Methods of constructing SLCFs emission inventory v.s. IPCC methods in China

Catalog

- SLCFs coverage sources
- Differences with IPCC methods
- Applicability at global level
- Gaps and advices

Catalog

- SLCFs coverage sources
- Differences with IPCC methods
- Applicability at global level
- Gaps and advices

SLCFs coverage sources: Energy and IPPU

Energy

- Power Industry
- Manufacturing and Construction
- Transportation
- Commercial Sector
- Residential Sector
- Biomass Burning

Most based on fuel consumption

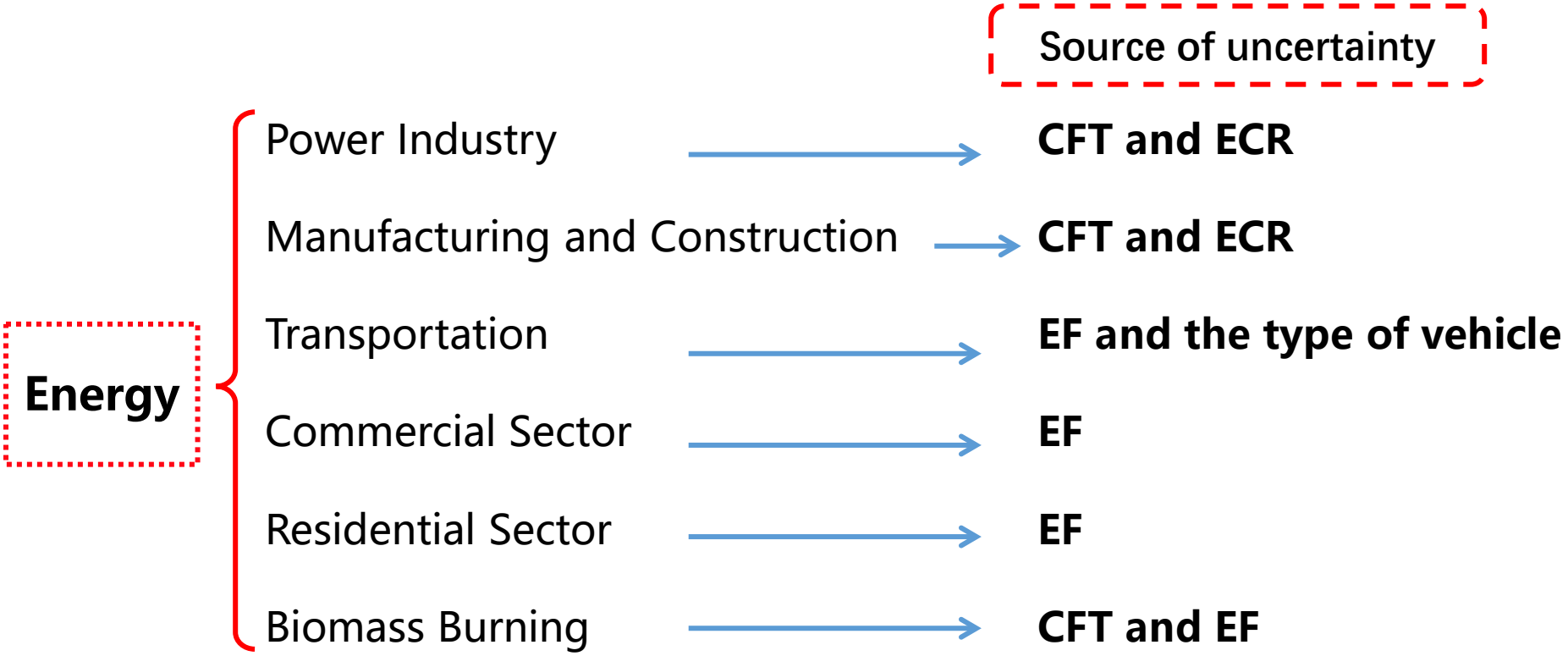
IPPU

- Chemical industry
- Metal Industry
- Solvents Use
- Wood Industry
- Food and Beverage Industry
- Solid waste incineration

Based on product output / consumption

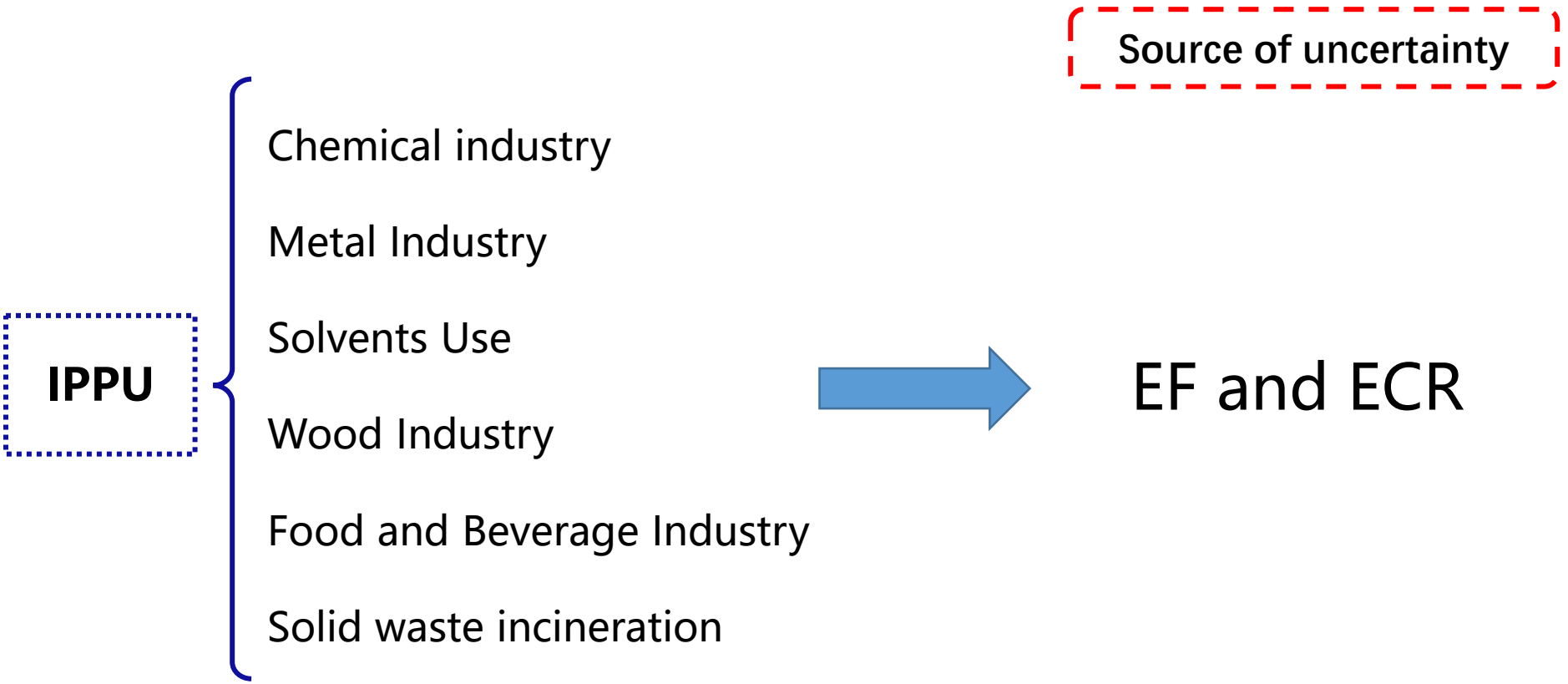
SLCFs coverage sources: Uncertainty of Energy sector

Uncertainty arises because it is not easy to obtain accurate combustion fuel types (CFT), emission fators (EF)and emission control reductions (ECR)



SLCFs coverage sources: Uncertainty of IPPU sector

Similar to the Energy sector, the main uncertainty of IPPU comes from emission fators (EF)and emission control reductions (ECR)



SLCFs coverage sources: Main emission components

Major emission setors of each pollutant (marked in red)

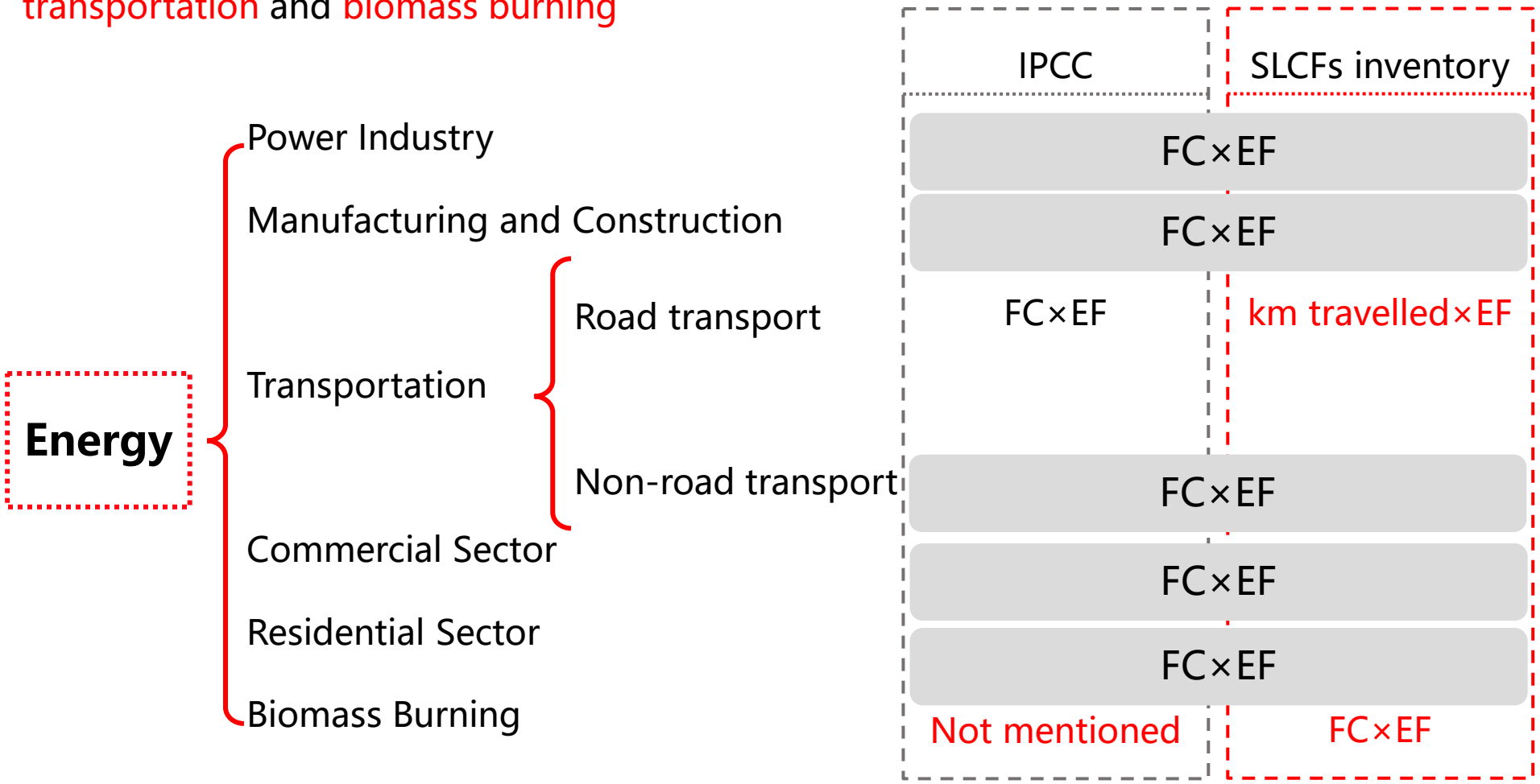
		NOx	NH_3	SO_2	CO	VOCs	$PM_{2.5}$_related
Energy	Power Industry	✓		✓			
	Manufacturing and Construction	✓		✓			
	Transportation	✓				✓	
	Commercial Sector						
	Residential Sector				✓		✓
	Biomass Burning						✓
IPPU	Chemical industry					✓	
	Metal Industry						✓
	Solvents Use					✓	
	Wood Industry						
	Food and Beverage Industry						
	Solid waste incineration						

Catalog

- SLCFs coverage sources
- **Differences with IPCC methods**
- Applicability at global level
- Gaps and advices

Differences with IPCC methods: Energy sector

For the vast majority of SLCFs emissions from the Energy sector, it is based on fuel comsumption (FC) and EF (the same as IPCC), except for the sector of road transportation and biomass burning



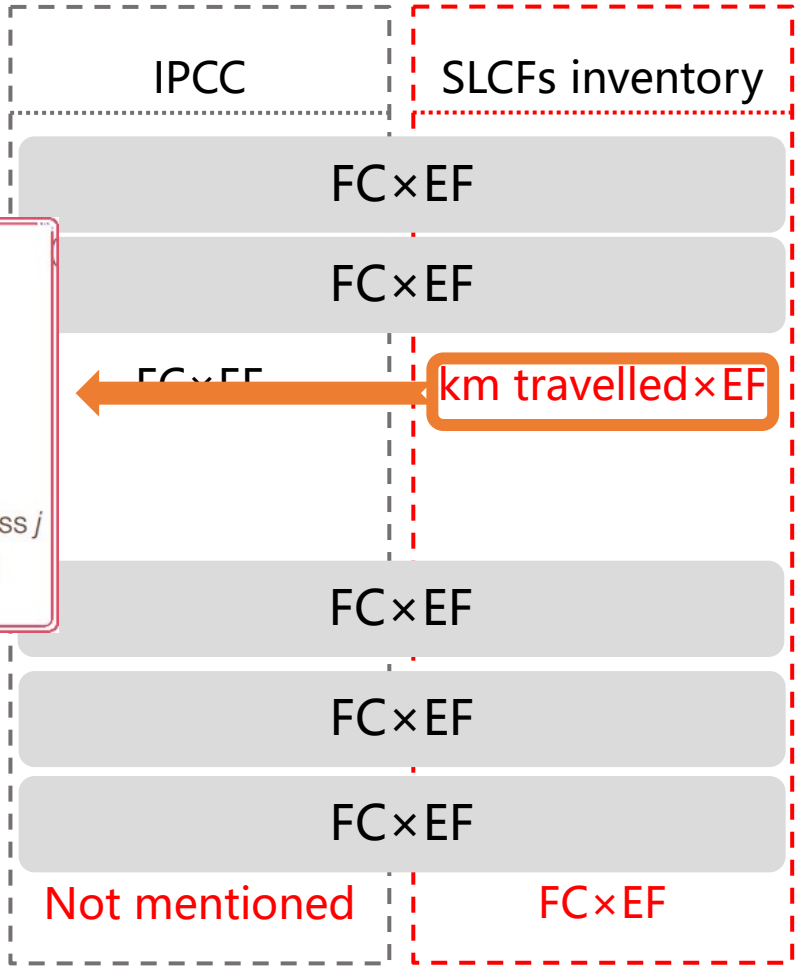
Differences with IPCC methods: Energy sector

For the vast majority of SLCFs emissions from the Energy sector, it is based on fuel comsumption (FC) and EF (the same as IPCC), except for the sector of road transportation and biomass burning

$$Em_{i,j,r} = Nv_j \times Mv_{j,r} \times e_{i,j,r}$$

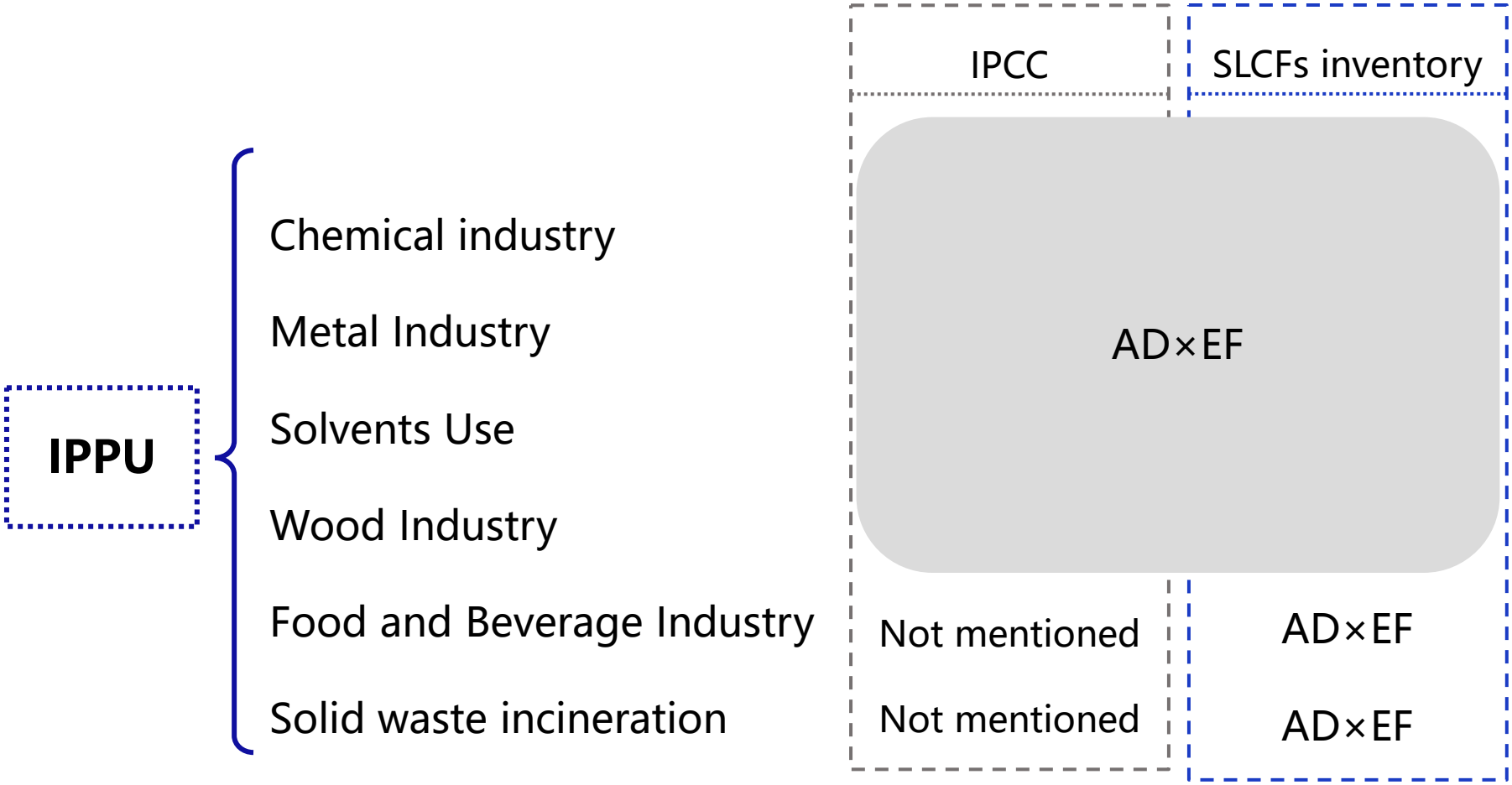
where,

j,r	= Vehicle class j and road type r (urban, rural)
$Em_{i,j,r}$	= Emission of pollutant i in gram (g), produced in the reference year by vehicle class j driven on road type r
Nv_j	= Number of vehicles (veh.) of class j in circulation in the reference year
$Mv_{j,r}$	= Annual mileage per vehicle (km/veh.) driven on road type r by vehicles class j
$e_{i,j,r}$	= Average fleet representative baseline emission factor in g/km for pollutant i, relevant for vehicle class j, operated on road type r.



Differences with IPCC methods: IPPU sector

For IPPU sector emissions of SLCFs, most methods have been consistent with IPCC methods, i.e. based on activity level (AD); Usually the product yield) multiplied by the EF. In addition, solid waste combustion is not included in the IPCC system



Catalog

- SLCF coverage sources
- Differences with IPCC methods
- **Applicability at global level**
- Gaps and advices

Applicability: Different SLCFs emission inventories

Many environmental protection departments or institutions have developed some SLCFs emission inventory system, which are often applicable to different regions

Such as:

UNEP : UNEP Atmospheric Brown Clouds Emission Inventory

EMEP: EMEP/EEA Air Pollutant Emission Inventory

AP-42: AP-42 emission inventory factor system

MEE: Technical guide for compilation of emission inventory from Ministry of ecology and Environment of the People's Republic of China

Applicability: MEE(MEP)

MEP issued a series of technical guidelines for compilation of the emission inventory to guide the construction of emission inventory in China.

such as:

Technical guide for compilation of Chinese emission inventory		
Guide Name	**Institute**	**Web Link**
Technical guide for compilation of primary source emission inventory of atmospheric fine particulate matter(Trial)	MEP	http://www.mee.gov.cn/gkml/hbb/bgg/201408/W020140828351293619540.pdf
Technical guide for compilation of emission inventory of volatile organic compounds (Trial)	MEP	http://www.mee.gov.cn/gkml/hbb/bgg/201408/W020140828351293705457.pdf
Technical guide for compilation of atmospheric ammonia emission inventory (Trial)	MEP	http://www.mee.gov.cn/gkml/hbb/bgg/201408/W020140828351293771578.pdf
Technical guide for compiling air pollutant emission inventory of civil coal (Trial)	MEP	http://www.mee.gov.cn/gkml/hbb/bgg/201610/W020161031388726962758.pdf
Technical guide for compilation of primary source emission inventory of inhalable particulate matter(Trial)	MEP	http://www.mee.gov.cn/gkml/hbb/bgg/201501/W020150107594587771088.pdf
Technical guide for compiling air pollutant emission inventory of road motor vehicles(Trial)	MEP	http://www.mee.gov.cn/gkml/hbb/bgg/201501/W020150107594587831090.pdf
Technical guide for compilation of emission inventory of air pollutants from non road mobile sources(Trial)	MEP	https://www.mee.gov.cn/gkml/hbb/bgth/201407/W020140708387895377980.pdf
Technical guide for compilation of emission inventory of air pollutants from biomass combustion sources(Trial)	MEP	www.mee.gov.cn/gkml/hbb/bgg/201501/W020150107594588071383.pdf

Applicability: MEP

MEP issued a series of technical guidelines for compilation of the emission inventory to guide the construction of emission inventory in China.

- **Applicability:** The system is mainly established according to China's characteristics and adopts China's local emission factors and emission departments to the greatest extent. Therefore, it is suitable for the construction of inventory in China.
- **Compared with the IPCC Tier1 method:** The difference of the construction method is mainly reflected in the **transportation sector,** which is calculated based on the vehicle millage rather than the fule consumption.

Catalog

- SLCF coverage sources
- Differences with IPCC methods
- Applicability at global level
- **Gaps and advices**

Gaps and advices

As mentioned above, compared with IPCC's greenhouse gas emission inventory construction system, emission inventory construction of SLCFs often considers more sectors and methods.

- **Sectors:** SLCFs emission estimation often needs to consider more comprehensive sectoral emissions, such as solid waste incineration, ordnance detonation, biomass combustion and solvent use process emissions (mainly VOCs).
- **Methods:** Compared with IPCC system, in addition to the calculation based on vehicle mileage of road transportation mentioned before, more and more energy departments (especially factories and enterprises) have developed real-time calculation methods for on-line monitoring, which is worthy of further exploration.

THANKS