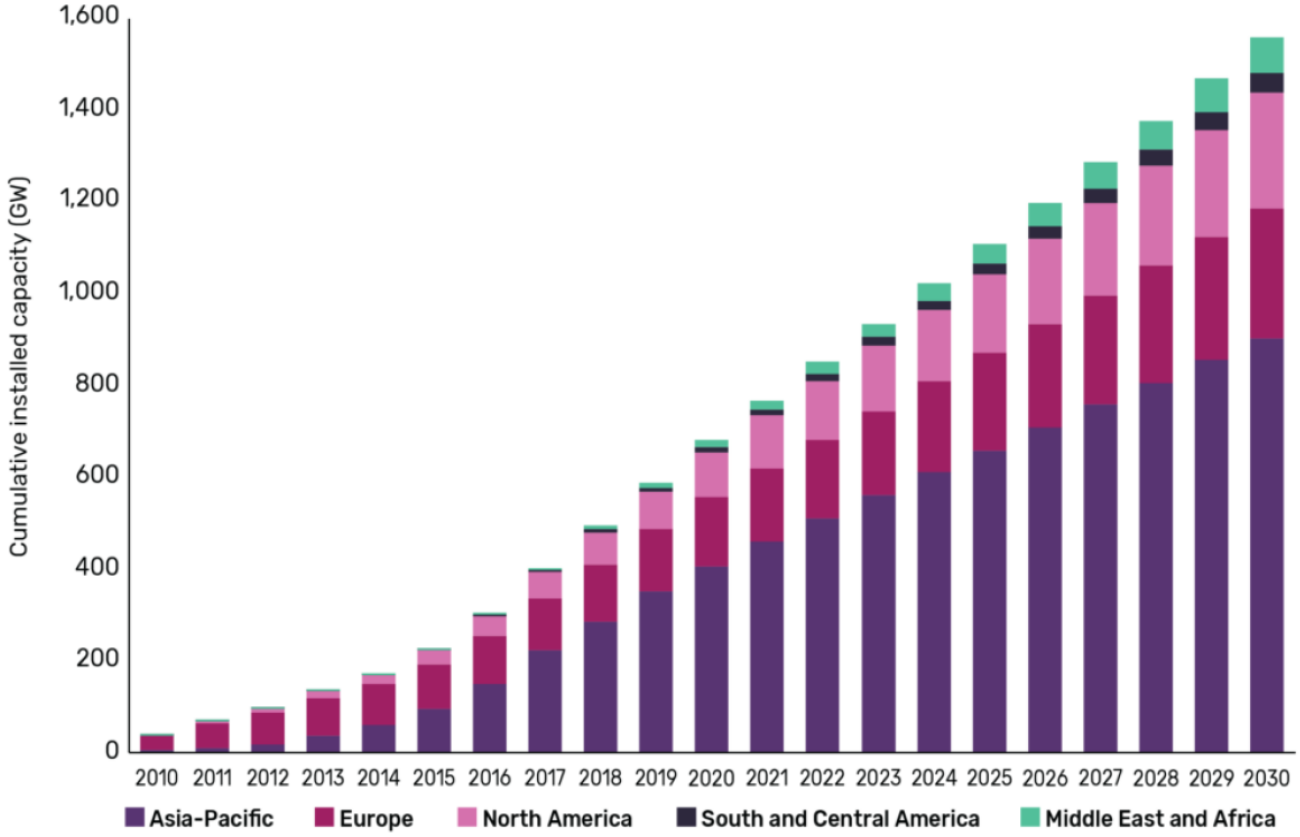
Renewable Energies are key for the Transition to Sustainability

Renewable Energies, namely Solar PV, an excellent example for problem-solving ingenuity of mankind

Solar PV Market Size 2021:
855 GW_p / 155 billion US$
at a growth rate of 144 GW_p

By far the biggest market for Solar PV is Asia, with China alone accounting for 37% ww

Similar growth rates observed for Wind Power, both on-shore and off-shore, with a significant cost-reduction potential and so called “Base Load Capability”

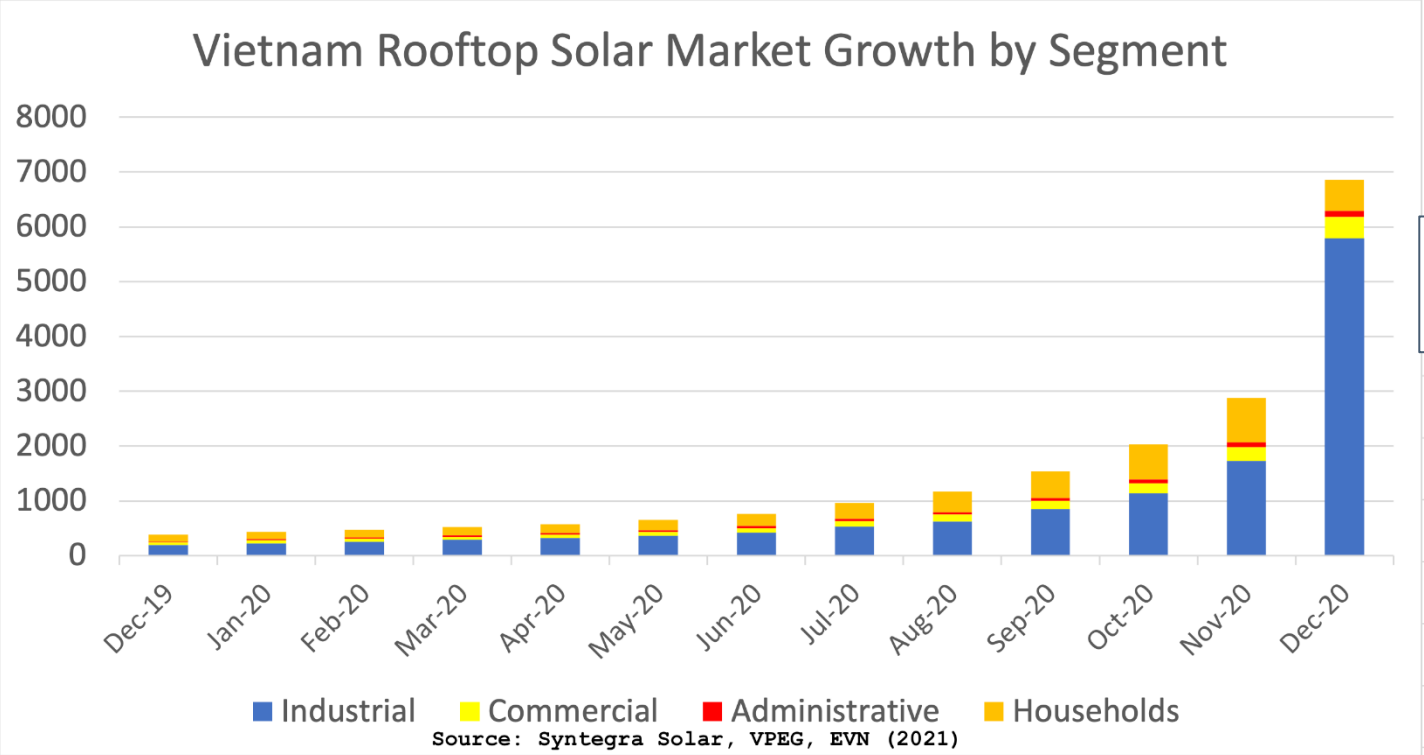


The global solar photovoltaic (PV) market size was USD 154.47 billion in 2020. The market is expected to grow from USD 199.26 billion in 2021 to USD 1,000.92 billion in 2028 at a growth rate of 25.9% in the 2021-2028 periods. The

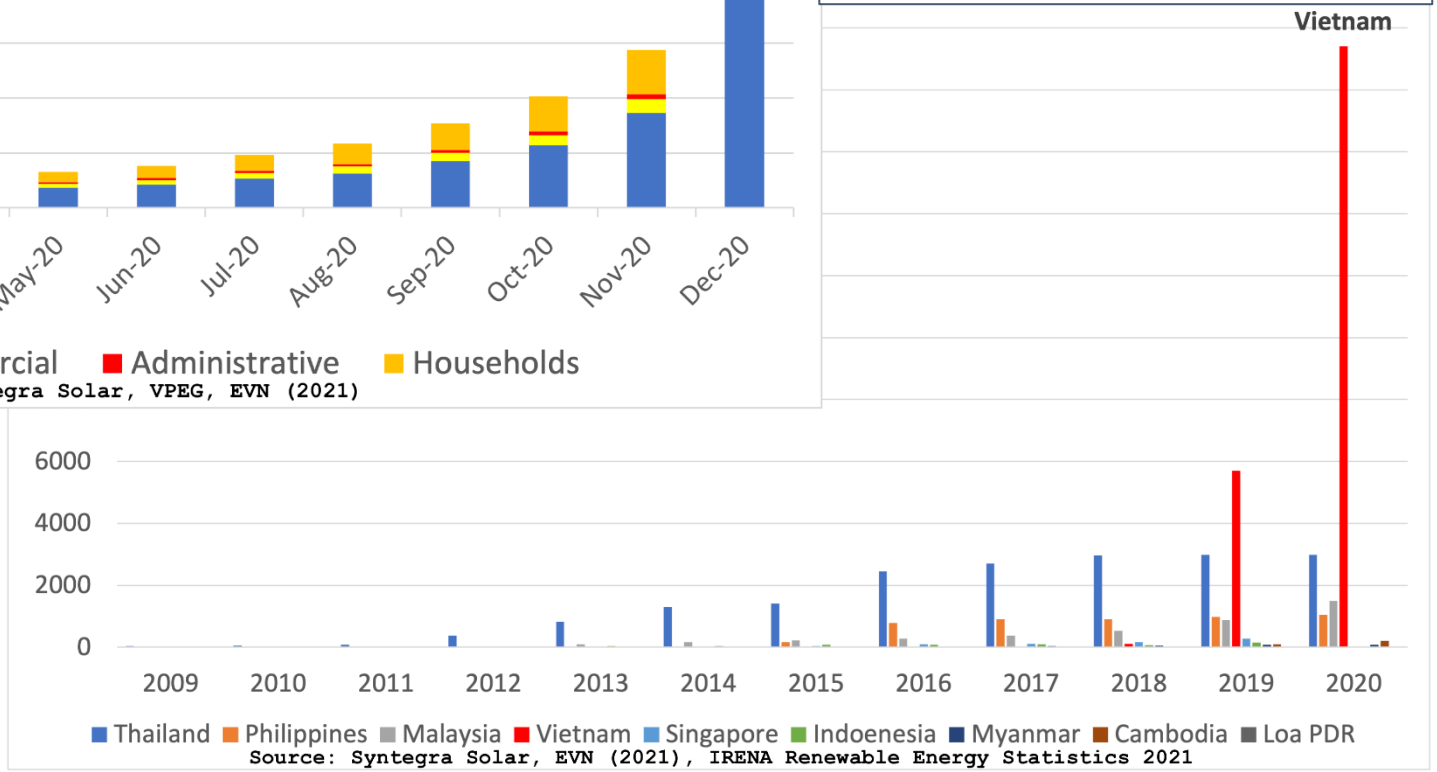
Abundance, Cost-Effectiveness, Familiarization, Favorable Financing, last not least “Conviction” fuel the dramatic, continous growth of RE Technologies world-wide

Vietnam is a ww leading success story in large scale & large scope utilization of Solar PV

Solar PV Market Growth by a factor of 185 in two years



PV Installations in SEA cumulative values [MW_p]



Installed capacity of Solar PV Power Plants & Systems is >4 times higher than all installed capacity cumulated in SEA

Economic Growth outnumbers Emissions Reduction in Vietnam

Vietnam's economic growth – leading worlwide – counteracts efforts underway to reduce greenhouse emissions

	2014	2020	2025	2030
Industry	49,368.3	71,963.2	91,578.2	111,645.9
Transport	30,552.3	46,984.2	64,291.4	88,043.9
Agriculture	1,398.4	5,315.0	6,151.0	7,266.3
Commercial	3,621.8	4,876.9	6,373.9	7,816.2
Residential	10,337.5	10,840.4	11,344.8	11,338.0
Non-energy*	871.5			
Total	**96,149.8**	**139,979.7**	**179,739.3**	**226,110.3**

Sources	**2014**	**2020**	**2025**	**2030**
Electricity generation	52,401.0	174,571.2	280,516.4	406,581.0
Oil refineries	1,935.2	6,215.4	10,079.1	13,438.8
Exploiting and processing gas	4,223.5	4,574.6	6,653.9	7,901.5
Crude oil exploitation	14,139.2	18,506.6	19,400.7	19,400.7
Coal milling exploitation	2,733.6	3,618.5	4,268.6	4,928.4
Total	**75,432.6**	**207,486.3**	**320,918.6**	**452,250.3**

	2014	2020	2025	2030	AAGR (2010-30)
Energy use	96,189.8	139,979.7	179,739.3	226,110.3	5.6%
Energy supply	75,432.6	207,486.3	320,918.6	452,250.3	11.6%
Total	**171,622,4**	**347,466.0**	**500,658.0**	**678,360.6**	**8.9%**

Nov. 1st, 2022 – https://e.vnexpress.net/news/business/data-speaks/vietnam-digital-economy-growth-expected-to-be-highest-in-southeast-asia-4530127.html

Economic Growth outnumbers Emissions Reduction in Vietnam: this will have to be addressed in Vietnam, one way or another

Conclusion:

Effective, intelligent, focused action needed - no time to waste!

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- Climate change / global warming is likely the biggest challenge to humankind (all other things equal)
- Climate change / global warming is strongly correlated to greenhouse gas emissions, namely CO_2 emissions
- Vietnam a Top-5 Country affetected by Climate Change
- Solutions are possible – RE is an example in case – but need focused, timely action
- "Sustainable Practise" goes way beyond reducing CO_2 emissions – it is about
  - Business Model Innovations
  - Technology Innovation
  - Smart Resource Allocation
  - Financing Solutions – a truly important and most leveraging factor

At the Examples of two leading firms and of financing instruments, we see how approaches towards Sustainable Practises does work.

Back-Up Slide
distributed but not shown

The BIG picture:

$C0_2$ concentration strongly correlatd to Global Temeperature rise.

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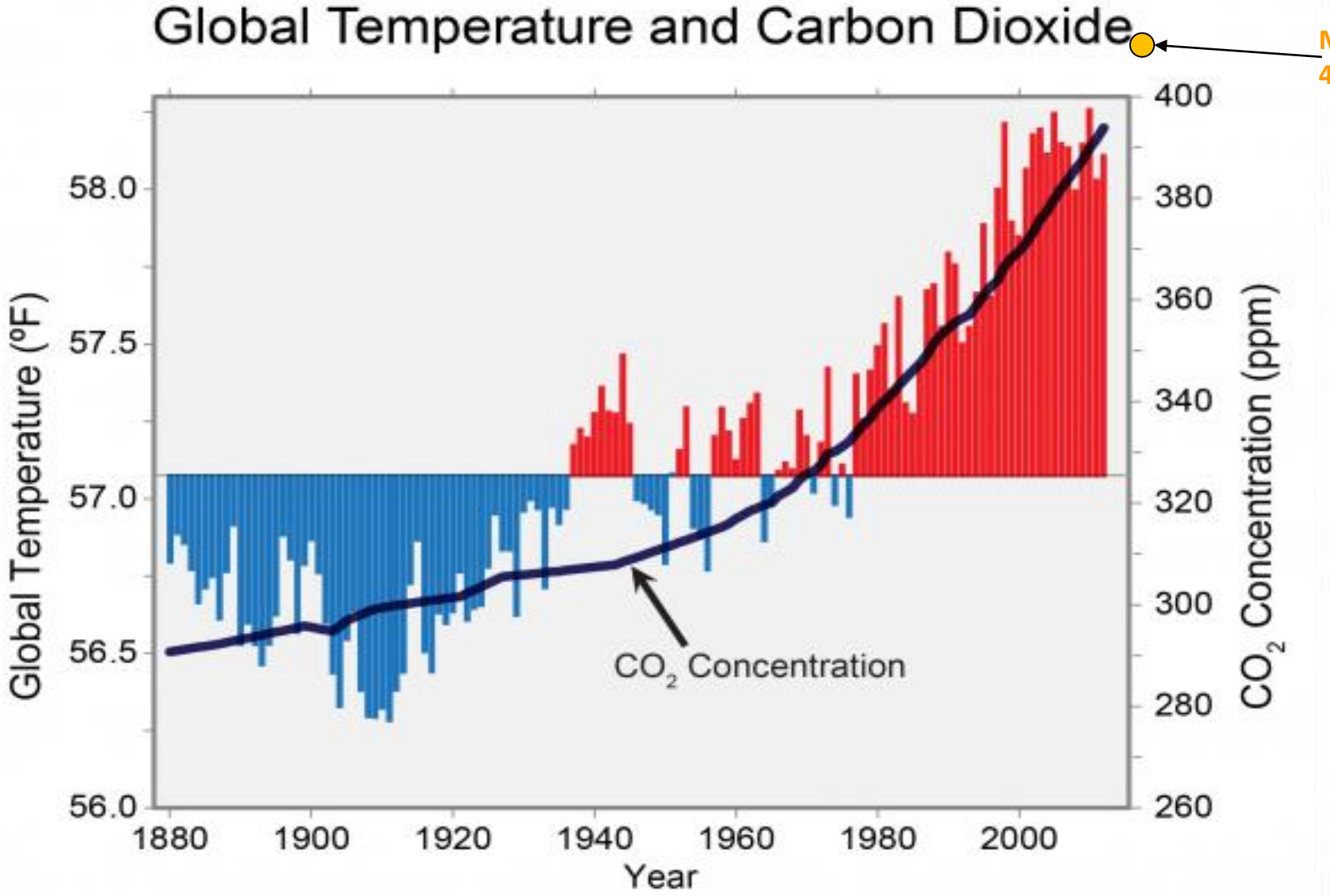

The BIG picture:

For almost all regions worldwide, highest temperatures ever recorded

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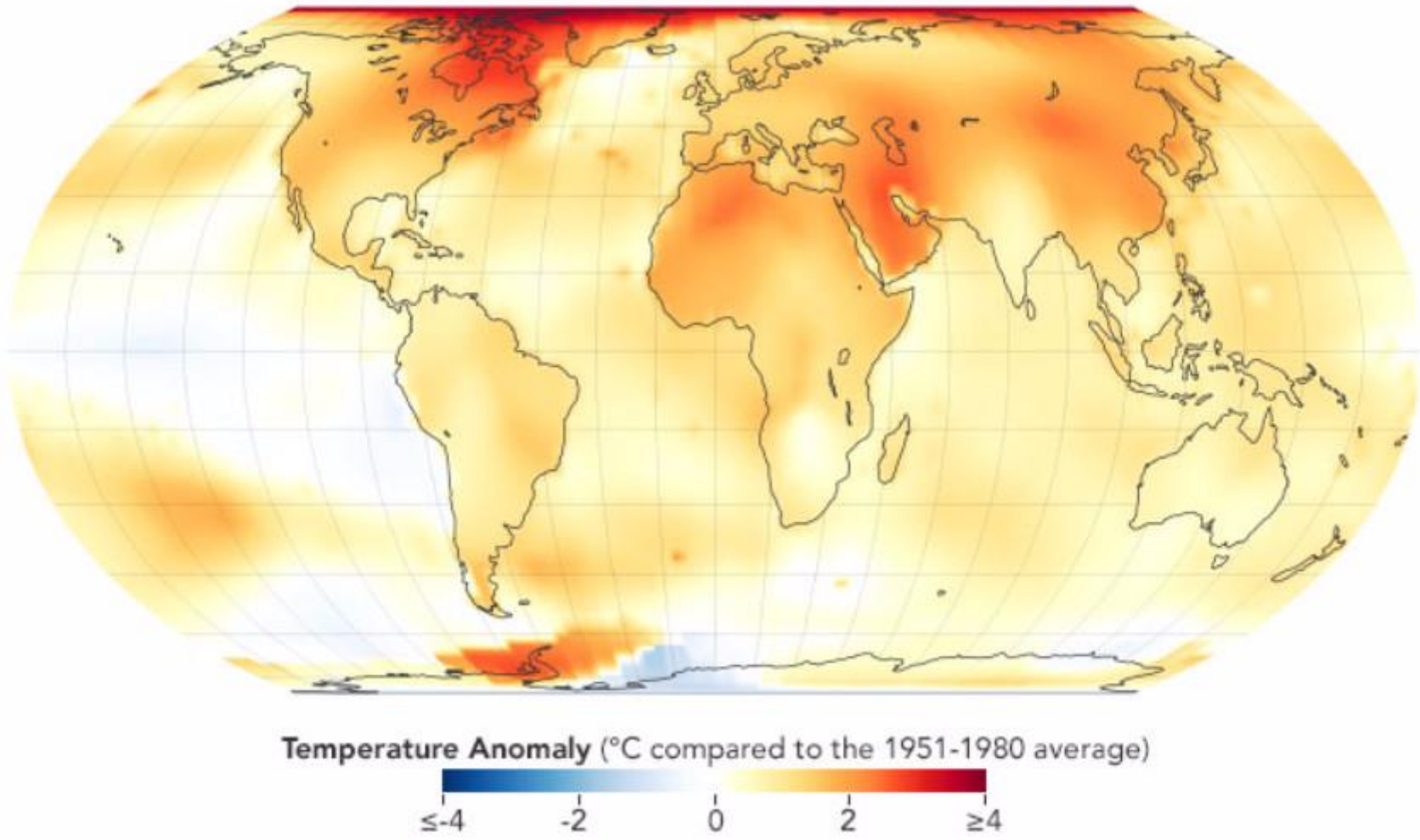
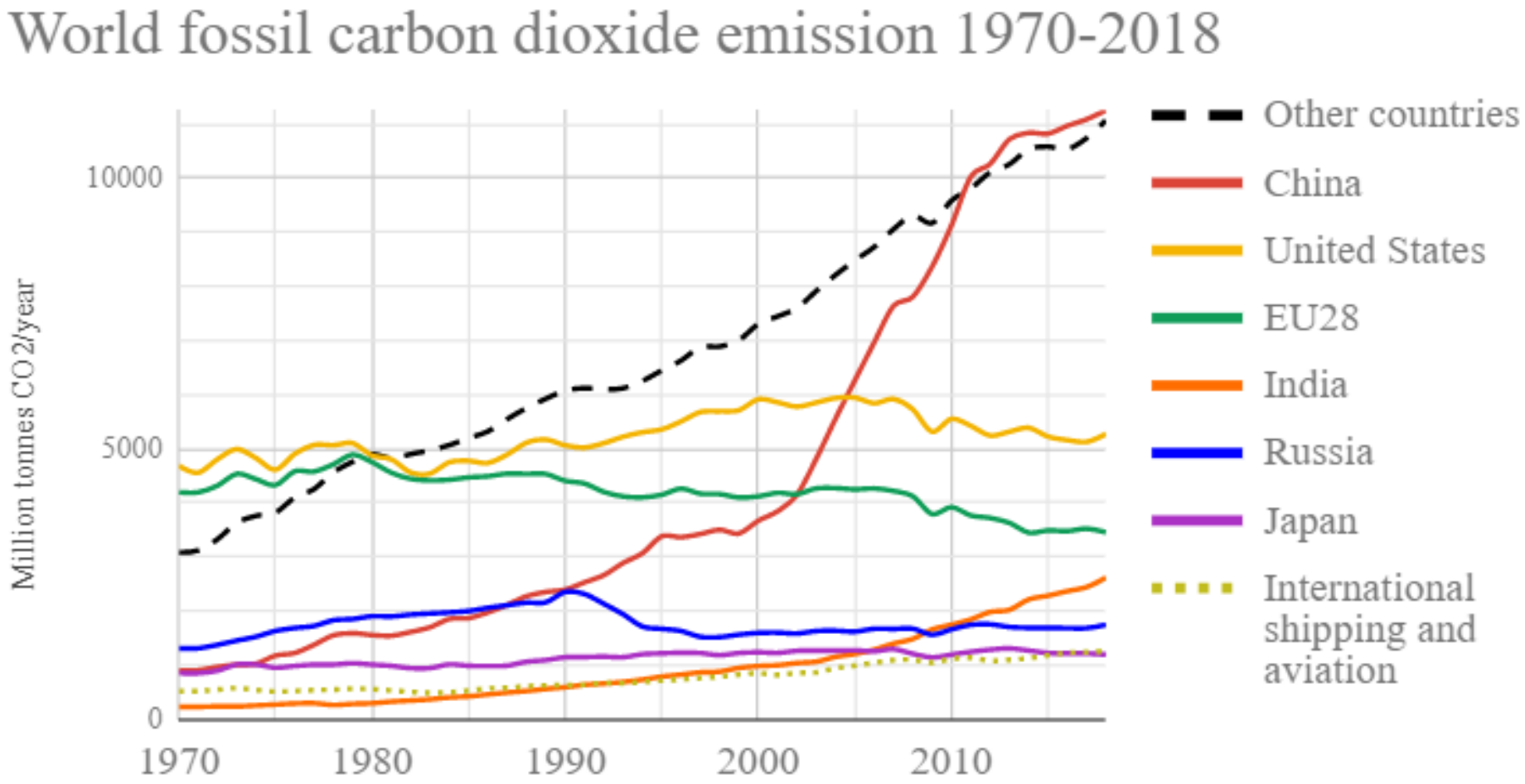


Heat map showing temperature anomaly for 2021, compared to 1951-1980 average.

The BIG picture: $C0_2$ Emmitents by Country

Electricity demand in China jumped by 10% in 2021,adding the equivalent of the total demand of all of Africa



China and India account for almost 75% of all additional CO2 emmissions since 2019

The BIG picture:
Greenhouse Gas Emissions by Country – Vietnam is # 21

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Rang (2019)	Land	1950	1960	1970	1980	1990	2000	2010	2015	2016	2017	2018	2019	Anteil* %	2019 rel. 1990 %***
1	Volksrepublik China	79	806	824	1530	2520	3560	8930	10200	10200	10400	11256	11535	30,3	+380
2	Vereinigte Staaten	3150	3630	4850	5170	5250	6110	5780	5480	5360	5320	5275	5107	13,4	+1
3	Indien	77	153	252	357	669	1070	1620	2150	2230	2300	2622	2597	6,8	+333
4	Russland	396	897	1540	2320	2560	1500	1640	1650	1640	1670	1748	1792	4,7	−25
5	Japan	111	259	834	1020	1160	1270	1220	1230	1210	1190	1199	1154	3,0	0
6	Deutschland	524	846	1080	1150	1060	911	842	804	809	805	753	702	1,8	−31
7	Iran	1	38	93	123	213	378	584	660	669	698	728	701	1,8	+243
8	Südkorea	3	15	59	141	268	448	600	652	659	673	695	652	1,7	+141
9	Indonesien	12	26	50	136	208	339	470	564	571	595	558	626	1,6	+282
10	Saudi-Arabien	4	2	41	143	140	255	468	548	557	547	625	615	1,6	+255
11	Kanada	150	201	344	431	467	575	561	581	568	575	594	585	1,5	+29
12	Südafrika	72	122	188	238	300	368	447	447	449	439	477	495	1,3	+58
13	Mexiko	53	126	188	299	322	417	510	500	531	539	496	485	1,3	+67
14	Brasilien	26	62	116	201	225	358	452	536	504	510	500	478	1,3	+110
15	Australien	58	95	160	229	279	351	408	404	414	418	415	433	1,1	+56
16	Türkei	10	20	49	83	157	233	316	384	404	428	417	416	1,1	+177
17	Vereinigtes Königreich	519	627	716	614	613	576	520	430	407	395	372	365	1,0	−38
18	Italien	48	125	325	419	445	474	430	360	357	353	345	332	0,9	−23
19	Polen	116	214	326	487	385	324	338	315	326	339	334	318	0,8	−14
20	Frankreich	209	290	471	531	406	421	396	349	351	354	323	315	0,8	−19
21	Vietnam	1	7	26	16	22	58	149	206	222	224	271	305	0,8	+1390

The BIG picture:

And the results are coming in: Extreme Weather Conditions

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Billion-Dollar Weather Disasters, Jan.-Sep. 2022

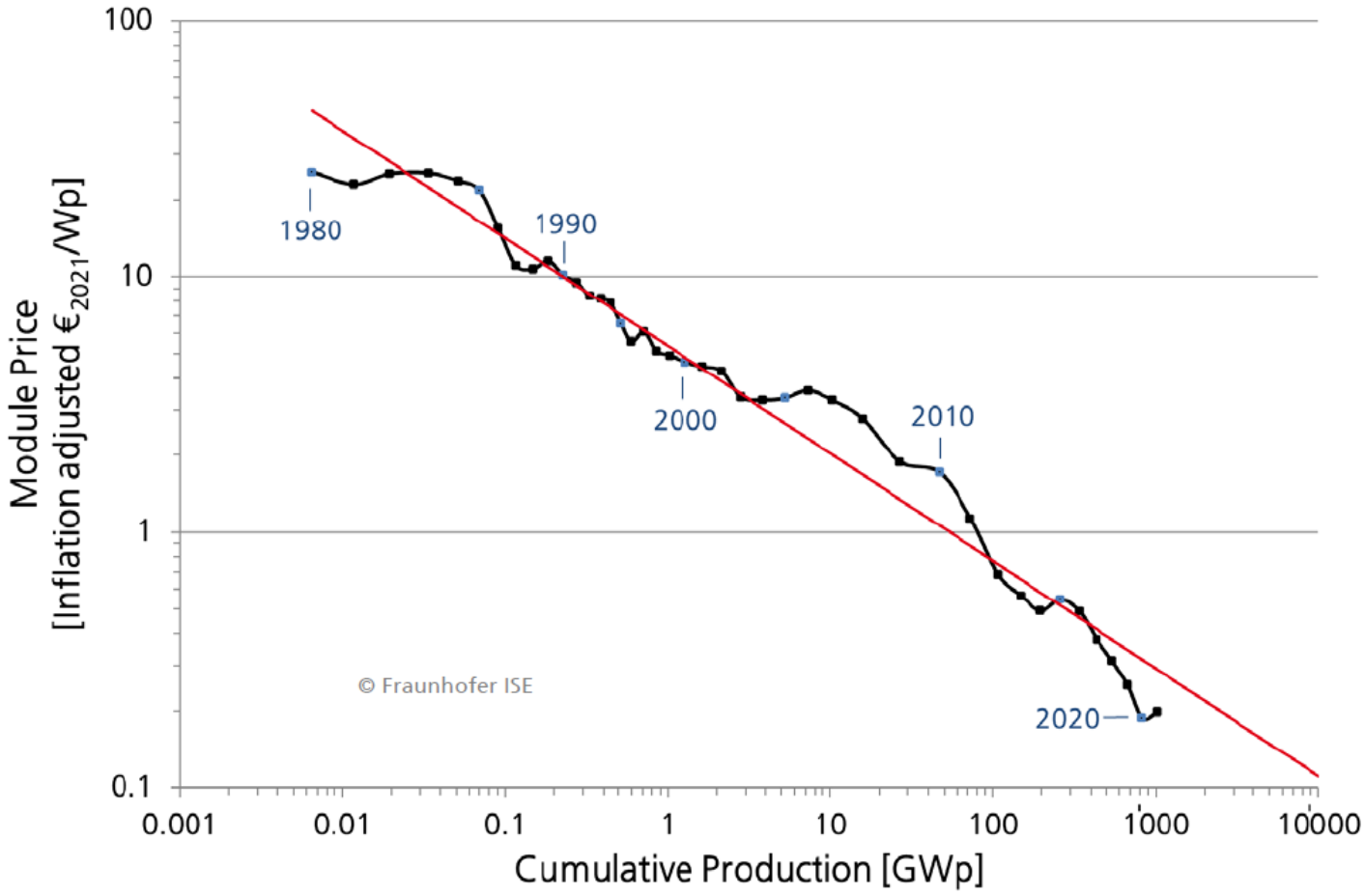
Rank	Disaster	Location	Dates	Damage	Deaths
1	Hurricane Ian	U.S. (FL, SC, NC), Cuba	Sep. 27-Oct. 1	>$20 billion	137
2	Drought	Europe (W, S, Central)	Yearlong	$20 billion	N/A
3	Flooding	China	Jun. 1-Sep. 30	$12 billion	239
4	Drought	China	Yearlong	$8.4 billion	N/A
5	Flooding	Eastern Australia	Feb. 23- Mar. 31	$7.5 billion	22
6	Flooding	Pakistan	Monsoon season	$5.6 billion	1693
7	Windstorm Eunice	Europe, Western & Central	Feb. 18-19	$4.3 billion	17
8	Drought	U.S.	Yearlong	$4.0 billion	N/A
8	Drought	Brazil	Yearlong	$4.0 billion	N/A
10	Hurricane Fiona	Caribbean, Canada	Sep. 18-25	$3.1 billion	31
11	Flooding	South Africa	Apr. 8-15	$3.0 billion	455
12	Severe Weather	U.S. Plains, Midwest	May 11-12	$2.6 billion	5
13	Severe Weather	Europe, Western & Central	Jun. 19-24	$2.3 billion	3
14	Severe Weather	U.S. Plains, Midwest	Apr. 10-14	$2.2 billion	1
15	Severe Weather	U.S. South, Midwest, NE	Jun. 11-17	$2.0 billion	3
15	Drought	Somalia, Ethiopia, Kenya	Yearlong	$2.0 billion	N/A
17	Flooding	India	Monsoon season	$1.8 billion	1883
17	Severe Weather	U.S. Plains, South, Midwest	May 19-22	$1.8 billion	2
17	Severe Weather	U.S. Plains, Midwest	May 9-10	$1.8 billion	0
20	Severe Weather	Europe, Western & Central	Jun. 2-6	$1.6 billion	0
21	Severe Weather	Canada	May 21	$1.4 billion	12
21	Severe Weather	U.S. Midwest, Mid-Atlantic	Jun. 4-8	$1.4 billion	0
23	Severe Weather	U.S. Plains, South	Mar. 29-Apr. 1	$1.2 billion	2
23	Severe Weather	U.S. Plains, South	Apr. 4-7	$1.2 billion	3
23	Severe Weather	Europe, Western & Central	Jun. 26-29	$1.2 billion	2
23	Typhoon Nanmadol	Japan	Sep. 18-21	$1.2 billion	4
23	Severe Weather	U.S. Mid-Atlantic, Midwest	Jul. 21-25	$1.2 billion	0
23	Flooding	U.S. (MO, KY)	Jul. 25-28	$1.2 billion	28
29	Severe Weather	U.S. Plains, Midwest	May 1-3	$1.1 billion	0

Background image: Flooding in New South Wales, Australia, February 2022. Image credit: NSW Police Force

At the example of RE: Solutions are possible!

Clear Thinking, Determination, Focus, Stamina are key Success Factors

Costs and Prices for Solar PV are somewhat bottoming out since 2020



Learning Rate:
Each time the cumulative PV module production doubled the price went down by about 25% for the last 41 years.

The sucess story of Renewable Energies gives hope for complementing solutions

Key Messages! Implications?

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⇒ **Sustainability is a Mega-Trend**
here to stay for decades to come, much influenign the way we are/will do business

⇒ **Climate Change is a key driver:**
Vietnam is one of the five (5) countries hardest hit by climate change, namely Mekong

⇒ **Key driver: Economics:**
rapid deployment - strong policy framework (example Germany, Vietnam)

⇒ **Key driver: New, enabling technologies mature, namely energy storage / batteries**

⇒ **Key driver: New emerging demand drivers, CO_2 neutral manufacturing and e-mobility**

Vietnam leads the way with the fastest ecomoic growth but also growth of RE Technologies
However, Vietnam must address it's out-of-control CO_2 emission balance

Germany and selected European countries can much contribute to advanced National Power Generation and Distribution Systems with high RE percentages