

National HFC inventories: summary and analysis

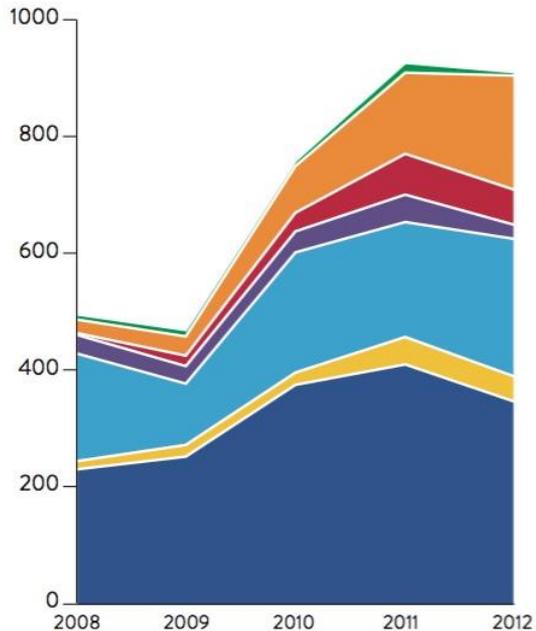
Duncan Brack, IGSD

Kigali, 14 October 2016

- **Climate and Clean Air Coalition's HFC Initiative funding 14 national HFC inventories**
- **6 completed: Bangladesh, Chile, Colombia, Ghana, Indonesia, Nigeria (all UNDP)**
- **8 under way: Bahamas, Cambodia, Jordan, Kyrgyzstan, Maldives, Mongolia, South Africa, Vietnam (UNEP, UNIDO, World Bank)**
- **Bilaterally funded: Moldova, Sri Lanka (UNDP)**
- **Inventories use import data and surveys of end users of HFCs – include details of importers, breakdown of use per sector, and national consumption estimates (past and forward projections)**
- **This paper summarises the first six inventories; project carried out by UNEP for CCAC, with involvement of UNDP**
- **Further report to cover all inventories next year**

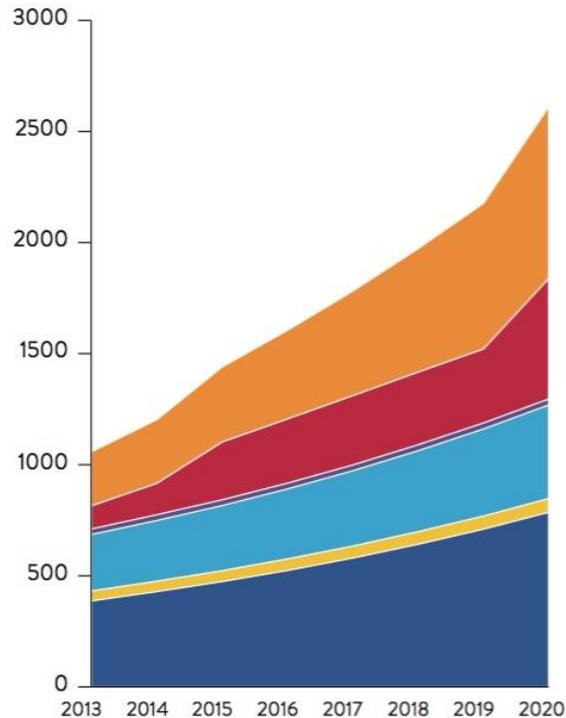
Introduction

CHART 3.1 HFC consumption in Chile, 2008-12 (metric tonnes)



■ HFC-134a ■ R-410A
■ HFC-227ea ■ R-507A
■ R-404A ■ Others
■ R-407C

CHART 3.3 Projected (2013-20) HFC consumption in Chile (metric tonnes)



■ HFC-134a ■ R-407C
■ HFC-227ea ■ R-410A
■ R-404A ■ R-507A

Wide range of HFCs in use

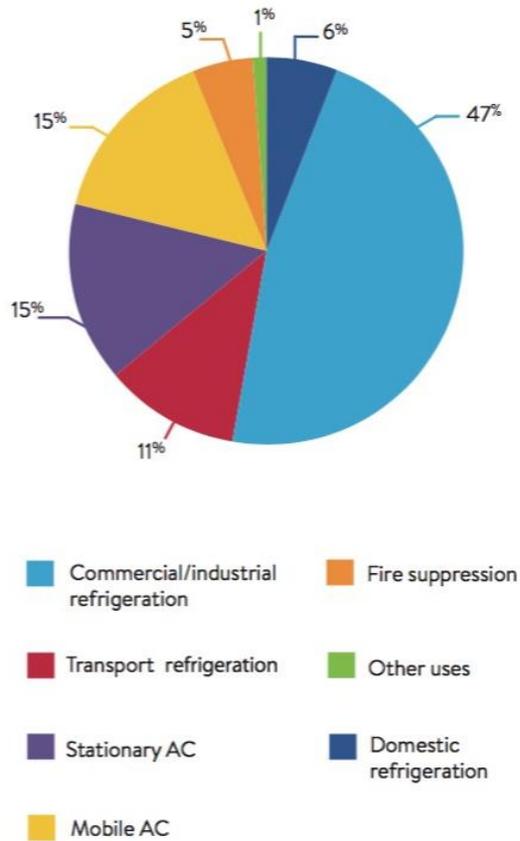
Consumption x2 2008-12

x3 2012-20

Fall 2011-12 due to rise in HFC prices

Chile: HFCs

CHART 3.2 Sectoral breakdown of HFC consumption in Chile, 2012



**Commercial /
industrial
refrigeration
main sector
(47%)**

Chile: sectors

CHART 4.1 HFC consumption in Colombia, 2008–12 (metric tonnes)

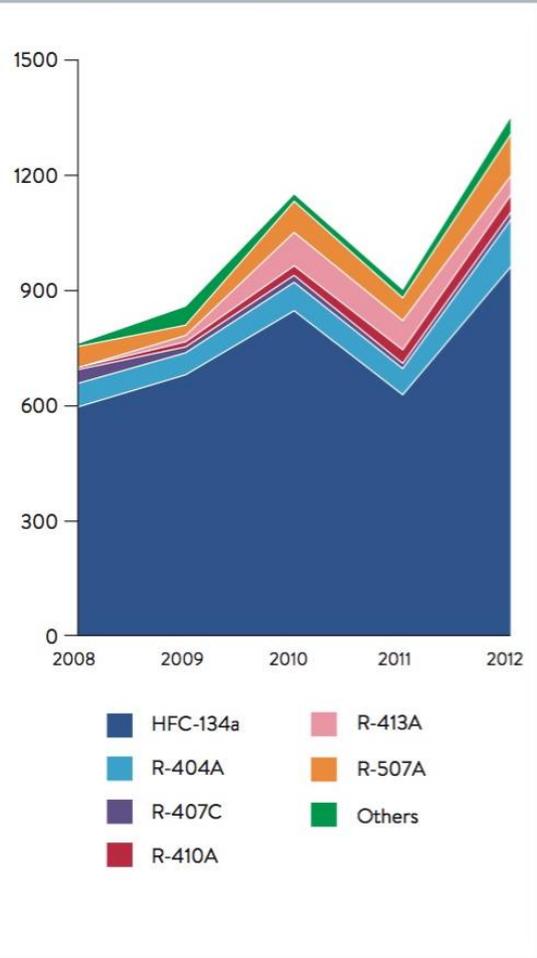
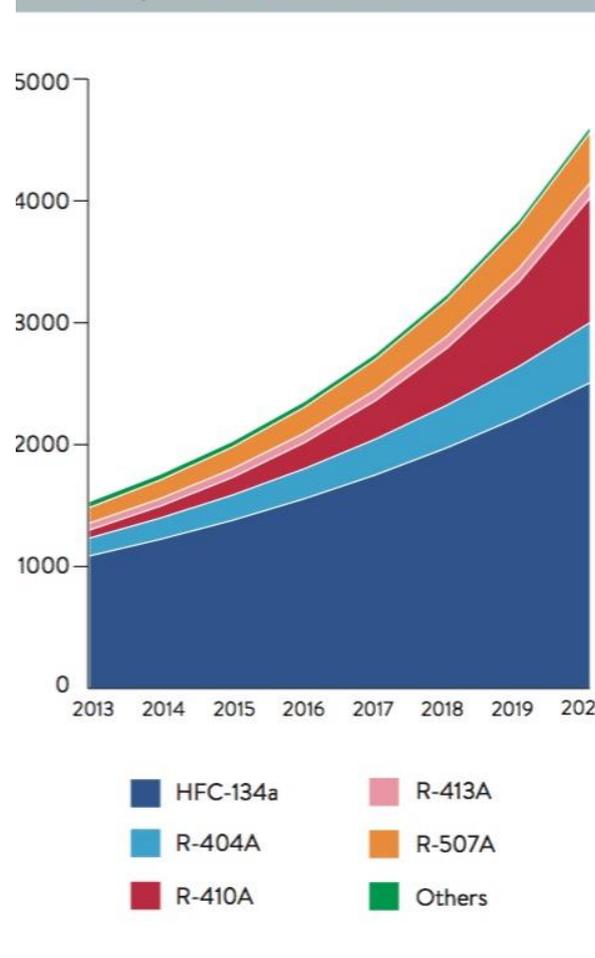


CHART 4.3 Projected HFC consumption in Colombia, 2013–20 (metric tonnes)



Wide range of HFCs in use

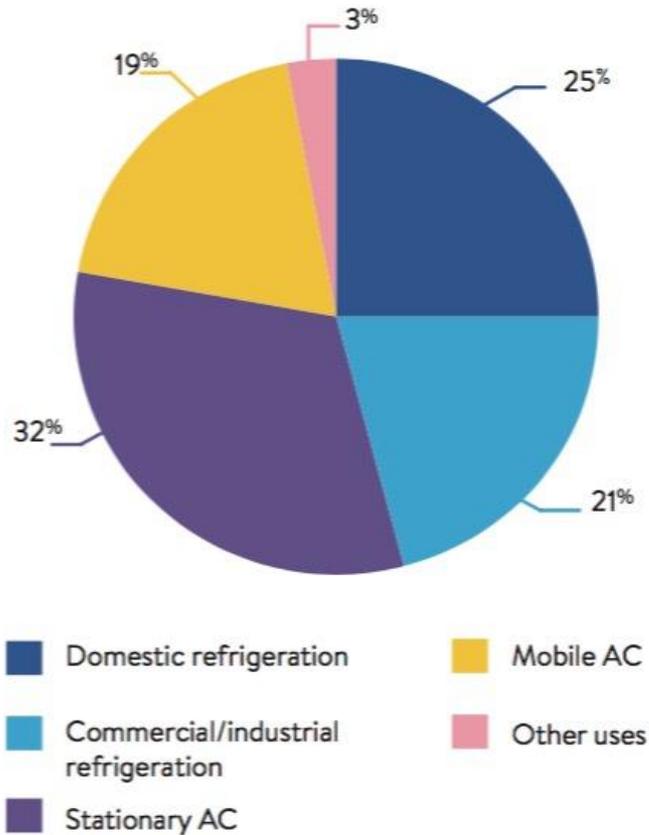
Consumption x2 2008–12

x3 2013–20

Fall in 2010–11 due to stockpiling in previous year

Colombia: HFCs

CHART 4.2 Sectoral breakdown of HFC consumption in Colombia, 2014



**Stationary AC
main sector
(32%)**

**Supermarkets
main users**

Colombia: sectors

CHART 2.1 HFC consumption in Bangladesh, 2011-13 (metric tonnes)

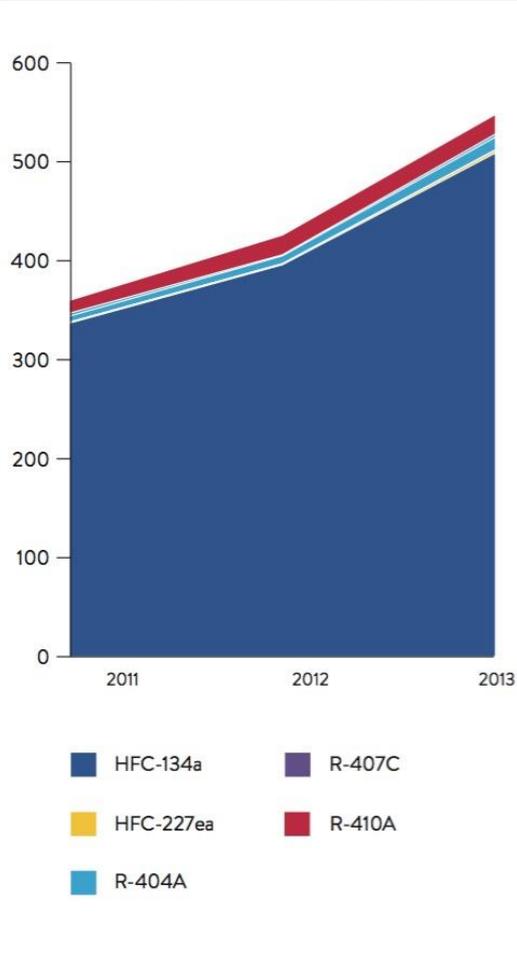
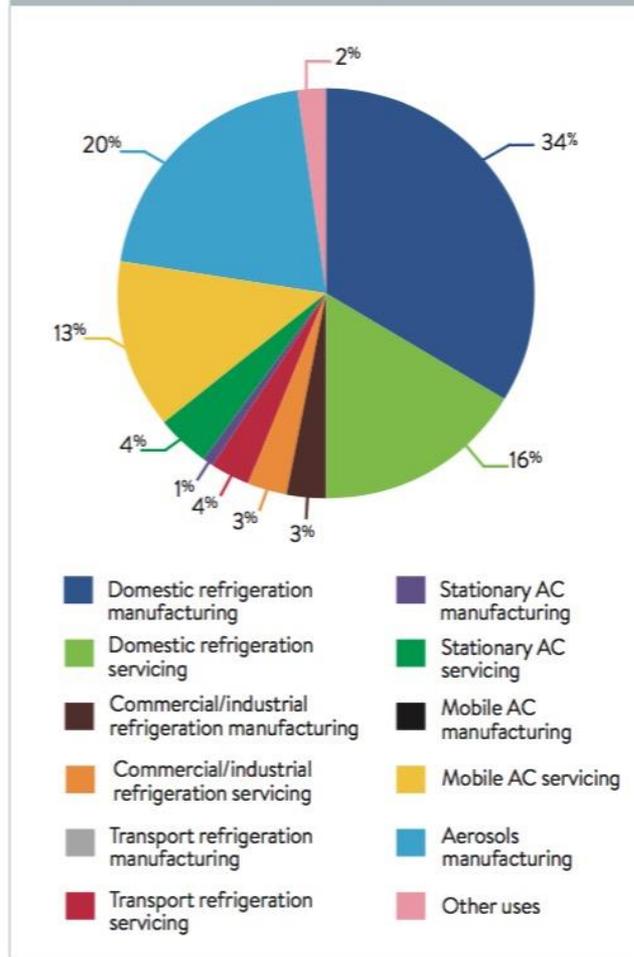


CHART 2.2 Sectoral breakdown of HFC consumption in Bangladesh, 2013



Consumption
x1.5 2011-13

X2 2013-18

May under-estimate future growth

Domestic refrigeration:
50%

MDIs: 20%

Servicing / manufacturing
breakdown

Bangladesh: HFCs and sectors

CHART 6.1 HFC consumption in Indonesia, 2009–20 (metric tonnes)

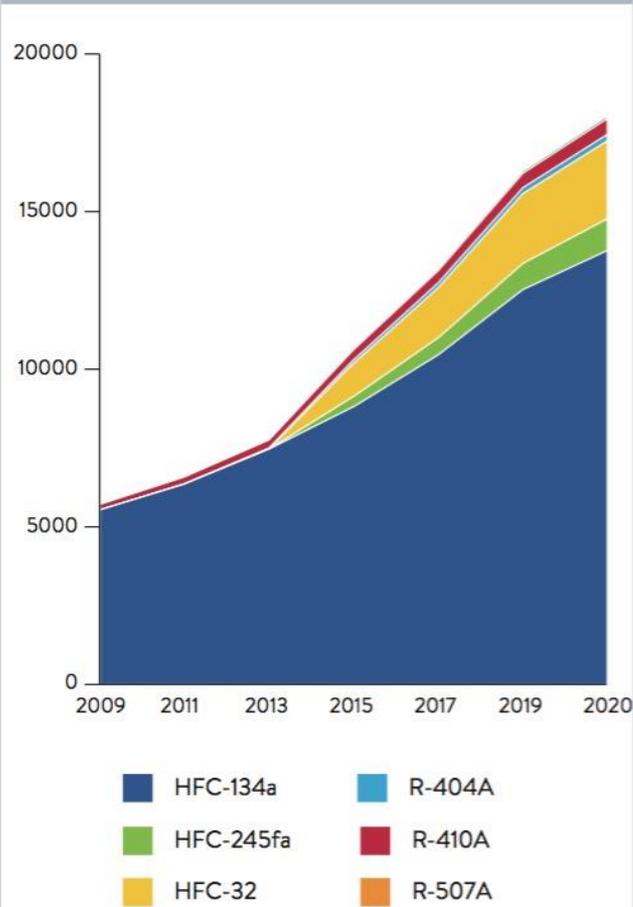
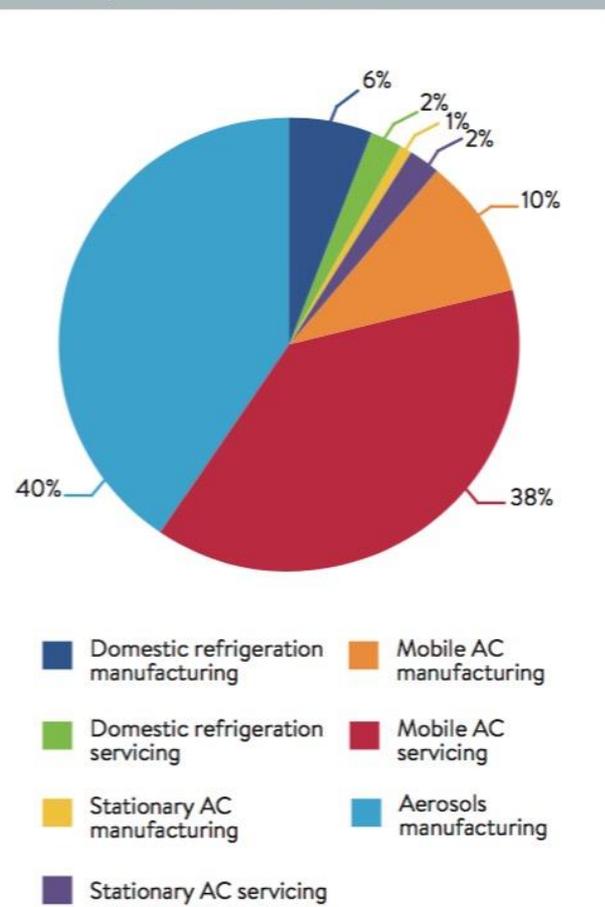


CHART 6.2 Sectoral breakdown of HFC consumption in Indonesia, 2013



No import data;
all figures are
projections

MAC main
sector (48%)

Non-medical
aerosols (40%)
– doubtful?

Servicing /
manufacturing
breakdown

Indonesia: HFCs and sectors

CHART 5.1 HFC consumption in Ghana, 2011-14 (metric tonnes)

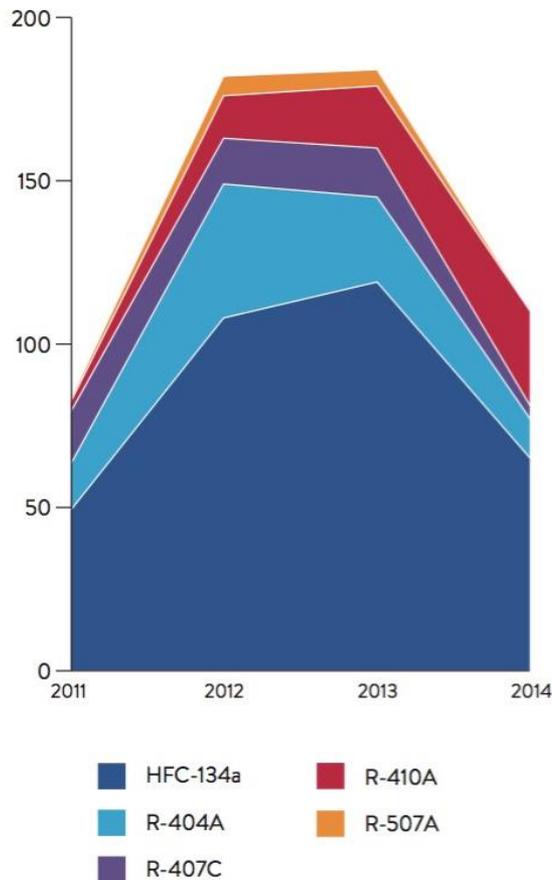
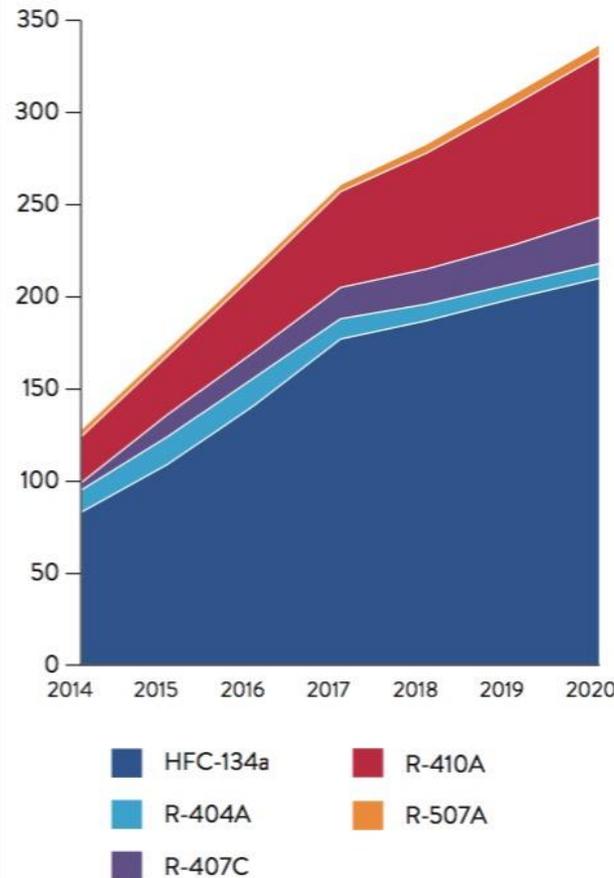


CHART 5.3 Projected HFC consumption in Ghana, 2014-20 (metric tonnes)



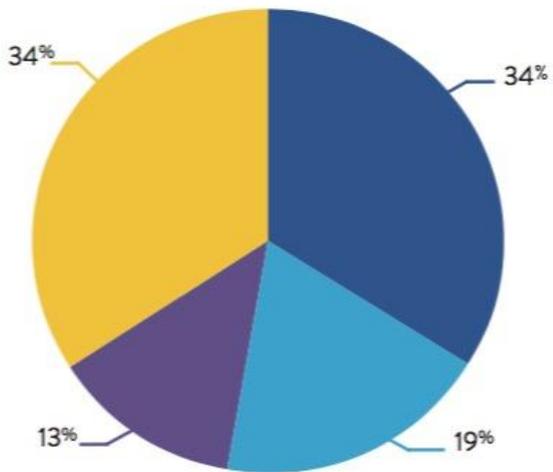
Fall 2013-14:
hydrocarbon uptake, EE programme, power disruptions?

Data problems
- differences in end-user data

Data adjusted;
may be revised further

Ghana: HFCs

CHART 5.2 Sectoral breakdown of HFC consumption in Ghana, 2014⁷



■ Domestic refrigeration ■ Stationary AC
■ Commercial/industrial refrigeration ■ Mobile AC

Domestic
refrigeration,
MAC (both 34%

No
manufacturing
- all servicing

Ghana: sectors

CHART 7.2 HFC consumption in Nigeria, 2012–14 (metric tonnes)

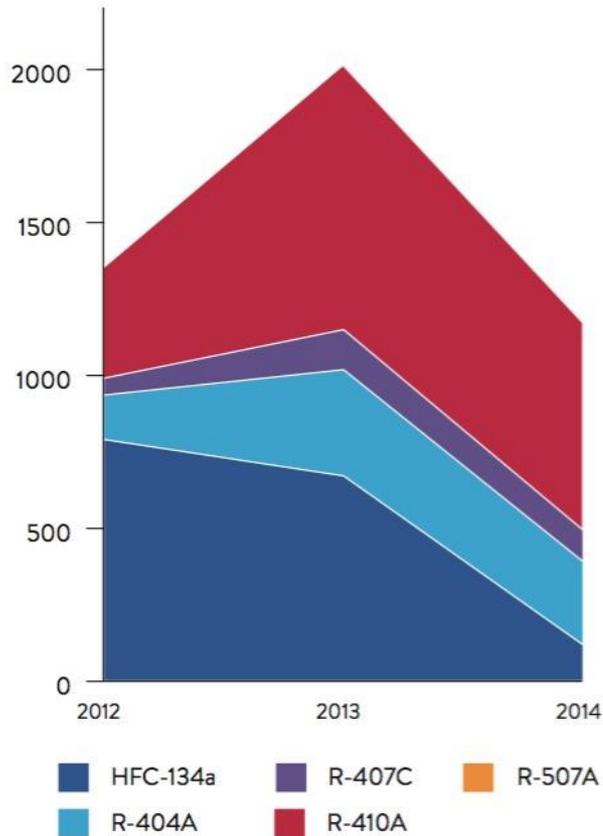
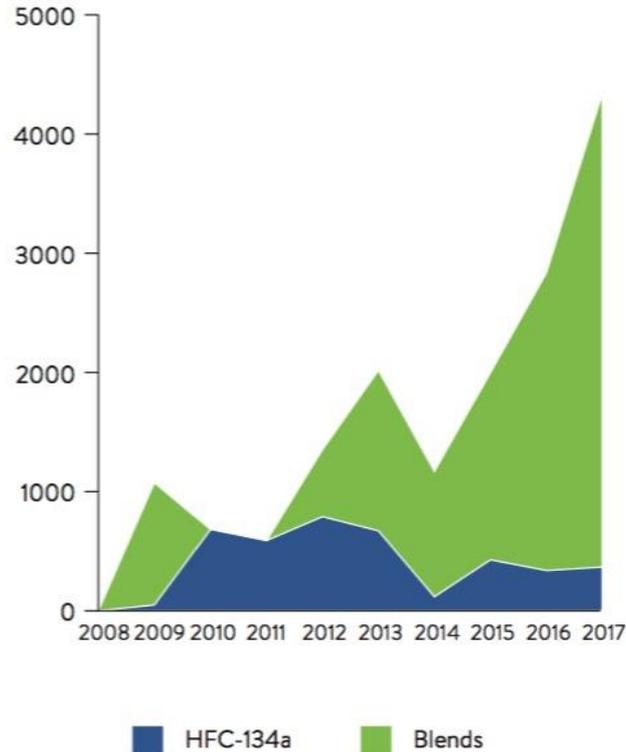


CHART 7.3 Actual (2008–14) and projected (2015–17) HFC consumption in Nigeria (metric tonnes)



Lack of detailed data

Fall 2009–10: stockpiling in previous year?

Fall 2013–14: hydrocarbons?

Future growth rate may be over-estimate

Manufacturing 20%; servicing 80%

Nigeria: HFCs

CHART 8.1 HFC consumption by country, six countries, 2011-17 (metric tonnes)⁹

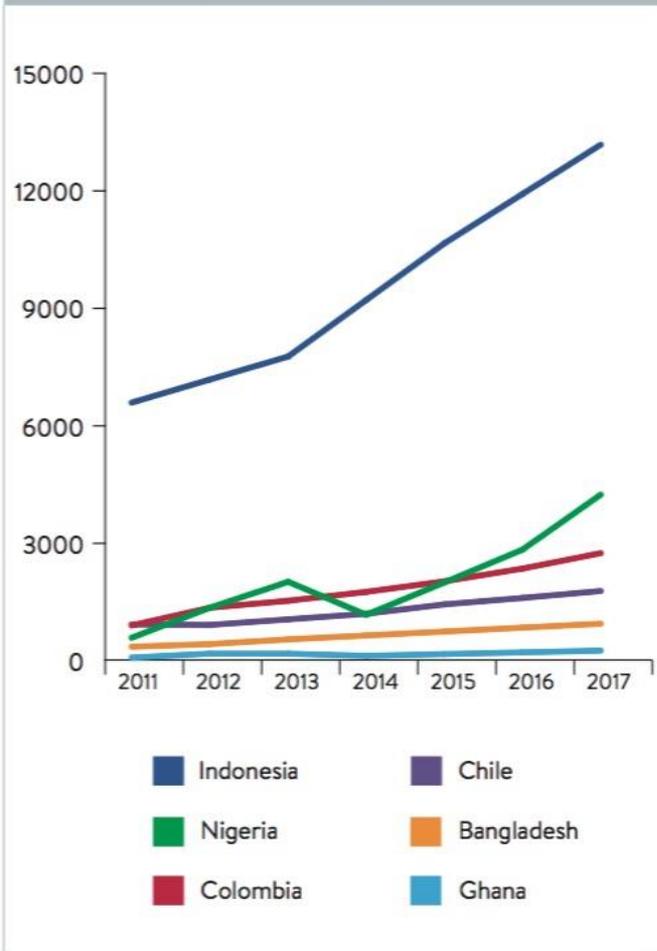
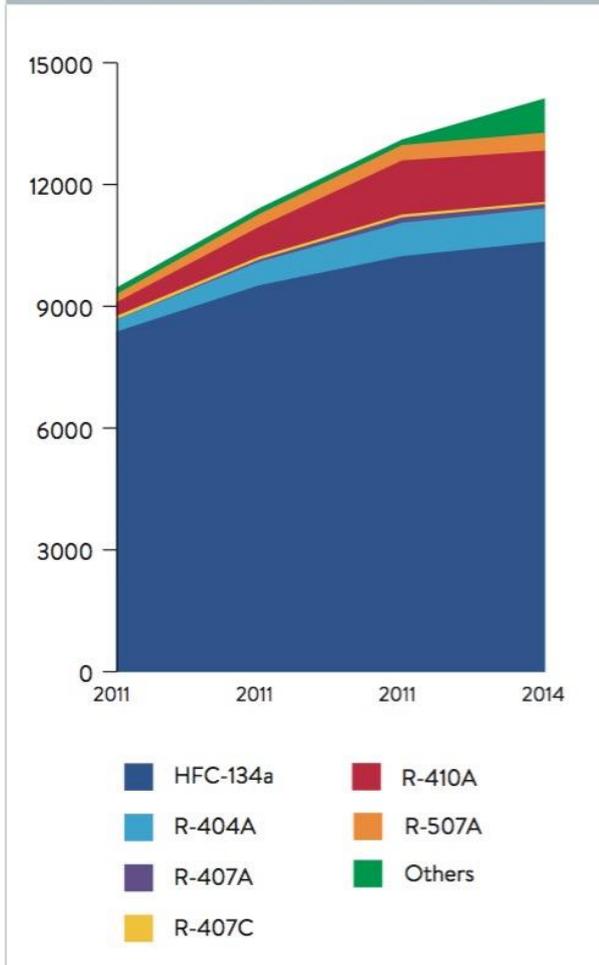


CHART 8.3 Aggregate HFC consumption by chemical, six countries, 2011-14 (metric tonnes)¹⁰



2011-17
covered in all
inventories

Average annual
rate of growth
= 16%

134a main HFC
2011-14 - but
future growth
stronger in R-
410A, R-404A,
R-507A, HFC-
32 (ID)

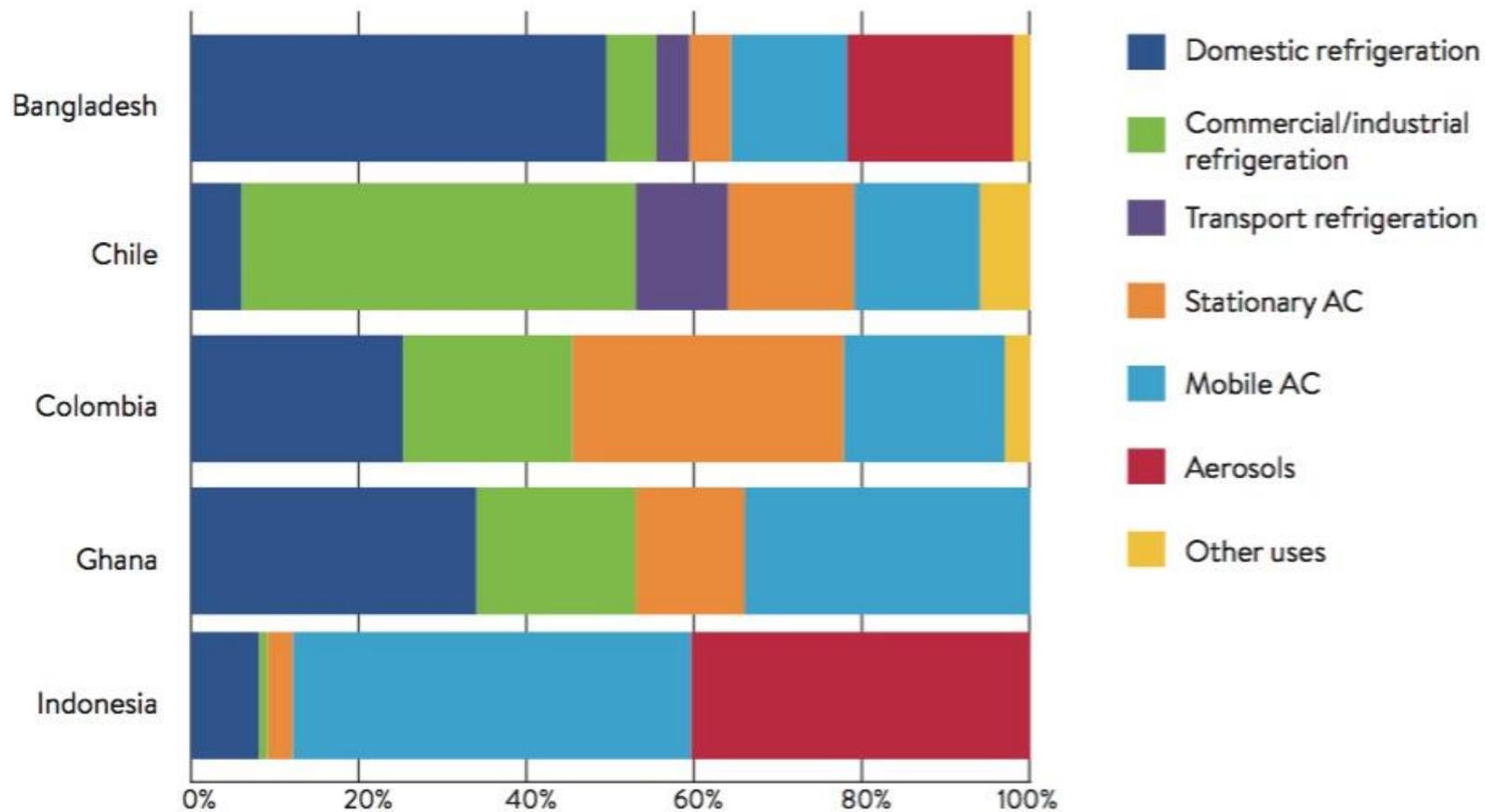
Overview: HFCs

TABLE 8.2 Annual growth rates of HFC consumption, observed and projected

Country	Observed growth rate per year	Period	Projected growth rate per year	Period
Bangladesh	23%	2011–13	14%	2014–18
Chile	16%	2008–12	14%	2013–20
Colombia	15%	2008–12	16%	2013–20
Ghana	(a)		18%	2014–20
Indonesia	(b)		12%	2009–20
Nigeria	(a)		50%	2014–17

Overview: rates of growth

CHART 8.4 Comparative sectoral breakdown of HFC consumption, five countries¹¹



Overview: sectors

- Data availability is a problem (note Sri Lanka)
- All countries anticipate continued growth in HFC use: particularly from spread of household and commercial RAC and mobile AC and expansion of MDI manufacturing (Bangladesh)
- Phase-out of HCFCs will add to growth, particularly in stationary AC
- No use of HFCs for foam-blowing yet; expected in Bangladesh, some in Indonesia
- Hydrocarbon alternatives: very little in Bangladesh, Indonesia; some in Chile, Colombia; more in Ghana, Nigeria
- Climate impacts: will cover in next year's report
- Inventory reports also identify options for HFC reduction and avoidance

Overview: points to note