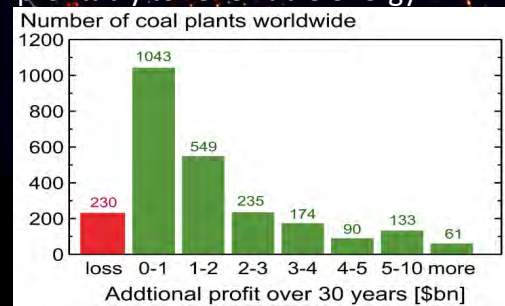


SwitchCoal

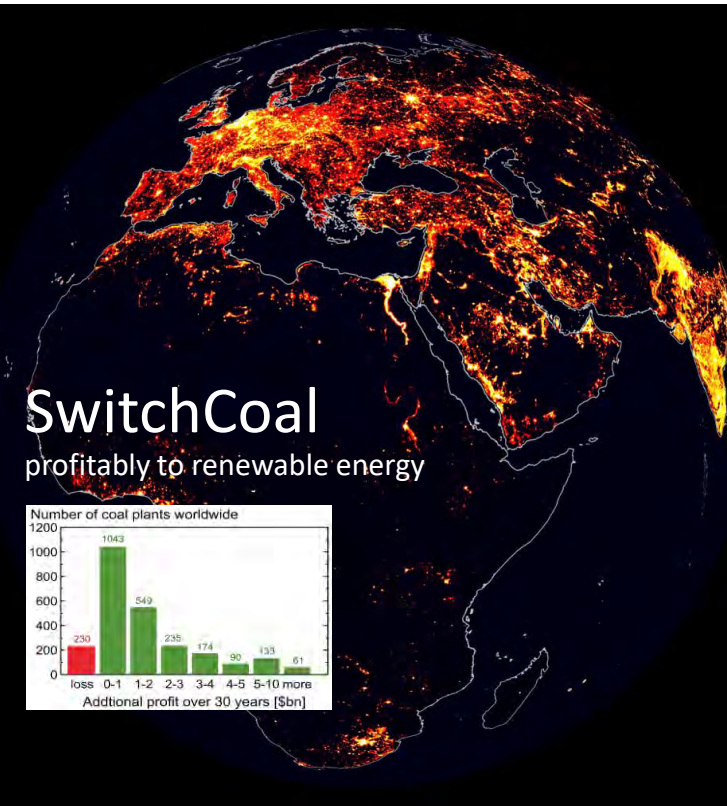
profitably to renewable energy.



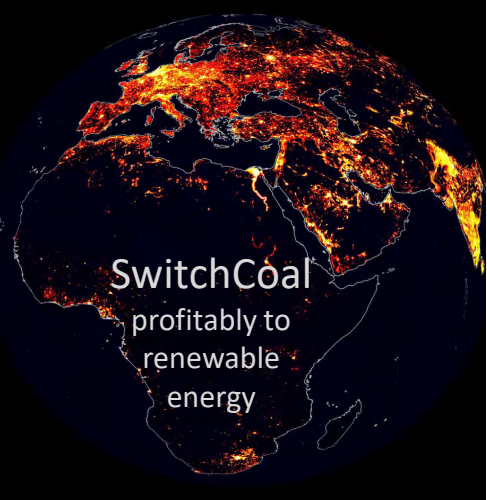
Solutions Study

COP28

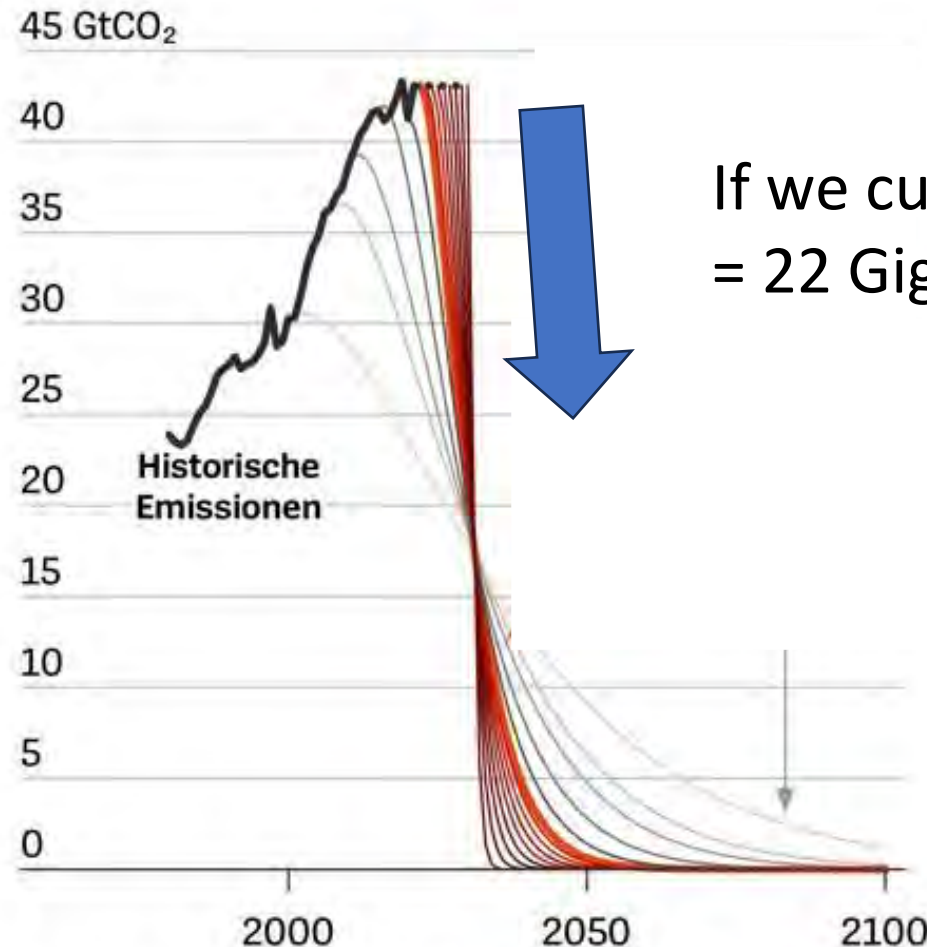
“We need to reduce 22 Gigatons by 2030”



Dr Sultan Al Jaber, COP28 president

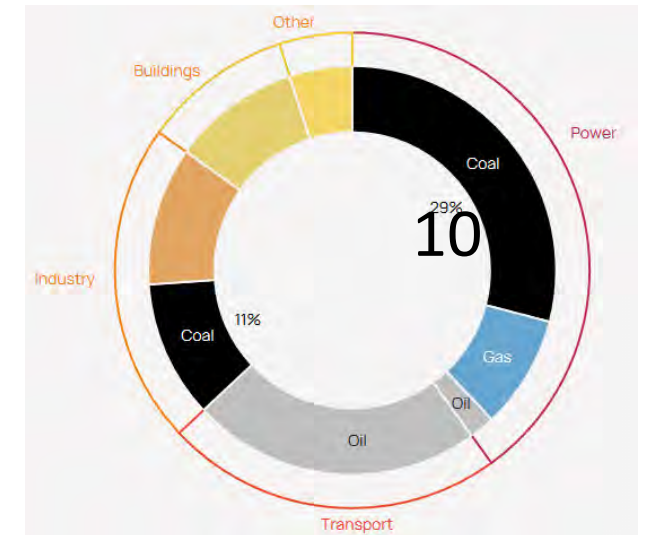


Climate tipping points - „1.5 degrees still within reach“ Dr Sultan Al Jaber



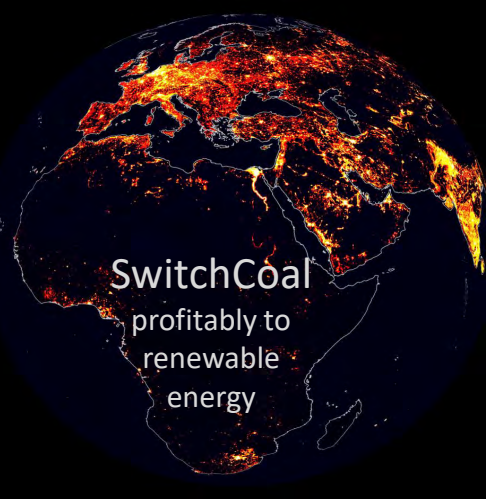
If we cut emissions in half by 2030
= 22 Gigatonnes

10 Gigatons is coal plants



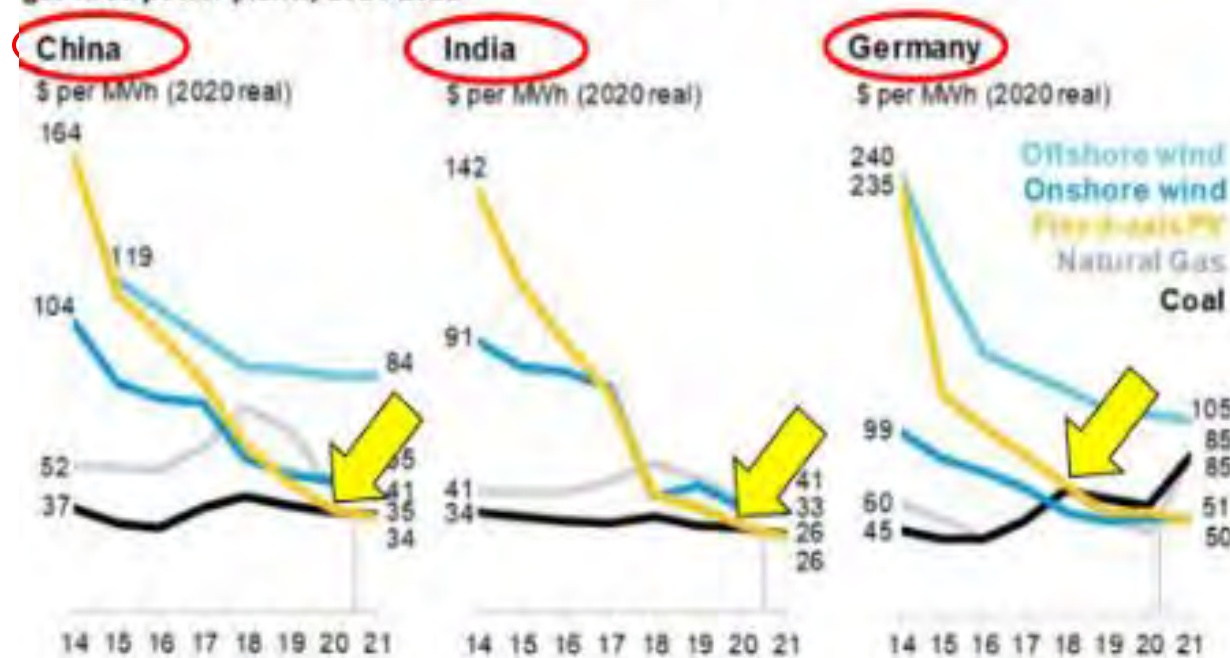
Note:
Despite the World Climate
Paris Agreement (2015),
emissions are still rising

=> to avoid uncontrollable catastrophic climate change, beyond 1.5°



Bloomberg: Economic tipping point reached

Figure 1: Levelized cost of electricity for new solar and wind versus running costs of existing coal- and gas-fired power plants, 2014-2021



Source: BloombergNEF. Note: LCOE exclude subsidies or tax-credits and reflect utility-scale power plants.

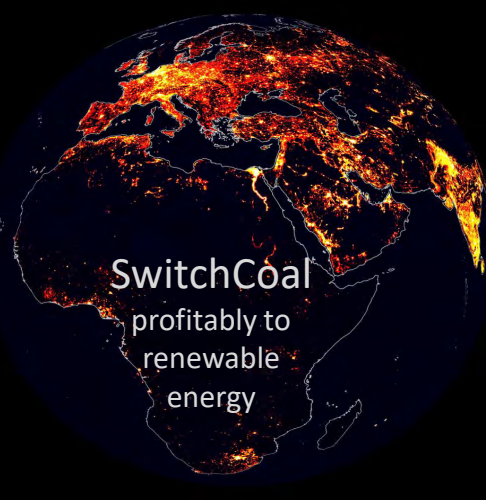
Germany (2017)
China (2019)
India (2019)

Note:
same in the US

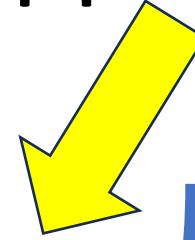
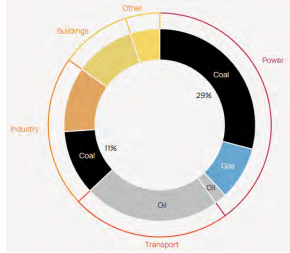
Note:

- OPEX of coal plants (black)
- LCOE of new wind (blue) and solar (yellow)

=> New wind + solar cheaper than existing coal!



10 Gigatons + economic tipping point



SWITCH COAL
key question
= cheaper?

Can we switch each of the 2,500 coal plants in the world to WIND-SOLAR-BATTERY SYSTEMS?

SwitchCoal profitably to renewable energy

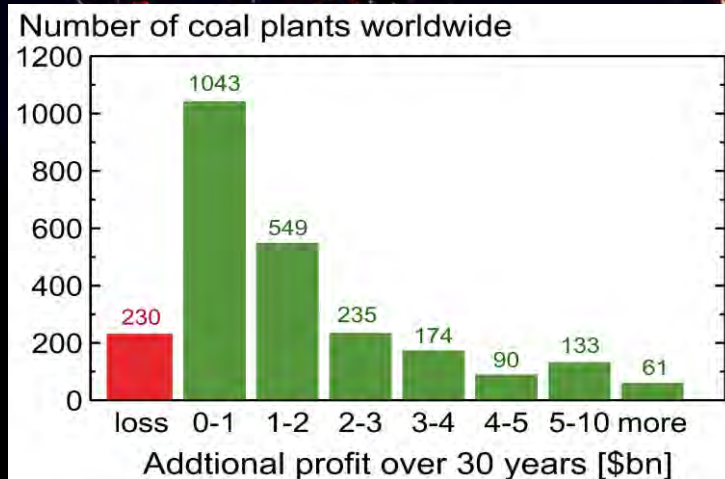
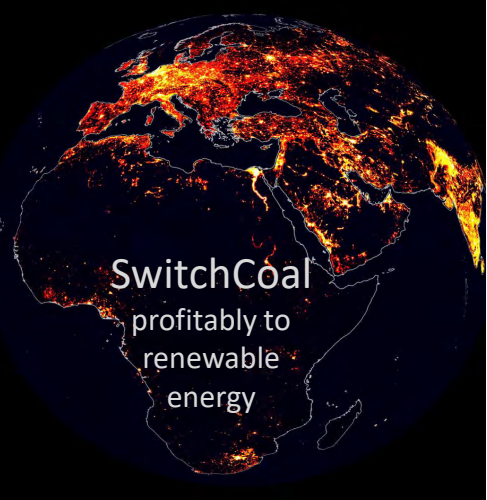


Foto: Nasa - CO2 emissions

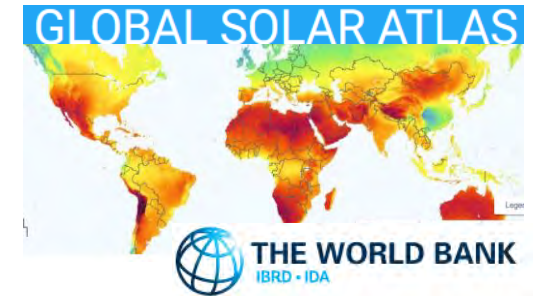
Dr Ingo Stuckmann 1
Thomas Schmidt 1
Thomas Ladwig 1
Frank Haferkorn 1
Nancy Birkhölzer 8
Leonidas v Bothmer 8
Stefan Golla 2
Solvejg Nasert 4
Prof. Felisa Tibbitts 3
Prof. Holger Jahn 4
Prof. Claudia Kemfert 5
Prof Pietro Altermatt 6
Jochen Wermuth 7

1 Zero Emission Think Tank, Berlin
2 Scientists for Future
3 Chair in Human Rights and Higher Education UNESCO, Faculty of Law, Economics and Governance, Utrecht, NL formerly Columbia University, NY
4 FH Design, Potsdam
5 DIW Berlin
6 University of Oxford, UK
Lead scientist Trinasolar
7 Climate impact investor
8 Web and Graphics design



Solutions Study in 3 Steps

Step 1: Wind & solar potential
at each coal plant site

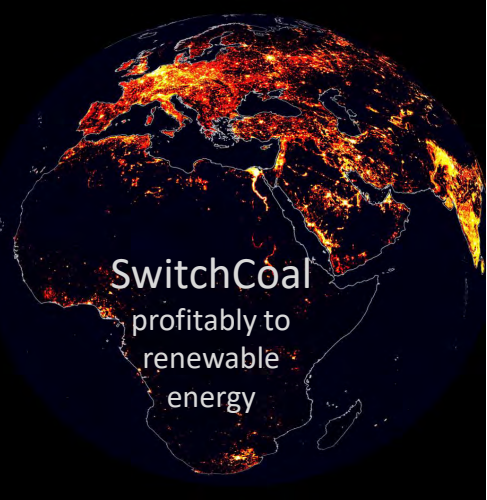


Step 2: Economics

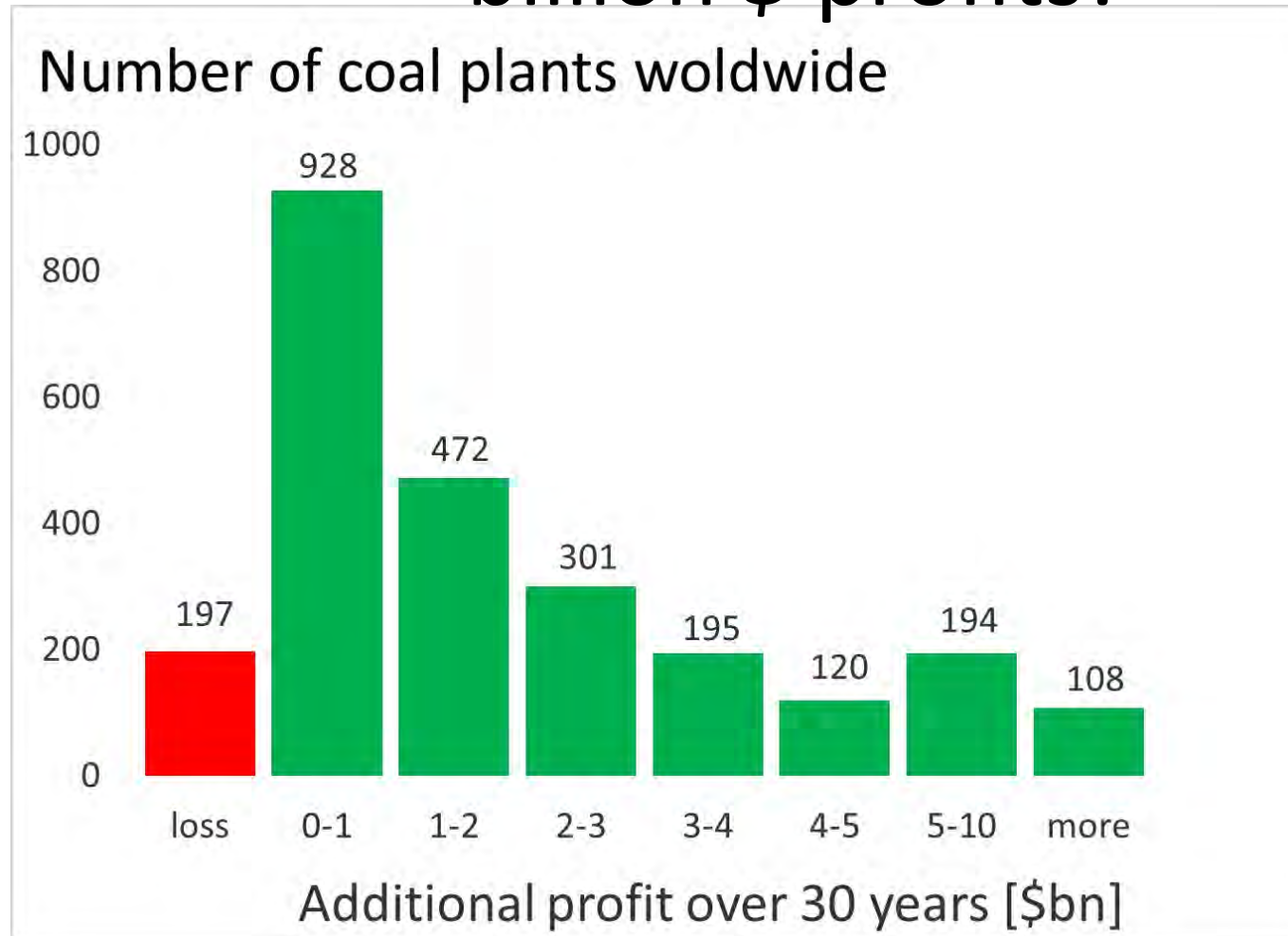


Step 3: ABC guide for delegates

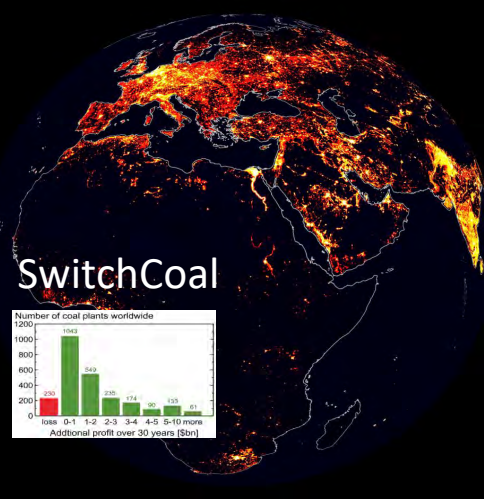




Results 90% of all coal plants switched to Wind-Solar-Battery systems + billion \$ profits!



Note: Battery 50%



SUMMARY

Country	Switchable	Mt CO2	Invest[\$bn]	Project R[\$bn]	add'l Profits[\$bn]
United States	202 / 216	1004.7	475.1	950.1	553.7
Uzbekistan	0 / 2	0,0	0,0	0,0	0,0
Vietnam	27 / 28	131.2	70.6	141.2	49.7
Zambia	2 / 2	1.5	0.6	1.2	1.0
Zimbabwe	3 / 3	10.2	4.6	9.3	8.2
Global (sum)	2318 / 2515	9806	4917	9834	6172

Wind farm installations
Solar PV installations

1.5 TW
4.8 TW

Investment Wind-Solar-Battery
Project Returns On Investment
add'l **profits** (cheaper OPEX)

\$ 5 Trillion
\$ 10 Trillion
\$ 6 Trillion

CO2 reductions

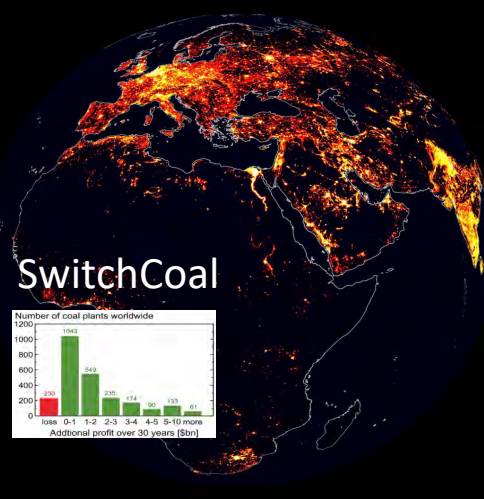
10 Gigatons

=> switch **90%** coal plants
=> make **trillion \$ profits**



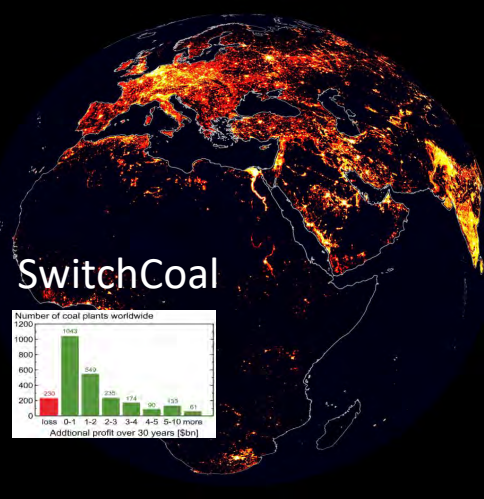
Note: Wind-Solar-Battery systems calculated with **standard project ROI**.

In addition, with much lower OPEX compared to coal plants, renewables produce **add'l profits**—, billions of dollars for distribution!



Country by Country – Billions of profits!

Country	Number of coal plants profitably switchable	Annual CO ₂ emissions, saved by switching	Investment in wind-solar-battery sys	Project Return on investment 5-6% IRR, approx not compounded	Additional profits from switching, over 30 years
	profitable/all	Mt/yr	\$bn	\$bn	\$bn
Argentina	2 / 2	3.2	1.2	2.5	2.3
Australia	16 / 19	98.6	43.8	87.7	60.8
Bangladesh	7 / 7	34.6	16.8	33.6	15.0
Bosn and Herz	0 / 5	0.0	0.0	0.0	0.0
Botswana	2 / 2	3.6	1.6	3.3	2.8
Brazil	7 / 7	15.7	7.2	14.4	9.1
Brunei	1 / 1	1.2	0.5	1.1	0.8
Bulgaria	10 / 10	28.3	15.2	30.4	77.4
Cambodia	5 / 5	8.0	4.0	8.1	3.0
Canada	10 / 10	17.2	10.0	20.0	13.4
Chile	8 / 8	22.6	10.7	21.4	13.5
China	1162 / 1187	5261.1	2671.0	5341.9	2826.7



STEP 3 COP28 guide



- A) **Act on climate**: delegates can **pledge** coal plant retirements – increase NDCs
- B) **Borrow** - delegats can **find financing** for renewables @COP28
- C) **Cash in** - Delegates can bring home **billions of profits** for distribution

Country-by-Country

Zimbabwe example only

3 coal plants

Investment renewables

Project Return on Invest

+ add'l **Profits**

Country	Switchable	Mt CO2	Invest[\$bn]	Project R[\$bn]	add'l Profits[\$bn]
United States	202 / 216	1004.7	475.1	950.1	553.7
Uzbekistan	0 / 2	0,0	0,0	0,0	0,0
Vietnam	27 / 28	131.2	70.6	141.2	49.7
Zambia	2 / 2	1.5	0.6	1.2	1.0
Zimbabwe	3 / 3	10.2	4.6	9.3	8.2
Global (sum)	2318 / 2515	9806	4917	9834	6172

10 Mt ➡

NDC/Global Stoke Take

\$4.6 BN ➡

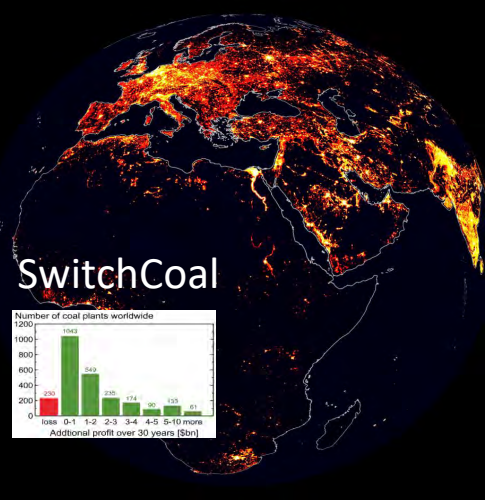
Find Financing @COP

\$9.3 BN

\$8.2 BN ➡

Distribute @home

Note: „know your ABC“



Note: Wind-Solar-Batt systems calculated with **standard project ROI**
Source: IEA

COP28: Delegates can bring home billions of dollars for distribution



Additional profits
\$8.2 BN



Project Return on Investment
\$9.3 BN

Boost returns

Lower electricity prices for all

Utilities in oligopolistic structures often highly profitable

US: Public Utility Commission (PUC) mandates lower rates

+Add'l tax revenues

\$4,6 BN

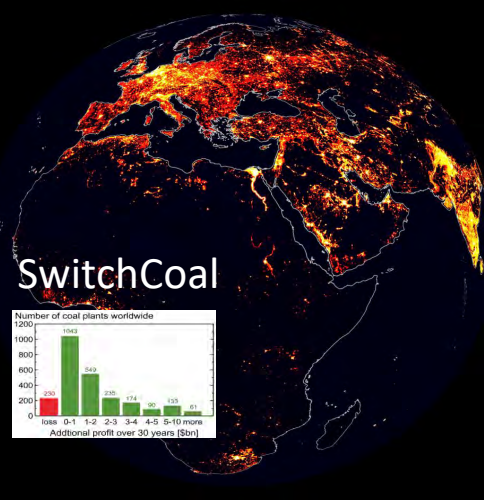


Investment

Project Return

Zimbabwe

Investment renewables \$4.6 BN
Project Return on Invest \$9.3 BN
+ add'l **Profits** **\$8.2 BN**



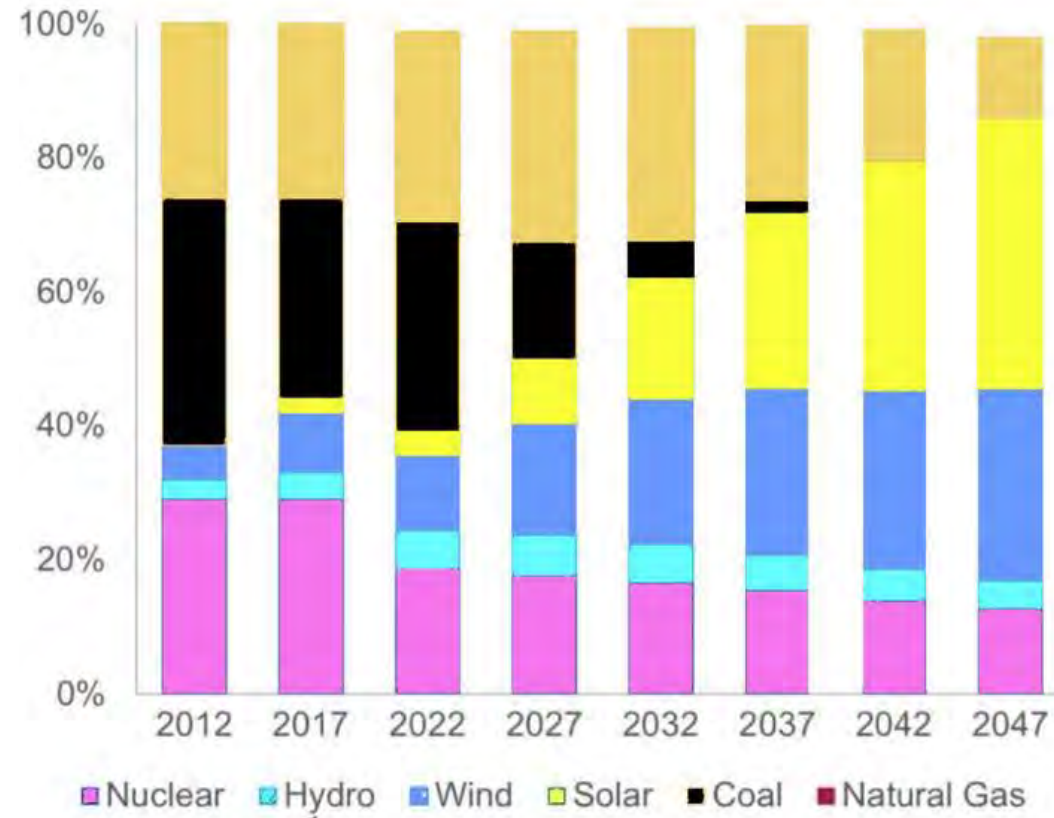
US has shut down 50% of coal plants

because renewables are cheaper

Proof of concepts

Note:
2022 higher coal usage due to energy crisis with high gas pricing.

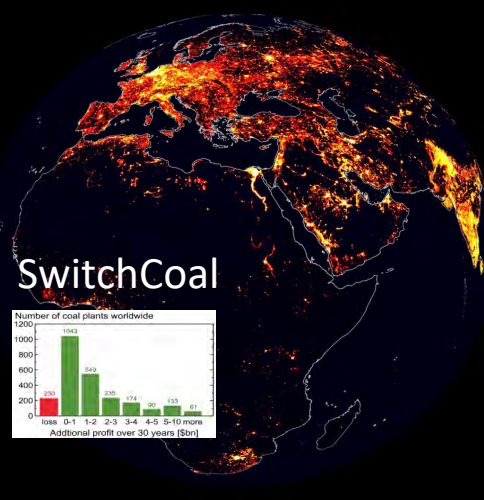
Note:
Past 10 years approx. 50% coal plants replaced by gas and renewables.
Renewables are cheapest.



Note: on economic grounds

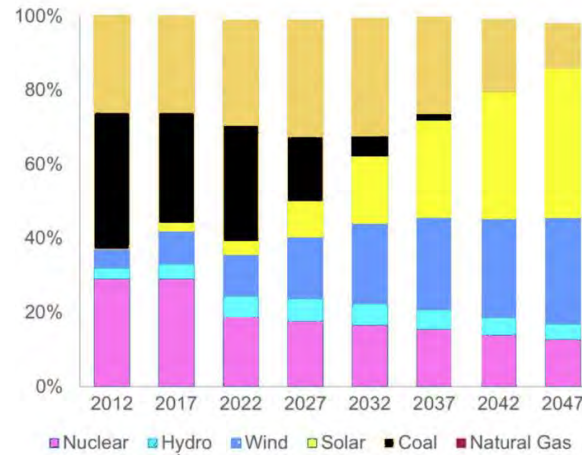
Source: (recoloured) Wood Mackenzie IEA

=> approx 50% of coal plants shut down (290/510)
=> most coal plants shut down around 2030



US shuts down coal

- on purely economic grounds
- because renewables are cheaper

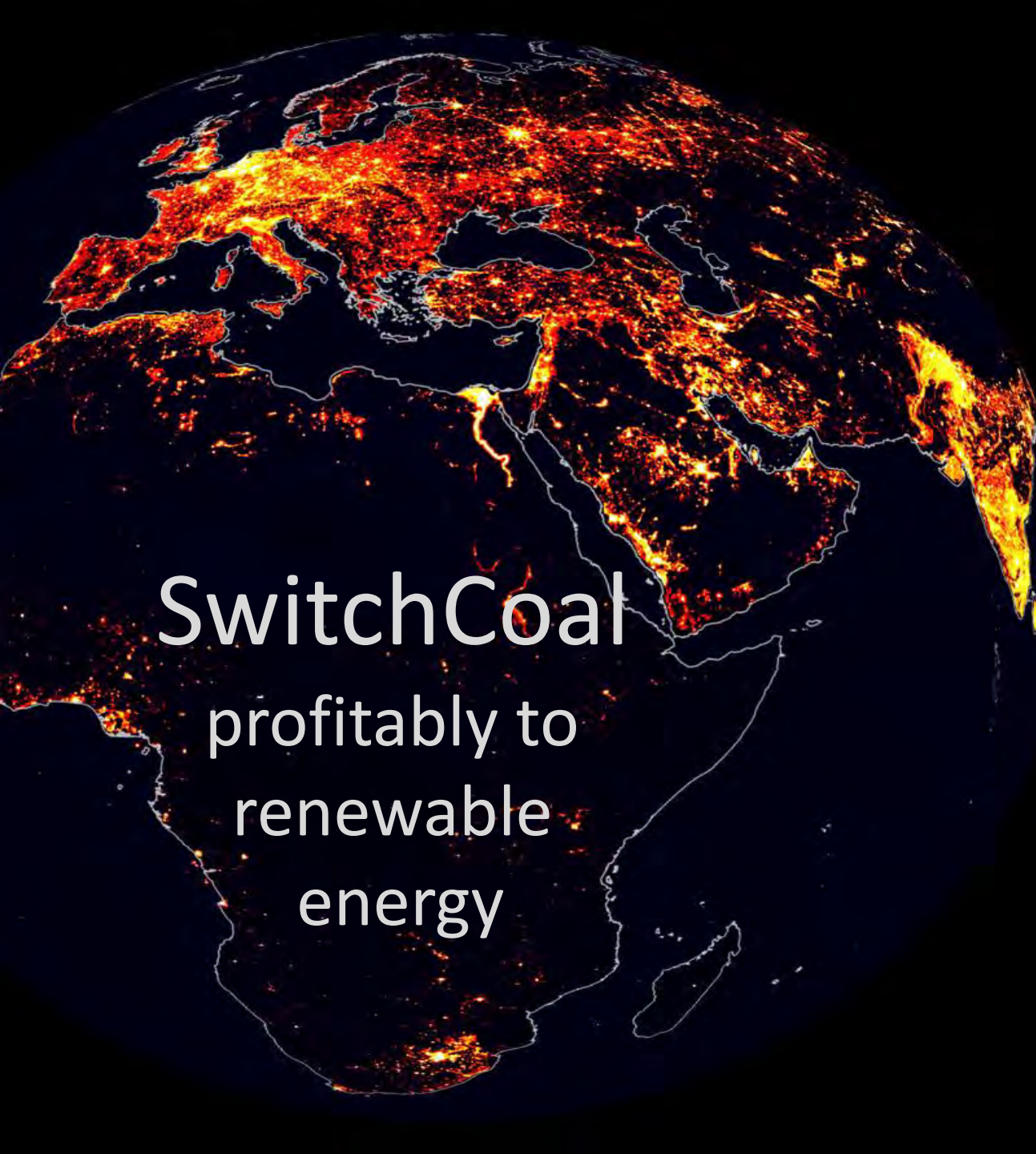


Source: (recoloured) Wood Mackenzie IEA

Will the world follow?

& keep 1.5° in reach?

That's *exactly* why we did this
Solutions Study:
We show it pays off!



SwitchCoal
profitably to
renewable
energy

Global Relevance

Switch coal

-low hanging fruit

10 Gigatons less + billions in profits

- ONLY chance to cut CO2 emission by 2030

- LAST chance to keep 1.5°C in reach

- SHIFT in paradigms / new mind-set

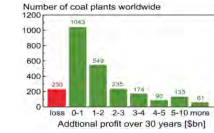
study switches UN motto “act on climate”
to “act on climate & profit from it!”

illustrating a new mindset for effective climate solutions

, with a win-win approach = everybody understands this

= **this is the silver bullet** to solve the
climate crisis once and for all

Make no mistake, with global climate
tipping points dangerously close to tipping
into an uncontrollable climate beyond 1.5°C
SWITCH COAL - is - our LAST CHANCE





“I am
doing this
for you,
little girl”

(our lead author)



Thank you!
please,
act on climate
& profit from it!



30 years of climate conferences



It is a common perception that climate policy has not delivered over the past 30 years, given that carbon **emissions** are **still rising**, despite the Paris Climate Agreement (2015). The question is

Why?

We identified a single reason for it.



30 years of climate conferences



It is a common perception that climate policy has not delivered over the past 30 years, given that carbon **emissions** are **still rising**, despite the Paris Climate Agreement (2015). The question is

Why?

We identified a single reason for it.

The cost trap!



30 years of inaction – Why?



Act on climate – too expensive?

Politicians and voters often think it's **too expensive** to act on climate; I do **not want to pay** for it is popular, and, even social politics comes in, I **cannot afford** it – so let's rather do nothing.

ssssnapppp !!

And the cost trap snapped again.

30 years of political inaction continues.

The UN motto “act on climate” has not worked.



Cost trap as effective as climate denial

And, by observation, the cost trap in Europe and other countries has been as effective as climate denial in the US in preventing any real action – and that's why we have seen 30 years of political inaction.



30 years of inaction – new mind-set



How can we break the spell?

We have shown in our switch coal solutions study, that switching coal plants to wind-solar-battery systems is now **highly profitable**, delegates at the COP can bring home **billion \$ profits**, if they pledge to retire coal plants:

Let`s “act on climate & profit from it!” We may have finally figured it out!

New mind-set “act on climate & profit from it”

Therefore, the authors suggest to change the UN motto “act on climate” to reflect the new mind-set switch coal is bringing to the table, let`s say “act on climate & profit from it”

Everybody understands it.

A new, pragmatic and highly effective win-win approach.

*Note: This is the **silver bullet** to solve the climate crisis. Once and for all.*

Call to action

The authors urge COP delegates to pledge coal plant retirements - and come home with billion \$ profits for distribution. Let`s go for it & profit from it! It gotta be fun.