



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



SUSTAINABLE DEVELOPMENT GOAL 9
INDUSTRY, INNOVATION AND INFRASTRUCTURE

A/C conversions and prospects for cooperation

Rome, July 12, 2019

Presented by:

Ole Nielsen, Chief of Montreal Protocol Division, UNIDO

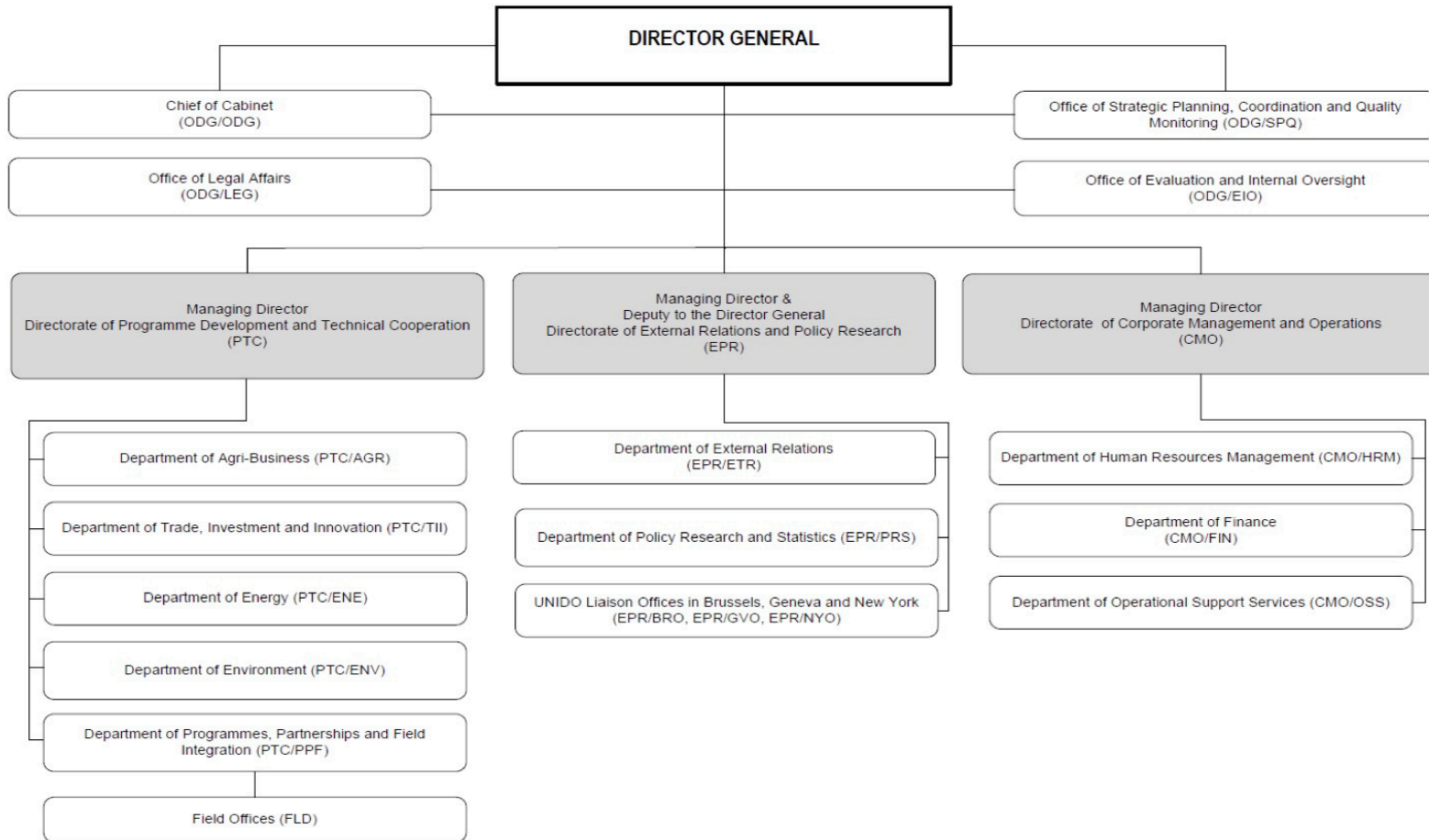




Brief

- UNIDO = United Nations Industrial Development Organization
- Overall mandate: Inclusive Sustainable Industrial Development







Brief

- Environment Department
 - Industrial Resource Efficiency;
 - Emerging Compliance Regime;
 - Stockholm Convention; and
 - Montreal Protocol.
- Montreal Protocol Division:
 - Implementing HCFC phase-out in 80 countries;
 - Institutional strengthening;
 - Enabling activities for Kigali ratification; and
 - Technology demonstrations.



Kigali amendment





Kigali Amendment

- Came into force 1 January 2019;
- When fully implemented: 0,4 deg. C global warming avoided (by end of century);
- July 5, 2019: Kigali Amendment ratified by 74 countries.



HFC Phase-down

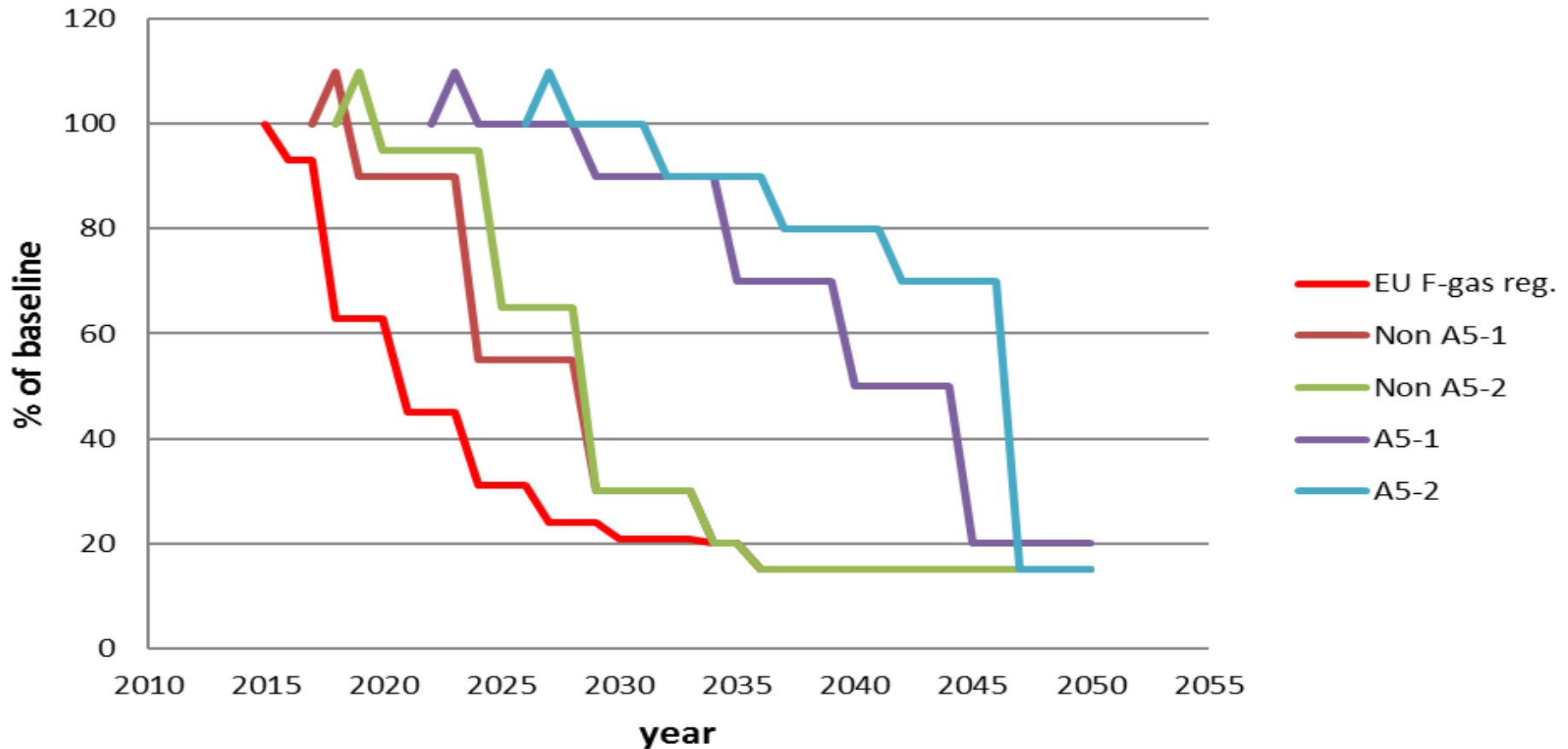
- Annex F substances

Substance*	100-year GWP**	Safety Class
HFC-134a	1,430	A1
HFC-245fa	1,030	B1
HFC-365mfc	794	–
HFC-227ea	3,220	A1
HFC-236fa	9,810	A1
HFC-43-10mee	1,640	–
HFC-32	675	A2L
HFC-125	3,500	A1
HFC-143a	4,470	A2L
HFC-152a	124	A2
HFC-23***	14,800	A1

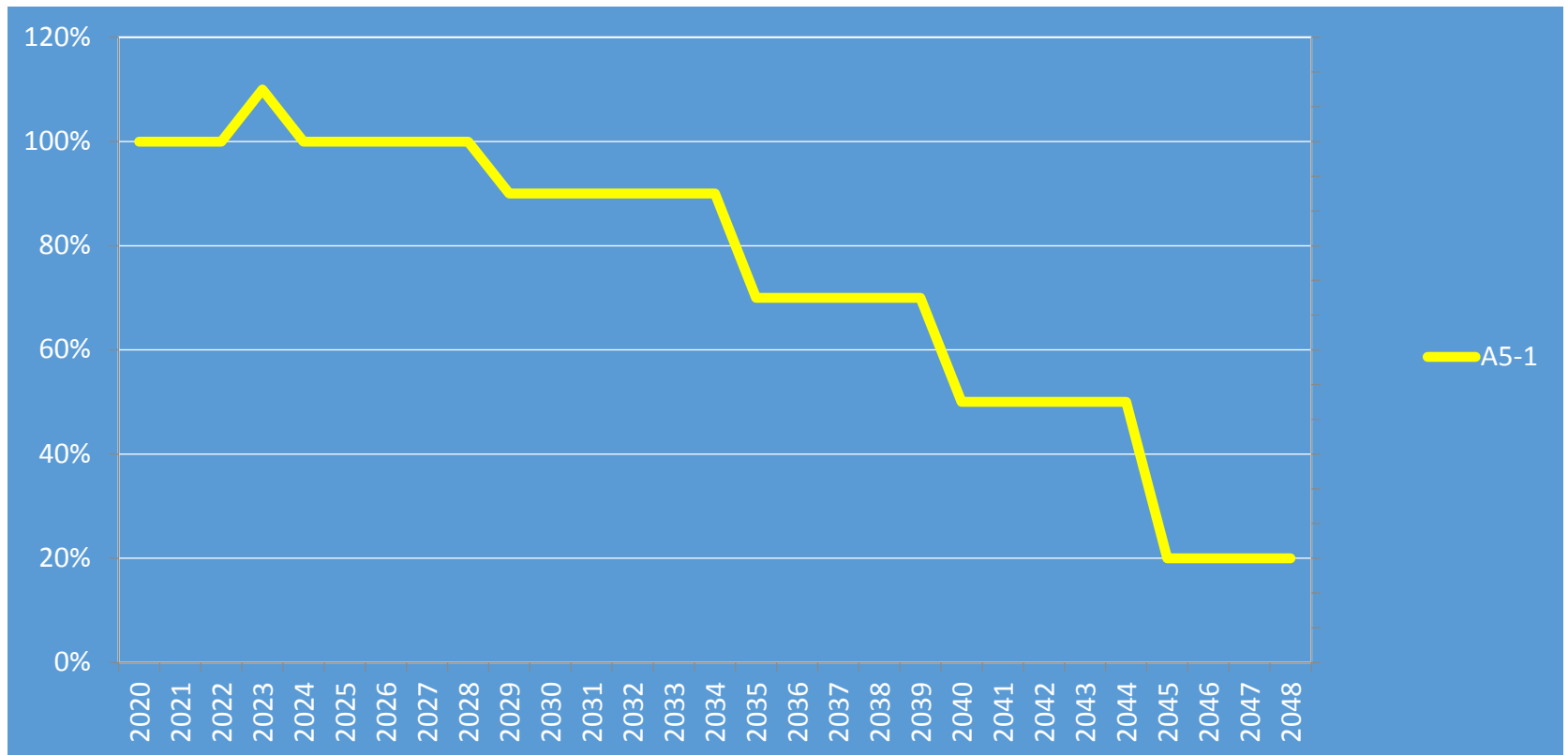
HFC Blend ^(a,b)	100-year GWP ^(c)	Safety Class
R-404A	3,922	A1
R-407A	2,107	A1
R-407C	1,774	A1
R-407F	1,825	A1
R-410A	2,088	A1
R-507A	3,985	A1

EU F-gas

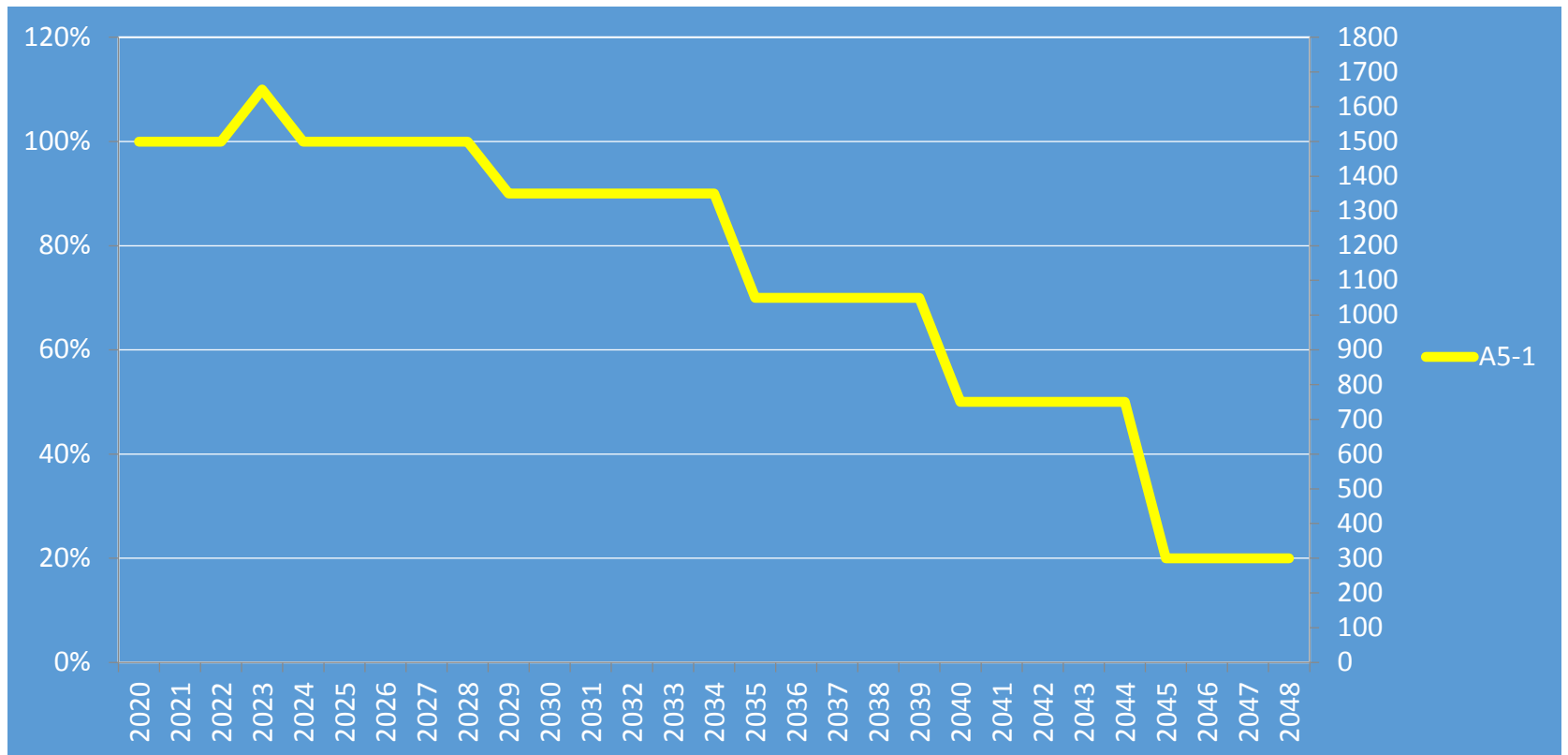
HFC consumption phase down for art.5 and non-art 5 countries



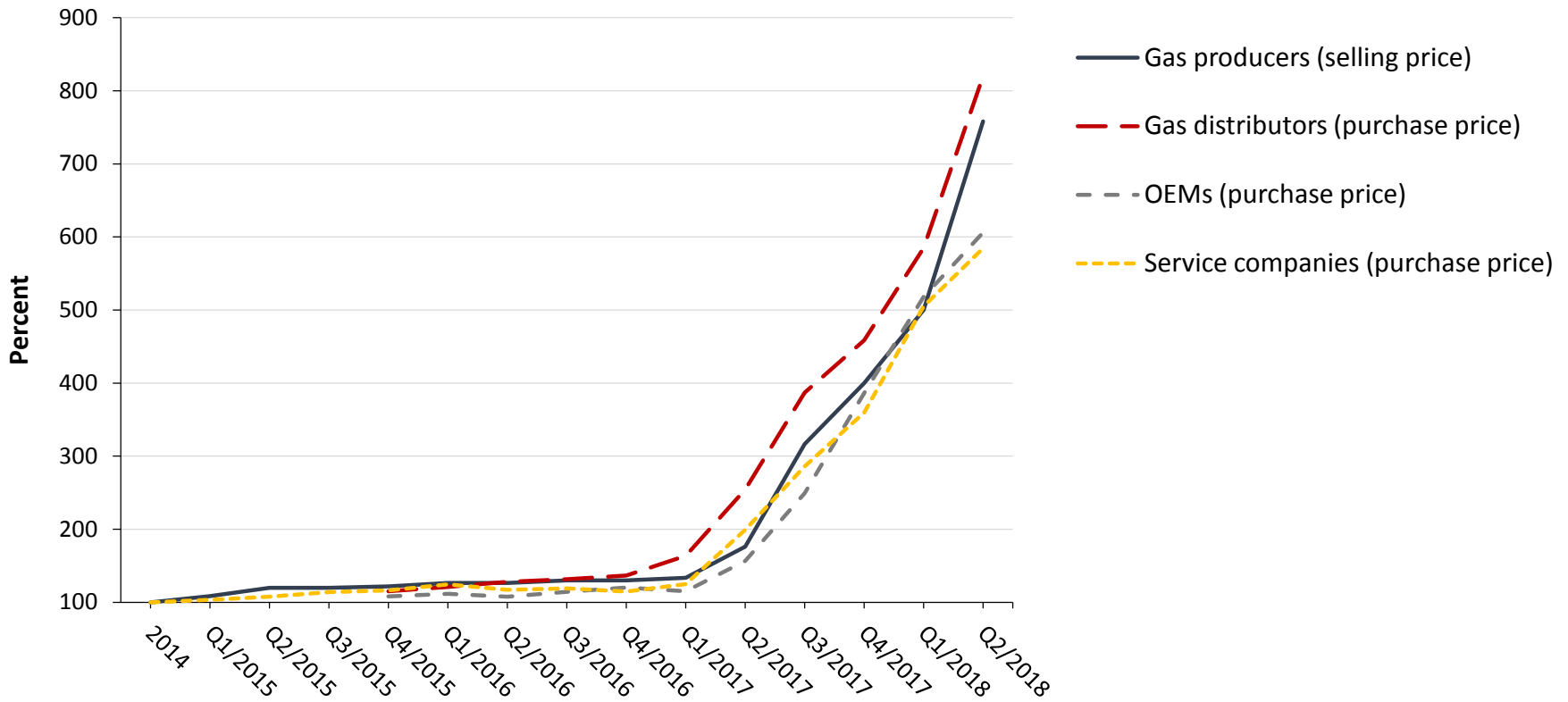
Regulatory certainty



Regulatory certainty

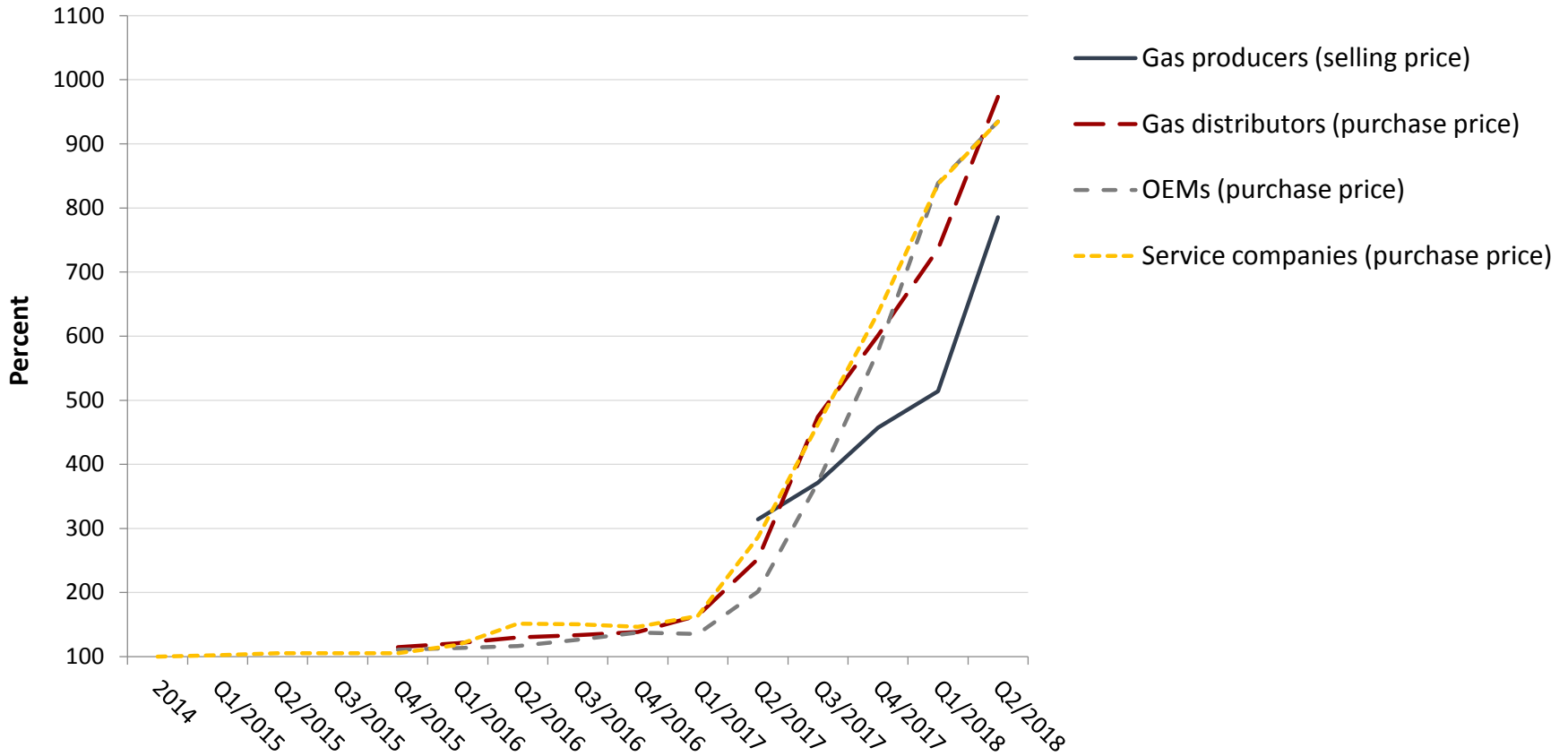


Development of the average price of R134a (GWP 1430) along the supply chain from 2014 to Q2/2018 (price index, 2014 = 100 percent)



Source: Öko-Recherche 2018 (on behalf of EU Commission)

Development of the average price of R410A (GWP 2088) along the supply chain from 2014 to Q2/2018 (price index, 2014 = 100 percent)



Source: Öko-Recherche 2018 (on behalf of the EU Commission)



UNIDO programs in A/C sector

- China HPMP stage I: R-290/R-410; stage II: R-290/R-744
- Midea (demo), GMCC (demo): R-290
- Argentina, Jordan, Syria: R-410;
- Algeria, Bahrain: R-290/R-32;
- Brazil, Pakistan, Saudi Arabia (demo): R-290

- Several in pipeline
- Many industries in developing countries depends on SKD/CKD kits from China



UNIDO China program in A/C sector

- Support comprise:
 - Factory conversions
 - Technical assistance / research
- Current installed capacity: 6 M units annually;
- Future installed capacity: 6 M units annually;
- Total sales with subsidy from FECO (IOC):
 - Approx 150,000 split A/C's



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



SUSTAINABLE DEVELOPMENT GOAL 9
INDUSTRY, INNOVATION AND INFRASTRUCTURE





Barriers for R-290 market penetration

- Restrictive standards:
 - R-290 charge limitations;
 - Current upper limit for R-290 is 7 kW;
 - R-290 products sensitive to charge in terms of energy efficiency.
- Marketing:
 - No financial incentive to market R-290 as a gas;
 - Consequently no technical support from R-290 manufacturer;
 - Technical expertise at A/C manufacturer level.

Barriers for R-290 market penetration

- Liability:
 - Flammability;
 - Difficult to control use/maintenance/EOL for manufacturer;
 - Uncertainty on skill level of service technicians.
- Cost:
 - Technical solutions to mitigate flammability risks has extra costs;
 - Not yet reached the level of economy of scale;
 - Additional operations needed for installation and servicing.

Italian bilateral component in China

- Integrated into the HPMP stage II;
- Main focus areas:
 - Risk assessment for R-290;
 - Standards;
 - Identification of export barriers;
 - CO₂ HPWH demo; and
 - Training



Thank you for the attention!

