Agenda Item 4

Air Navigation Performance Framework Results from the 2021 data collection exercise

(reflecting State submissions up to 6 November 2021)

EASPG/3

Paris, France

30 Nov / 2 Dec 2021

Contents

Executive Summary

Highlights on performance results

- COVID19 response measures resulted in an unprecedented drop in air traffic in 2020. The absence of demand had ripple effects on a variety of operational performance measures. The associated performance indicators for 2020 have therefore to be evaluated in light of the global push to curb and manage the spread of COVID19.
- On average an overall annual traffic reduction of 55-60% was observed in 2020 throughout the EUR region. Travel constraints on international traffic also applied to intra-regional traffic. The varying national policies in response to curbing the spread of COVID19, including the prevalence of phases with higher transmission and infection rates (i.e. “waves”) caused a steadily varying connectivity across the regions.
- The EUR region is characterised by a wide variety in the size of the airspace as well as of traffic density. The top 8 States included in the report cover two thirds of the continental airspace. The share increased by 3 States in comparison to 2019. This shows the tilted impact of COVID-related travel constraints across the EUR region.
- About 60% of the (pre-pandemic) IFR flight hours within the continental airspace in 2019 is serviced by 8 participating States. 5 States are accountable for more than 50% of all en-route ATCO hours on duty in the EUR Region while 30% of the ATCO hours in terminal & aerodrome services are observed in 3 States.
- The average IFR flight duration per State (in continental airspace) varies from 0.15 hrs (9 minutes) to 1.98 hrs (119 minutes).

Highlights on performance results

- More than half of the States have a single continental FIR. A smaller number has 2 (often a division between upper and lower), while 7 reporting States have 3 or more FIRs.
  The number of FIRs is associated with volume of airspace and number of control unit.
- A majority of States have a single ACC. 4 reporting States have established 2 ACCs, while 9 reporting States have 3 or more ACCs.
  The distribution is similar to the number of FIRs.
- On average, the average flight hour per IFR flight across the EUR region is slightly increased (just under 0.5 min/flight) compared to 2019.
  On a per country basis, the observed average flight hour per flight, however, ranges in the same order of magnitude.
  This suggests that scale-related efficiencies took place (due the number of lower air traffic) while operating a similar network and the numerical increase is subject to the overall reduced number of flights.
- A concentration of airport IFR movements is observable. 60% of all movements were observed at 7 reporting States.
  The average national number of IFR airport movements ranges around 180.000 while the top 2 States observed movement numbers of a factor of 5-5.5 more (+/- 900.000).
- Just under two-third of all ATCOs in operations at ACCs are deployed in 7 reporting States within the EUR region.

Highlights on performance results

- In light of the overall traffic decline in 2020 due to COVID19, the total number of all causes en-route ATFM delay in the EUR region dropped in comparison to the previous 2 years. Still a similar pattern is observed with the majority of en-route ATFM delay concentrated in a small number of States. The vast majority of States does not generate any significant delay.
- Demand/capacity mismatch in en-route airspace due to ATC capacity problems are concentrated in a limited number of States. The top 3 States account for about 80% of the observed en-route ATFM delay with 1 State causes about half of all such delay.
- Due to the decline in air traffic, ATFM delay at airports dropped significantly in comparison to previous years. Weather remains one of the main delay causes while other factors played only a minor/negligible role. In 2020, 2 airports triggered 50% of the delay, and the top 20 airports accounted for just under 90% of all observed airport ATFM delay

Highlights on performance results

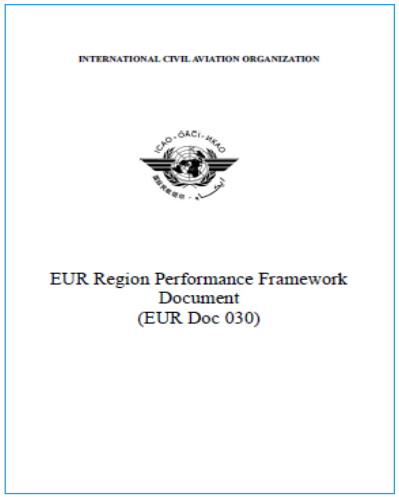
- Flight efficiency followed broadly the pattern of the previous years. This suggests that – despite the traffic reduction – further efficiencies due to restructuring of the network, removal of operational/procedural constraints/routing have been limited.
- The data suggest that there is a variety of results in the ATCO productivity, a dozen of States perform better than the average while a dozen perform below the average.
- The participation of States and Stakeholders to the ICAO activities (e.g. workshops, meetings, reports) varies greatly. Due to the prevailing COVID19 situation and associated constraints, many in-person events had to be cancelled and online interactions became the primary interaction tool used also on a day-to-day basis.

Introduction

ICAO Performance Framework Document

ICAO EUR Doc 030 describes the performance Framework (available in English/Russian language)

- Introduction
- Background
- Relationship with ICAO Global developments
- Relationship with the EU Performance Scheme
- Geographical scope
- Roles and responsibilities
- KPAs/KPIs/Metrics
- Monitoring and reporting at regional/national level
- Guidance material

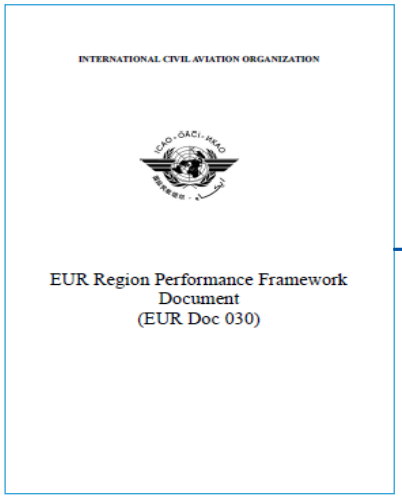


EUR Region Performance Framework

KPA	OBJECTIVES	FOCUS AREAS	INDICATORS
SAFETY	Ensure safety continuous improvement through reduction of ATM related safety occurrences and implementation of uniform safety standards		Effectiveness of Safety Management (Safety Maturity Questionnaire) Level of State Safety/Just culture (Safety Culture Questionnaire) Adoption of an harmonized occurrences severity classification methodology
CAPACITY	Capacity meets demand for en-route and at airports	En-route ATFM Delay	Average en-route ATFM delay generated by airspace volume
		Airport ATFM Delay	Average ATFM delay per flight in the main airports (to be identified by States)
EFFICIENCY	Ensure users may use most efficient routes	Horizontal Flight Efficiency	Average horizontal en route flight efficiency (length of the en route part of the actual trajectory/last flight planned route vs great circle)
ENVIRONMENT	Contribute to the protection of environment (fuel/CO2 emissions reduction)		CO2 emissions related to inefficiencies in route extension
COST EFFECTIVENESS	Contribute to optimization of costs for ANS	ATCO Productivity	IFR Flights (en-route) per ATCO hour duty
			IFR flight hours per ATCO hour on duty
			IFR movements per ATCO hour on duty
PARTICIPATION BY ATM COMMUNITY	Ensure States' participation to Regional planning and implementation activities		Level of participation to meetings
			Level of responses to planning activities
			Level of provision of performance results

No longer Doc 030
Regional Safety reporting

ICAO Performance Framework Reporting Tables



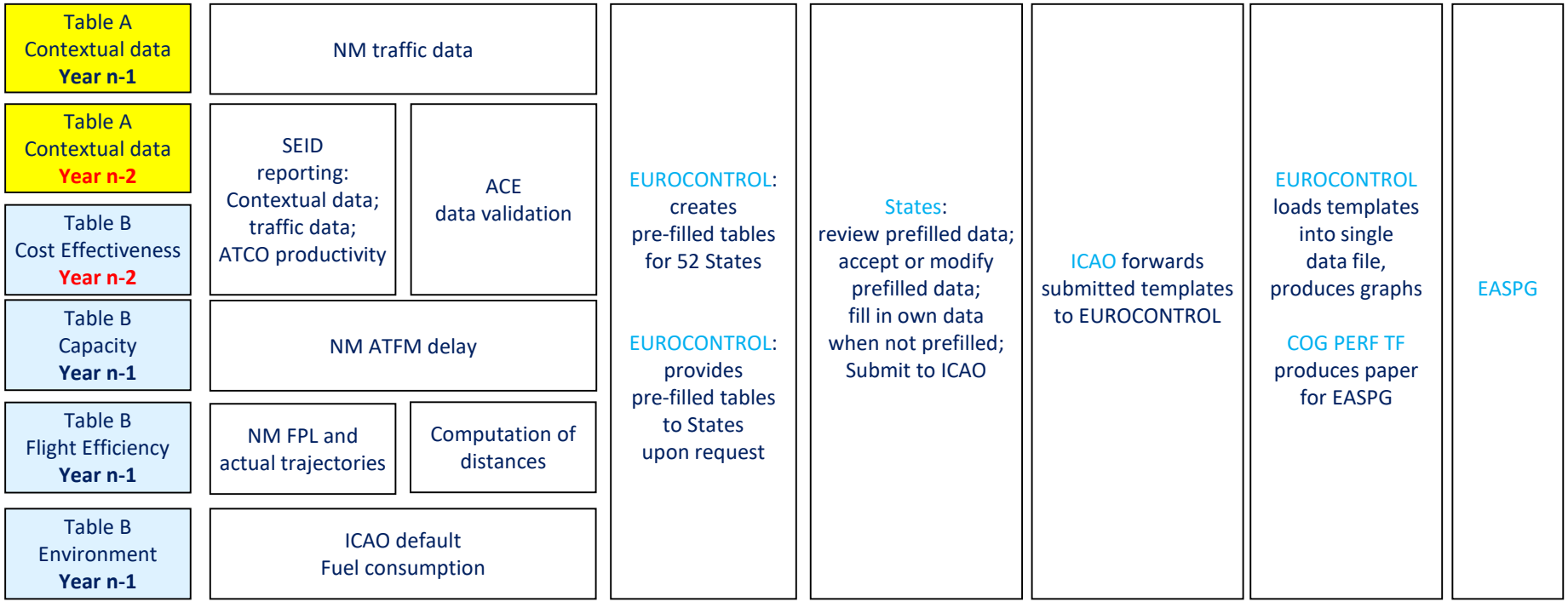
- Table A – Contextual Data
  - Continental Airspace
    - Airspace
    - Traffic
    - ATC Facilities
    - ATCOs in Operations
  - Oceanic Airspace
    - Airspace
    - Traffic
    - ATC Facilities
    - ATCOs in Operations

Contextual data

- Table B – Performance Data
  - Continental Airspace
    - Safety (No longer included)
    - Capacity
    - Flight Efficiency
    - Environment
    - Cost Effectiveness
- Table C – Participation Data
  - EUR Region Activities
    - Level of participation

Performance data

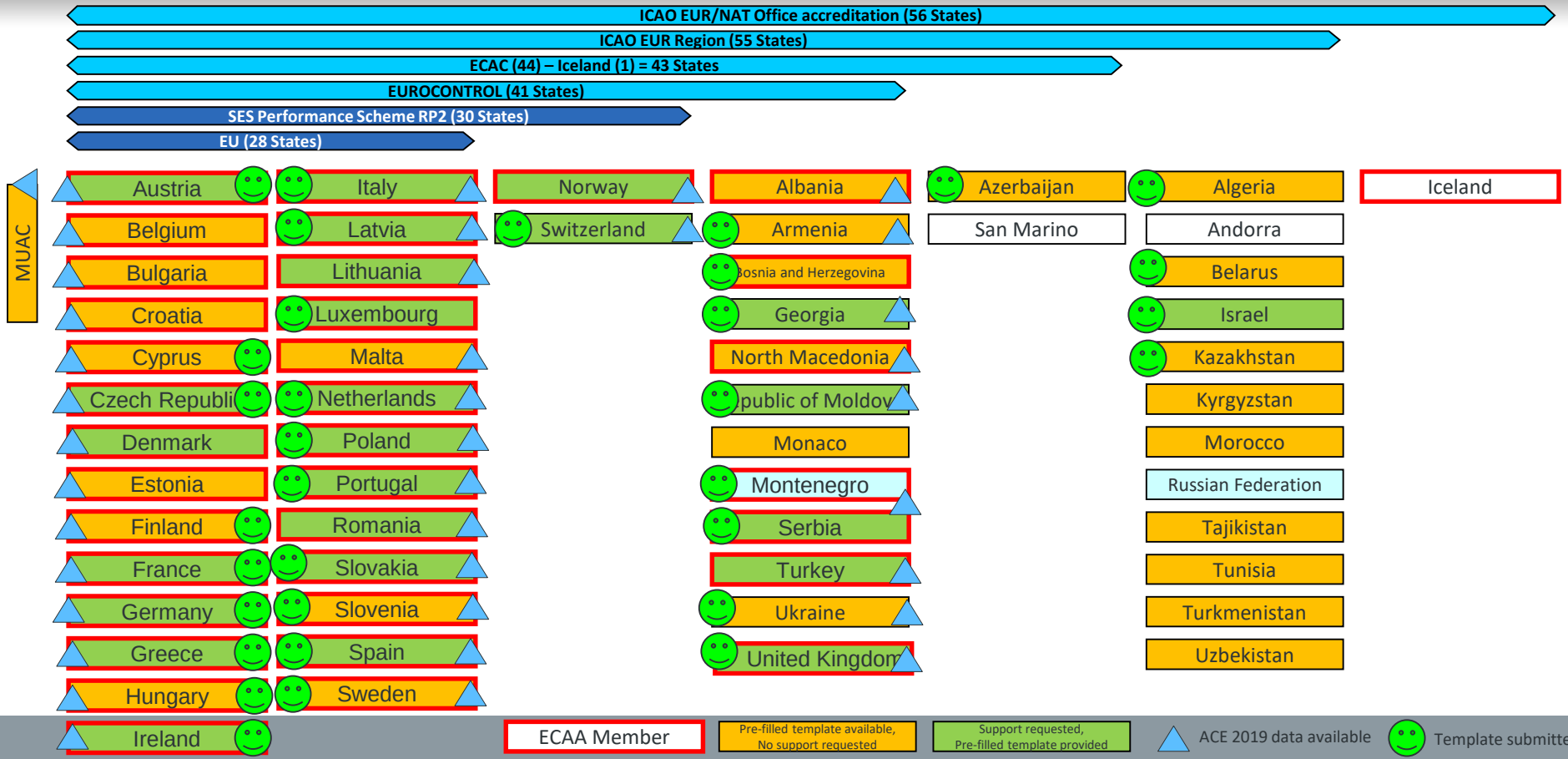
Data flow for Doc 030 Reporting



ICAO PARIS UNITING AVIATION

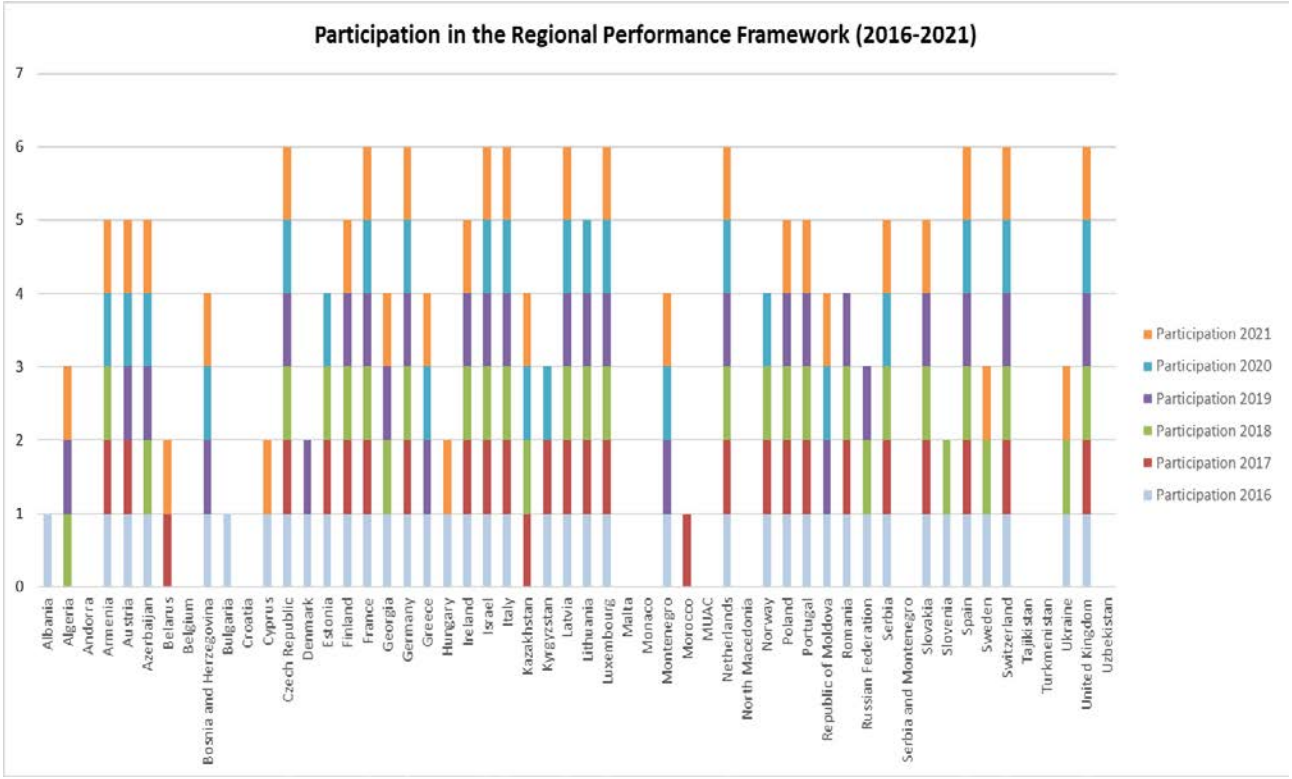
Level of participation in 2021

Status on 06-11-2021



Level of participation 2016-2021

Status on 06-11-2021

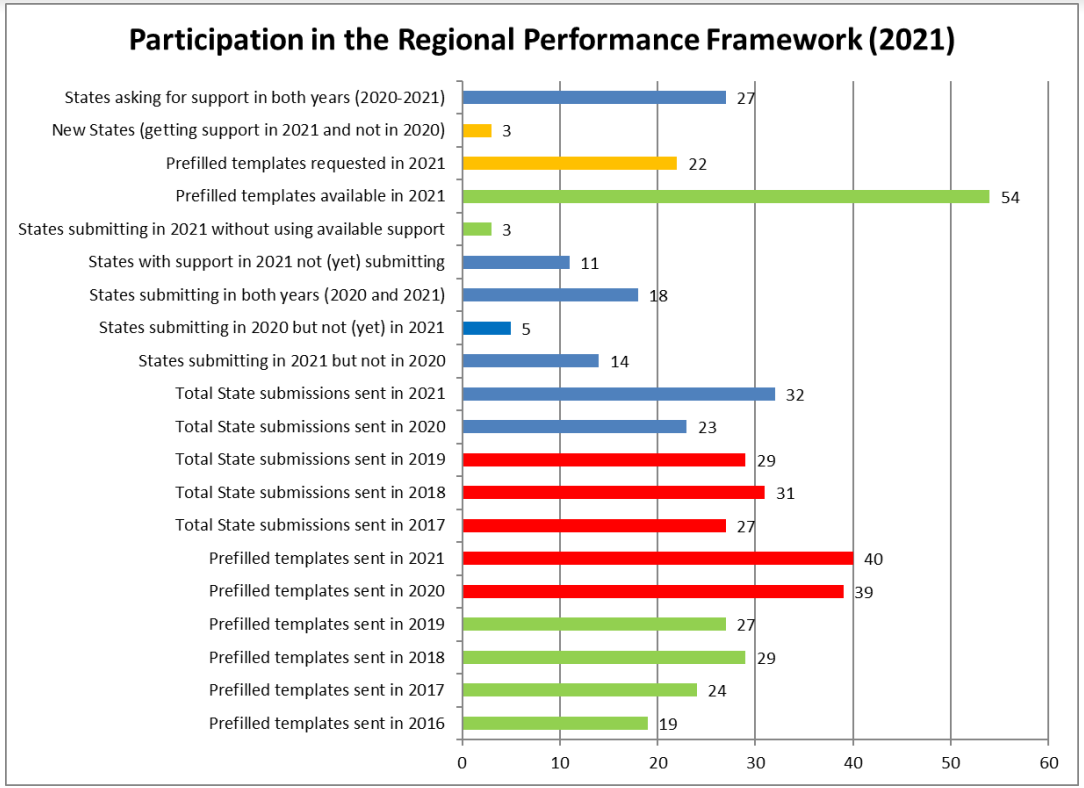


ICAO EUR Doc 030 participation varied over the past years.

Participation in 2021: 32

With several States «rejoining» after COVID disruptions in 2019 and 2020.

Level of participation 2016-2021



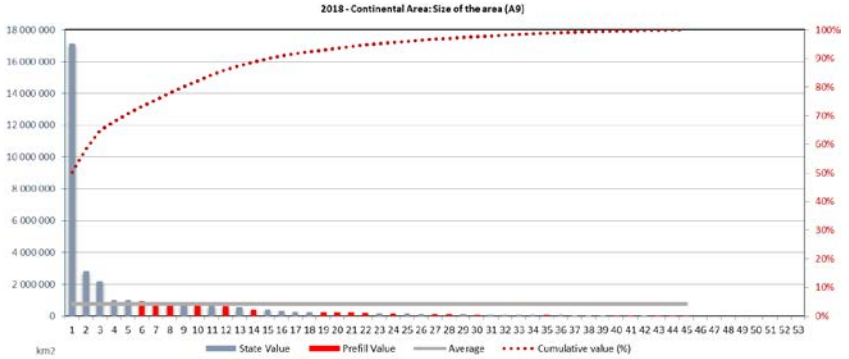
- Participation in 2021: 32
- Strong increase from 2020 (23 submissions) → reporting stabilised with pandemic and associated measures coming to and end.
- States actively benefitting from support through prefilling (e.g. reduction of replication, consitency, quicker turnaround)
- Potential to increase participation through targeting non-reporting States

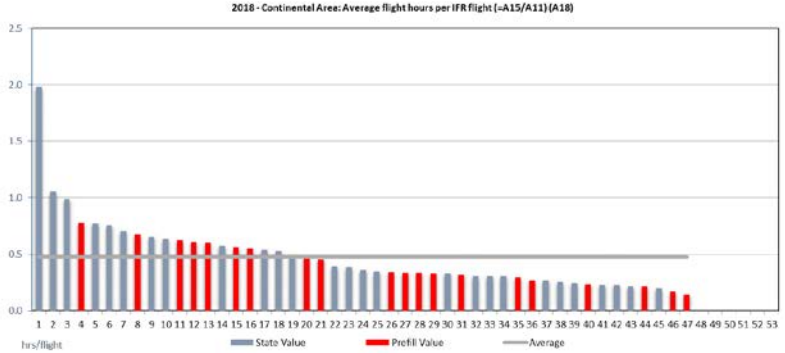
Processing and presentation of results

- Data is collected in one Excel reporting template per State
- Data of individual States is collated into a single data set
  - Basis for graphical representation of results
    - Combination of prefilled and submitted data
      - Grey bars: data as submitted by the State
      - Red bars: prefilled data where available, for States which did not submit a template
      - In some cases the number of States in the graphs is smaller than the number of pre-filled + submitted templates. Reason: for some States the template is only partially filled.
  - Results are anonymised
    - But each State can see where it stands in comparison to all States in the Region
      - Each State knows its own values and can therefore position itself in the graphs

Explanation of graphs

- Title
  - Identifies the data: year, scope (geographical and/or KPA), name of the data item, identifier code in the template
- X-axis
  - The list of anonymised States for the State- and ANSP-based data items (MUAC included as an ANSP), and the list of anonymised airports for the airport-based data items (± 180 airports). Note that the labels are ranking numbers, not State/airport identifiers: in principle the mapping between numbers and States/airports is different for each graph.
- Left y-axis
  - The value of the data item, with the measurement units in the bottom left corner (blank means it is simply a count).
- Grey line
  - The average value (arithmetic mean), based on the number of States/ANSPs for which results are available for this data item (the length of the line indicates for how many States/ANSPs data is available). This value is a proxy for the regional average: it will change as data for more States/ANSPs is available.
- A series of grey and/or red bars
  - The profile of individual State/ANSP/airport values in descending order. This provides a good picture of the differences within the region. The bars do not show the difference between a reported value of zero and the value not being reported, but this can be deduced from the brown line (absence of a bar below the grey line means value zero or a value too small to be visible in the graph).
- A red dotted line
  - For data items which are aggregatable over States/ANSPs/airports: the cumulative profile of the blue bars in percent (see right-hand axis).



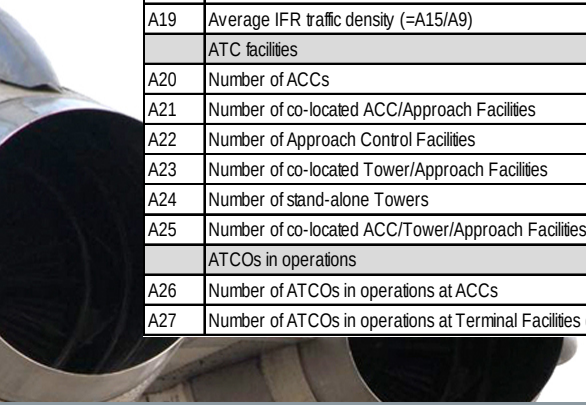


Contextual data (Table A)

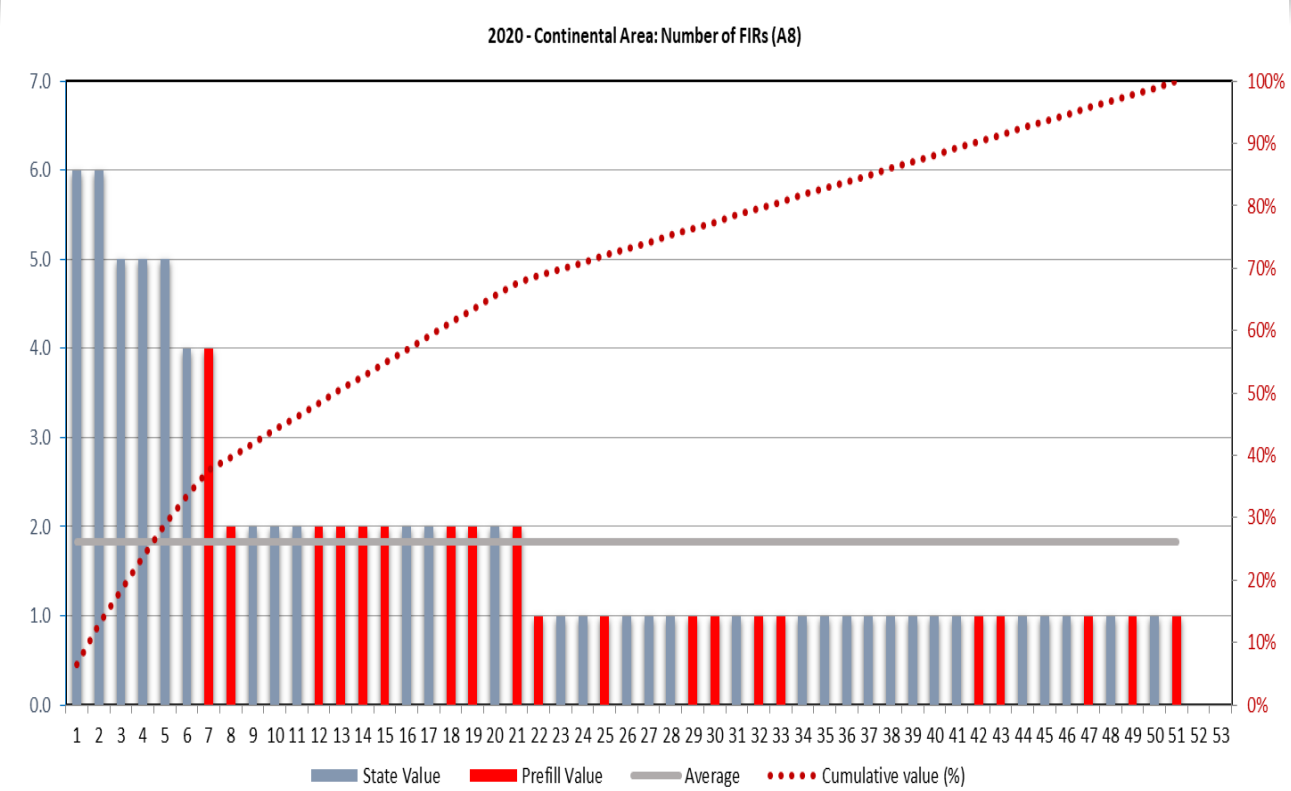
Data items

	Continental Area	
	Airspace	
A8	Number of FIRs	Number
A9	Size of the area	km^2
A10	Radar Surveillance Coverage at FL 290	km^2
	Traffic	
A11	Total number of IFR flights controlled (=A12+A13+A14)	Flights/year
A12	Number of domestic IFR flights controlled	Flights/year
A13	Number of international IFR flights controlled	Flights/year
A14	Number of IFR overflights controlled	Flights/year
A11b	Total number of IFR flights controlled (use only if A12+A13+A14 not available)	Flights/year
A15	Number of IFR flight-hours controlled	hrs/year
A16	Number of IFR airport movements controlled (departures+arrivals)	Mov/year
A17	Number of VFR airport movements controlled (departures+arrivals)	Mov/year
A18	Average flight hours per IFR flight (=A15/A11)	hrs/flight
A19	Average IFR traffic density (=A15/A9)	hrs/km^2/year
	ATC facilities	
A20	Number of ACCs	Number
A21	Number of co-located ACC/Approach Facilities	Number
A22	Number of Approach Control Facilities	Number
A23	Number of co-located Tower/Approach Facilities	Number
A24	Number of stand-alone Towers	Number
A25	Number of co-located ACC/Tower/Approach Facilities	Number
	ATCOs in operations	
A26	Number of ATCOs in operations at ACCs	FTE
A27	Number of ATCOs in operations at Terminal Facilities (APP+TWRs)	FTE

	Oceanic Area (for States having an Oceanic Area)	
	Airspace	
A28	Number of FIRs	Number
A29	Size of the area	km^2
A30	Radar Surveillance Coverage at FL 290	km^2
	Traffic	
A31	Number of IFR flights controlled (=A32+A33+A34)	Flights/year
A32	Number of domestic IFR flights controlled	Flights/year
A33	Number of international IFR flights controlled	Flights/year
A34	Number of IFR overflights controlled	Flights/year
A31b	Number of IFR flights controlled (use only if A32+A33+A34 not available)	Flights/year
A35	Number of IFR flight-hours controlled	hrs/year
A36	Average flight hours per IFR flight (=A35/A31)	hrs/flight
A37	Average IFR traffic density (=A35/A29)	hrs/km^2/year
	ATC facilities	
A38	Number of OACs	Number
	ATCOs in operations	
A39	Number of ATCOs in operations at OACs	FTE

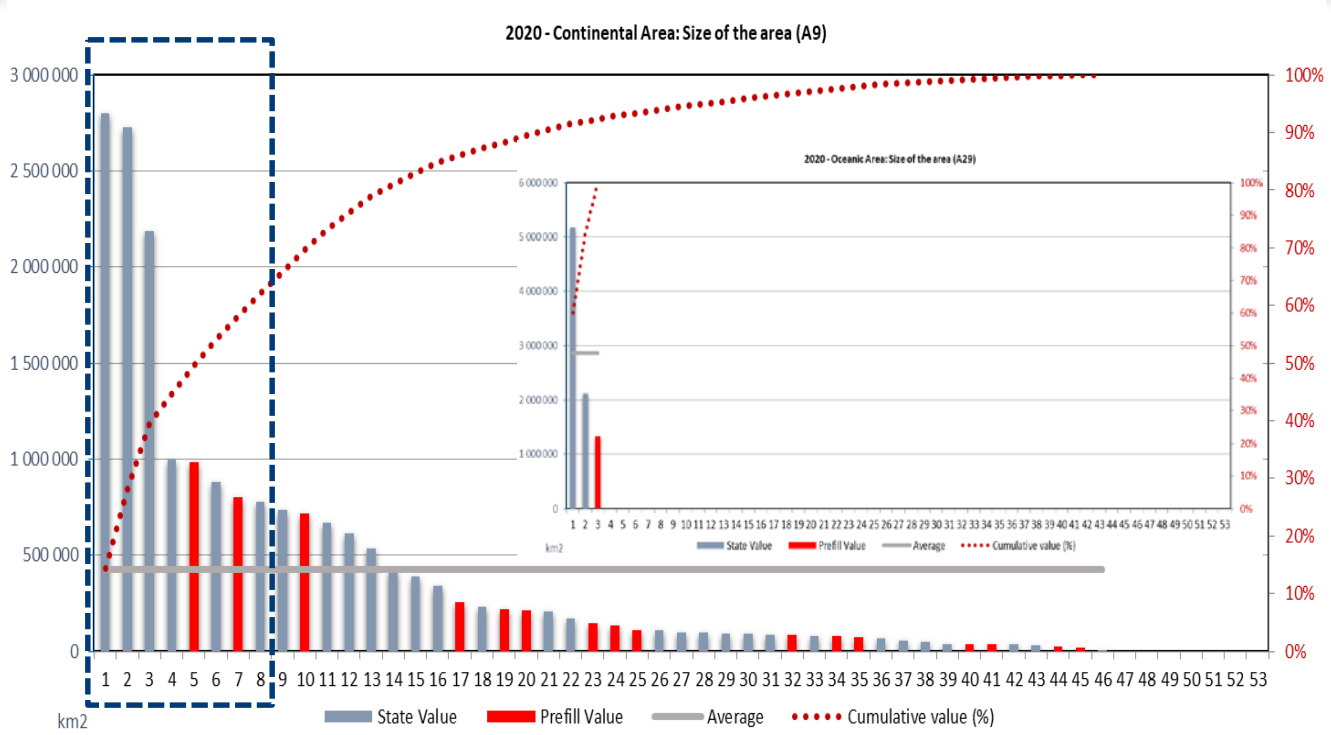


Data items A8



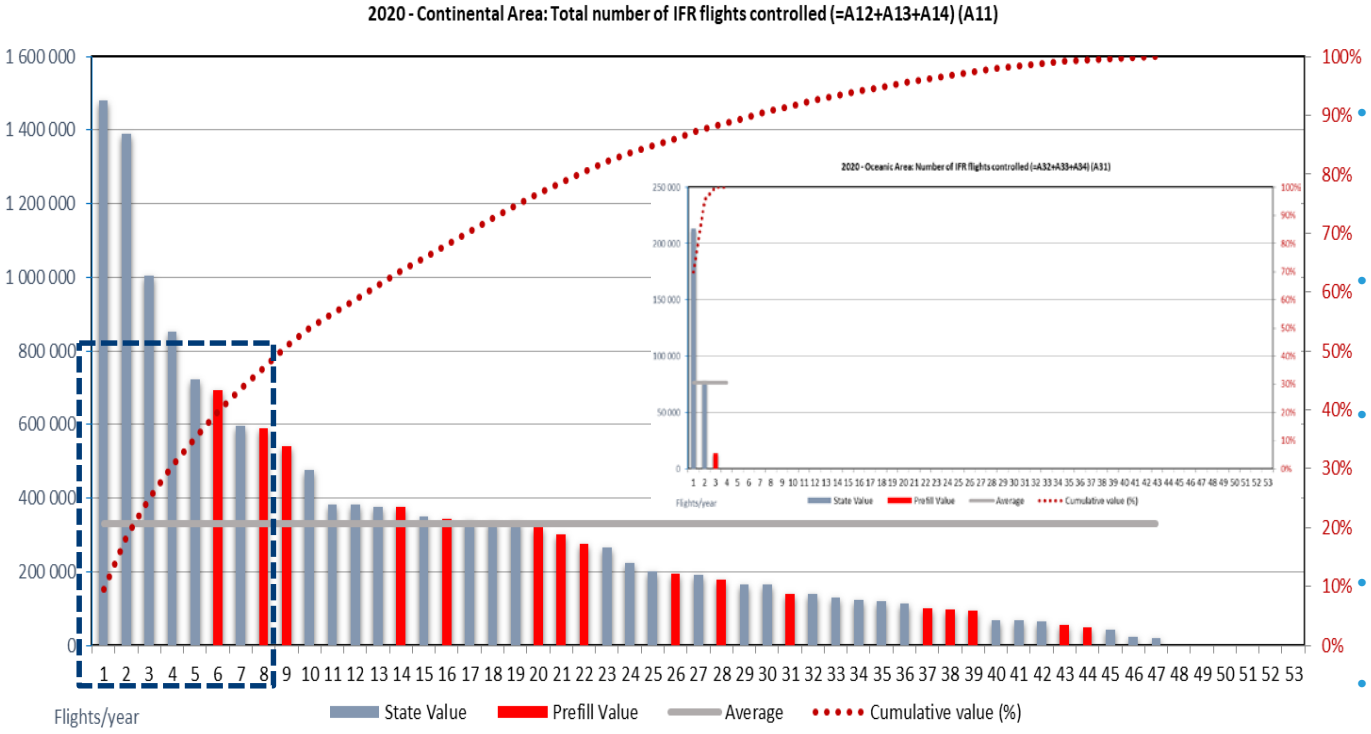
- Continental airspace in the EUR region varies widely, including the organisation of service provision in terms of FIRs.
- Smaller States / airspaces organise their air navigation service regions as a single FIR while larger nations (and associated airspace) is structured in a multitude of FIRs.
- 7 reporting states have 4 or more FIRs accounting for approximate 40% of all FIRs.

Data items A9 & A29

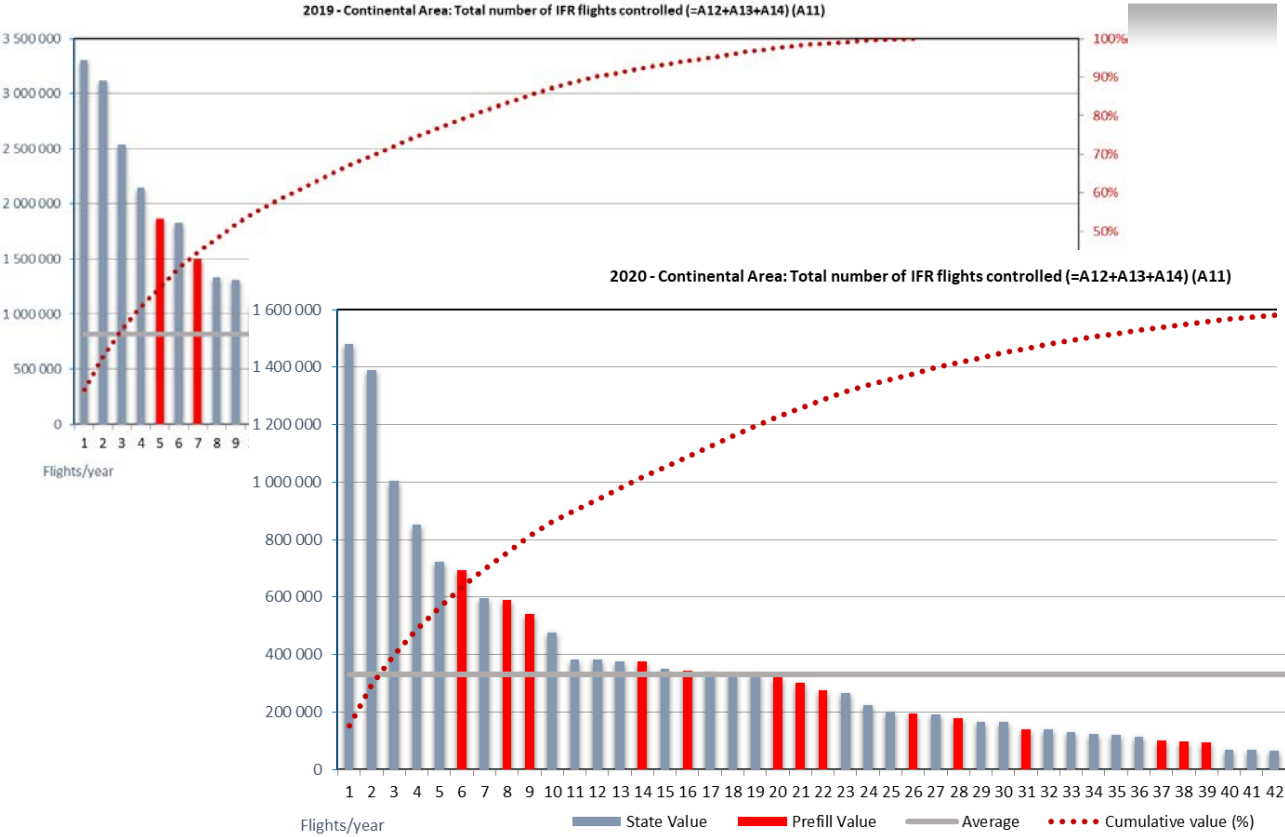


- The top 5 States included in the report cover over 50% of the continental airspace. Two third of the continental airspace is served including another 3 States (= total 8 States).
- Airspace sizes vary widely across the EUR region performance framework participants.
- With 50% of the States, 95% of the continental airspace is covered.
- The EUR region is characterised by a wide variety in the size of the continental airspace. Oceanic airspace and service provision is largely concentrated in a small number of States.

Data items A11 & 31

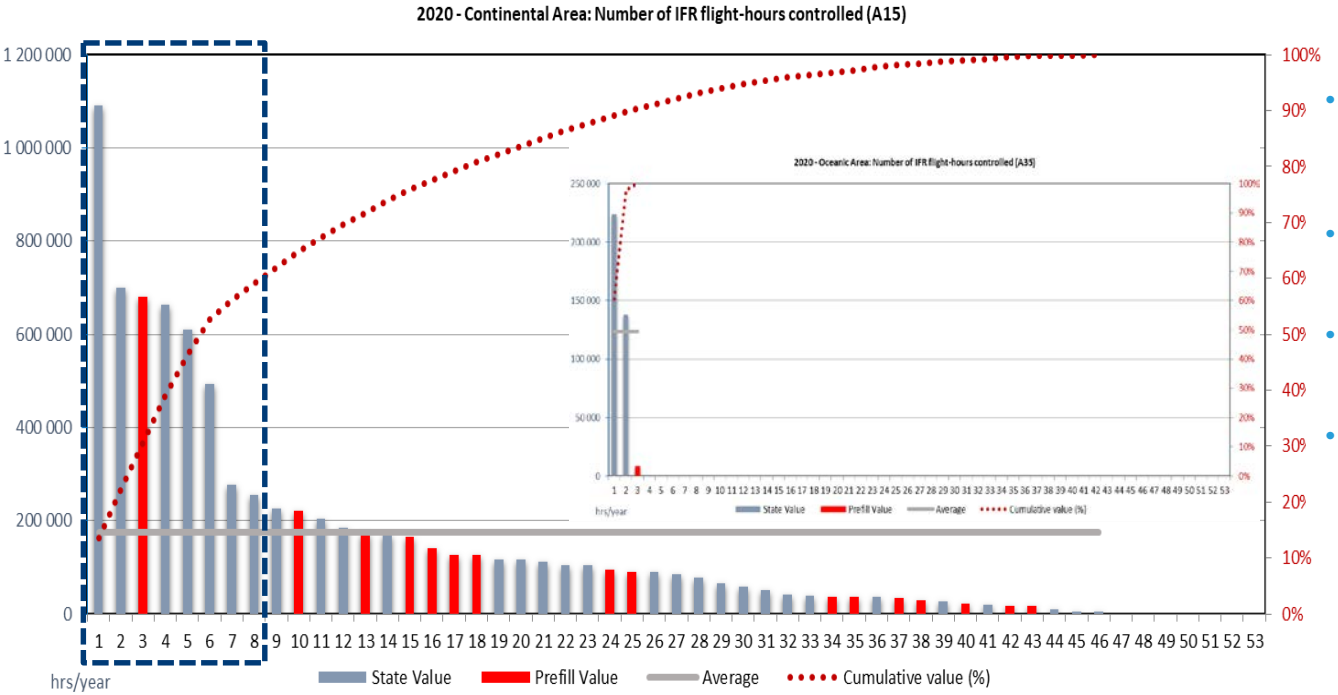


- Traffic in 2020 dropped significantly in comparison to previous years in reaction to the local and international travel constraints.
- Just under 50% of the total IFR flight hours are accrued by 8 States (while in 2019 this was more centralised in 5 States).
- Similar to the overall traffic share across the region, the share of the reduction is heavily dependent on the size of the continental airspace.
- On average, the total annual traffic (controlled IFR flights) dropped by 55-60%.
- There are nuances in different States with traffic decreasing at higher margins.



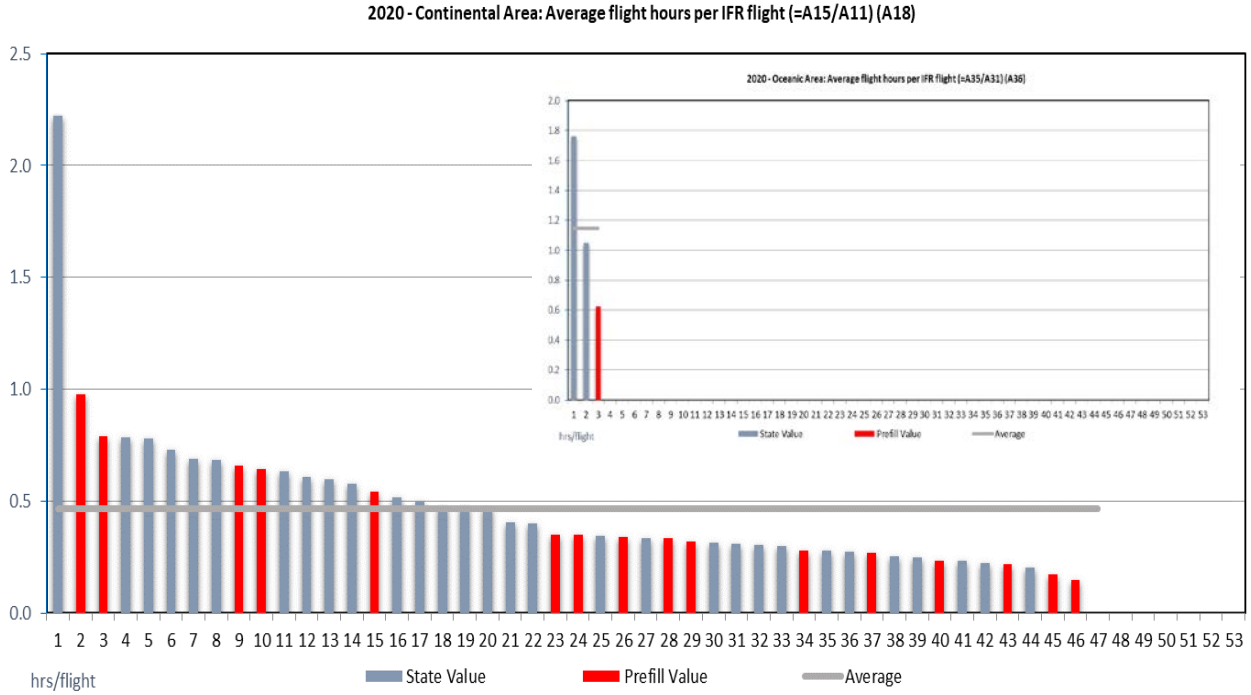
- Comparing traffic levels in 2019 vs 2020, the overall pattern of traffic is broadly consistent.
- While in 2020 traffic ranged from just under 3.4 million flights to under 100.000 flights; the range reduced to under 1,5 million flights to negligible traffic.
- Total annual traffic dropped on average 55-60% across the region.
- This suggests, while the peak of the decline followed the WHO pandemic declaration in March 2020, and with different patterns of recovery throughout QIII/QIV, the 2nd half of 2020 saw increasing traffic across the region.

Data items A15 & A35



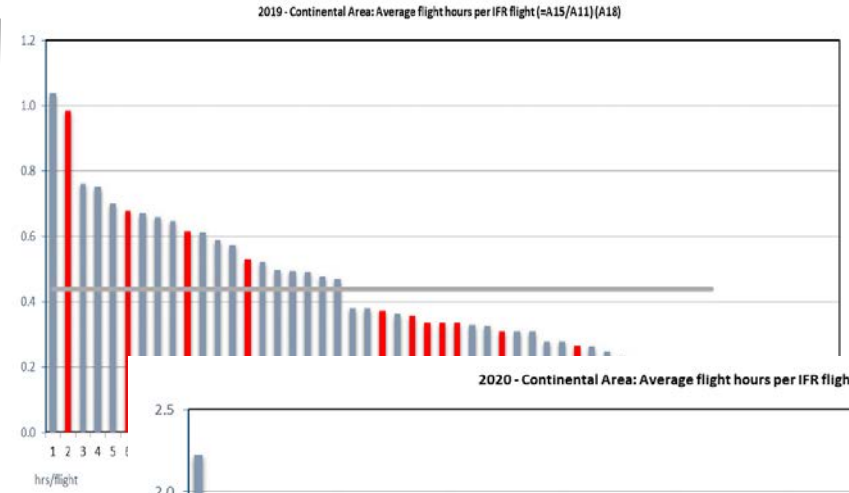
- About 60% of the (pre-pandemic) IFR flight hours within the continental airspace in 2019 is serviced by 8 participating States.
- IFR hours are associated with the overall IFR traffic accounted by the States
- The oceanic traffic is primarily handled by 2 participating States.
- Oceanic traffic served by 3 States was heavily impacted due to the travel constraints on international air traffic.

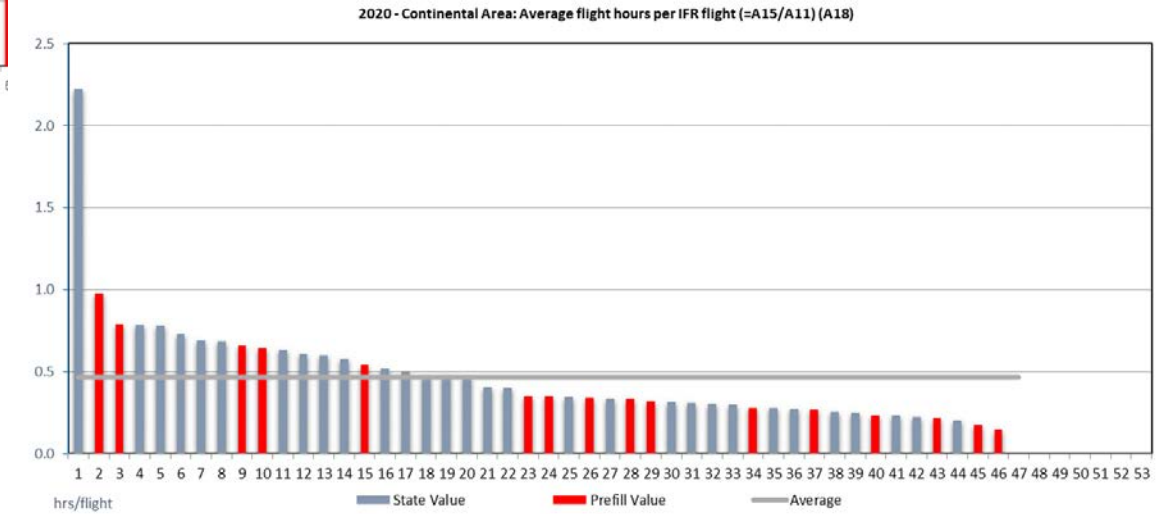
Data items A18 & 36



- With the exemption of the top 1 reporting State, the average flight hours per IFR flight is broadly consistent with the previous year.
- The average flight hour per IFR flight decreased slightly in comparison to last year and ranges now at just under 0.5 min per flight.
- 70% of the participating States observed an average flight hours per flight of under half an hour. This is strongly correlated with the size of the national airspace volume.

Data items A18

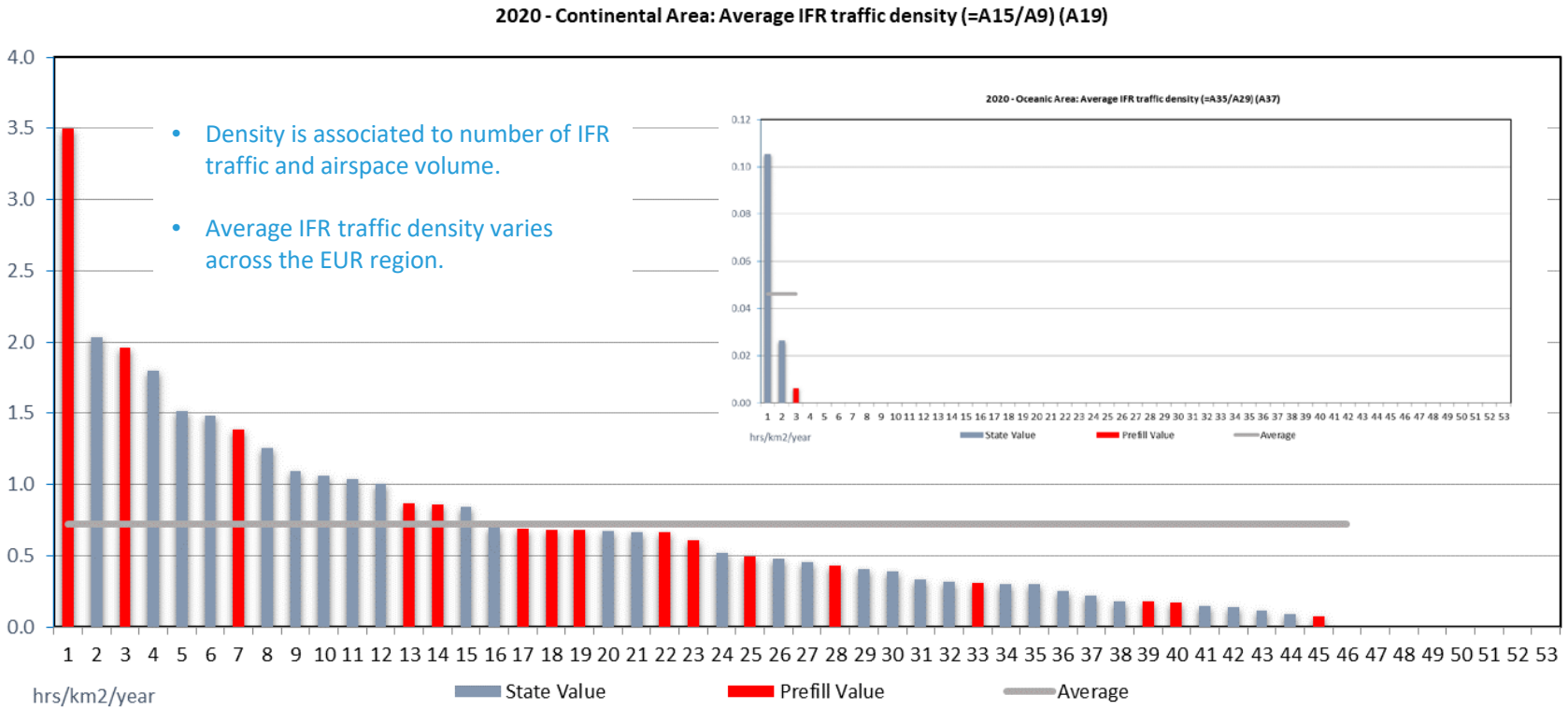




- Comparing average flight hours per IFR flight in 2019 vs 2020 – and excluding the outlier for the top 1 State in 2020 – average flight hours are consistent with the previous year.

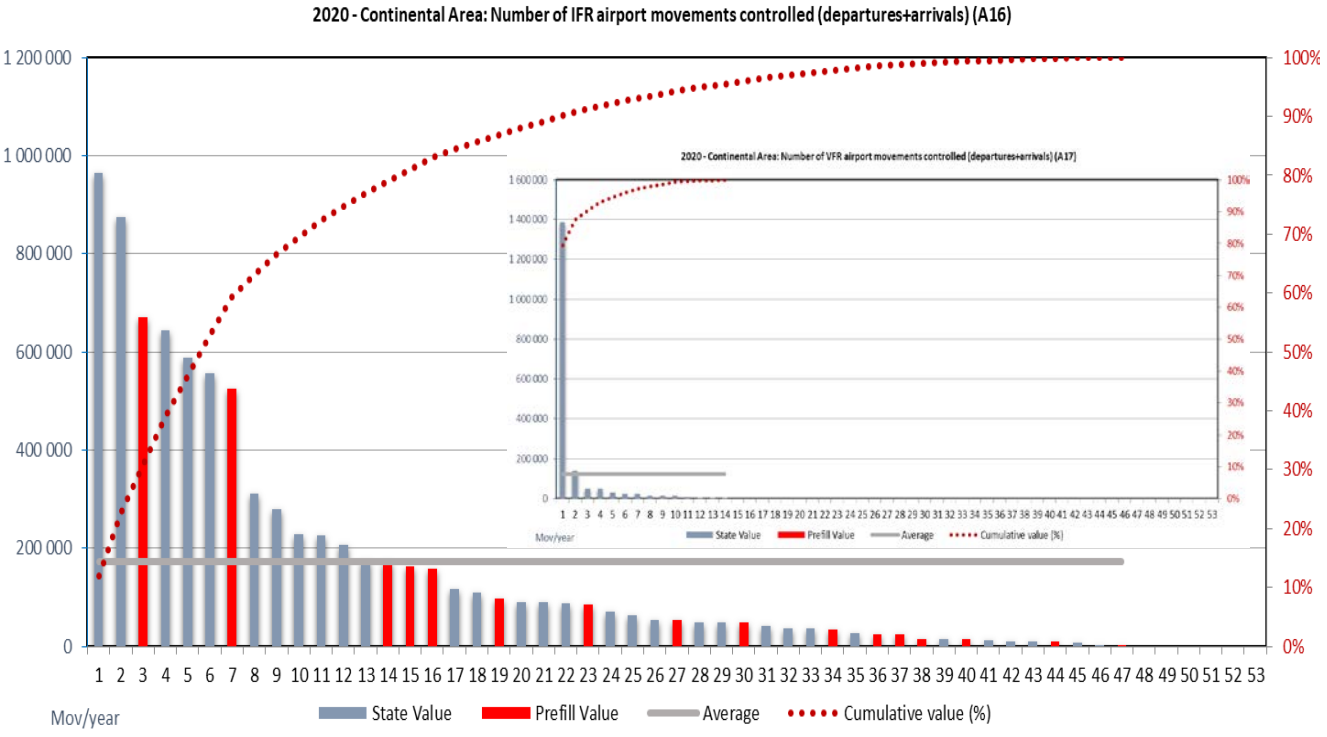
- On average the average flight hour per IFR flight across the EUR region is slightly increased (just under 0.5 min/flight) compared to 2019.
  On a per country basis, the observed average flight hour per flight, however, ranges in the same order of magnitude.
  This suggests that scale-related efficiencies took place (due the number of lower air traffic) while operating a similar network.

Data items A19 & A37



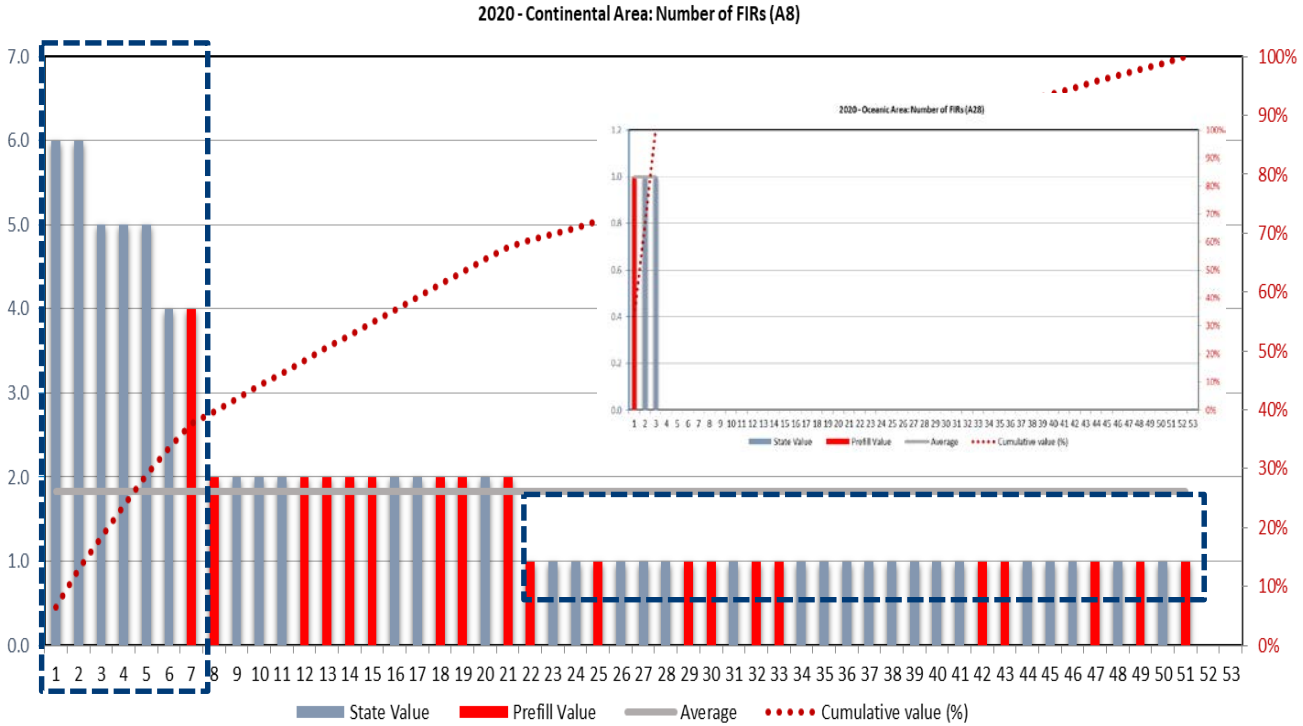
- Density is associated to number of IFR traffic and airspace volume.
- Average IFR traffic density varies across the EUR region.

Data items A16 & A17



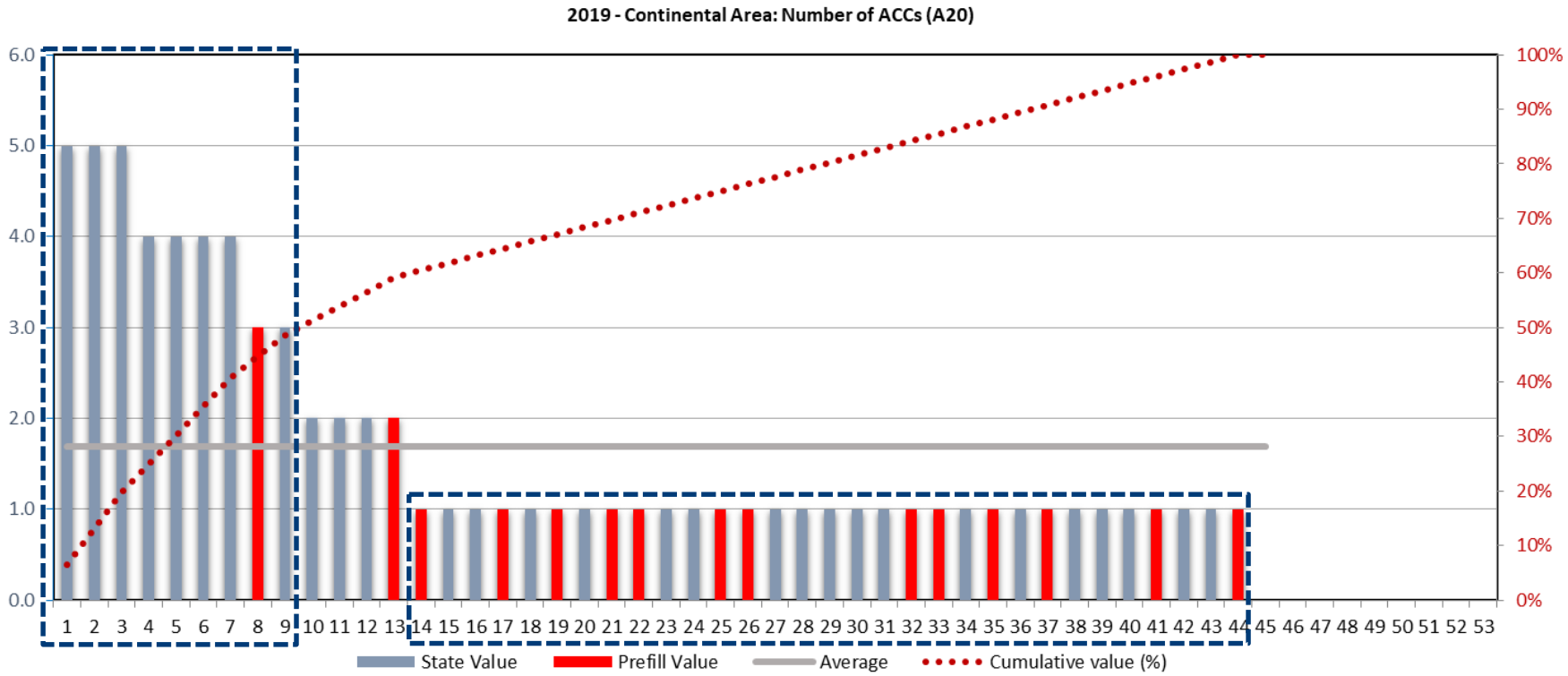
- Traffic changes observed at the national airport level follow the overall traffic developments in 2020.
- It is recognised that traffic levels may vary widely locally as traffic recovery at several airports, depends on various factors.
- A concentration of airport IFR movements is observable. 60% of all movements were observed at 7 reporting States.
  The average national number of IFR airport movements ranges around 180.000 while the top 2 States observed movement numbers of a factor of 5-5.5 more (+/- 900.000).
- An interesting pattern is observed with VFR movement. While for the top 1 State VFR traffic dropped by around 20%, it appears that VFR traffic in other States did not drop that significant.

Data items A8 & A28



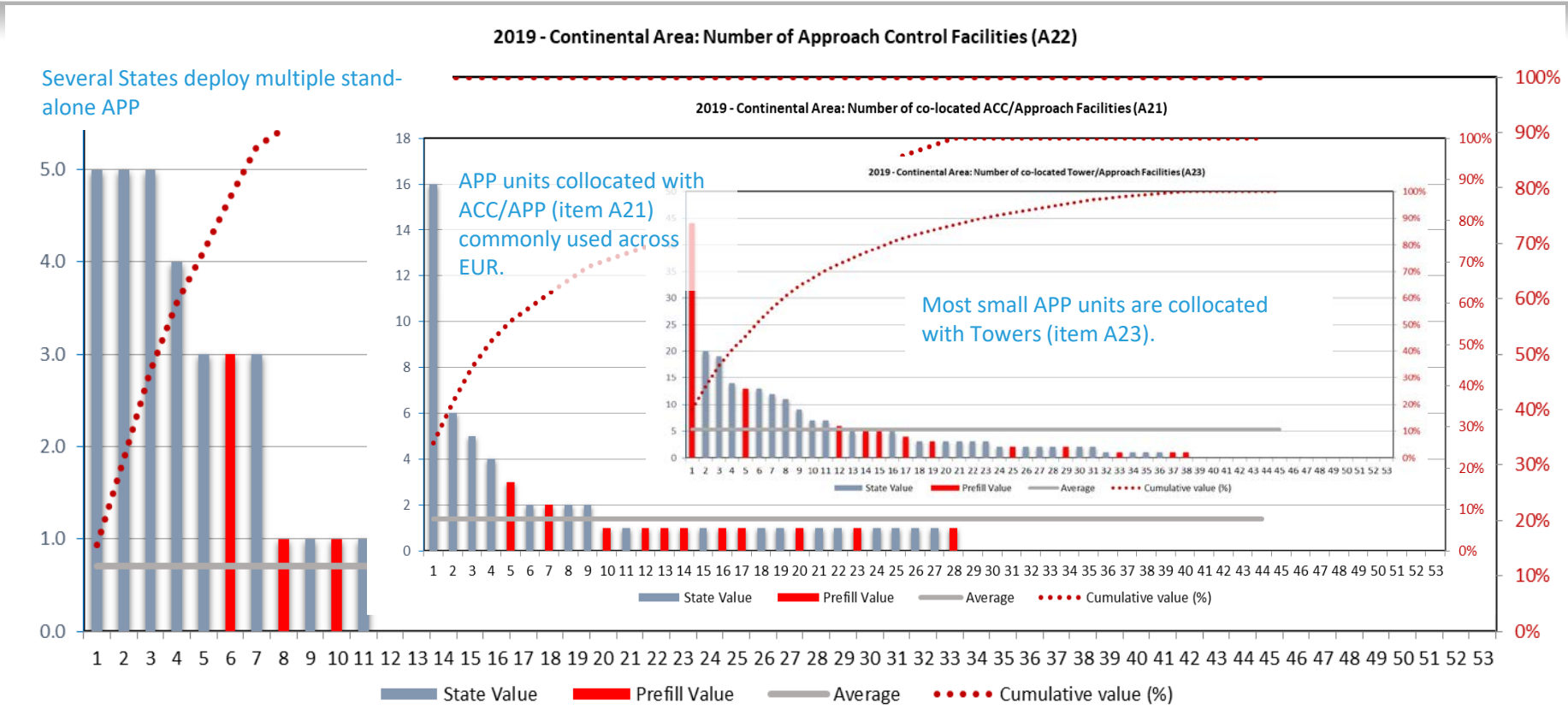
- More than half of the States have a single continental FIR. A smaller number has 2 (often a division between upper and lower), while 7 reporting States have 3 or more FIRs.
- The number of FIRs is associated with volume of airspace and number of control unit.

Data item A20

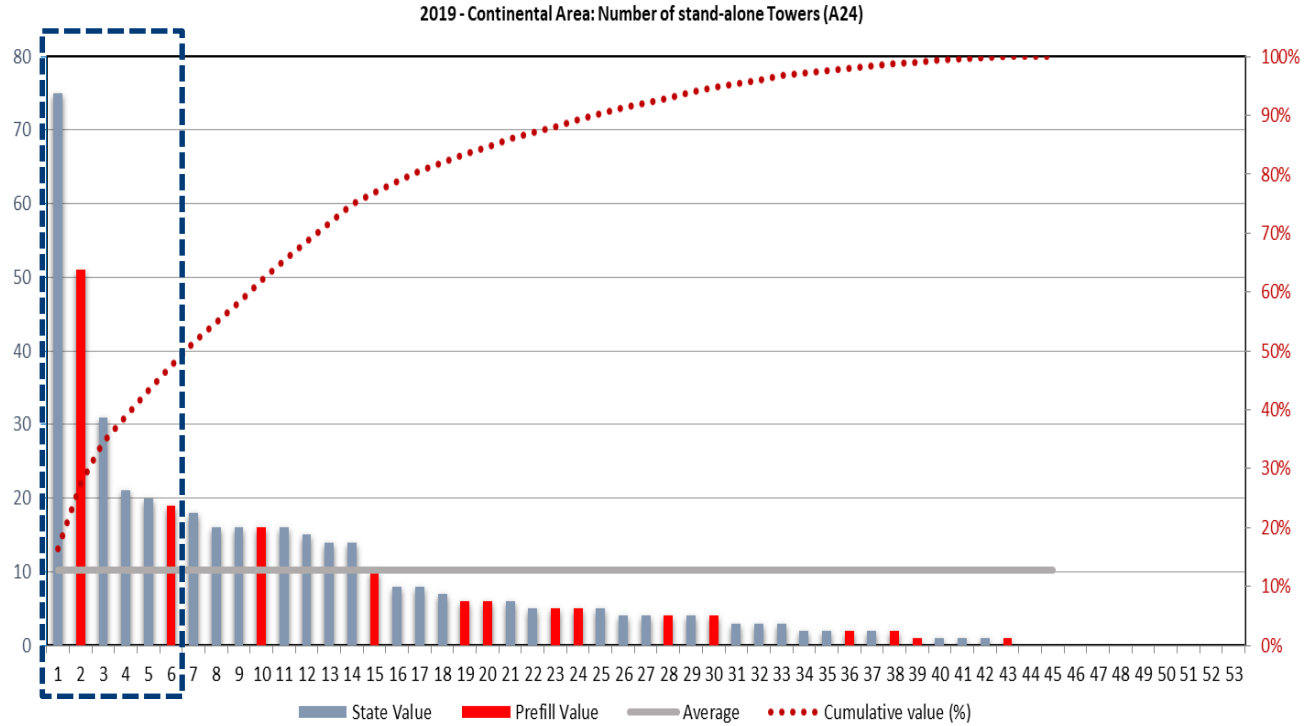


A majority of States have a single ACC. 4 reporting States have established 2 ACCs, while 9 reporting States have 3 or more ACCs.
The distribution is similar to the number of FIRs.

Data items A22, A21, A23

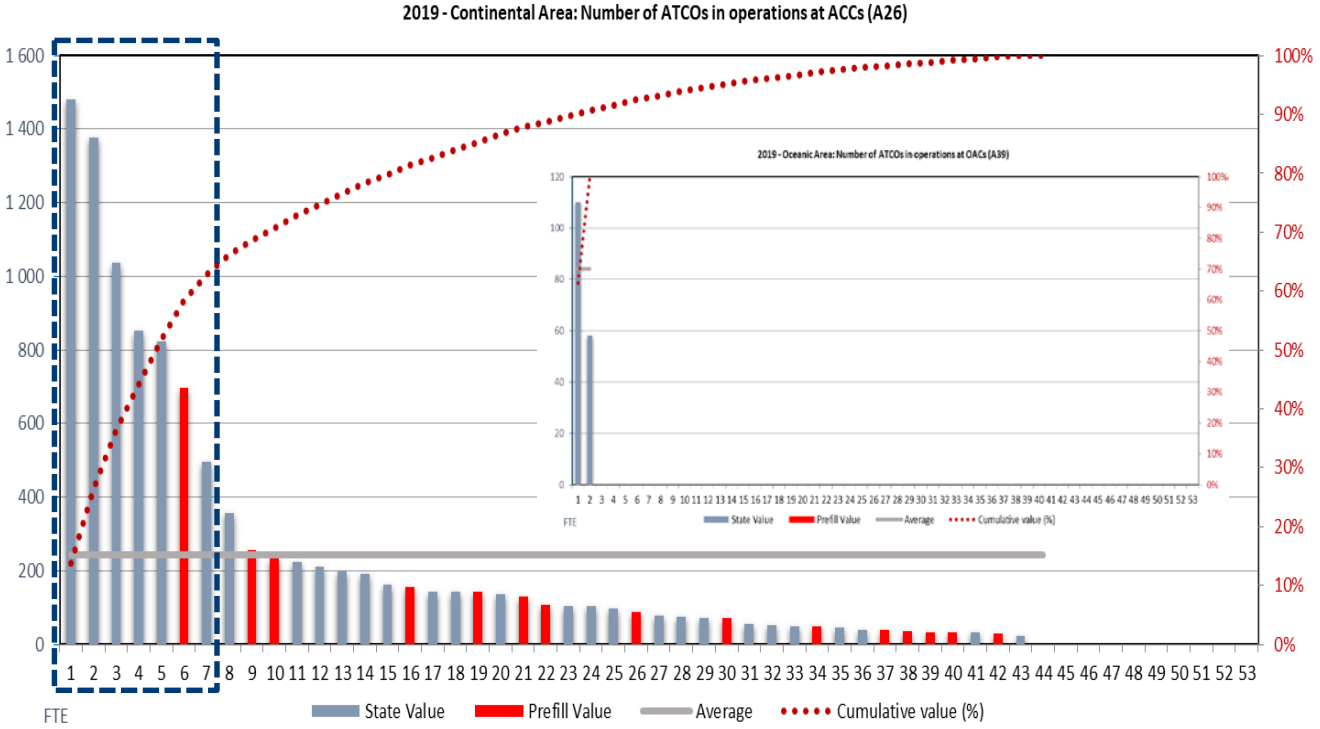


Data item A24



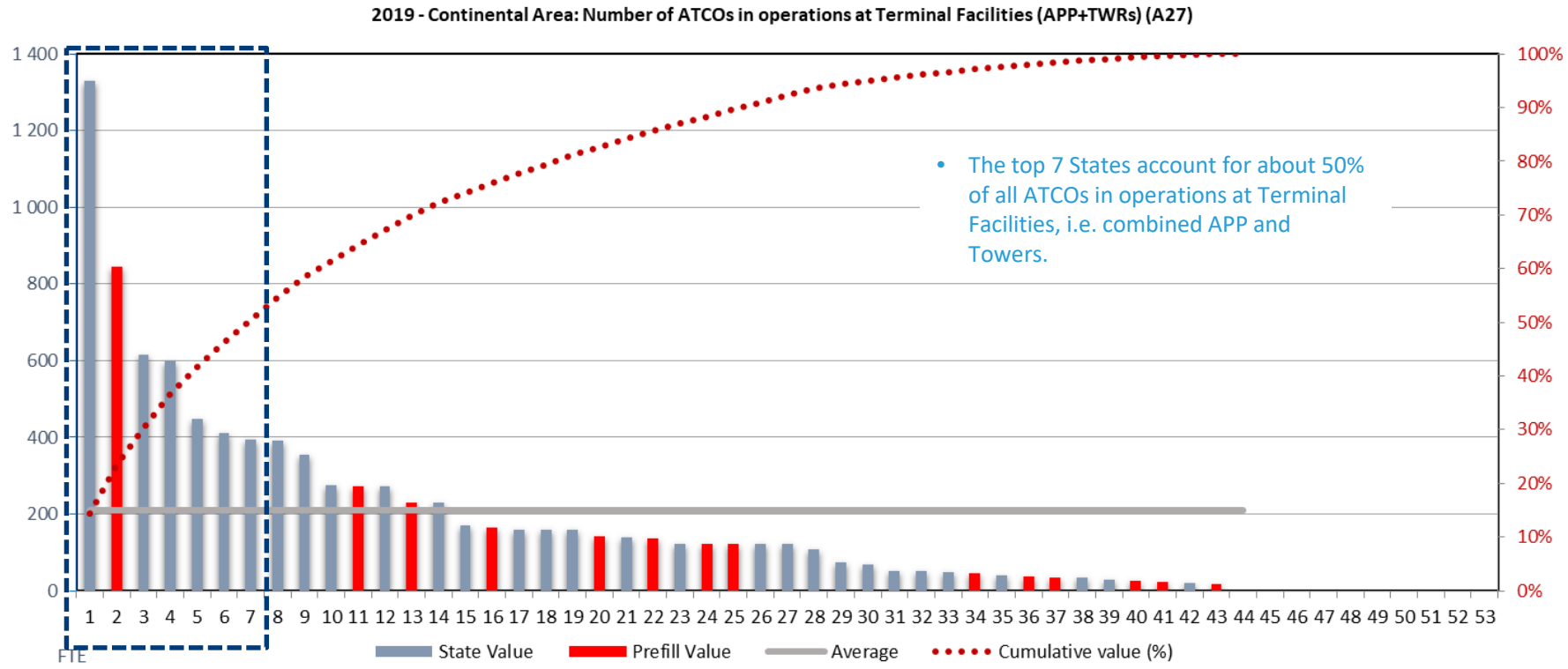
- The top-6 States account for 50% of all Towers in the EUR Region.
- The remaining States have 20 or less towers.
- The average number of stand-alone towers per State is 10.

Data items A26 & 39



- Just under two-third of all ATCOs in operations at ACCs are deployed in 7 reporting States.
- There is only a small subset of States operating oceanic traffic.

Data item A27



- The top 7 States account for about 50% of all ATCOs in operations at Terminal Facilities, i.e. combined APP and Towers.

Performance data (Table B)

KPA	Capacity
Objective	Ensure that Air Navigation Service capacity meets demand in en-route airspace and at airports
Indicators	- Average ATFM delay per flight generated by the airspace volume (en-route) - Average ATFM delay per flight in the main airports (to be identified by States in advance and based on the regional relevance)

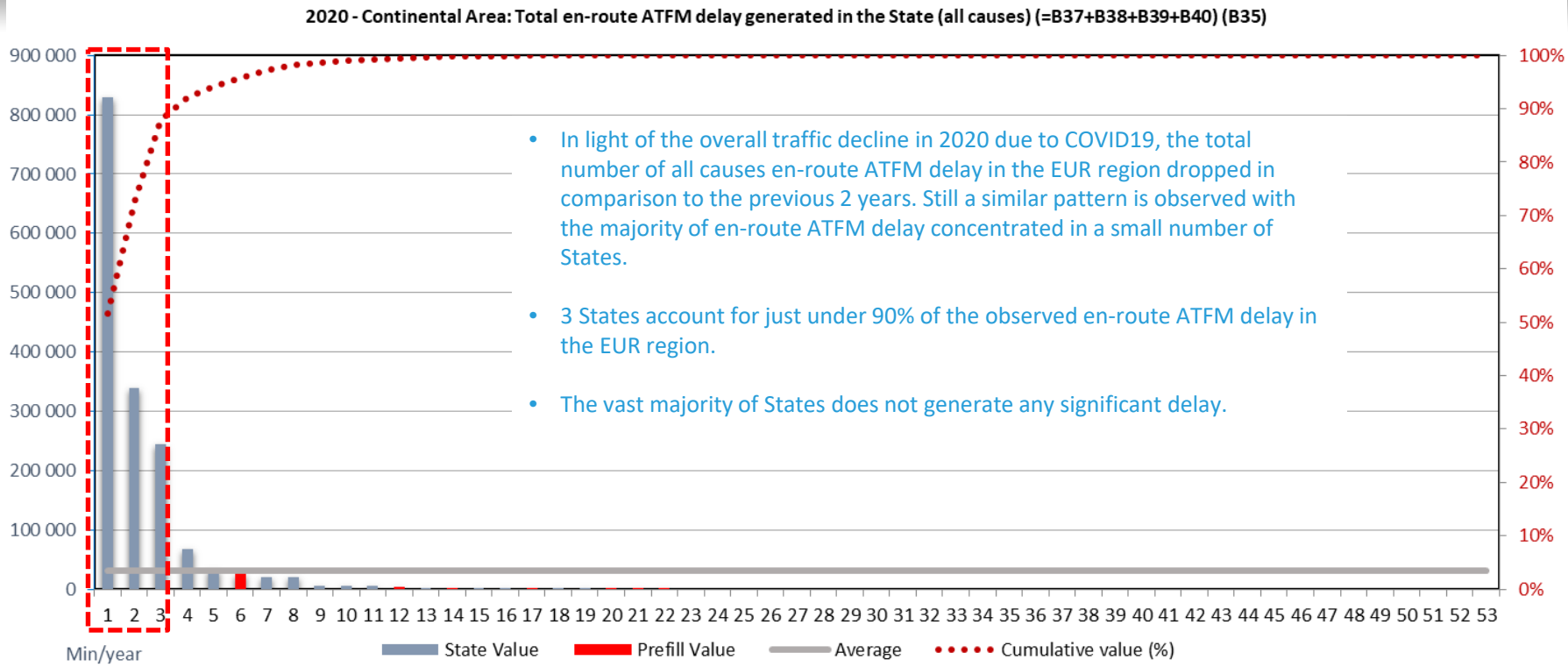
Please note

- Indicators measure
  - The location where the problem (capacity bottleneck) is, not where the delay is taken (departure airport)
  - Performance of airspace volumes and airports, not flights
    - Despite the expression as a value “per flight”
  - Within the Capacity KPA
    - Demand/capacity imbalance
    - Not capacity itself
- Limitations
    - Not designed to measure excess capacity
    - No data if airspace or airport does not participate in a centralised ATFM process

Data items

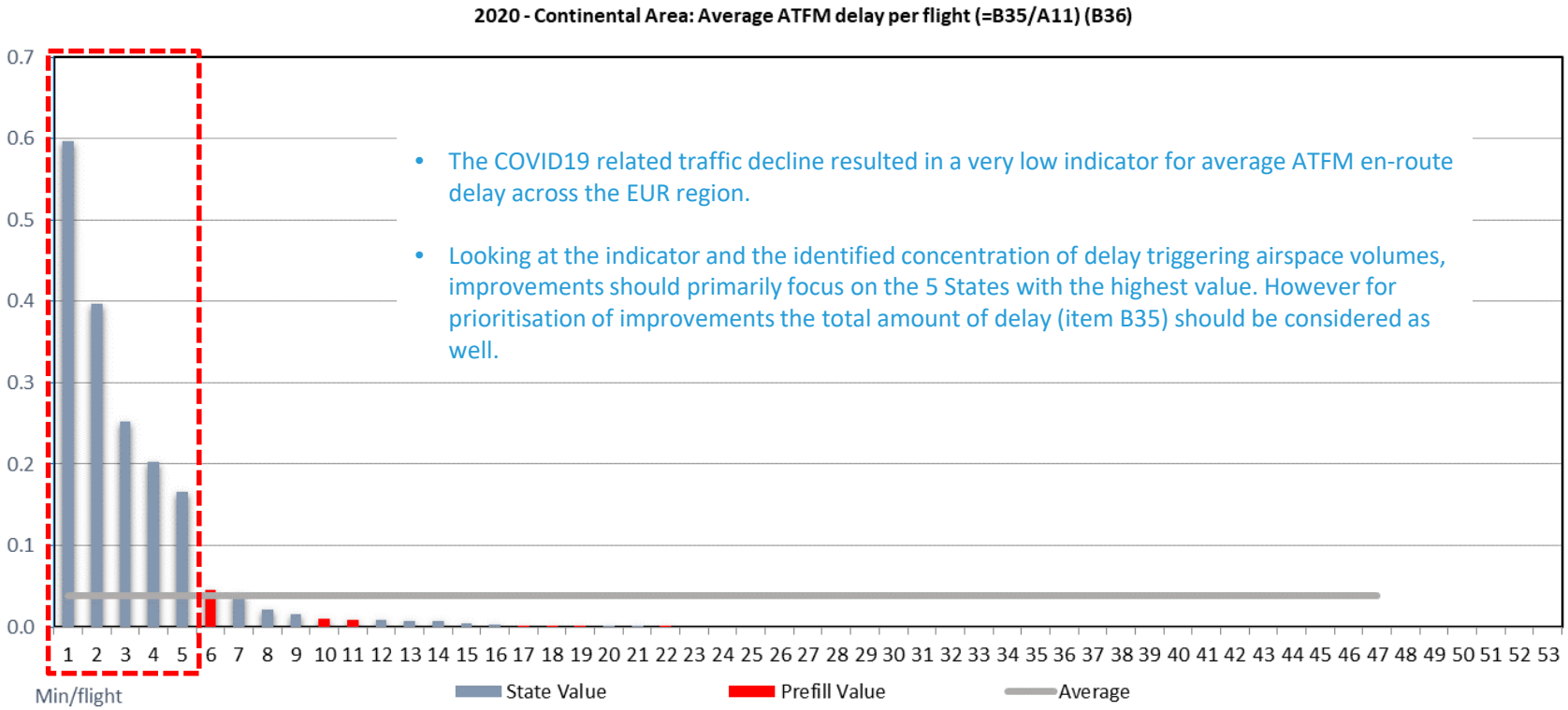
	Capacity	
	En-route ATFM delays (continental airspace)	
B35	Total en-route ATFM delay generated in the State (all causes) (=B37+B38+B39+B40)	Min/year
B36	Average ATFM delay per flight (=B35/A11)	Min/flight
B37	En-route ATFM delay generated in the State (ATC capacity causes)	Min/year
B38	En-route ATFM delay generated in the State (ATC other causes)	Min/year
B39	En-route ATFM delay generated in the State (Weather causes)	Min/year
B40	En-route ATFM delay generated in the State (All other causes)	Min/year
B35b	En-route ATFM delay generated in the State (Cause unknown, use only if B37, B38, B39 & B40 not available)	Min/year
	Airport ATFM delays	
	Airport identifier	ICAO code
B41	Total number of IFR arrivals at the airport	Arrivals/year
B42	Total airport ATFM delay generated by the airport (all causes) (=B44+B45+B46+B47)	Min/year
B43	Average ATFM delay per arrival (=B42/B41)	Min/arrival
B44	Airport ATFM delay generated by the airport (ATC & aerodrome capacity causes)	Min/year
B45	Airport ATFM delay generated by the airport (ATC other causes)	Min/year
B46	Airport ATFM delay generated by the airport (Weather causes)	Min/year
B47	Airport ATFM delay generated by the airport (All other causes)	Min/year
B42b	Airport ATFM delay generated by the airport (Cause unknown, use only if B44, B45, B46 & B47 not available)	Min/year

Data item B35



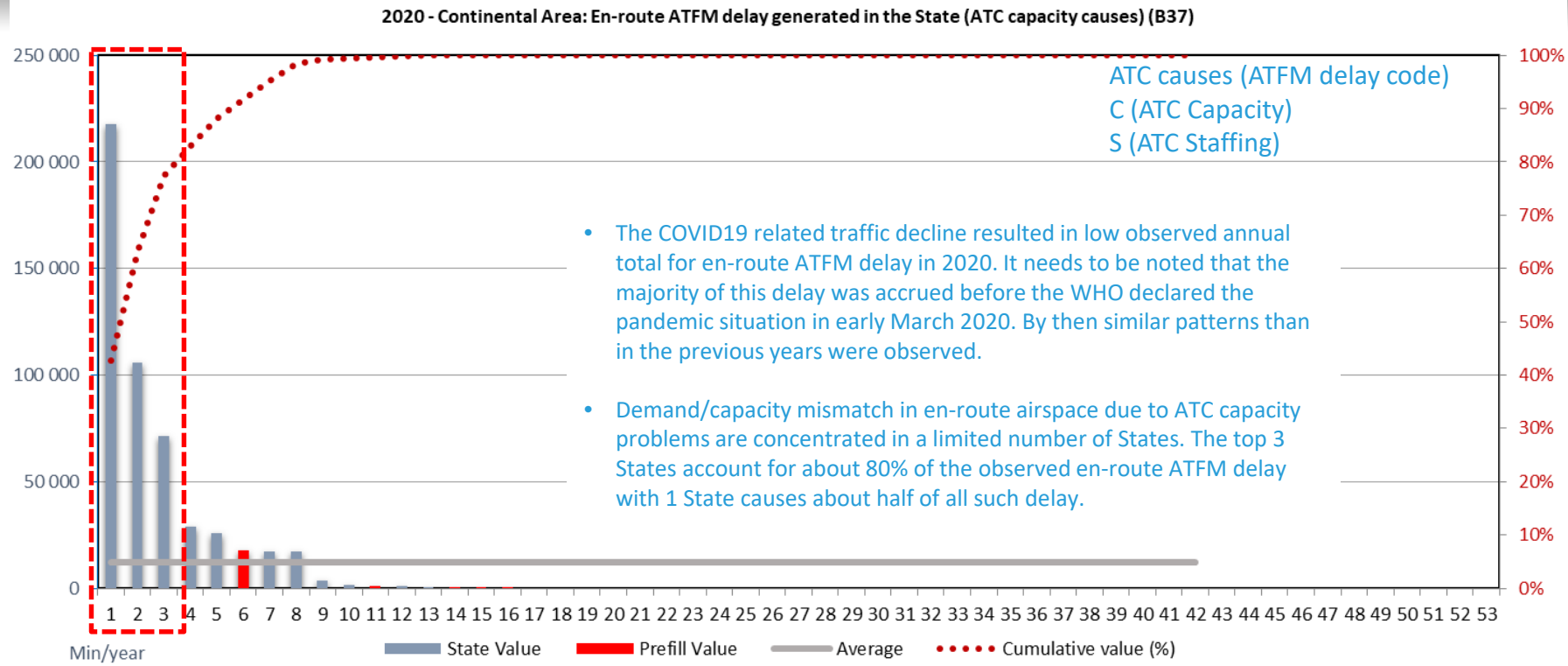
- In light of the overall traffic decline in 2020 due to COVID19, the total number of all causes en-route ATFM delay in the EUR region dropped in comparison to the previous 2 years. Still a similar pattern is observed with the majority of en-route ATFM delay concentrated in a small number of States.
- 3 States account for just under 90% of the observed en-route ATFM delay in the EUR region.
- The vast majority of States does not generate any significant delay.

Data item B36



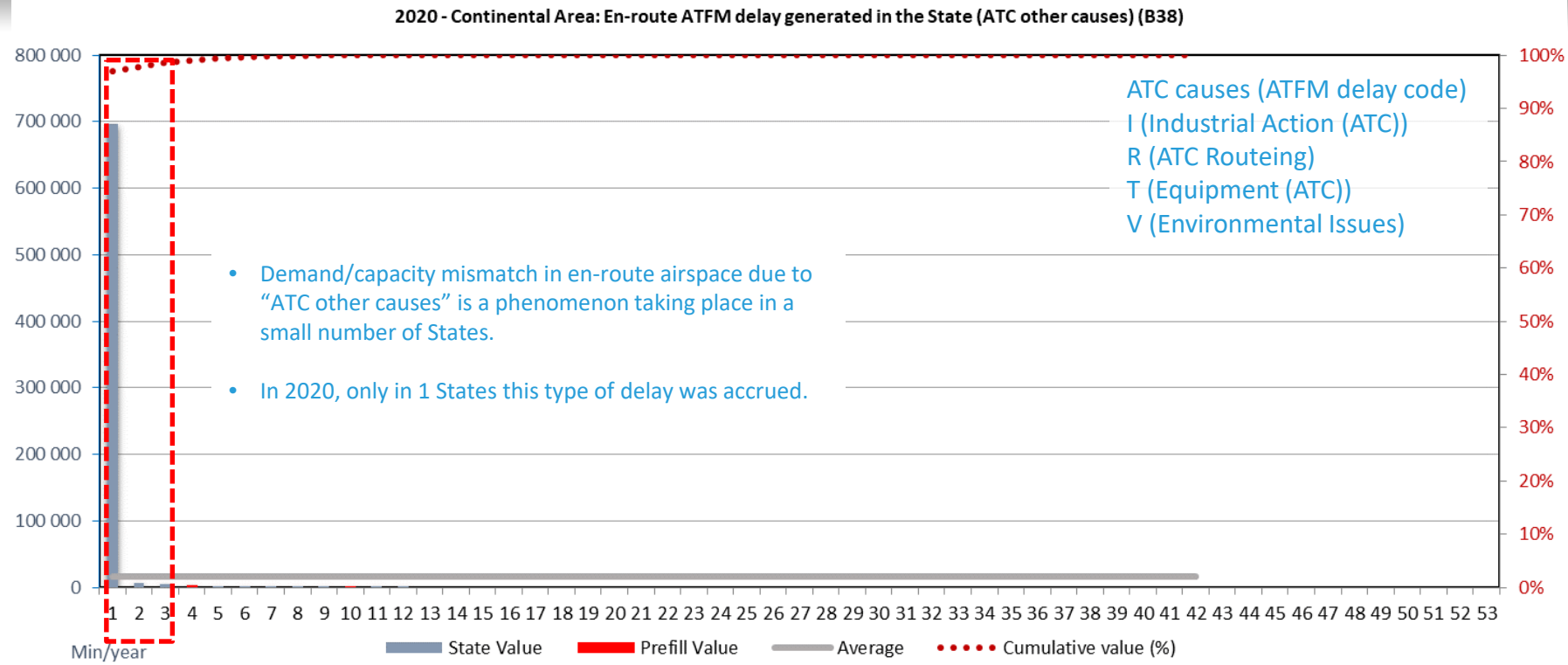
- The COVID19 related traffic decline resulted in a very low indicator for average ATFM en-route delay across the EUR region.
- Looking at the indicator and the identified concentration of delay triggering airspace volumes, improvements should primarily focus on the 5 States with the highest value. However for prioritisation of improvements the total amount of delay (item B35) should be considered as well.

Data item B37

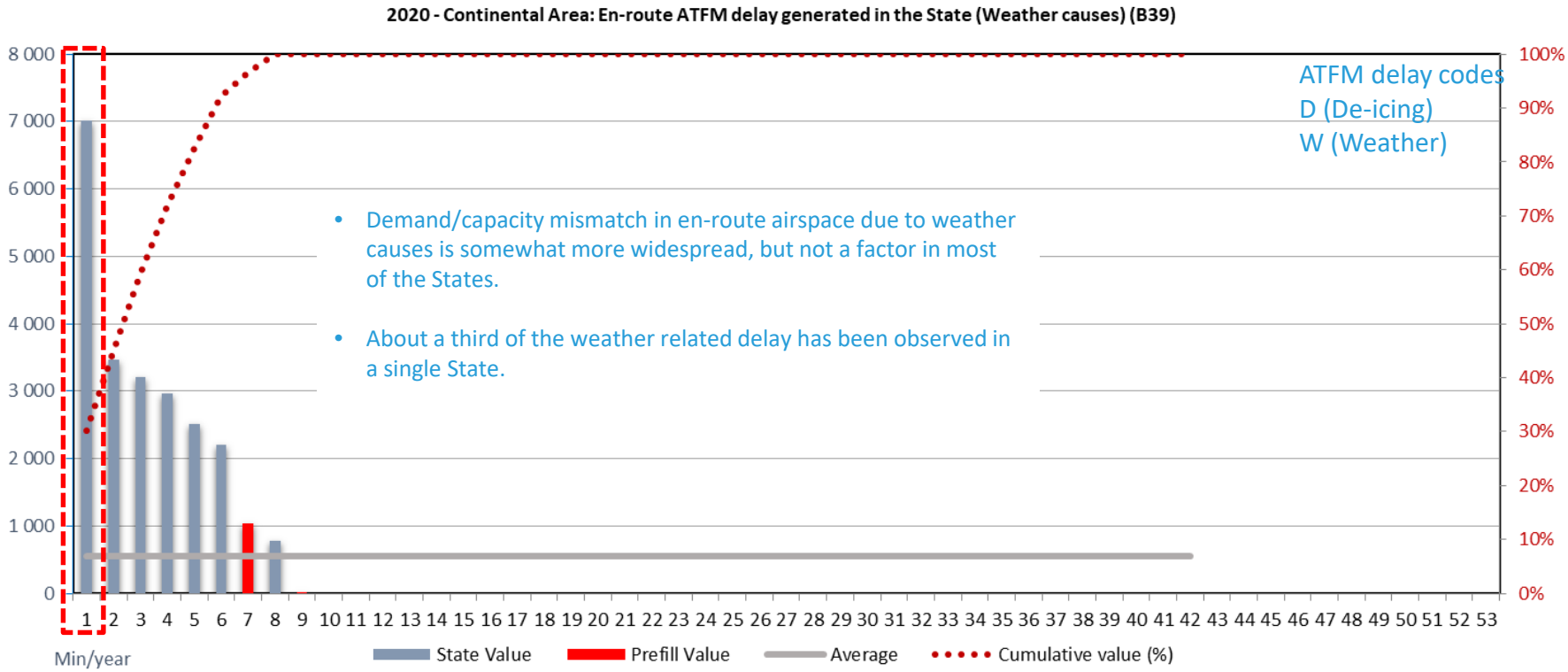


- The COVID19 related traffic decline resulted in low observed annual total for en-route ATFM delay in 2020. It needs to be noted that the majority of this delay was accrued before the WHO declared the pandemic situation in early March 2020. By then similar patterns than in the previous years were observed.
- Demand/capacity mismatch in en-route airspace due to ATC capacity problems are concentrated in a limited number of States. The top 3 States account for about 80% of the observed en-route ATFM delay with 1 State causes about half of all such delay.

Data item B38



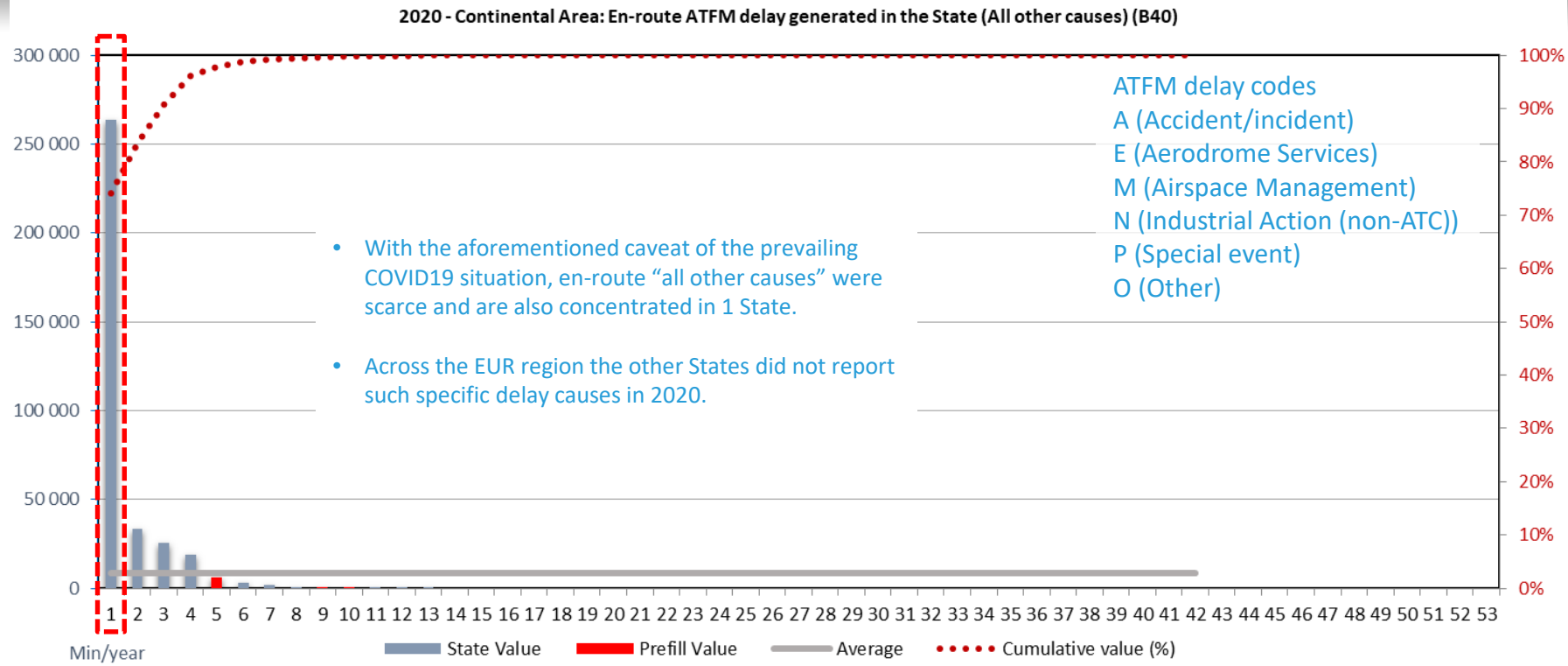
Data item B39



ATFM delay codes
D (De-icing)
W (Weather)

- Demand/capacity mismatch in en-route airspace due to weather causes is somewhat more widespread, but not a factor in most of the States.
- About a third of the weather related delay has been observed in a single State.

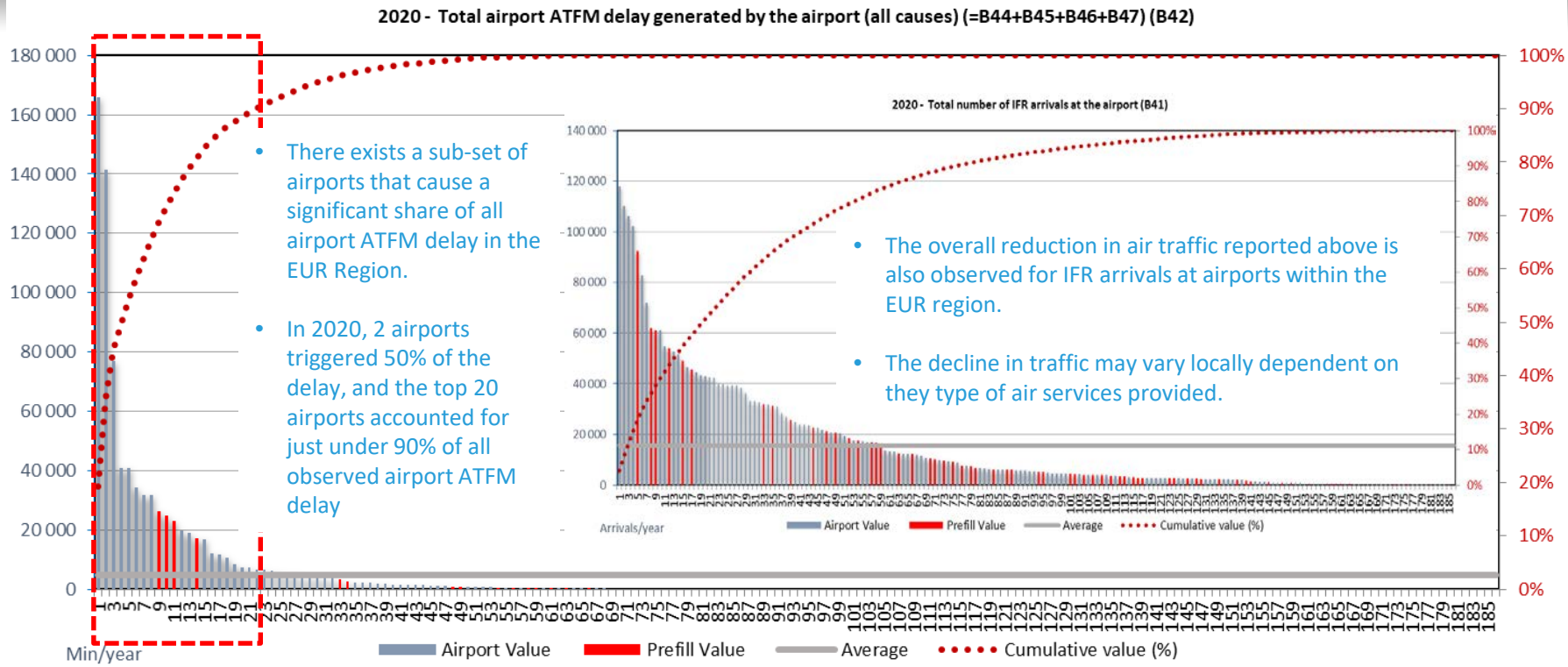
Data item B40



- With the aforementioned caveat of the prevailing COVID19 situation, en-route “all other causes” were scarce and are also concentrated in 1 State.
- Across the EUR region the other States did not report such specific delay causes in 2020.

ATFM delay codes
A (Accident/incident)
E (Aerodrome Services)
M (Airspace Management)
N (Industrial Action (non-ATC))
P (Special event)
O (Other)

Data items B42 & B41

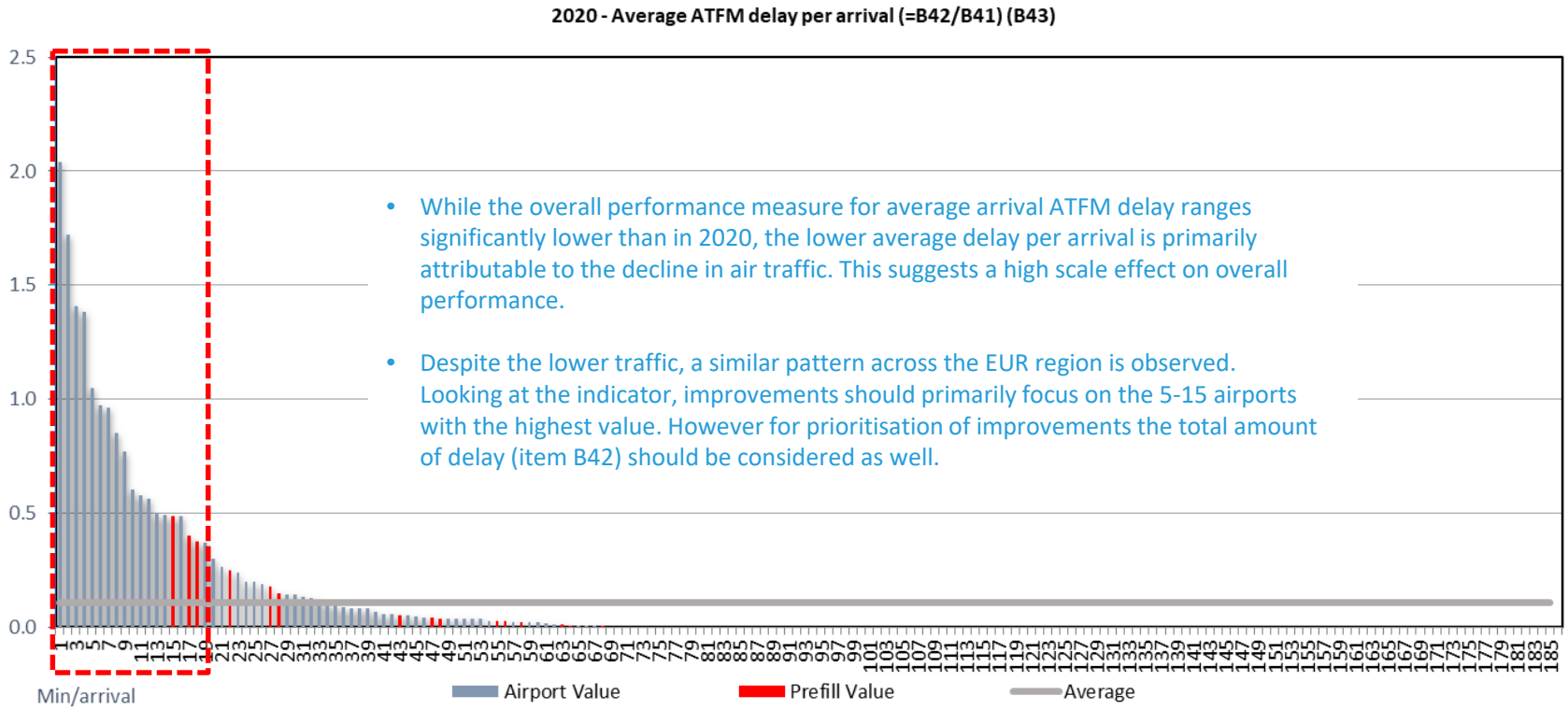


- There exists a sub-set of airports that cause a significant share of all airport ATFM delay in the EUR Region.
- In 2020, 2 airports triggered 50% of the delay, and the top 20 airports accounted for just under 90% of all observed airport ATFM delay

- The overall reduction in air traffic reported above is also observed for IFR arrivals at airports within the EUR region.
- The decline in traffic may vary locally dependent on they type of air services provided.

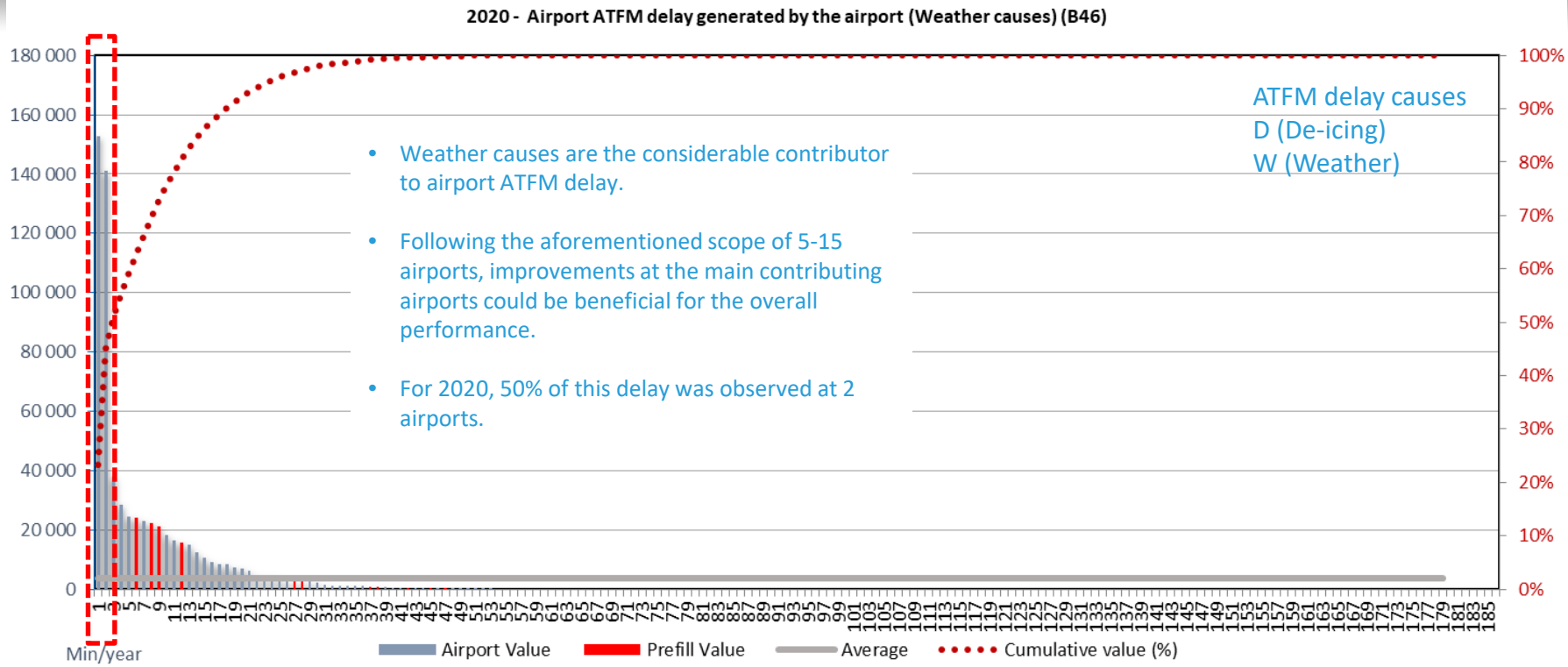
6 airports are causing 50% of all airport ATFM delay in the EUR Region.

Data item B43



- While the overall performance measure for average arrival ATFM delay ranges significantly lower than in 2020, the lower average delay per arrival is primarily attributable to the decline in air traffic. This suggests a high scale effect on overall performance.
- Despite the lower traffic, a similar pattern across the EUR region is observed. Looking at the indicator, improvements should primarily focus on the 5-15 airports with the highest value. However for prioritisation of improvements the total amount of delay (item B42) should be considered as well.

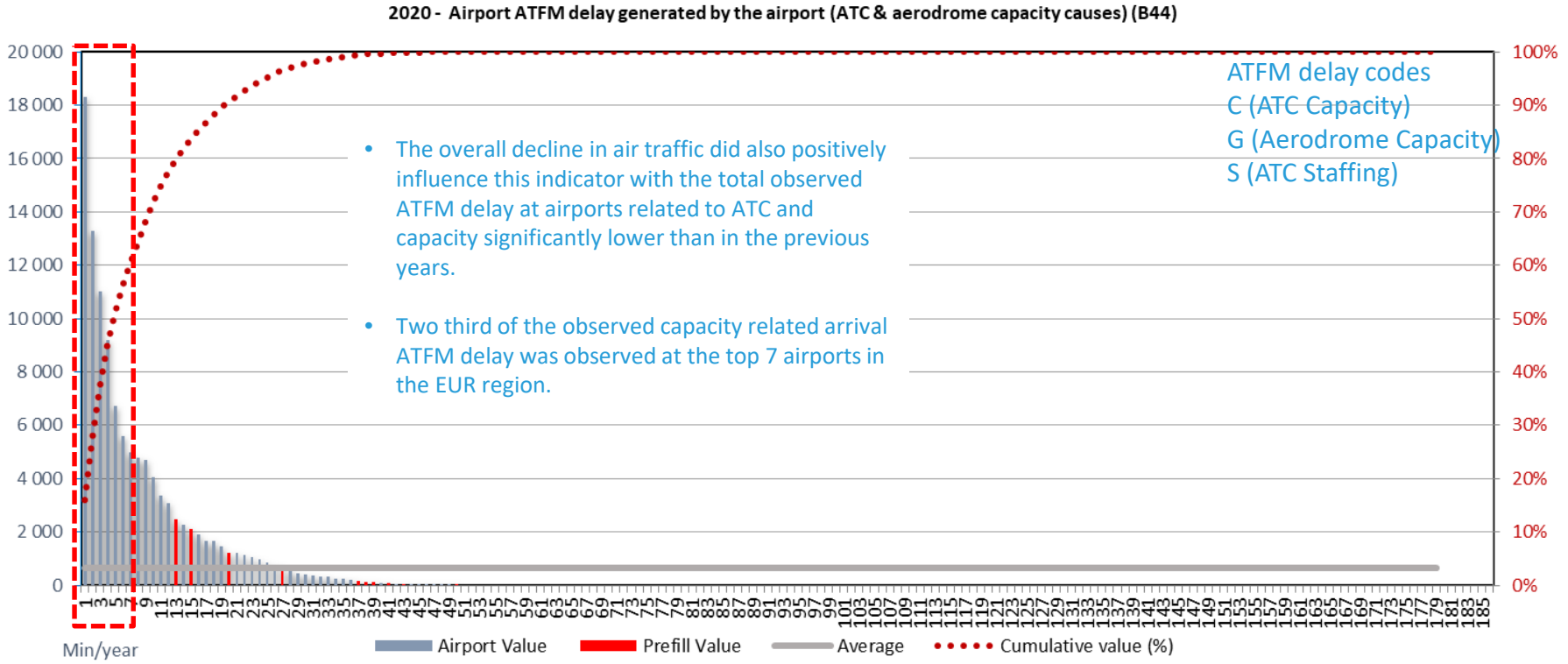
Data item B46



- Weather causes are the considerable contributor to airport ATFM delay.
- Following the aforementioned scope of 5-15 airports, improvements at the main contributing airports could be beneficial for the overall performance.
- For 2020, 50% of this delay was observed at 2 airports.

ATFM delay causes
D (De-icing)
W (Weather)

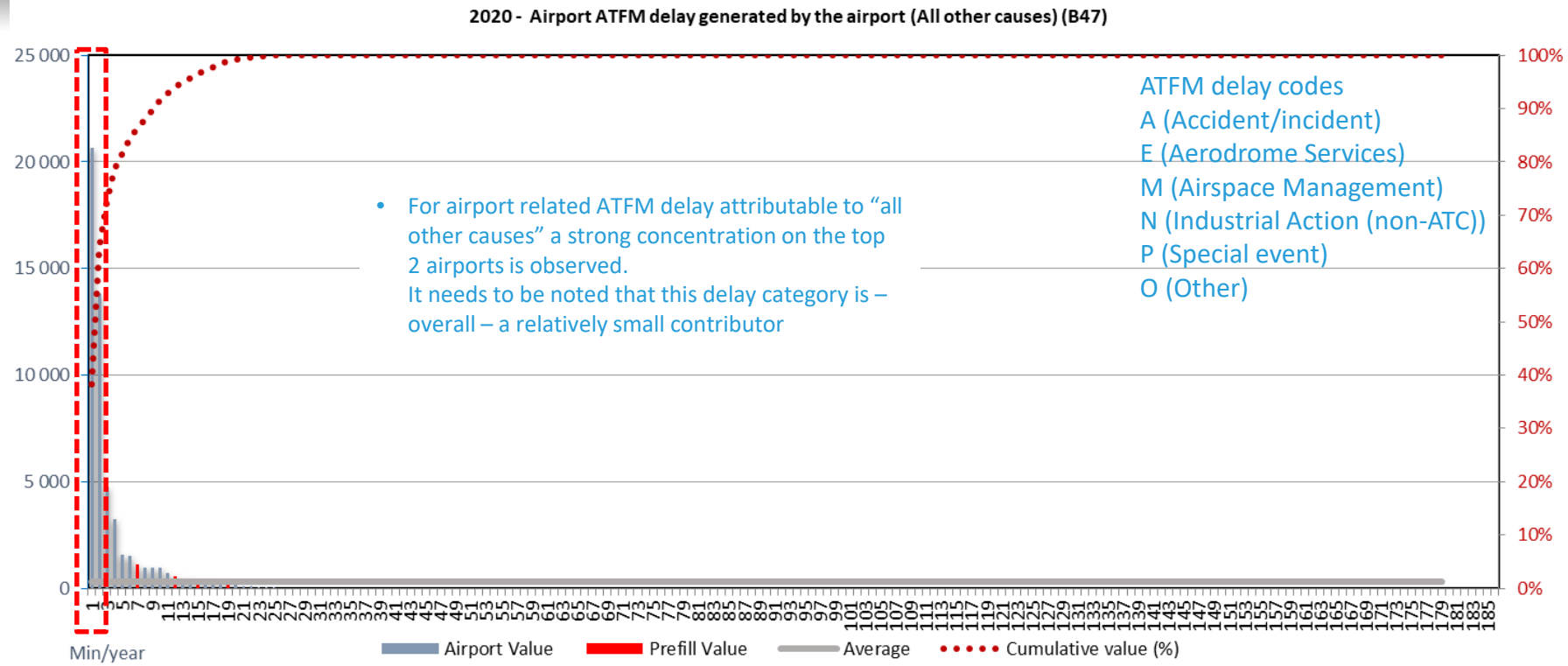
Data item B44



- The overall decline in air traffic did also positively influence this indicator with the total observed ATFM delay at airports related to ATC and capacity significantly lower than in the previous years.
- Two third of the observed capacity related arrival ATFM delay was observed at the top 7 airports in the EUR region.

ATFM delay codes
C (ATC Capacity)
G (Aerodrome Capacity)
S (ATC Staffing)

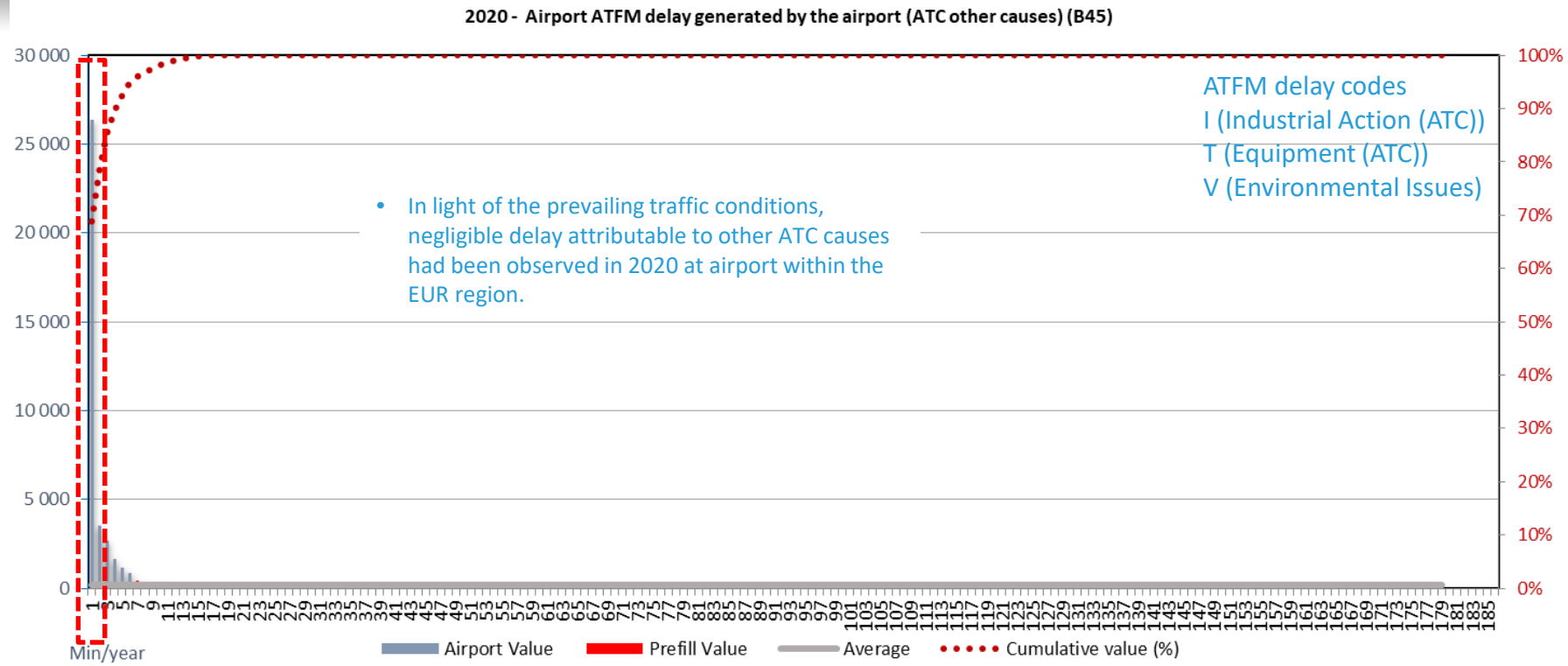
Data item B47



- For airport related ATFM delay attributable to “all other causes” a strong concentration on the top 2 airports is observed.
  It needs to be noted that this delay category is – overall – a relatively small contributor

ATFM delay codes
A (Accident/incident)
E (Aerodrome Services)
M (Airspace Management)
N (Industrial Action (non-ATC))
P (Special event)
O (Other)

Data item B45



- In light of the prevailing traffic conditions, negligible delay attributable to other ATC causes had been observed in 2020 at airport within the EUR region.

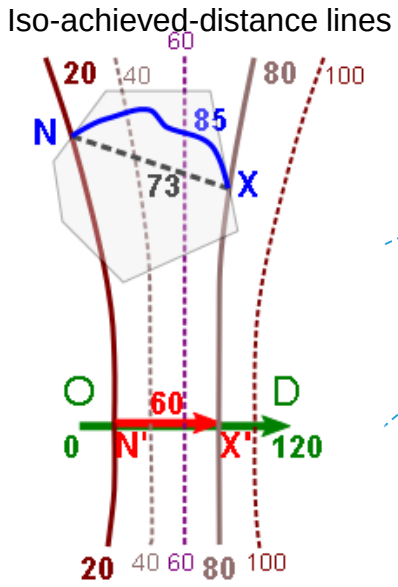
ATFM delay codes
I (Industrial Action (ATC))
T (Equipment (ATC))
V (Environmental Issues)

On average, ATC other causes is the smallest contributor to airport ATFM delay. However at one airport it was a severe problem in 2018.

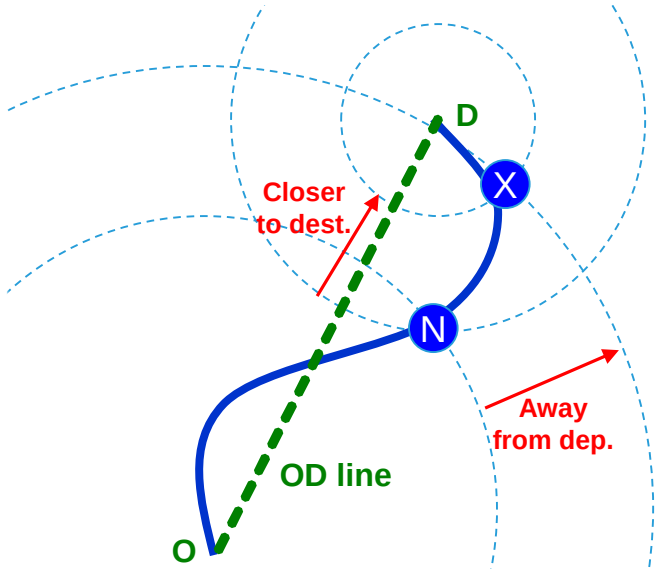
KPA	Efficiency
Objective	Ensure that users [can?] use the most efficient routes – focussing on the horizontal flight-efficiency
Indicator	Average horizontal en route flight efficiency, defined as the difference between the length of the en route part of the actual trajectory (where available) or last flight planned route and the great circle.

Notion of "Achieved Distance"

- O, D, N, X: **O**rigin, **D**estination, e**N**try, e**X**it
- "Corresponding portion of the great circle distance OD" = achieved distance N'X' (needed to calculate the indicator at State level)
- Calculation of achieved distance N'X' for flight segment NX: (distance-closer-to-destination + distance-away-from-departure)/2
- Important properties
  - Sum of achieved distances of flight segments is always equal to total direct (great circle) distance from O to D
  - Actual, achieved and excess distances for flight segments are aggregatable (bottom-up from State level to regional level)

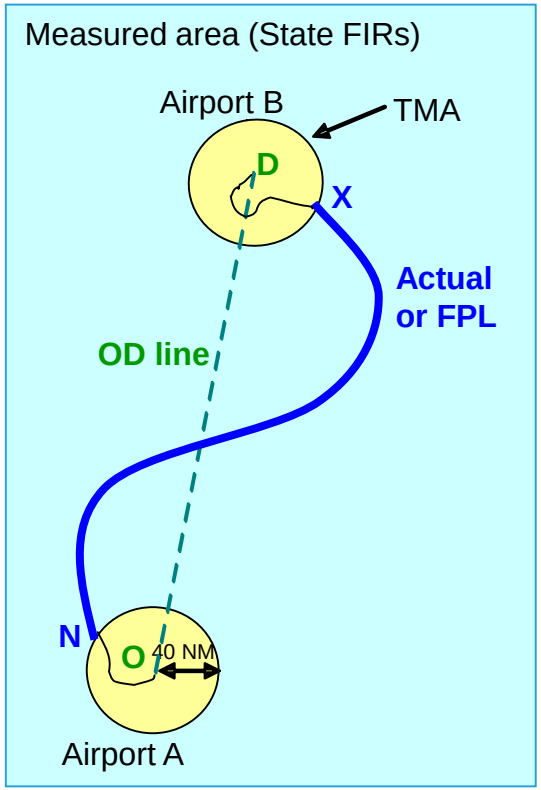


In the example to the left:
Extra distance: 85 – 60 = 25
Inefficiency = 25 / 60 = 0.42 = 42%

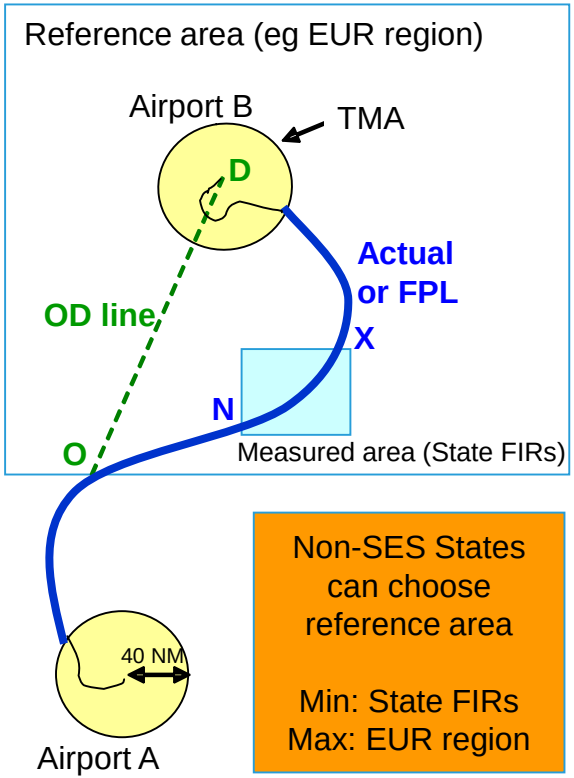


Processing of domestic flights and overflights

Domestic flight

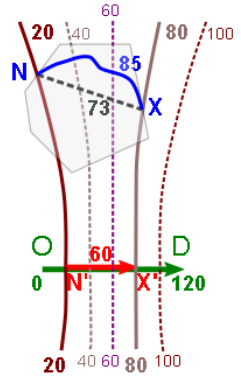


Overflight



Non-SES States can choose reference area

Min: State FIRs
Max: EUR region

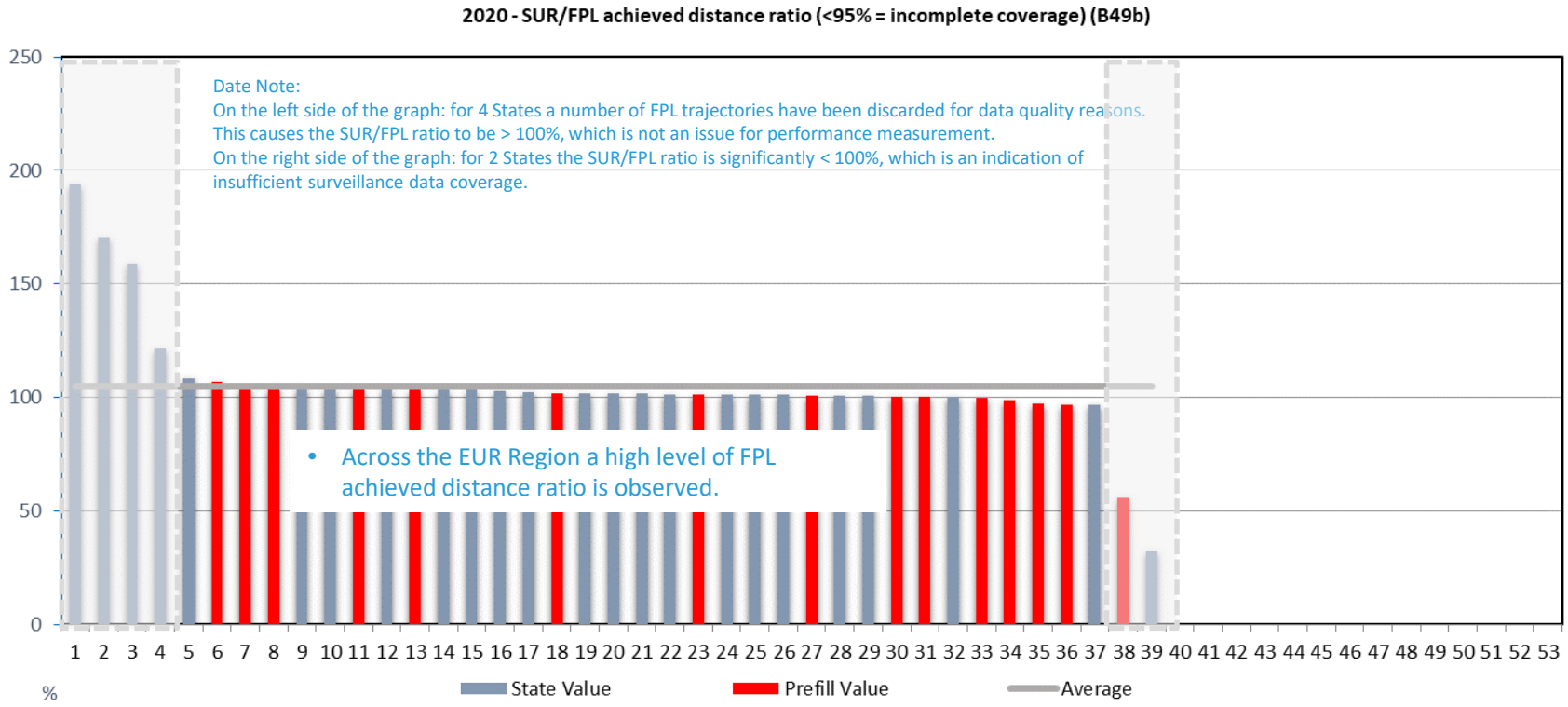


- Required inputs: Trajectory and the coordinates of points O, D, N, X
  (**O**rigin, **D**estination, e**N**try, e**X**it)
- Computed: Trajectory distance (NX), achieved distance (N'X')
- For the NX parts of all trajectories of IFR flights domestic, departing, arriving, or overflying IFR flights

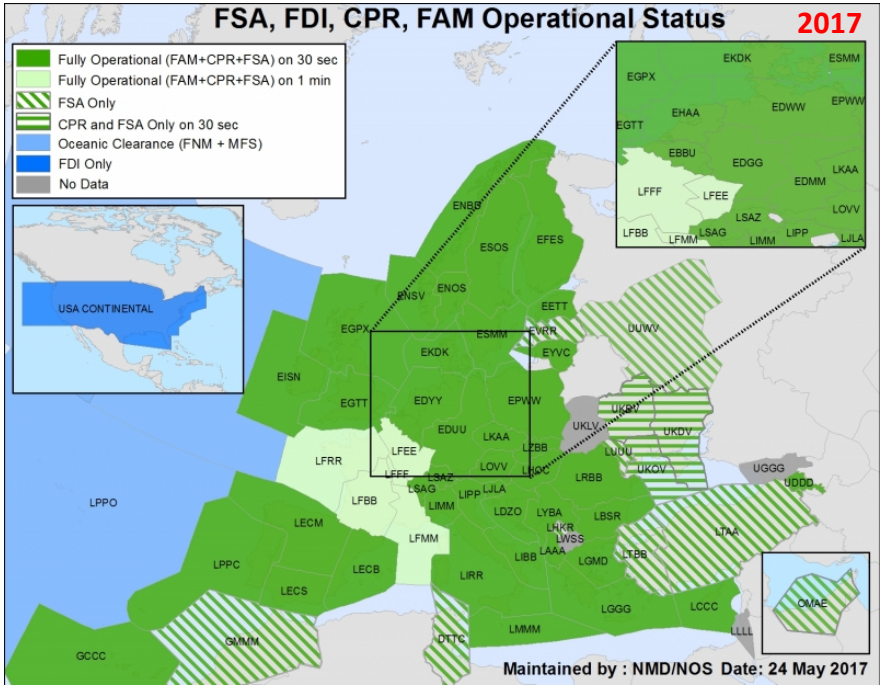
Data items

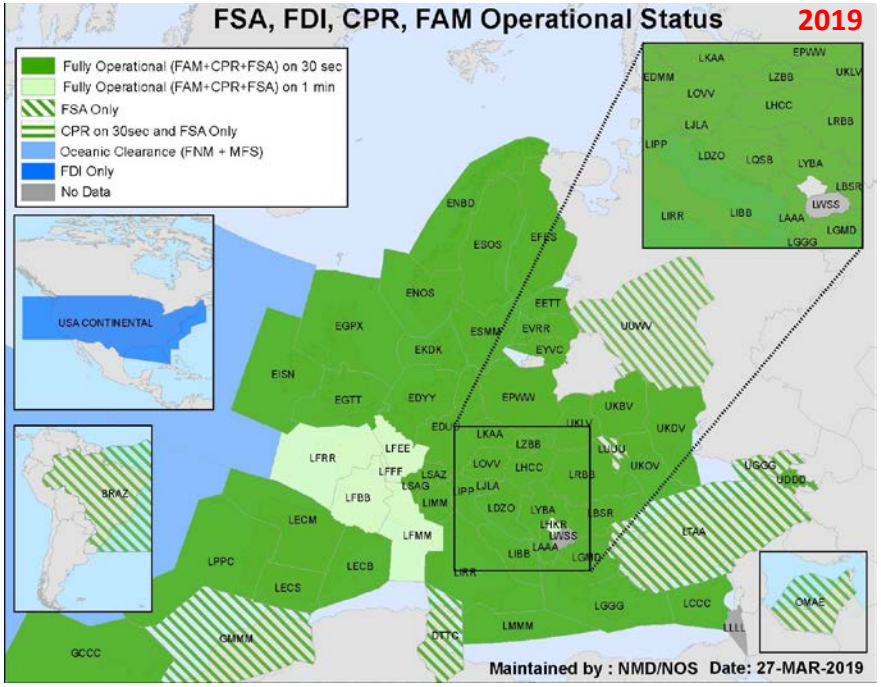
	Flight Efficiency	
	Horizontal en-route flight efficiency	
B48	Name of selected reference area (provide list of FIRs in annex)	Text
B50fpl	Total planned IFR distance (flight plan)	km/year
B51fpl	Total achieved IFR distance (flight plan)	km/year
B50sur	Total actual IFR distance (surveillance data)	km/year
B51sur	Total achieved IFR distance (surveillance data)	km/year
B49	Data source for B50 - B53 (surveillance data or flight plan)	SUR or FPL
B49b	SUR/FPL achieved distance ratio (<95% = incomplete coverage)	%
B50	Total flown IFR distance	km/year
B51	Total achieved IFR distance	km/year
B52	Total extra IFR distance (=B50 – B51)	km/year
B53	Horizontal en-route flight efficiency (=B52/B51)	%

Data item B49b

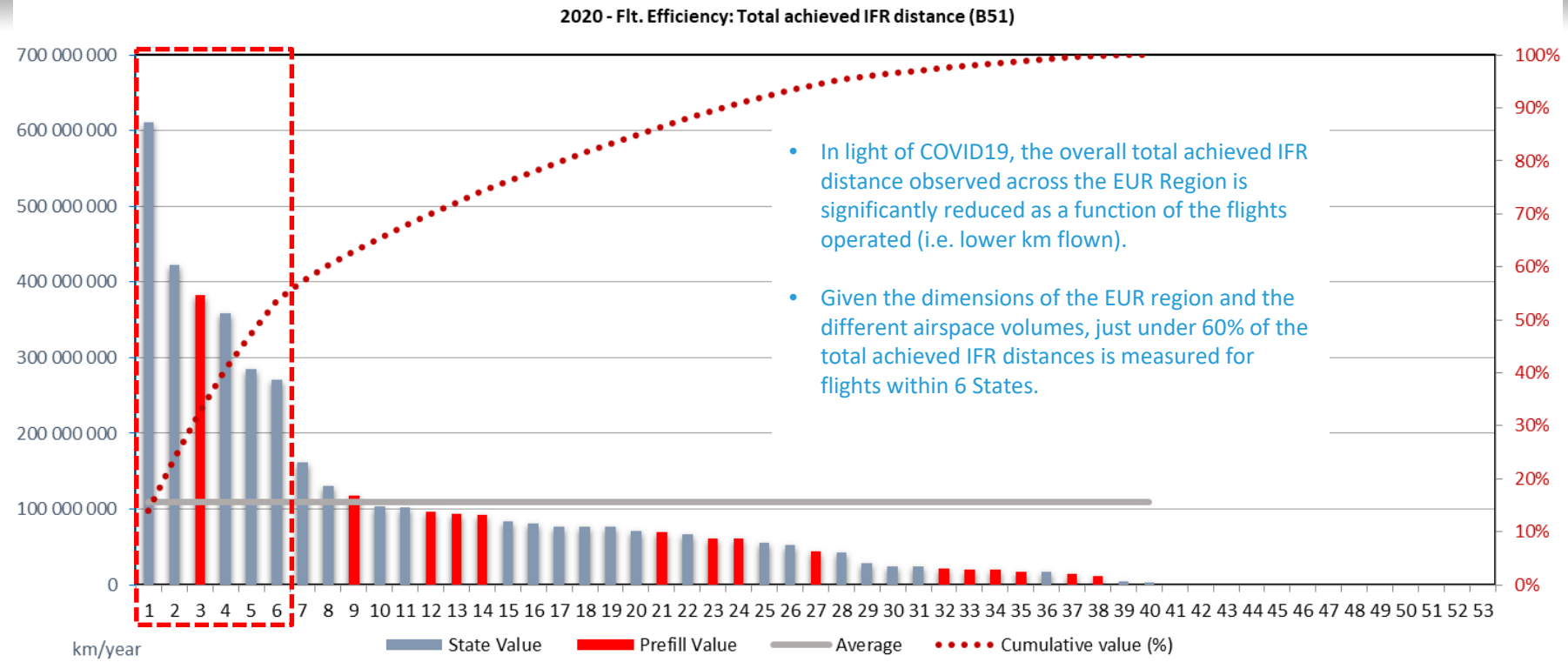


Surveillance data (CPR) coverage





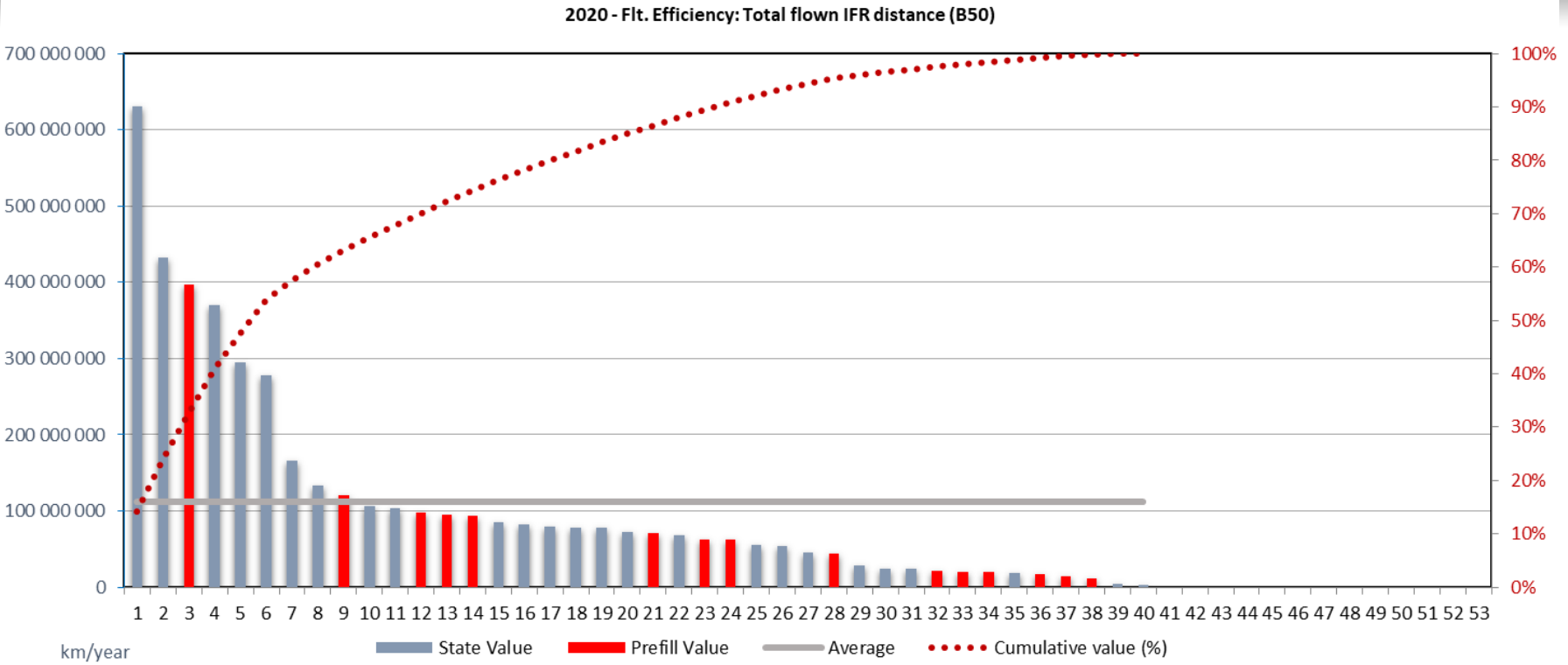
Data item B51



- In light of COVID19, the overall total achieved IFR distance observed across the EUR Region is significantly reduced as a function of the flights operated (i.e. lower km flown).
- Given the dimensions of the EUR region and the different airspace volumes, just under 60% of the total achieved IFR distances is measured for flights within 6 States.

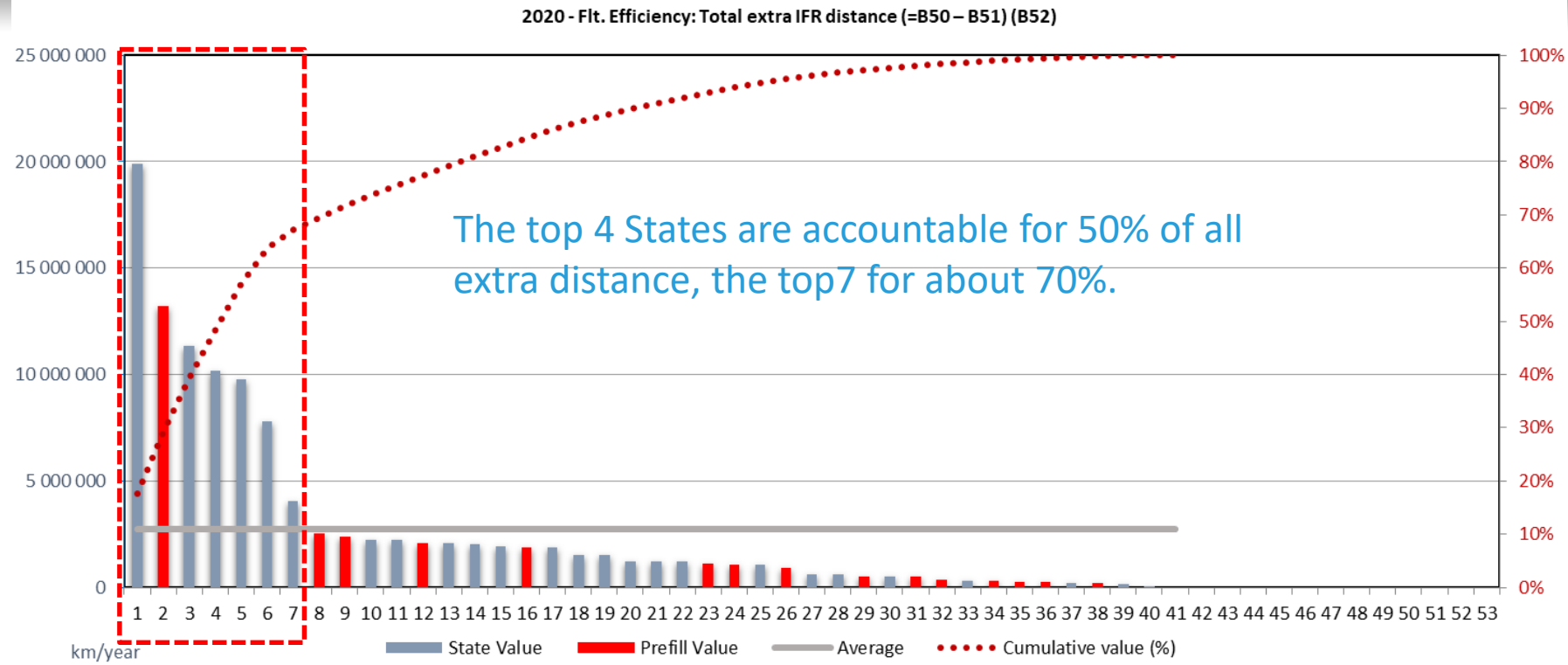
Note: Total achieved IFR distance := contribution to the great circle distance of the flights

Data item B50



Note: Total flown IFR distance (=actual distance) fused from SUR and FPL data sources and adjusted to compensate for insufficient surveillance data coverage.

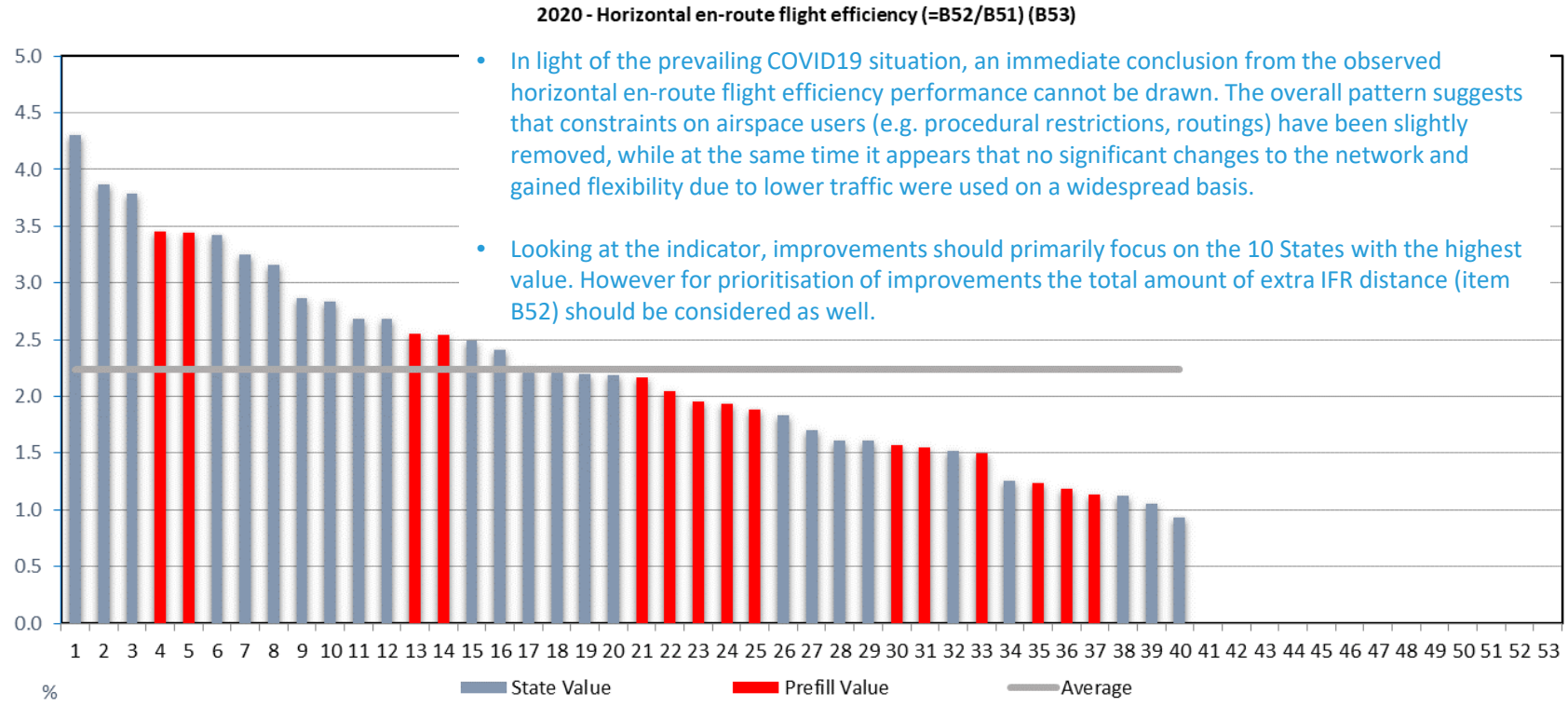
Data item B52



The top 4 States are accountable for 50% of all extra distance, the top7 for about 70%.

Note: Total extra IFR distance (=excess distance flown) based on fused SUR and FPL data sources and adjusted to compensate for insufficient surveillance data coverage.

Data item B53



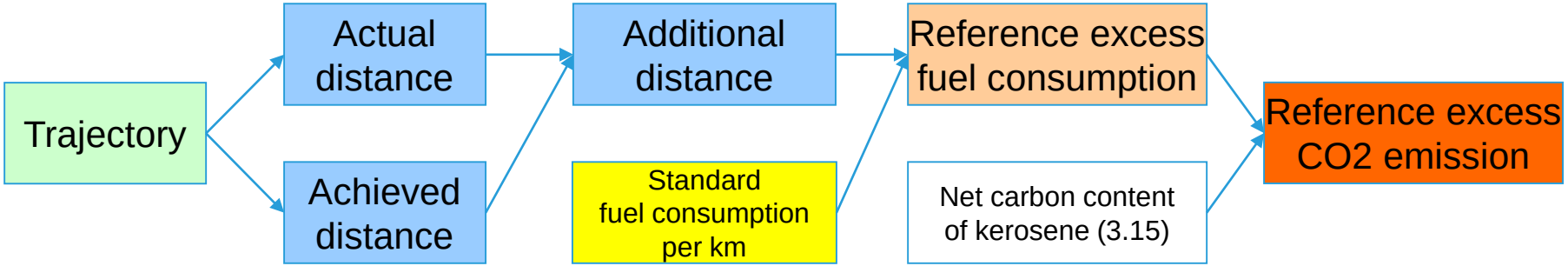
- In light of the prevailing COVID19 situation, an immediate conclusion from the observed horizontal en-route flight efficiency performance cannot be drawn. The overall pattern suggests that constraints on airspace users (e.g. procedural restrictions, routings) have been slightly removed, while at the same time it appears that no significant changes to the network and gained flexibility due to lower traffic were used on a widespread basis.
- Looking at the indicator, improvements should primarily focus on the 10 States with the highest value. However for prioritisation of improvements the total amount of extra IFR distance (item B52) should be considered as well.

KPA	Environment
Objective	Contribute to the protection of the environment – focussing on fuel savings and CO2 emission reductions
Indicator	CO2 emissions deriving from inefficiencies in flight efficiency (conversion of additional distance into CO2 emissions based on standard values formula)

Definition of indicator

- Reference excess fuel consumption:
  Total additional distance flown in the airspace volume (i.e. State) multiplied by a standard fuel consumption factor (value chosen by each State)

- Reference excess CO2 emission:
  Reference excess fuel consumption multiplied by 3.15 (net carbon content of kerosene)



Remarks

- Indicator
  - Has low data requirements and is therefore easy to implement
    - Because mostly based on “additional distance” already computed
  - Publishes an approximation of excess CO2 emission, resulting from horizontal flight inefficiency
    - The optimum indicator value is not equal to zero
    - Value is influenced by many different factors (including traffic volume, fleet characteristics etc.)
    - Indicator does not cover everything (missing: vertical flight efficiency, TMA inefficiencies, surface movement inefficiencies)
    - Hence the absolute value of the indicator should not be interpreted as representing the CO2 emissions caused by ANS.
    - Indicator to be used for “general purpose” and trend analysis only

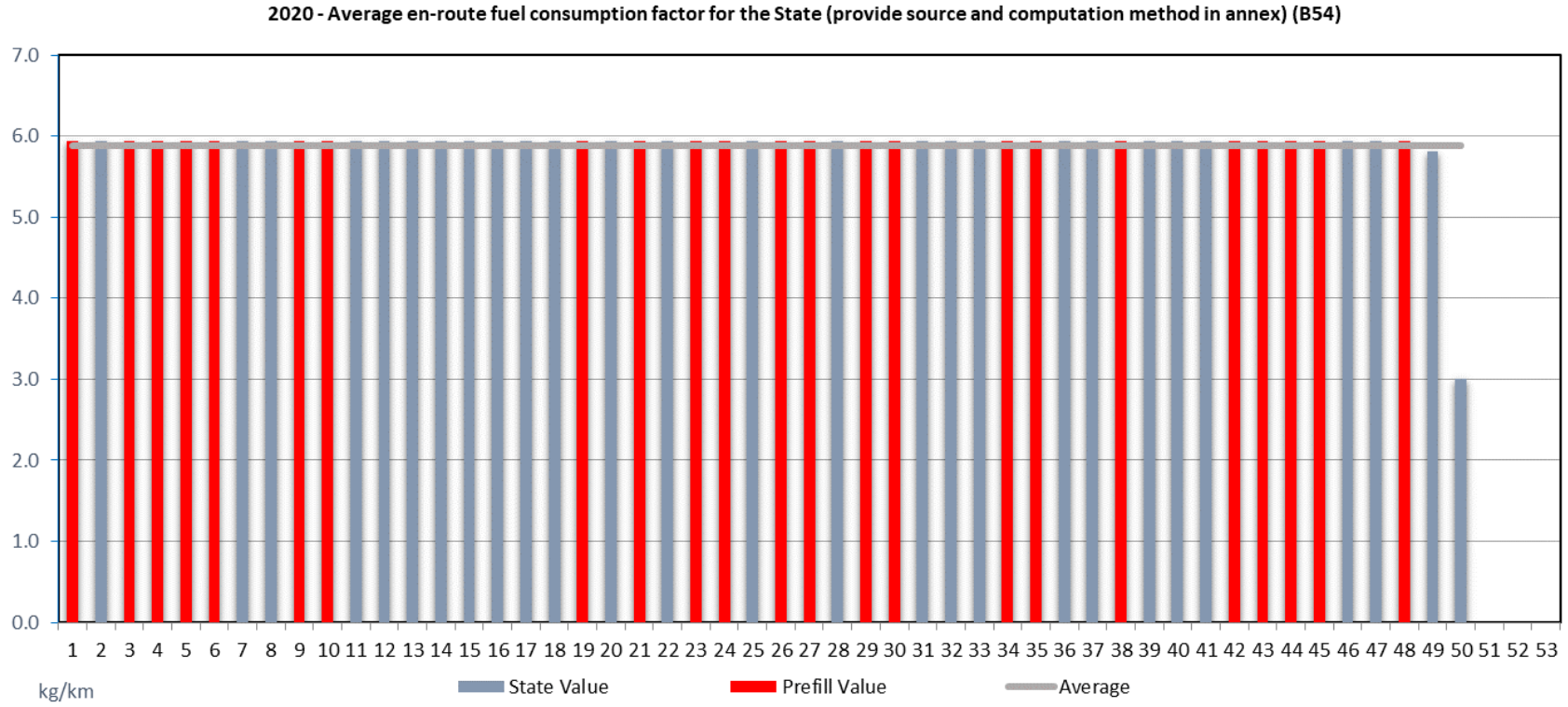
Data items

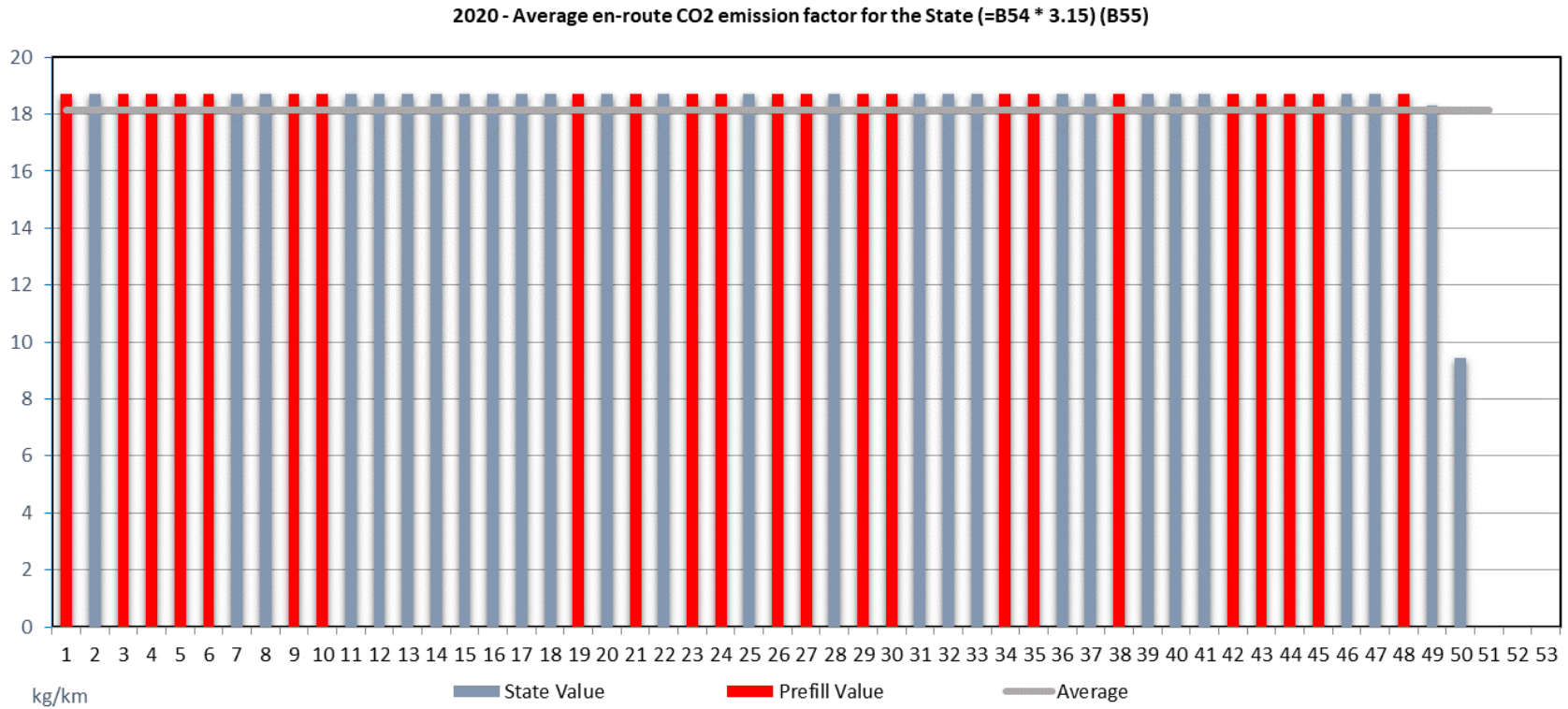
	Environment	
	CO2 emissions deriving from inefficiencies in flight efficiency	
B54	Average en-route fuel consumption factor for the State (provide source and computation method in annex)	kg/km
B55	Average en-route CO_2 emission factor for the State (=B54 * 3.15)	kg/km
B56	Theoretical CO_2 emissions deriving from inefficiencies in horizontal en-route flight efficiency (=B52 * B55 / 1000)	Tonnes/year

B54 – Average en-route fuel consumption factor

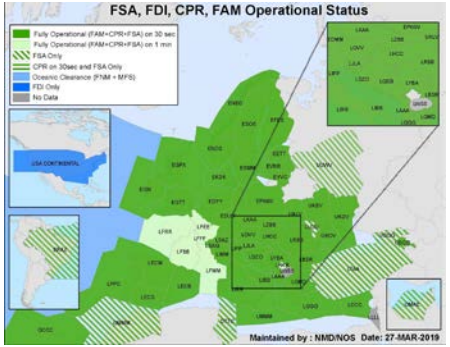
- State can choose method/value
  - Global standard value from ICAO
    - Average fuel burn per nautical mile (NM) of flight = 11 kg/NM = 5.9 kg/km
      - Source: Doc 9750 3rd ed. page App H-8
    - Used for the prefilling of the template
  - State-specific standard value: the standard kerosene consumption per kilometer of a typical jet aircraft type
    - States can select their own “typical aircraft type”, reflecting the composition of traffic in their airspace
  - State-specific measured value: a calibrated average fuel consumption per kilometre flown,
    - computed from the State’s average annual traffic composition in terms of aircraft types, vertical traffic distribution and distance flown
      - using the ICAO Fuel Savings Estimation Tool (IFSET)
      - or any other modeling tool, if available
    - recalibration needed every couple of years to take into account changes in traffic composition

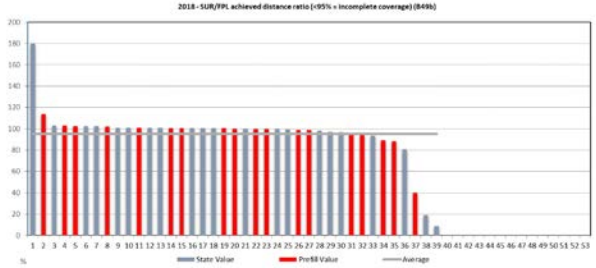
Data items B54




2020 - Average en-route CO2 emission factor for the State (=B54 * 3.15) (B55)
20
18
16
14
12
10
8
6
4
2
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
kg/km
State Value
Prefill Value
Average

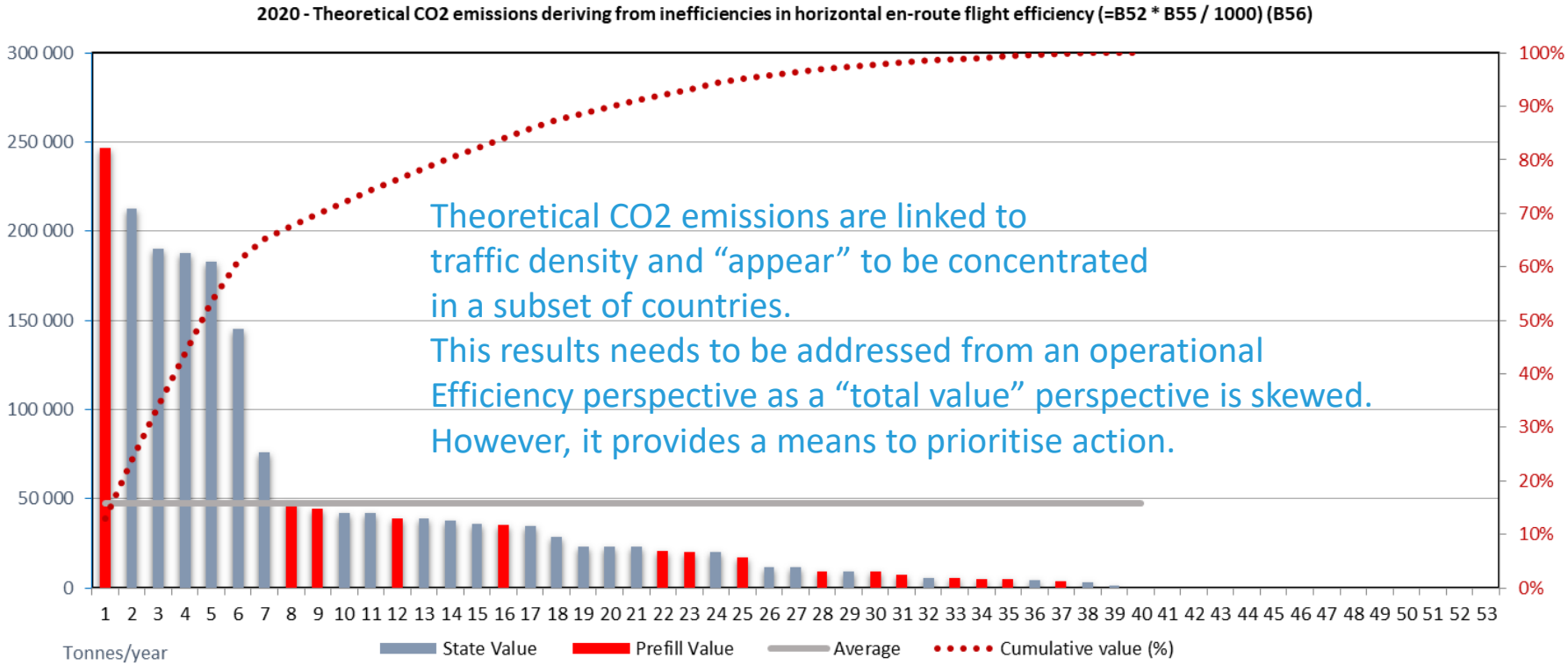
Addressing coverage issues





- Indicator is an absolute value
  - Susceptible to coverage issues
    - Geographical, time, flight category filtering
- Coverage checks & corrections
  - SUR data available
    - Sufficient match with FPL data (achieved distance comparison >95%)
      - Use additional distance from SUR data as is
    - Insufficient match with FPL data
      - Upscale additional distance from SUR data to 95% of additional distance from FPL data
  - SUR data not available
    - Use additional distance from FPL data

Data item B56



Theoretical CO2 emissions are linked to traffic density and “appear” to be concentrated in a subset of countries.

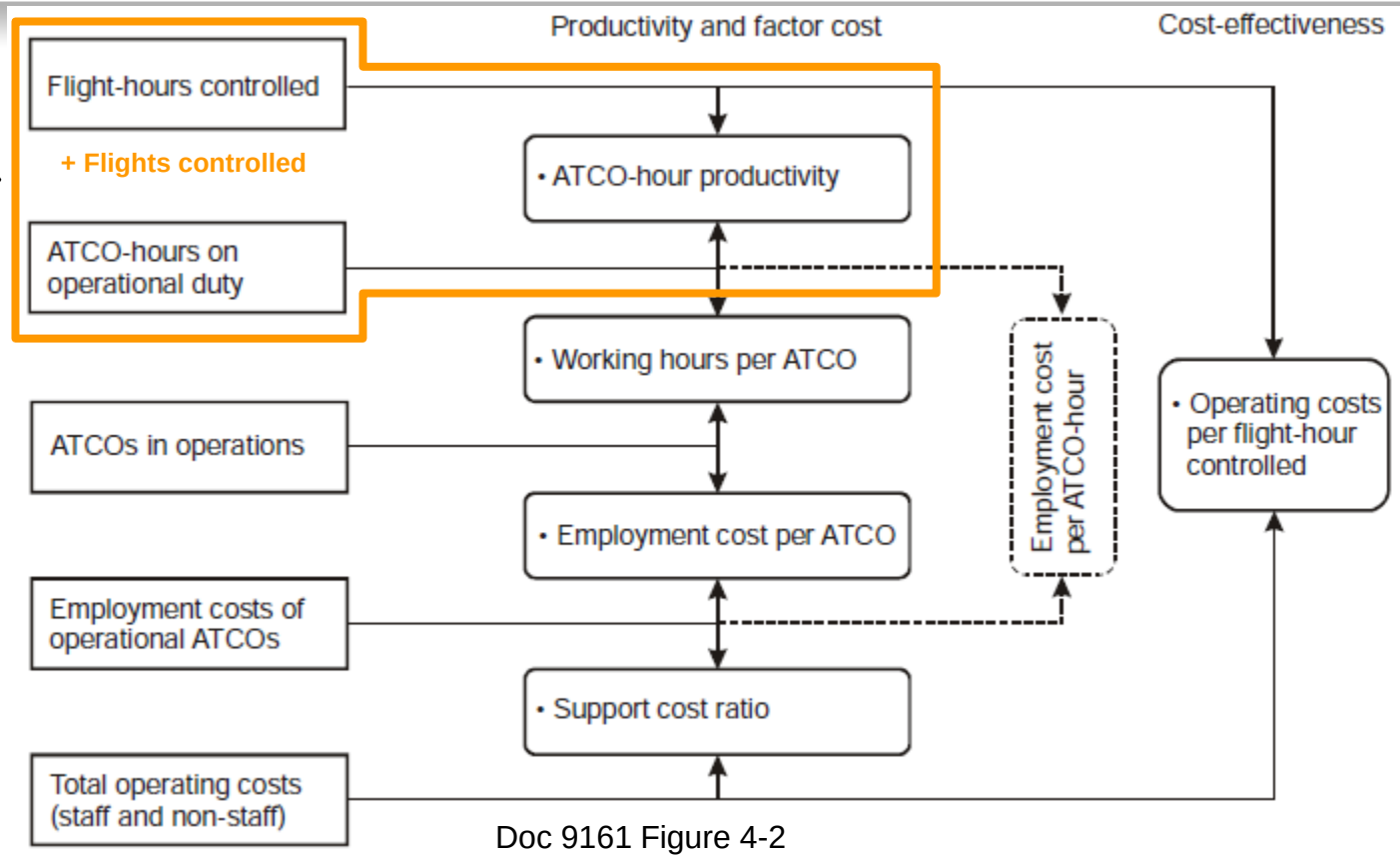
This results needs to be addressed from an operational Efficiency perspective as a “total value” perspective is skewed.

However, it provides a means to prioritise action.

KPA	Cost effectiveness
Objective	Contribute to optimize the cost for air navigation services
Indicators	- IFR flights (en-route) per ATCO hour on duty - IFR flight hours (en-route) per ATCO hour on duty - IFR movements (airport) per ATCO hour on duty

Origin of indicators

EUR Region Framework



Doc 9161 Figure 4-2

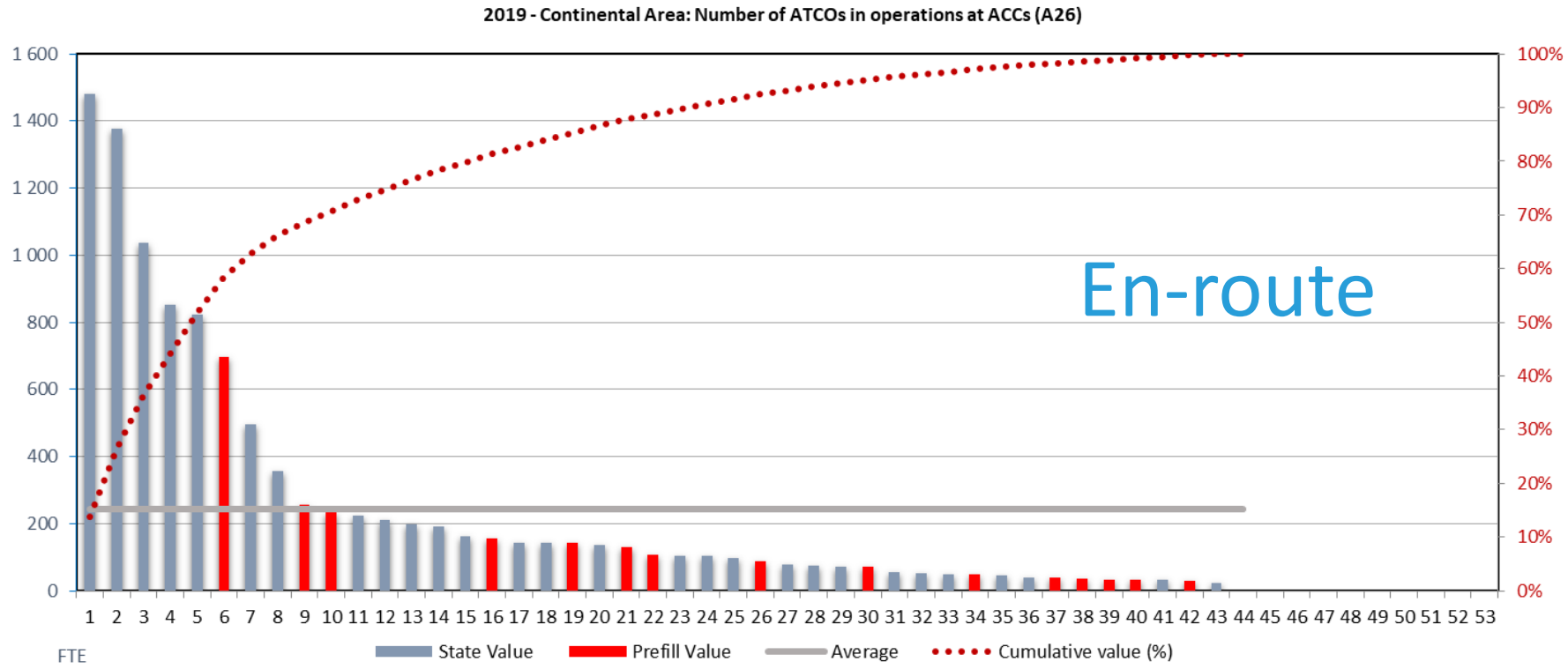
Remarks

- Indicators
  - Focus on an important component of ANSP costs
    - However with the limitation that working hours per ATCO, employment cost per ATCO, and support cost are not covered
  - Reuse data reporting already in place for many States
    - Also reuse existing data definitions and terminology
      - EUROCONTROL Specification for Economic Information Disclosure (SEID)
  - Have relatively simple reporting requirements
    - Only traffic volume and ATCO hours on duty
  - Avoid entering into financial information disclosure issues for the initial implementation of the framework

Data items

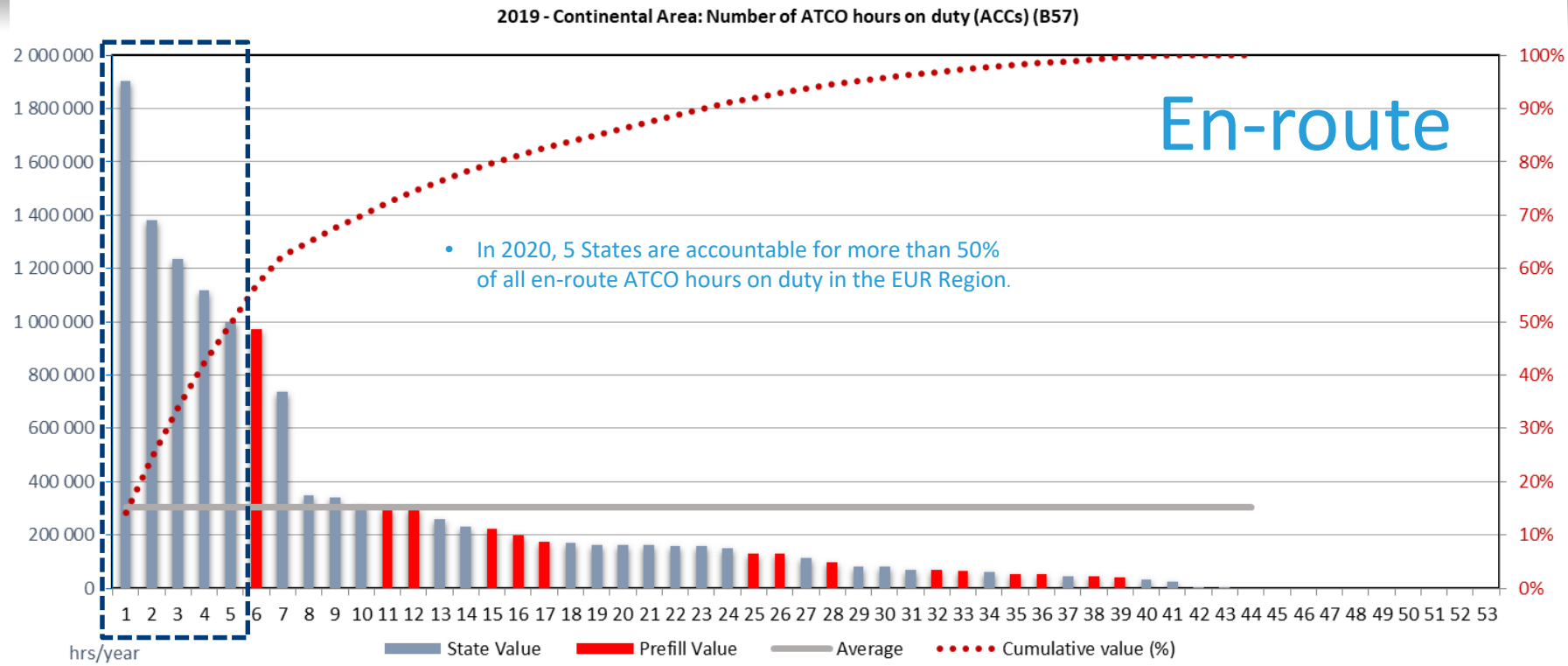
	Cost effectiveness	
	ATCO productivity (Continental Area)	
B57	Number of ATCO hours on duty (ACCs)	hrs/year
B58	Number of ATCO hours on duty (APP+TWRs)	hrs/year
B59	IFR flights (en-route) per ATCO hour on duty (ACCs) (=A11/B57)	Flights/hr
B60	IFR flight hours per ATCO hour on duty (ACCs) (=A15/B57)	hrs/hr
B61	IFR movements (airport) per ATCO hour on duty (APP+TWRs) (=A16/B58)	Mov/hr

Data item A26

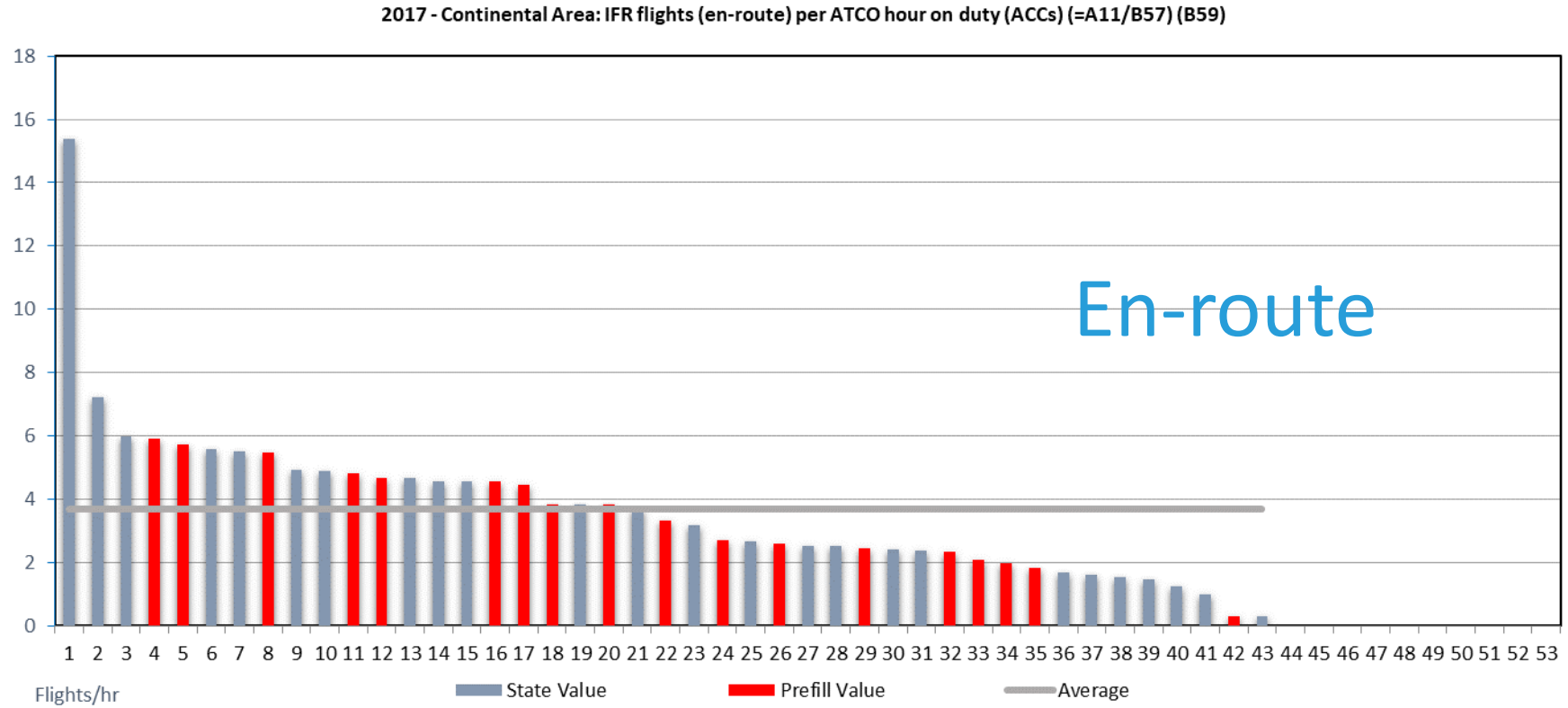


Note: This graph is repeated here for ease of reference and comparison with the next graph (ATCO hours on duty).

Data item B57

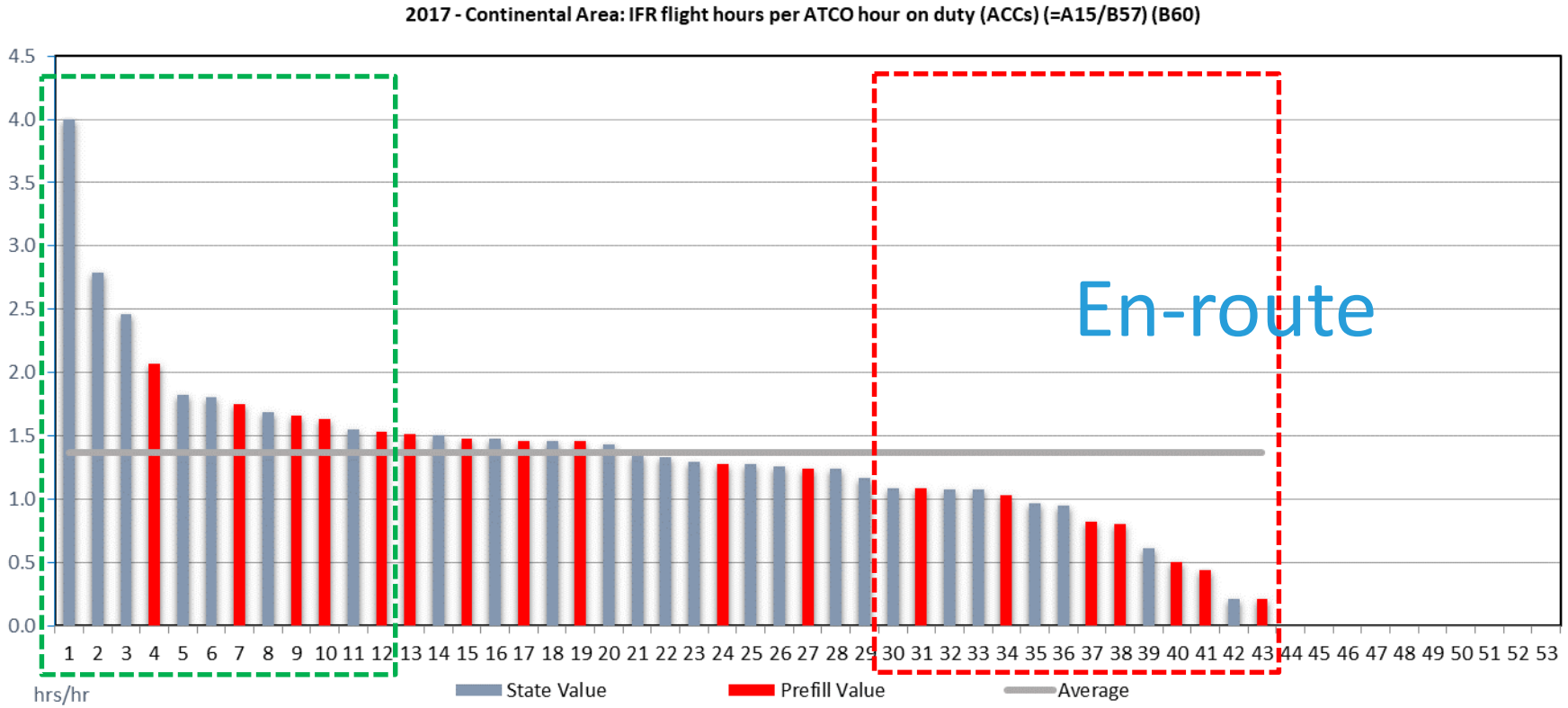


Data item B59



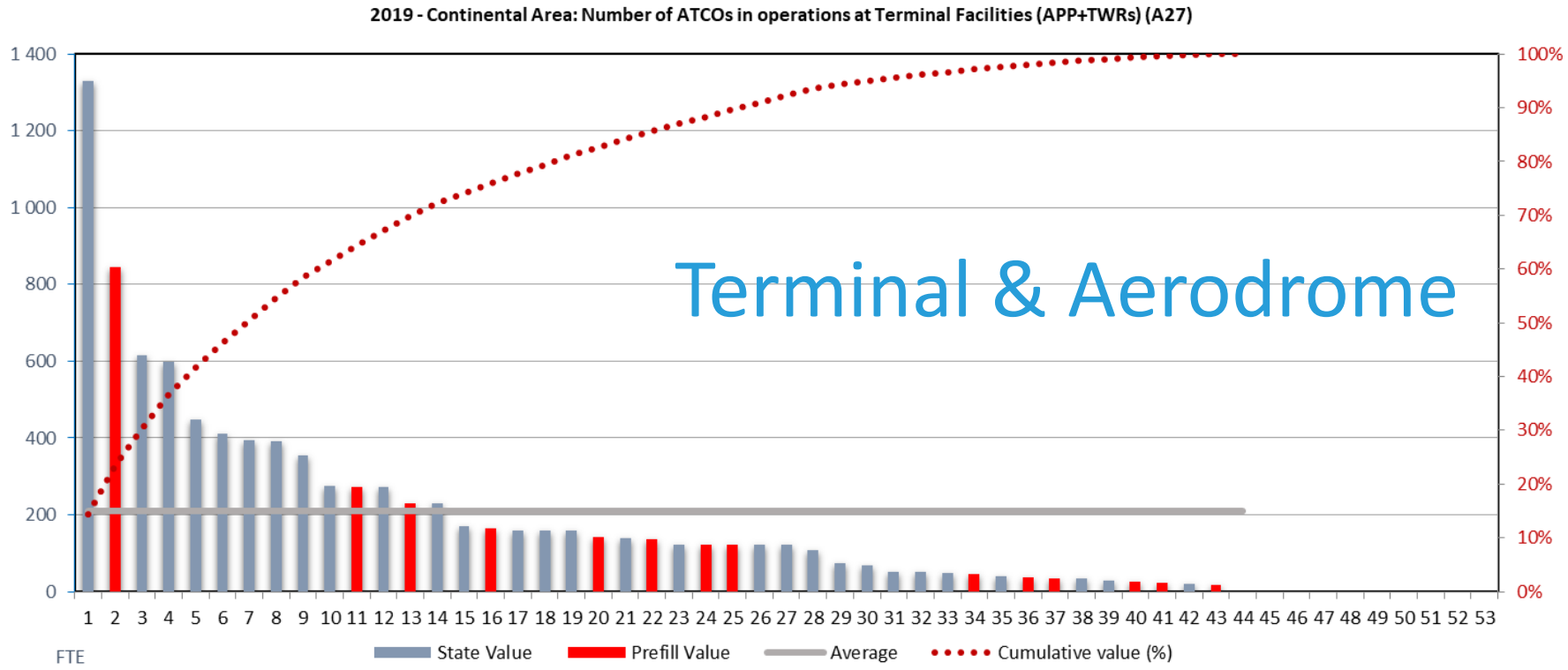
In terms of number of movements handled per en-route ATCO hour on duty, there is a large variation but this does not take into account the average flight duration in the State.

Data item B60



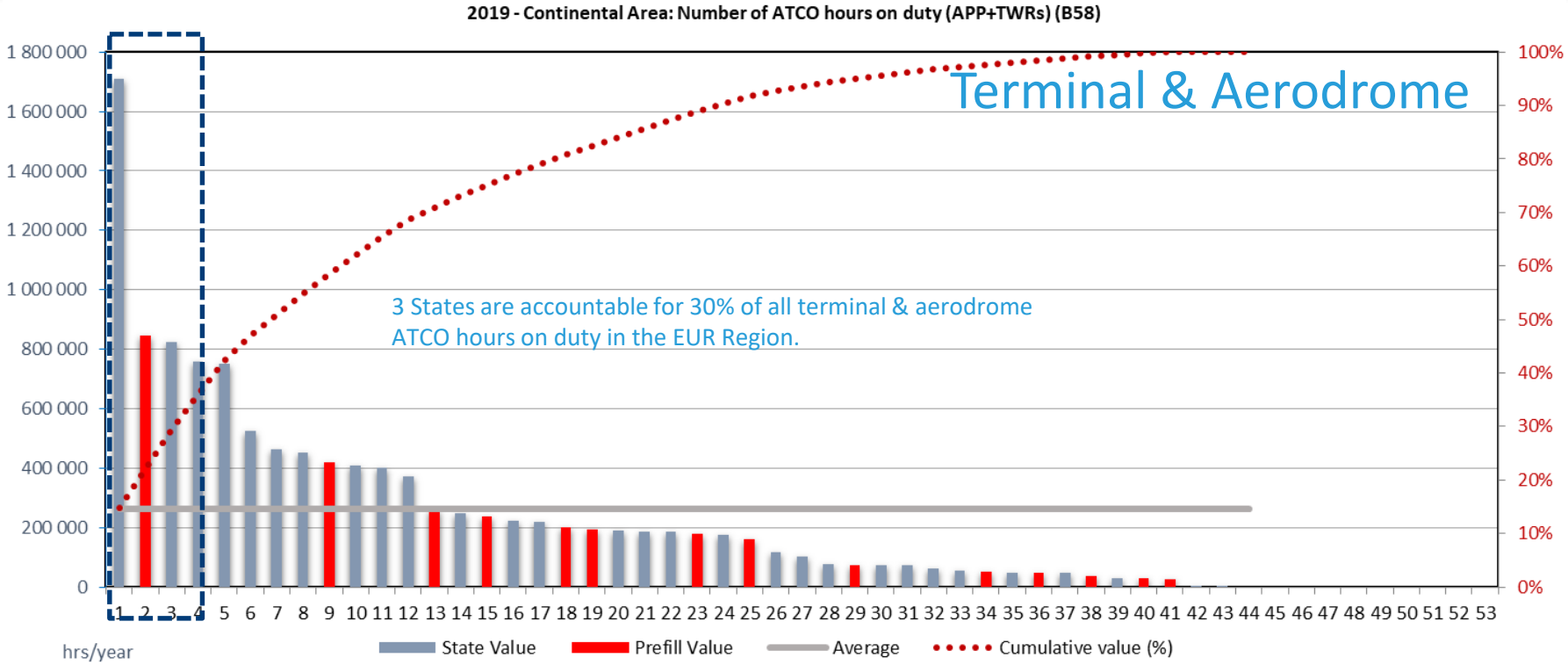
Item B60 is a better indicator for en-route ATCO productivity than item B59. The data suggest that about a dozen States at the tail end of the distribution need to work on improving their ATCO productivity. Lessons can be learned from the dozen States on the left side of the graph which perform better than average.

Data item A27

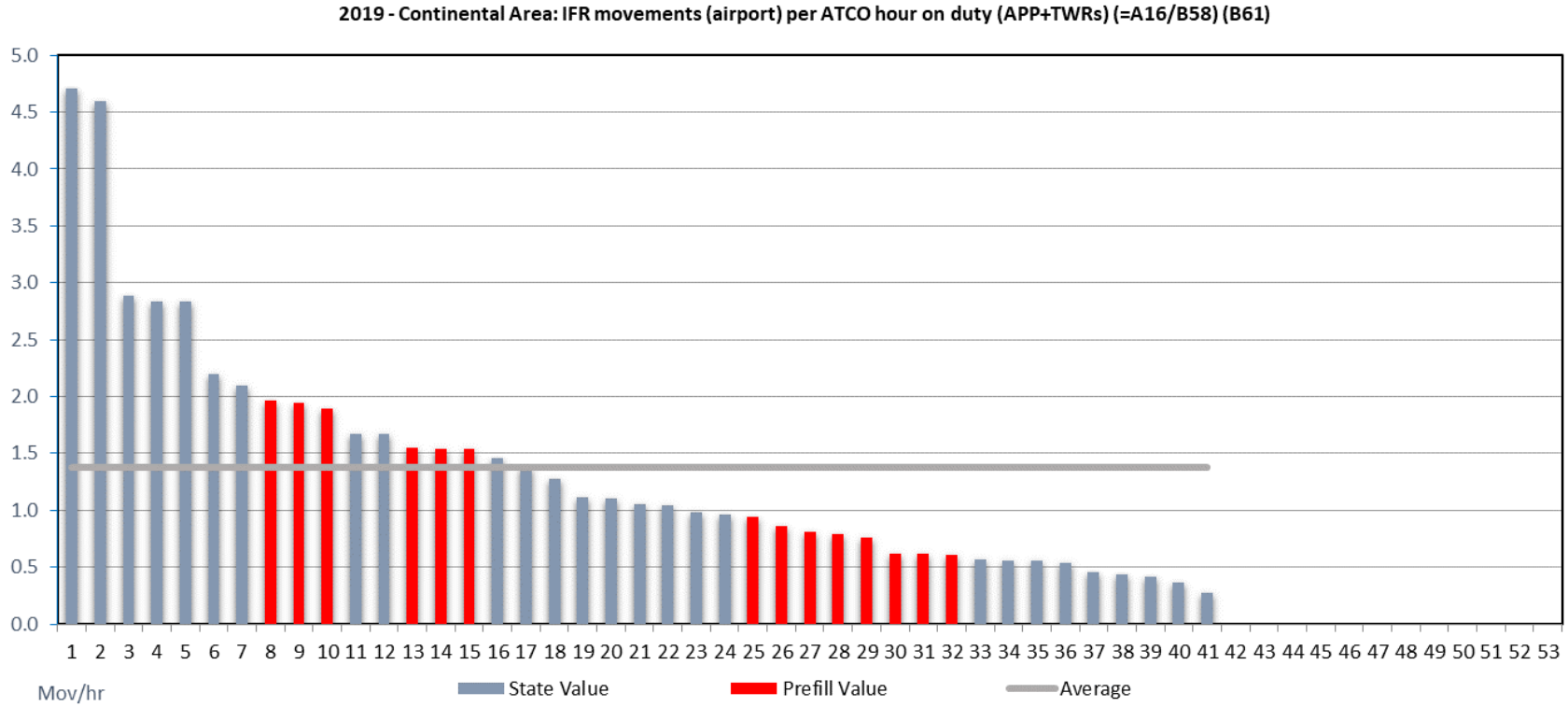


Note: This graph is repeated here for ease of reference and comparison with the next graph (ATCO hours on duty).

Data item B58



Data item B61



Participation KPA

Examples of Participation in 2019

Subject/Meeting	# of invited States	# of States participating	Participation
ASBU Implementation Monitoring Report 2019	52/55	52/55	100 %
REG Performance Framework data provision 2019	55	27	49 %
CORSIA workshop, March 2019	55	31 plus 1 from outside of the EUR Region	56 %
GRF workshop, July 2019	55	29	53 %
SAR workshop and SAREX, September 2019	55	20	36 %
RDGE/30 meeting, April 2019	24	22 plus 2 from outside of the EUR Region	92 %
ENAVSECG/7 meeting, June 2019	56	30	55 %
METG/29 meeting, September 2019	55	44 plus 1 from outside of the EUR Region	80 %
AWOG/26 meeting, October 2019	55	6	11 %
ANSISG/2 meeting, October 2019	26	14	54 %
FMG/25 meeting, October 2019	55	30	55 %

Avg. 56 %

- The COVID19 pandemic limited the ability to conduct larger participation events in 2020. The WHO declared COVID19 a pandemic on March 2020. Associated measures to curb the further spread of the pandemic resulted in global, regional, and national constraints on mobility and person-to-person contact.
  The primary stakeholder interaction mechanism was through online/virtual events which was used on a widespread basis.
- Note: submissions are cross-checked for comments on in-person or virtual events.

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THANK YOU