EIA perspective on opportunities for natural refrigerants with a global HFC phase-down agreement

ATMOsphere Network Paris

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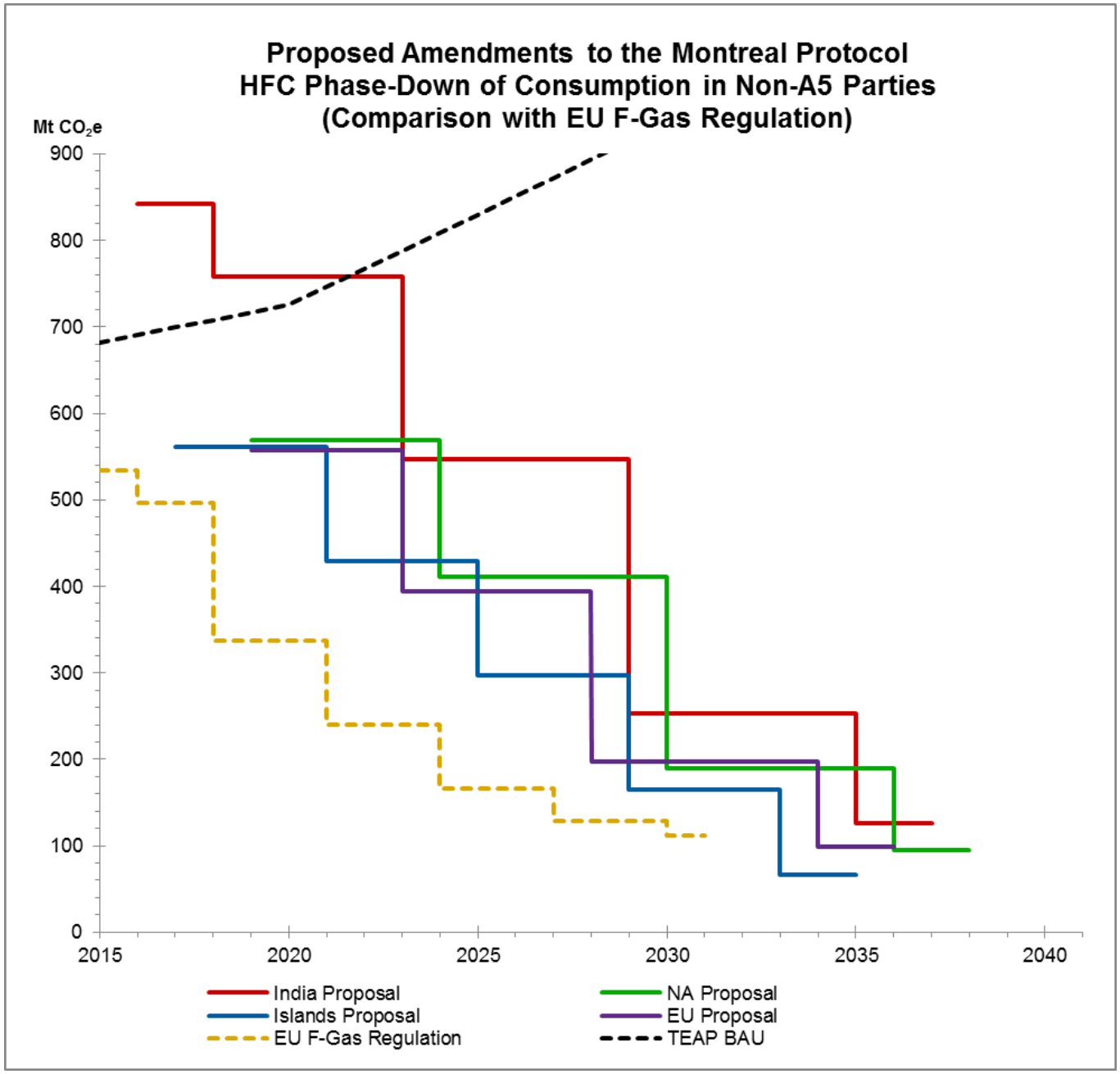
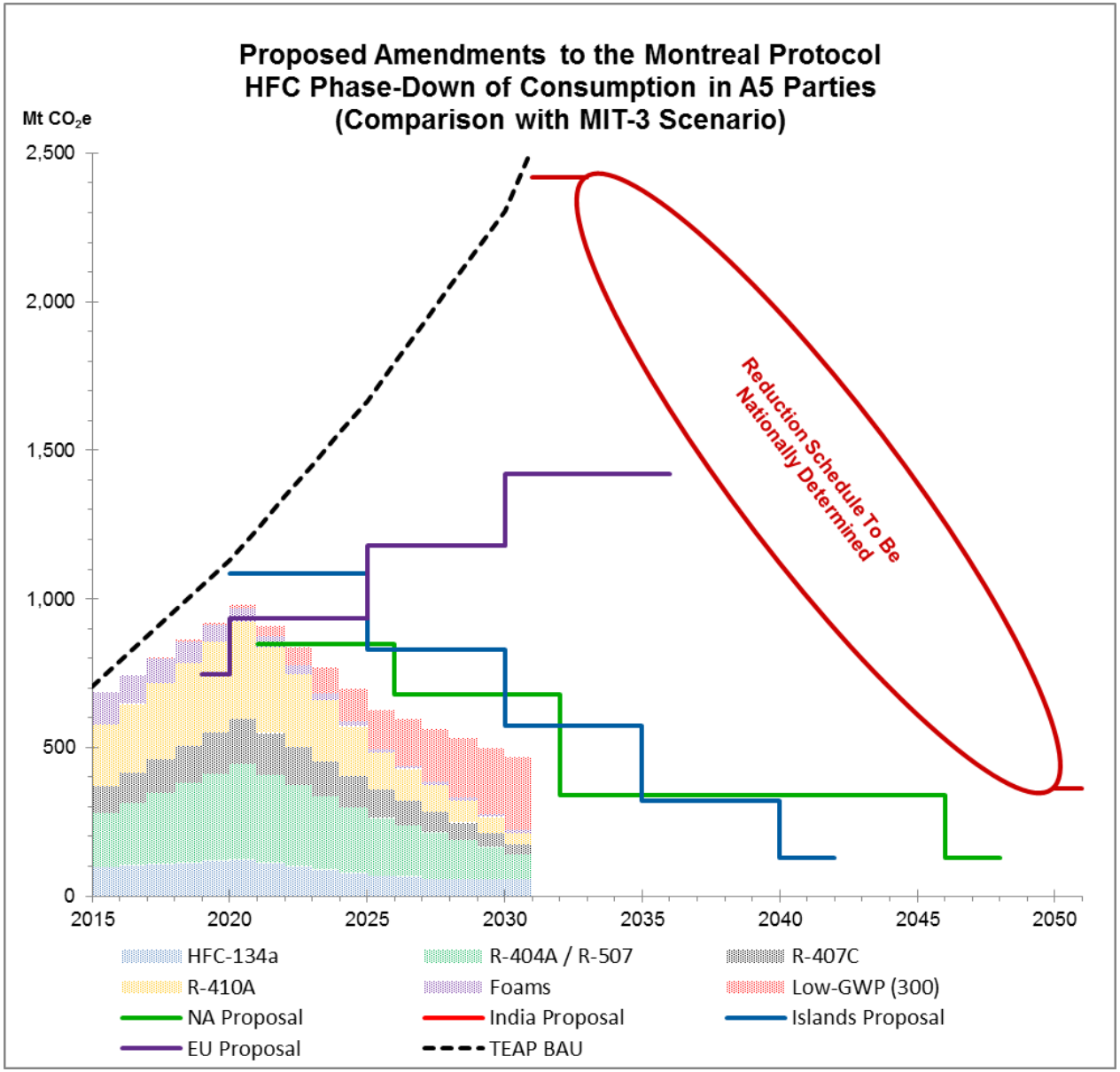
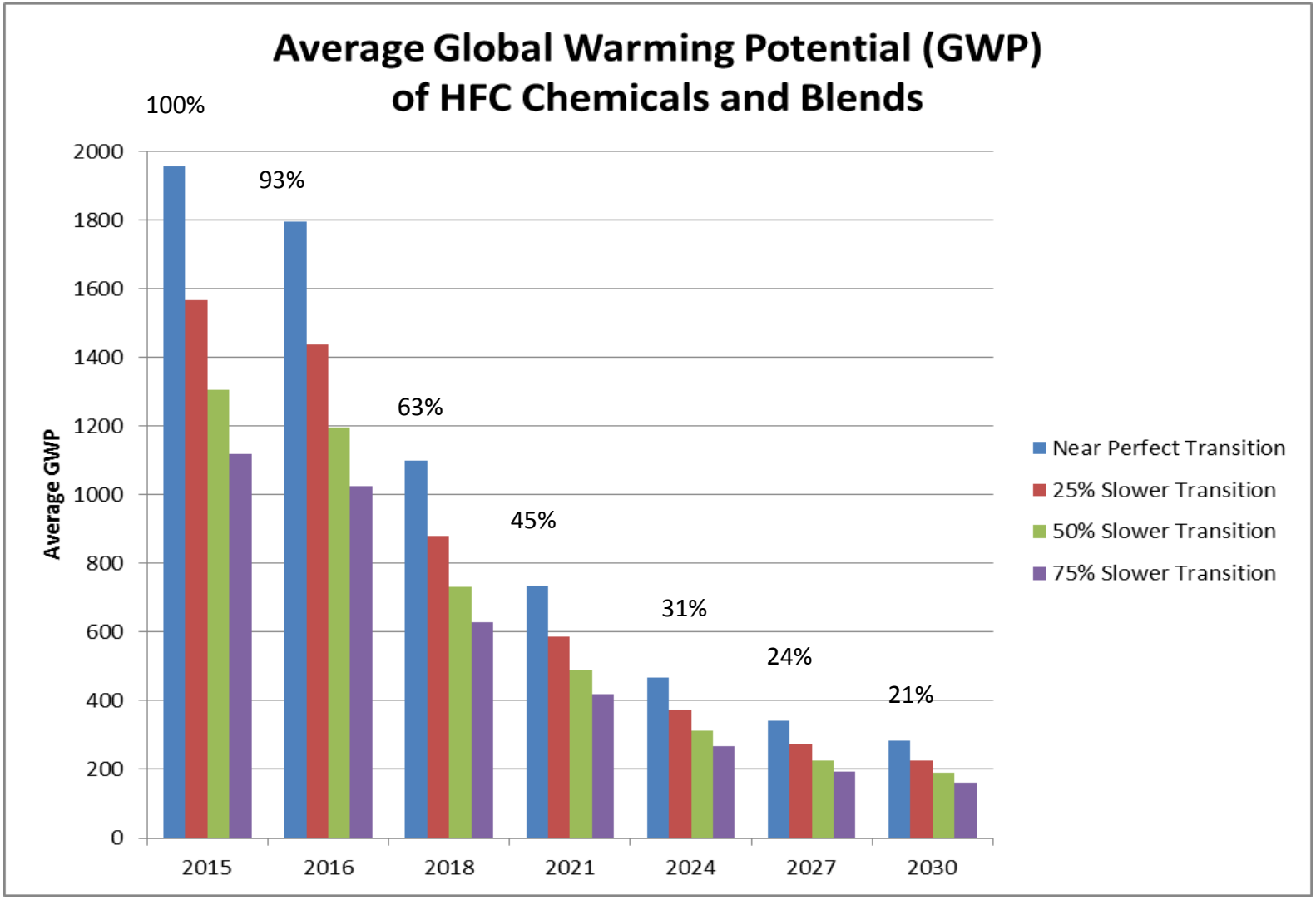
Outline

- Amendment proposals to the Montreal Protocol
- What is low-GWP – Impact of EU F-Gas Regulation
- Benefits of Natural Refrigerants
- China recommended substitutes for HCFCs
- Commercial refrigeration sector

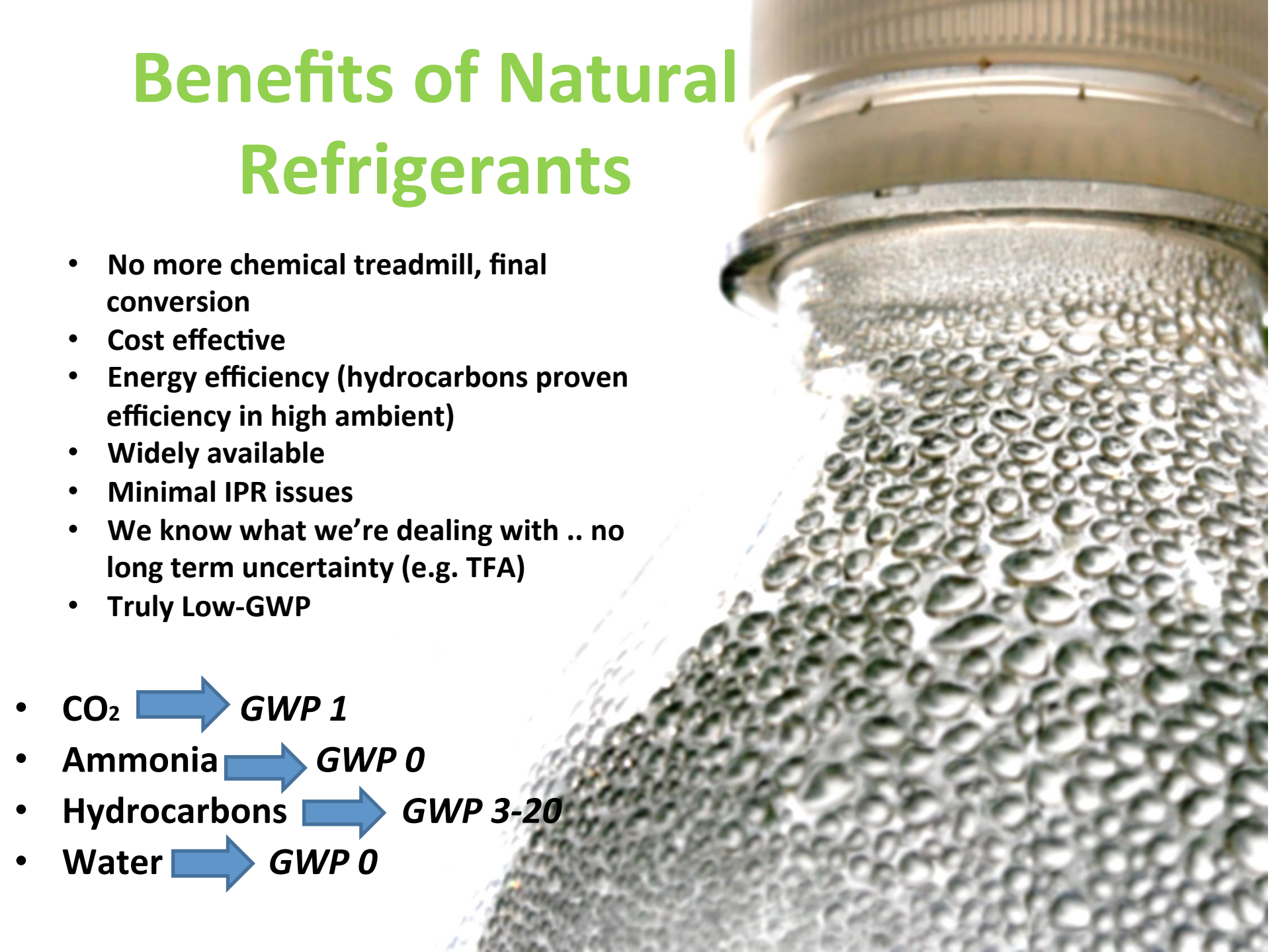

Proposed Amendments to the Montreal Protocol
HFC Phase-Down of Consumption in Non-A5 Parties
(Comparison with EU F-Gas Regulation)
Mt CO_2e
900
800
700
600
500
400
300
200
100
0
2015
2020
2025
2030
2035
2040
India Proposal
Islands Proposal
EU F-Gas Regulation
NA Proposal
EU Proposal
TEAP BAU


Proposed Amendments to the Montreal Protocol
HFC Phase-Down of Consumption in A5 Parties
(Comparison with MIT-3 Scenario)
Mt CO_2e
2,500
2,000
1,500
1,000
500
0
2015
2020
2025
2030
2035
2040
2045
2050
Reduction Schedule To Be Nationally Determined
HFC-134a
R-404A / R-507
R-407C
R-410A
Foams
Low-GWP (300)
NA Proposal
India Proposal
Islands Proposal
EU Proposal
TEAP BAU

EU F-Gas Regulation



Benefits of Natural Refrigerants



- No more chemical treadmill, final conversion
- Cost effective
- Energy efficiency (hydrocarbons proven efficiency in high ambient)
- Widely available
- Minimal IPR issues
- We know what we're dealing with .. no long term uncertainty (e.g. TFA)
- Truly Low-GWP

- CO_2 → *GWP 1*
- Ammonia → *GWP 0*
- Hydrocarbons → *GWP 3-20*
- Water → *GWP 0*

China First Catalogue of Recommended Substitutes for HCFCs 2015

HCFC	Application	Substitute	ODP (ozone depletion potential)	GWP (global warming potential)	Target field
HCFC-22	Refrigerant	R290 (propane)	0	3.3	Room air conditioner; Commercial independent refrigeration system
HCFC-22	Refrigerant	R600a (isobutane)	0	3	Commercial independent refrigeration system
HCFC-22	Refrigerant	CO2 (carbon dioxide)	0	1	Household heat pump water heater; Industrial/commercial heat pump water heater; Vehicle air conditioner; Industrial/commercial freezing and refrigeration system (used as refrigerant and secondary refrigerant)
HCFC-22	Refrigerant	NH3 (ammonia)	0	0	Refrigerated warehouse; Transport refrigeration; Condensing unit; Industrial refrigeration system
HCFC-22	Refrigerant	HFC-32 (difluoromethane)	0	675	Unitary air conditioner; Water chilling (heat pump) unit; Heat pump water heater; Condensing unit
HCFC-22 and HCFC-142b	Foaming agent	CO2 (carbon dioxide)	0	1	Extrusion polystyrene foam
HCFC-141b	Foaming agent	Cyclopentane, n-pentane and isopentane	0	11	Insulating materials for small appliance; Non-spraying foam for refrigerated container, solar panel and refrigerated warehouse
HCFC-141b	Foaming agent	H2O	0	0	Insulating materials for pipeline; Materials for solar panel

http://eshare.cnchemicals.com/publishing/home/2015/06/23/1980/china-throws-its-weight-behind-natural-refrigerants.html

Consumer Goods Forum November 2010 Commitment

"We are therefore taking action to mobilise resources within our respective businesses to ***begin phasing-out HFC refrigerants as of 2015 and replace them with non-HFC refrigerants (natural refrigerant alternatives)*** *where these are legally allowed and available for new purchases of point-of-sale units and large refrigeration installations.*

We recognise that barriers exist to wide scale adoption of more climate-friendly refrigeration, namely legislative restrictions in some markets, availability, cost, safety, maintenance and servicing. We will work to overcome those barriers by strengthening existing collaborative platforms and initiatives. We also will use our collective influence to encourage our supply base to develop natural refrigerant technologies that meet our business demand under commercially viable conditions."

Supermarket responses to Natural Refrigerants

Tesco (UK) 2012 "Natural refrigerant systems are future proof – because CO2 and hydrocarbons are naturally occurring substances we can be certain that there are no adverse environmental impacts of installing such systems"

Waitrose (UK) 2012 "We see no negative impact for the use of natural refrigerants, Waitrose and our supply chain continue to embrace natural refrigerants and do not feel that there are any blocks to moving forward."

Woolworths (South Africa) 2014 "We have CO_2 in very hot parts of the country and the system has proved to be reliable and efficient. Last week in our latest transcritical store we recorded temperatures of 50°C on the roof, without any problems."

Carrefour (France) 2015 "170 stores in 7 different countries have been fitted with CO_2 systems. Their energy performance has been tested in hot climates (Valencia in southern Spain, for example) and has been found to be very convincing…"

Aldi Sud (Germany) 2014 "Natural refrigerants already play an important role in our stores and will continue to do so in all future refrigeration systems. Whenever a technology with natural refrigerants represents a reliable, safe and cost-effective alternative to conventional HFC systems, we will apply it."

Thank you!

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