Matching the national climate change analytics with the statistical data and surveys

Webinar 2 – Using climate change-related statistics in the context of the Paris Agreement

Presenters: **Aleksandar Dedinec, Verica Taseska-Gjorgievska**
Macedonian Academy of Sciences and Arts

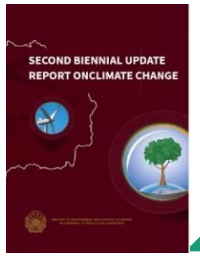
25 November 2020,
Organisers: UNDP Kyrgyzstan and ECE

1. National documents related to CC and data sources
2. Improvements in Energy balances
3. CC Mitigation analyses – correlation with SSO data
4. Take away notes

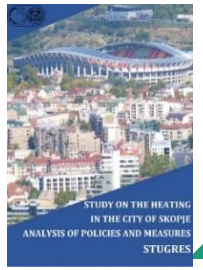
National documents related to climate change (CC)

2015 – MK signed the Paris Agreement

Intended National Contributions (INDC)

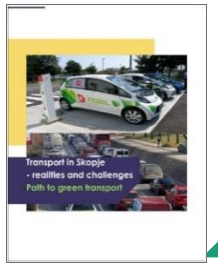


Second Biennial Update Report (SBUR)



Study on the Heating in the City of Skopje - Analysis of policies and measures (STUGRES)

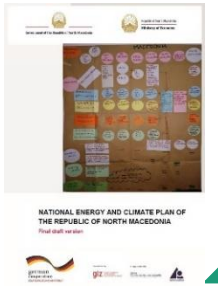
Study on Transport Sector – Analysis of policies and measures (STUTRA)



Transport Study for the City of Skopje

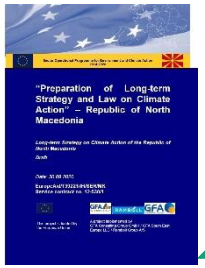
Strategy for Energy Development up to 2040

Third Biennial Update Report (TRUR)

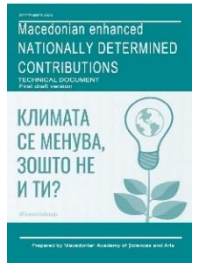


National Energy and Climate Plans (NECP) - *draft*

Study on Industry – Analysis of policies and measures (STUIND)



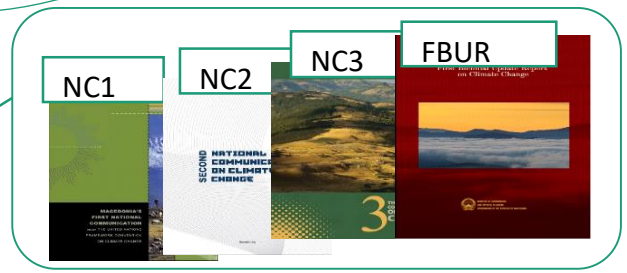
Long-term Strategy on Climate Action - *draft*



Enhanced NDC

MARKAL – Macedonia model was used for mitigation analyses

Previous documents



*Funded by: **UNDP** (all reporting documents to UNFCCC and sectoral mitigation analyses, **UK Government** (Energy Development Strategy), **GIZ** (NECP)*

Data sources used (most relevant)

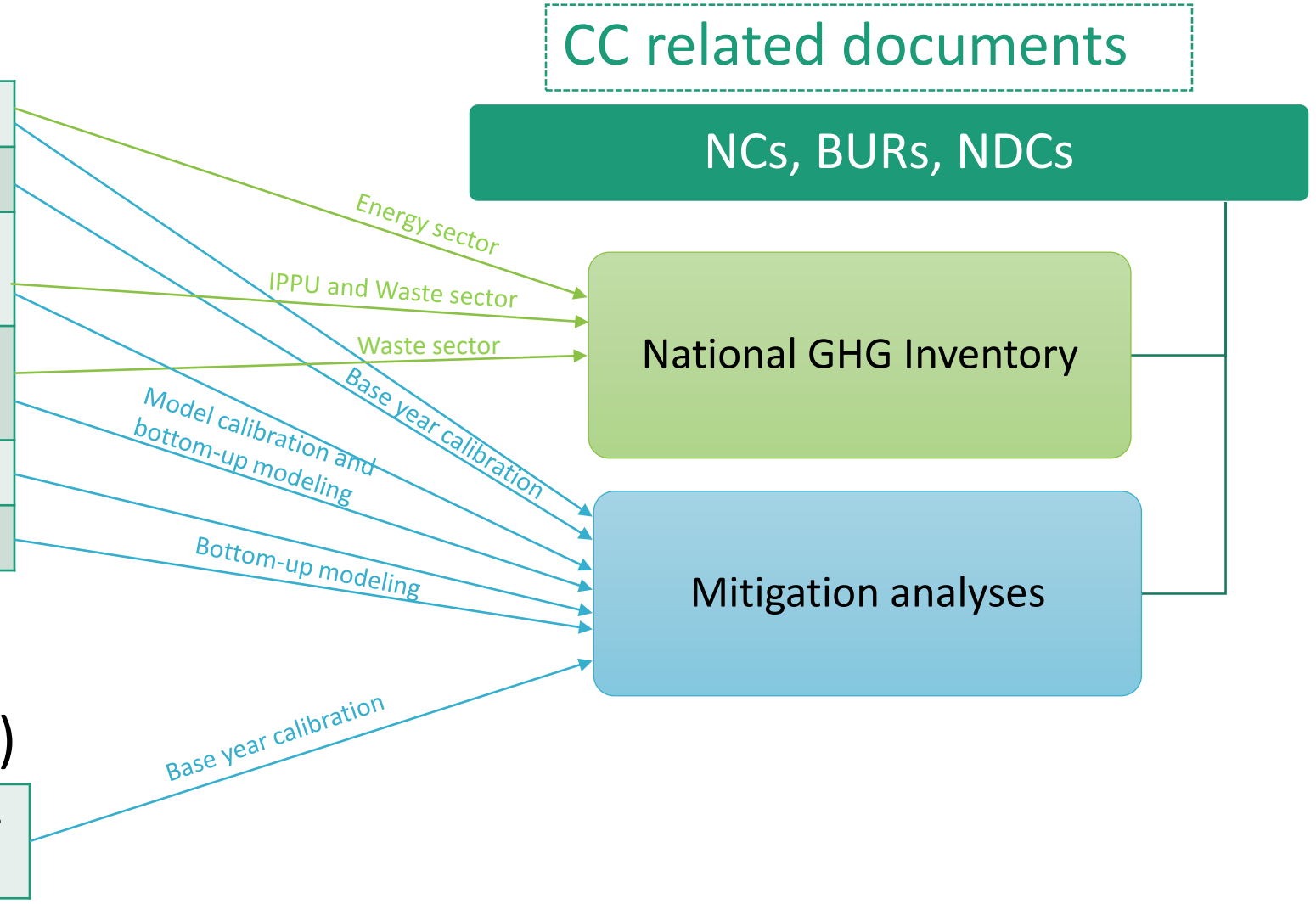
- SSO publications/data

Energy balances – annual publications
Population – estimates at the end of the year
Industrial Production (in natural units) – annual publications
Municipal solid waste – estimates at the end of the year
Energy consumption in households (2014)*
Transport - annual publications

*Published every 5 years

- Ministry of Economy (MoE)

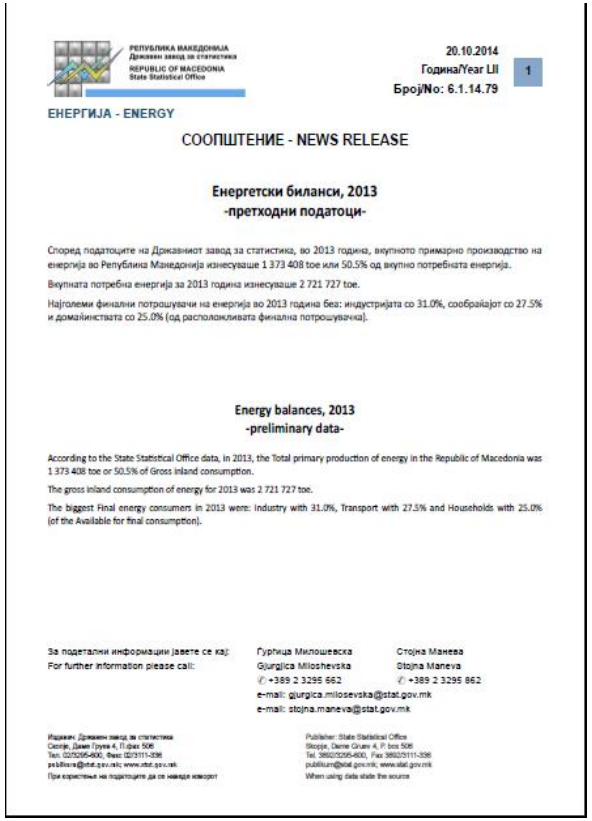
Energy Balances – annual estimates and five-year plans



Improvements in Energy balances (1/3)

Reason: Two publications from two institutions

- State Statistical Office (SSO)



РЕПУБЛИКА МАКЕДОНИЈА
Државен завод за статистика
REPUBLIC OF MACEDONIA
State Statistical Office

20.10.2014
Година/Year LII
Број/No: 6.1.14.79 1

ЕНЕРГИЈА - ENERGY

СООПШТЕНИЕ - NEWS RELEASE

Енергетски биланси, 2013
-претходни податоци-

Според податоците на Државниот завод за статистика, во 2013 година, вкупното примарно производство на енергија во Република Македонија изнесуваше 1 373 408 toe или 50.5% од вкупно потребната енергија.

Вкупната потребна енергија за 2013 година изнесуваше 2 721 727 toe.

Најголеми финални потрошувачи на енергија во 2013 година беа: индустријата со 31.0%, сообраќајот со 27.5% и домаинствата со 25.0% (од расположливата финална потрошувачка).

Energy balances, 2013
-preliminary data-

According to the State Statistical Office data, in 2013, the Total primary production of energy in the Republic of Macedonia was 1 373 408 toe or 50.5% of Gross inland consumption.

The gross inland consumption of energy for 2013 was 2 721 727 toe.

The biggest Final energy consumers in 2013 were: Industry with 31.0%, Transport with 27.5% and Households with 25.0% (of the Available for final consumption).

За подетални информации јавете се кај: Гурџица Милошевска, Стојна Манева
For further information please call: Gjurgjica Miloshevska, Stojna Maneva
+389 2 3295 662, +389 2 3295 862
e-mail: gjurgjica.milosevska@stat.gov.mk
e-mail: stojna.maneva@stat.gov.mk

- Ministry of Economy (MOE)

РЕПУБЛИКА МАКЕДОНИЈА
МИНИСТЕРСТВО ЗА ЕКОНОМИЈА

ПРЕДЛОГ

ЕНЕРГЕТСКИ БИЛАНС НА РЕПУБЛИКА МАКЕДОНИЈА ЗА ПЕРИОДОТ ОД 2015 ДО 2019 ГОДИНА

Скопје, декември 2014 година

Problems:

- Different questionnaires
- Double reporting by companies
- Inconsistency in definitions
- Different methodologies used

Difference in reported data

Improvements in Energy balances (2/3)

Problems ➔ Difference in reported data

MoE data **vs** **SSO data**

Табела 2.1 Финална потрошувачка на енергија во периодот од 2011 до 2014 годи

Вид на енергија	2011		2012		2013		2014 план		2014 реализација		реал./план	2014/201
	Пр. ед.	TJ	Пр. ед.	TJ	Пр. ед.	TJ	Пр. ед.	TJ	Пр. ед.	TJ		
1. Електрична енергија (GWh)	**9,018**	**32,466**	**8,889**	**32,001**	**8,153**	**29,350**	**8,569**	**30,848**	**8,065**	**29,034**	**0.941**	**0.989**
Домашно производство	6,342	22,832	6,424	23,126	5,725	20,609	6,980	25,129	5,639	20,301	0.808	0.985
Нето увоз	2,676	9,634	2,465	8,875	2,428	8,742	1,589	5,719	2,426	8,733	1.527	0.999
2. Лигнит и јаглен (10^3 t)	**31**	**941**	**161**	**4,862**	**190**	**5,748**	**188**	**2,044**	**222**	**2,566**	**1.256**	**0.446**
Домашно производство и нето увоз	7,737	57,491	7,492	53,181	6,803	55,871	7,872	58,494	7,443	50,020	0.855	0.895
Производство на ел. енергија	7,706	56,551	7,331	53,856	6,613	43,460	7,684	56,450	7,221	47,454	0.841	1.092
3. Кокс (10^3 t)	**59**	**1,672**	**71**	**2,010**	**81**	**2,295**	**54**	**1,550**	**74**	**2,122**	**1.369**	**0.925**
4. Нафтени деривати (10^3 t)	**751**	**31,939**	**761**	**32,462**	**732**	**31,330**	**754**	**32,212**	**721**	**30,944**	**0.961**	**0.988**
Домашно производство и нето увоз	768	32,647	784	33,388	763	32,564	766	32,729	755	32,306	0.987	0.992
Производство на ел. енергија	18	709	23	926	31	1,233	12	517	34	1,362	2.636	1.104
5. Природен гас (10^6 m^3n)	**105**	**3,521**	**60**	**2,004**	**69**	**2,304**	**113**	**3,797**	**83**	**2,787**	**0.734**	**1.210**
Увоз	137	4,608	137	4,611	160	5,362	328	11,017	170	5,705	0.518	1.064
Производство на ел. енергија	32	1,088	78	2,607	91	3,059	215	7,230	87	2,918	0.404	0.954
6. Огревно дрво (10^3 m^3)	**673**	**7,334**	**640**	**6,977**	**480**	**5,229**	**646**	**7,046**	**557**	**6,071**	**0.862**	**1.161**
7. Геотермална енергија (10^3 m^3)	**1,357**	**255**	**1,654**	**347**	**1,301**	**254**	**1,904**	**400**	**1,381**	**269**	**0.673**	**1.062**
Вкупна финална потрошувачка		**78,128**		**80,664**		**76,510**		**77,896**		**73,793**	**0.947**	**0.964**

T-03.1: Енергетски биланси, 2012

T-03.1: Energy balances, 2012

Биодизел Biodiesel	Топлинска енергија Derived heat	Вкупно електрична енергија Electrical energy	Supply and consumption
'000 тони/tonnes	TJ	GWh	
0.884	-	-	Total primary production
-	-	2741.497	Imports
-0.378	-	-	Stock change
0.250	-	72.175	Exports
0.256	-	**2669.322**	**Gross inland consumption**
-	-	-	Transformation input
-	-	-	Public thermal power stations
-	-	-	Autoprod. thermal power stationsand CHP

T-03.1: Енергетски биланси, 20

T-03.1: Energy balances, 2012

Вкупно нафтени продукти Total petroleum products	Рафинериски гас Refinery gas	ТНГ LPG	Моторен бензин Motor spirit	Керозини, млазни горива Kerosenes, jet fuels
000тони / '000 tonnes				
-	-	-	-	-
991.327	-	50.875	105.741	9.945
-35.968	-	-2.122	-7.750	-2.170
274.584	-	3.450	37.697	16.540
680.775	**-**	**45.303**	**60.293**	**-8.765**
39.666	-	-	-	-
23.147	-	-	-	-
-	-	-	-	-
-	-	-	-	-
16.518	-	-	-	-
-	-	-	-	-
243.533	-	9.845	45.655	16.914
-	-	-	-	-
-	-	-	-	-
243.533	-	9.845	45.655	16.914
-	-	-	-	-
-	-	-	-	-
0.256	-	-	-	-
24.957	-	-	-	-
-	-	-	-	-
859.941	**-**	**55.148**	**105.948**	**8.149**

Improvements in Energy balances (3/3)

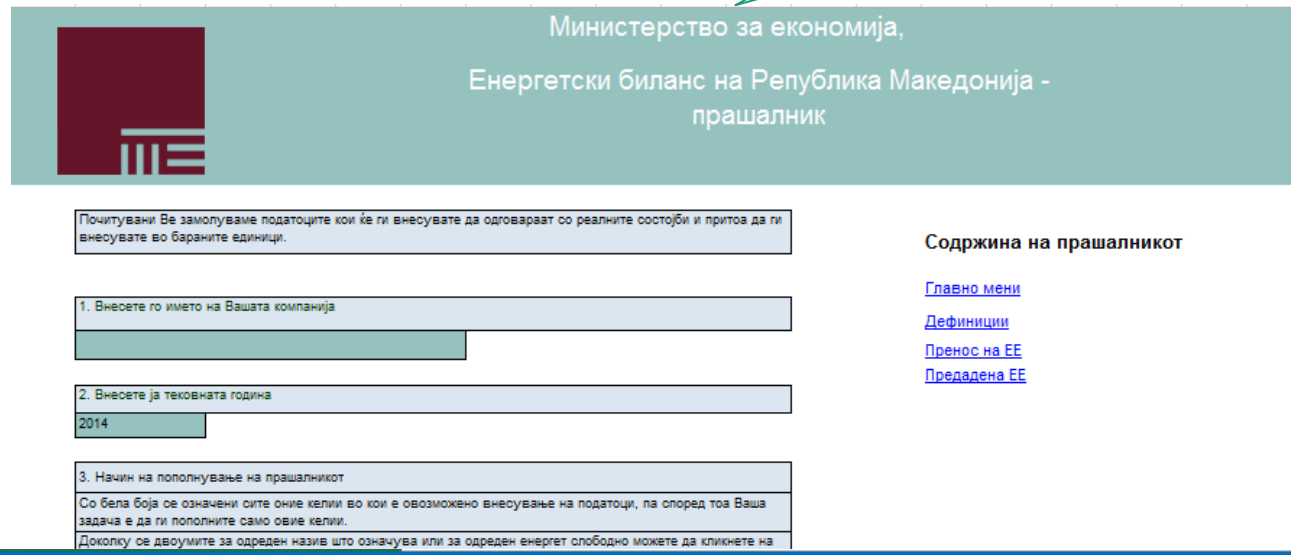
USAID Project (implemented by WINROCK)

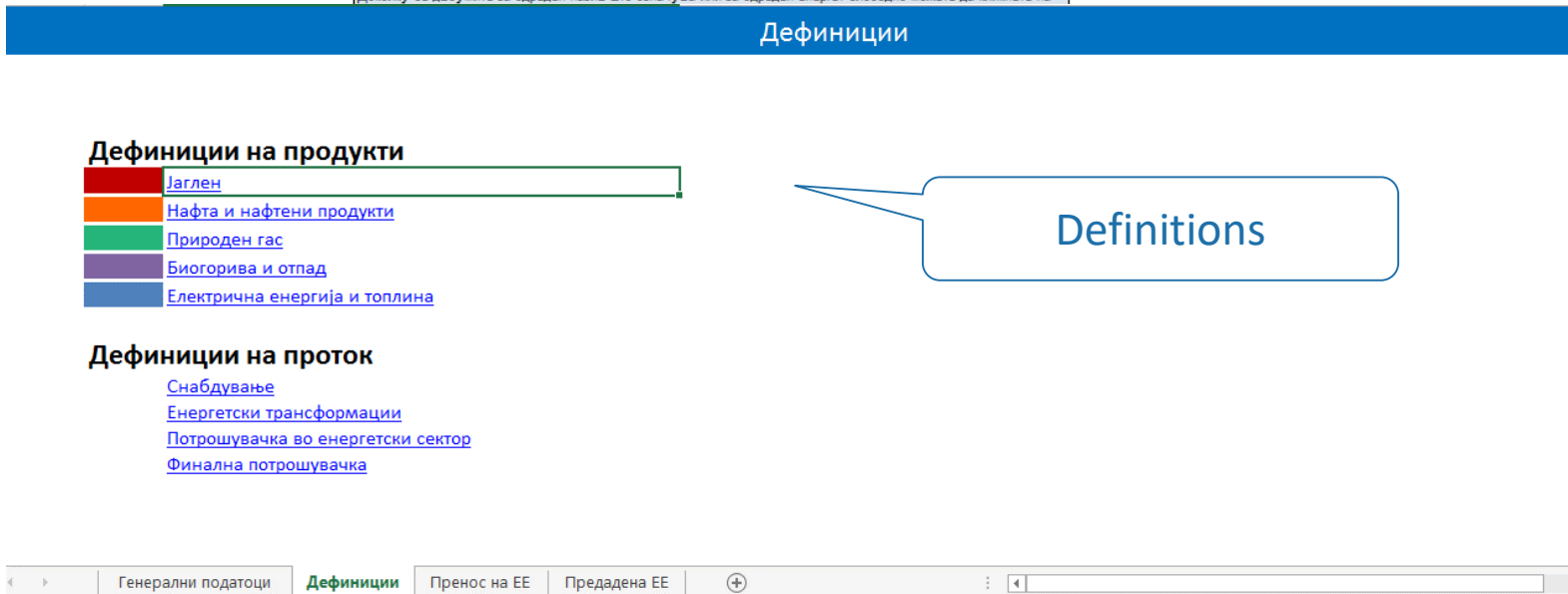
- Coordination body formed with representatives from SSO, MoE, Vice-President of the GoM, Energy Agency, WINROCK, CEI

Solutions:

- Alignment of questionnaires and definitions
- Using EUROSTAT methodology
- Avoid double reporting

General information





Definitions

Mitigation analyses – correlation with SSO data (1/6)

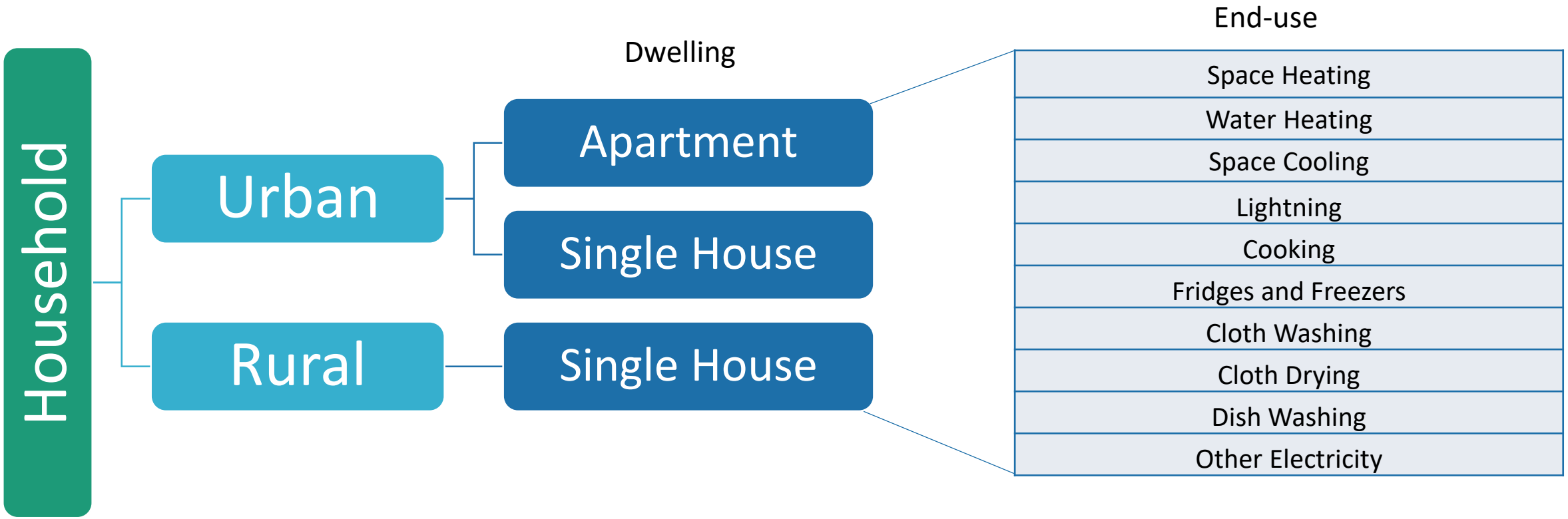
- Mitigation analyses – using MARKAL-Macedonia model

Input parameters in the model – base year calibration	SSO Document/Data
Demand drivers	Population – estimates at the end of the year
Energy Balance	**Energy balances – annual publications**
Households demand by: - Type of dwellings - Fuel - Appliances used	**Energy consumption in households – publication based on a survey applied every five-year**
Transport sector: - Number of vehicles by type - Number of passengers - Transported goods	Transport and communication (data related to transport of passengers and goods – road and rail transport)

- Bottom–up modeling of mitigation measures
- Output: Future energy balances (compatible with IEA, EUROSTAT)

Mitigation analyses – correlation with SSO data (2/6)

- Type of households in MARKAL-Macedonia model



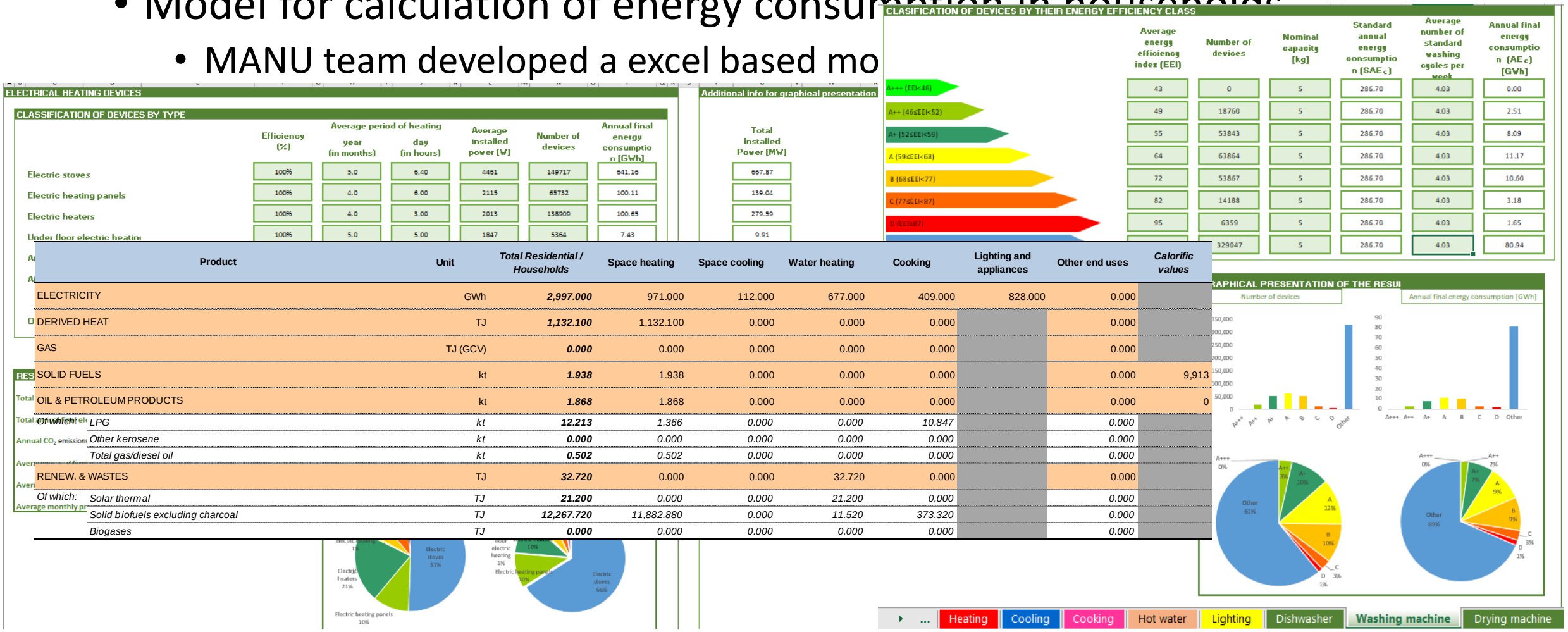
Mitigation analyses – correlation with SSO data (3/6)

- SSO - Household survey on energy consumption
  - Data collected on energy consumption and energy commodities, quantities, types of heating in households, etc., with emphasis on:
    - consumption of fuelwood and other woody materials consumed in households,
    - current use of energy efficient appliances, by providing information on their energy efficiency class, age of appliances and hours of use of the appliances
    - equipment of the buildings in terms of insulation, windows types

- The survey results improve the quality of the national energy statistics on energy consumption in households and provide data that may be used for the calculation of indicators that could serve as basis for policy making regarding the energy efficiency in households.

Mitigation analyses – correlation with SSO data (4/6)

- Model for calculation of energy consumption in households
  - MANU team developed a excel based mo



ELECTRICAL HEATING DEVICES

CLASSIFICATION OF DEVICES BY TYPE

	Efficiency (%)	Average period of heating: year (in months)	Average period of heating: day (in hours)	Average installed power [W]	Number of devices	Annual final energy consumption [GWh]	Total Installed Power [MW]
Electric stoves	100%	5.0	6.40	4461	149717	641.16	667.87
Electric heating panels	100%	4.0	6.00	2115	65732	100.11	139.04
Electric heaters	100%	4.0	3.00	2013	138909	100.65	279.59
Under floor electric heatin	100%	5.0	5.00	1847	5364	7.43	9.91

Additional info for graphical presentation

CLASIFICATION OF DEVICES BY THEIR ENERGY EFFICIENCY CLASS

	Average energy efficiency index (EEI)	Number of devices	Nominal capacity [kg]	Standard annual energy consumption (SAE$_c$)	Average number of standard washing cycles per week	Annual final energy consumption (AE$_c$) [GWh]
A+++ (EEI<46)	43	0	5	286.70	4.03	0.00
A++ (46≤EEI<52)	49	18760	5	286.70	4.03	2.51
A+ (52≤EEI<59)	55	53843	5	286.70	4.03	8.09
A (59≤EEI<68)	64	63864	5	286.70	4.03	11.17
B (68≤EEI<77)	72	53867	5	286.70	4.03	10.60
C (77≤EEI<87)	82	14188	5	286.70	4.03	3.18
D (EEI≥87)	95	6359	5	286.70	4.03	1.65
		329047	5	286.70	4.03	80.94

Product	Unit	*Total Residential / Households*	Space heating	Space cooling	Water heating	Cooking	Lighting and appliances	Other end uses	*Calorific values*
ELECTRICITY	GWh	***2,997.000***	971.000	112.000	677.000	409.000	828.000	0.000	
DERIVED HEAT	TJ	***1,132.100***	1,132.100	0.000	0.000	0.000		0.000	
GAS	TJ (GCV)	***0.000***	0.000	0.000	0.000	0.000		0.000	
SOLID FUELS	kt	***1.938***	1.938	0.000	0.000	0.000		0.000	9,913
OIL & PETROLEUM PRODUCTS	kt	***1.868***	1.868	0.000	0.000	0.000		0.000	0
Of which: LPG	*kt*	***12.213***	*1.366*	*0.000*	*0.000*	*10.847*		*0.000*	
Other kerosene	*kt*	***0.000***	*0.000*	*0.000*	*0.000*	*0.000*		*0.000*	
Total gas/diesel oil	*kt*	***0.502***	*0.502*	*0.000*	*0.000*	*0.000*		*0.000*	
RENEW. & WASTES	TJ	***32.720***	0.000	0.000	32.720	0.000		0.000	
Of which: Solar thermal	*TJ*	***21.200***	*0.000*	*0.000*	*21.200*	*0.000*		*0.000*	
Solid biofuels excluding charcoal	*TJ*	***12,267.720***	*11,882.880*	*0.000*	*11.520*	*373.320*		*0.000*	
Biogases	*TJ*	***0.000***	*0.000*	*0.000*	*0.000*	*0.000*		*0.000*	

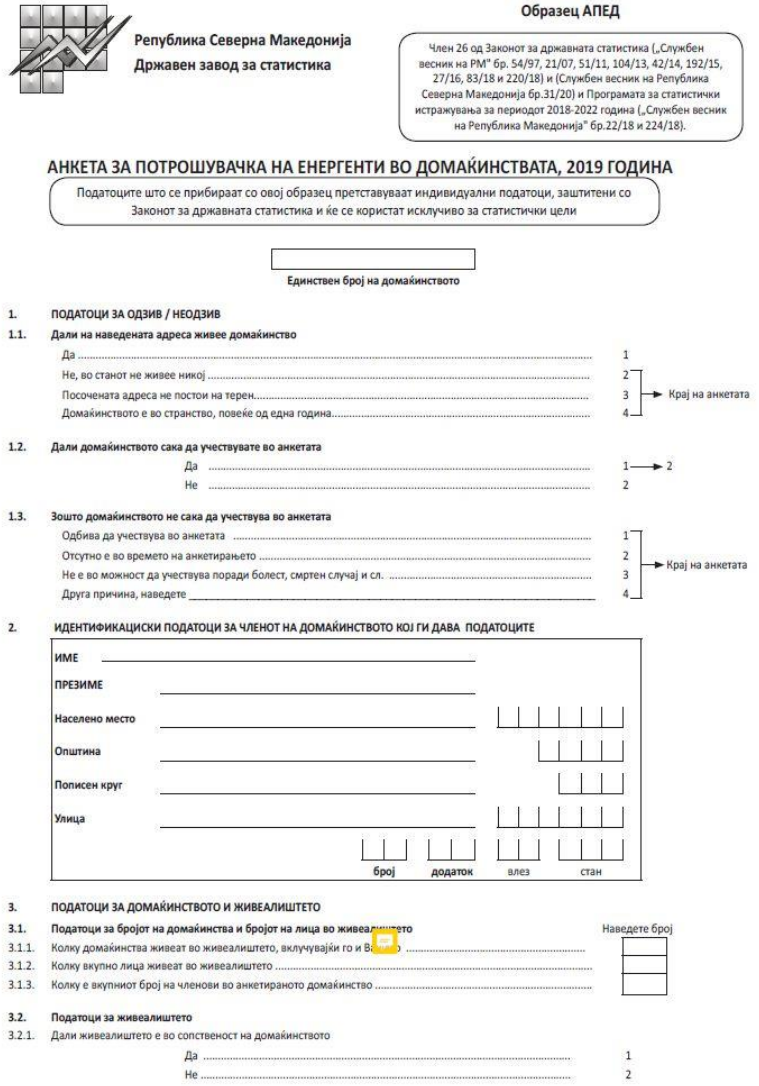
RAPHICAL PRESENTATION OF THE RESU

Number of devices | Annual final energy consumption [GWh]

... Heating | Cooling | Cooking | Hot water | Lighting | Dishwasher | Washing machine | Drying machine

Mitigation analyses – correlation with SSO data (5/6)

- SSO - Household survey on energy consumption - Questionnaire
  - MANU team provided comments on how to improve the Questionnaire to obtain information relevant for modelling of mitigation measures and tracking their progress of implementation



Република Северна Македонија
Државен завод за статистика

Образец АПЕД

Член 26 од Законот за државната статистика („Службен весник на РМ" бр. 54/97, 21/07, 51/11, 104/13, 42/14, 192/15, 27/16, 83/18 и 220/18) и (Службен весник на Република Северна Македонија бр.31/20) и Програмата за статистички истражувања за периодот 2018-2022 година („Службен весник на Република Македонија" бр.22/18 и 224/18).

АНКЕТА ЗА ПОТРОШУВАЧКА НА ЕНЕРГЕНТИ ВО ДОМАЌИНСТВАТА, 2019 ГОДИНА

Податоците што се прибираат со овој образец претставуваат индивидуални податоци, заштитени со Законот за државната статистика и ќе се користат исклучиво за статистички цели

Единствен број на домаќинството

1. ПОДАТОЦИ ЗА ОДЗИВ / НЕОДЗИВ

1.1. Дали на наведената адреса живее домаќинство

Да 1
Не, во станот не живее никој 2
Посочената адреса не постои на терен ..... 3 → Крај на анкетата
Домаќинството е во странство, повеќе од една година 4

1.2. Дали домаќинството сака да учествувате во анкетата

Да ..... 1 → 2
Не 2

1.3. Зошто домаќинството не сака да учествува во анкетата

Одбива да учествува во анкетата 1
Отсутно е во времето на анкетирањето 2
Не е во можност да учествува поради болест, смртен случај и сл. ..... 3 → Крај на анкетата
Друга причина, наведете _____ 4

2. ИДЕНТИФИКАЦИСКИ ПОДАТОЦИ ЗА ЧЛЕНОТ НА ДОМАЌИНСТВОТО КОЈ ГИ ДАВА ПОДАТОЦИТЕ

ИМЕ _____
ПРЕЗИМЕ _____
Населено место _____
Општина _____
Пописен круг _____
Улица _____
број | додаток | влез | стан

3. ПОДАТОЦИ ЗА ДОМАЌИНСТВОТО И ЖИВЕАЛИШТЕТО

3.1. Податоци за бројот на домаќинства и бројот на лица во живеалиштето — Наведете број

3.1.1. Колку домаќинства живеат во живеалиштето, вклучувајќи го и В... ..... |__|
3.1.2. Колку вкупно лица живеат во живеалиштето ..... |__|
3.1.3. Колку е вкупниот број на членови во анкетираното домаќинство ..... |__|

3.2. Податоци за живеалиштето

3.2.1. Дали живеалиштето е во сопственост на домаќинството

Да 1
Не 2

Mitigation analyses – correlation with SSO data (6/6)

- Possible indicators

Energy indicators – SSO

- Total primary energy production by energy commodities in 000 toe, by years
- Net import by energy commodities in 000 toe, by years
- Energy dependency - all products and solid fuels in percentages, by years
- Energy intensity [kgoe/ 000euros], by years Total primary renewable energy production in 000 toe, by years
- Share of electricity from renewable sources in total electricity production and in gross national electricity consumption in percentages, by years
- Share of renewable energy in gross final energy consumption in percentages, by years
- Gross inland consumption per capita [toe per capita], by years
- Final electricity consumption in households per capita, by years
- Gross national electricity consumption per capita, by years
- Final energy consumption in households per capita, by years

Same indicators are developed for the mitigation scenarios using the results from the MARKAL model

SSO indicators and related data could serve to track the progress of implementation of the mitigation scenarios

Take away notes

- Good practices in case of MK:
  - Alignment of the reporting requirements from the institutions/companies related to energy consumption
  - Alignment in the methodology used for developed of Energy balances by the relevant national institutions
  - Good bilateral cooperation with the SSO and the team responsible for the GHG Inventory compilation and CC mitigation analyses

KEY take away:

Consistent data collection and well-established communication between statistical offices and institutions (involved in the national CC processes) are essential, as a solid base for robust analyses in support of well-informed decision-making that could serve for creation of good policies at country and regional level.