ENERGY COOPERATION BETWEEN THE EU, THE LITTORAL STATES OF THE BLACK & CASPIAN SEAS AND THEIR NEIGHBOURING COUNTRIES

PROGRAMME FUNDED BY THE EU

ACTIVITY COMPLETION REPORT

ITS Technical Assistance to Azerbaijan in the field of Energy Statistics in the extension period (Feb. 2015 – Jan. 2016)

(CWP.17.AZ)

INOGATE Technical Secretariat and Integrated Programme in support of the Baku Initiative and the Eastern Partnership energy objectives

Contract No 2011/278827

A project within the INOGATE Programme

Implemented by:
Ramboll Denmark A/S (lead partner)
EIR Global sprl.
The British Standards Institution
LDK Consultants S.A.
MVV decon GmbH
ICF International
Statistics Denmark
Energy Institute Hrvoje Požar

Document title	**Activity Completion Report** **ITS Technical Assistance to Azerbaijan in the field of Energy Statistics in the extension period (Feb. 2015 – Jan. 2016)** **(CWP.17.AZ)**
Document status	**Final**

	Name	**Date**
Prepared by	Alenka Kinderman Lončarević	30/03/2016
	Damir Pešut	30/03/2016
	Nicolas Brizard	25/03/2016
	Tomasz Trus (support)	11/2015 - 01/2016
Checked by	Vlatka Robina	30/03/2016
	Raul Daussa	04/04/2016
Approved by	Peter Larsen	22/04/2016

Table of Contents

List of acronyms

AM	Armenia
AZ	Azerbaijan
BY	Belarus
CCs	INOGATE Country Coordinators
CEs	INOGATE Country Experts
CNG	Compressed Natural Gas
CWP	Country Work Plan
DSO	Distribution System Operator
EaP	Eastern Partnership
ECT	Energy Community Treaty
ECS	Energy Community Secretariat
EnC	Energy Community
EEIs	Energy Efficiency Indicators
ENP	European Neighbourhood Policy
ESAP	Energy Statistics Action Plan
ESN	Energy Statistics Network
EU	European Union
GE	Georgia
HPP	Hydro Power Plant
ITS	INOGATE Technical Secretariat
IEA	International Energy Agency
KZ	Kazakhstan
KY	Kyrgyzstan
MCM	Million Cubic Meters
MD	Moldova
MOE	Ministry of Energy
NGO	Non-government Organisation
NPP	Nuclear Power Plant
NSI	National Statistical Institute
NSS	National Statistical Service
PCs	INOGATE Partner Countries
RWP	Regional Work Plan
RES	Renewable Energy Sources
SSC	State Statistical Committee
TA	Technical Assistance
TJ	Tajikistan
TM	Turkmenistan
TPP	Thermal Power Plant
TSO	Transport System Operator
UA	Ukraine
UZ	Uzbekistan

1 PART 1 – EUROPEAN COMMISSION

1.1 Background

Assignment Title:	**ITS Technical Assistance to Azerbaijan in the field of Energy Statistics in the extension period (Feb. 2015 – Jan. 2016)**
Country and Dates:	TA delivered remotely and during a workshop on Energy Efficiency Indicators held in Minsk on 22-24 September (RWP.12)
Beneficiary Organisation:	State Statistical Committee (SSC), Ministry of Energy (MOE)
Beneficiary Organisation - key contact persons – name and e-mail address:	See list of key persons and their contact details in Annex 2.4.1
Deliverables Produced:	• Update of the methodology for data collection from households • Activity Completion Report for activity CWP.17.AZ • Final Assessment Report
Expert Team Members:	• Mr Nicolas Brizard, Key Expert for Energy Statistics • Ms Alenka Kinderman Lončarević, Senior Non Key Expert for Energy Statistics • Mr Tomasz Trus, Junior Expert for Energy Statistics

1.2 Essence of the Activity

Azerbaijan is one of the nine INOGATE PCs that have agreed upon an Energy Statistics Action Plan (ESAP) with ITS. Azerbaijan beneficiaries have worked actively to implement the ESAP during 2012-2016. The overarching objective of the Technical Assistance to Azerbaijan started in 2012 was to improve its energy statistics systems and to increase the capacity of the National Statistical Service to collect and compile energy statistics harmonised with EU and international standards.

The main objective of activity CWP.17.AZ carried out during the extension period (February 2015-February 2016) was to assist the beneficiary organisations with the implementation of a tailor-made model for the compilation of energy efficiency indicators in the household and industry sectors. For this task, ITS Experts have developed a methodology for the collection of data in the household and industry sectors and a template for the compilation of energy efficiency indicators.

1.3 Key Findings

Although Azerbaijan is self-sufficient in terms of energy resources, its government intends to further develop energy efficiency.

Activity CWP.17.AZ was implemented for the most part during the regional workshop on the calculation of energy efficiency indicators (RWP.12) to which Azerbaijan was invited to participate and partly through remote assistance provided during the preparation and follow-up phases of the workshop. It should be noted that ITS did not organise a mission to Azerbaijan in 2015-2016.

During the workshop in Minsk, Azerbaijan was provided with adequate methodologies, tools and models to develop data collection strategies for the residential and industry sectors with the view to

calculate appropriate energy efficiency indicators in these sectors. ITS and IEA experts also introduced the key concepts and objectives underlying the development of energy efficiency indicators including data requirements, data collection methodologies, calculation methodologies, modelling methodologies, etc.

Azerbaijani representatives have received ready-to-use Excel based models developed by the Energy Institute Hrvoje Požar (EIHP). These models have been explained in great detail during the workshop and can be used by SSC and MOE to develop their own system of energy efficiency indicators. These models are compatible with international best practices and in particular the IEA and ODYSSEE methodologies. They were also given IEA material: a well-established Excel template for the compilation of energy efficiency indicators and several high quality handbooks on the topic in the Russian language.

Unfortunately, SSC was not able to send representatives to the workshop in Minsk in September 2015. The workshop was only attended by representatives from the Energy Efficiency Department of the Ministry of Industry and Energy of the Republic of Azerbaijan. The Energy Efficiency Department was established in 2014 as a result of INOGATE involvement. The role of the Energy Efficiency Department is to monitor Energy Savings in the country and to support the Ministry in the area of Energy Efficiency. The Department is also in charge of conducting trainings and study tours related to energy efficiency issues. It also provides analytical research in the energy efficiency and energy sectors. The MOE representatives have passed the Excel models provided and explained during the workshop in Minsk to SSC.

In Azerbaijan, the development of Energy Efficiency Indicators is still in its infancy. Selected energy efficiency indicators were calculated and given in the Energy Balance for 2014. The successful implementation of a full-fledged system, one of the most complex tasks as far as energy statistics are concerned, will require significant additional work as well as the clarification of the role and responsibilities of various stakeholders including SSC and MOE.

In 2015, ITS experts provided technical assistance to Azerbaijan in the preparation of a survey on energy consumption in the household sector. They gave recommendations on questionnaire design, sample size and energy units that should be applied. Also, they explained that all the energy forms and technologies used in households for housing purposes must be captured by the survey. Questions on energy consumption from the use of personal cars can be added in the questionnaire to collect energy statistics on the transport sector. The results of this survey are expected to be fully available in 2016 and to be a key input in the development of a pilot for EEIs in the household sector.

It should also be noted that Azerbaijan has the ambition to develop the concept of green economy and SSC is interested in developing related indicators. The "green economy" is a concept that is promoted by a number of International Organisation including the UNEP. ITS experts shared with SSC a number of UNEP reports on the methodology of Green Economy Indicators.

1.4 Ownership and Benefits of the Activity

Technical Assistance provided by ITS	Actions undertaken by the NSI
• Assistance to Azerbaijan in the preparation of a survey on energy consumption in the household sector (questionnaire design, sample size, data control and validation) • Models for the calculation of EEI in the household sector delivered and training for their use provided to Azerbaijan beneficiaries • Prepared a list of recommendations for priority follow-up activities for the short-term and the medium-term • Azerbaijan representatives also participated in complementary activities: the Seminar on the use of energy statistics in energy planning (June 2015, Chisinau, Moldova) and the ESN meeting (in November 2015, Tbilisi, Georgia)	• SSC has prepared and adopted the methodology for surveying the household sector. The survey was to be launched in 2015. Results are expected in 2016. • SSC is considering/working on the development of methodologies for the collection of data on final energy consumption in the services, transport and industry sectors.

1.5 Challenges Faced

SSC produces comprehensive, advanced and good quality energy statistics, energy balances as well as statistics on CO2 emissions. Provided the right instruments and framework are established, Azerbaijan has the necessary potential in terms of knowledge and staff to develop good quality energy efficiency indicators.

Some fundamental components for the development of an effective system of energy efficiency indicators in Azerbaijan are still missing:

- The institutional framework and inter-agency coordination which are fit for purpose for energy statistics and energy balances are not fully in place yet for the calculation of energy efficiency indicators. As far as energy efficiency indicators are concerned, the Ministry of Energy is in the lead and the State Statistics Committee is involved but the roles and responsibilities for the collection and processing of data for the calculation of Energy Efficiency Indicators need to be more clearly defined.

- There is still a lack of disaggregated data at the level of the final energy consumption in demand sectors other than households i.e. industry, services and transport.

1.6 Recommendations

Azerbaijani representatives are invited to follow the general recommendations for the development of Energy Efficiency Indicators given during the Minsk workshop in September 2015 (see annex 2.4.2.)

ITS experts make the following specific recommendations to Azerbaijan with the aim to improve further the quality of their energy statistics and to start the implementation of a system for the calculation of energy efficiency indicators.

- SSC should start the preparation of comprehensive surveys of final energy consumption in key sectors of the economy (industry, services, transport and agriculture) in order to collect disaggregated consumption data by end-use or sub-sectors. SSC should make sure that these

surveys on final energy consumption are conducted on a regular basis (e.g. every 4 or 5 years);

- Using disaggregated consumption data collected through surveys, Azerbaijan should start the modelling and calculation of Energy Efficiency Indicators;
- A transparent and more practical institutional setup is needed in order to improve the collaboration between the Ministry of Energy and the State Statistical Committee. This institutional setup could be formalised in a Memorandum of Understanding which clearly defines the roles and responsibilities of each agency/stakeholder;
- The Ministry of Energy should set up a task force or working group on Energy Efficiency Indicators to develop and implement a system for the calculation of energy efficiency indicators and ensure that they are used to support and monitor energy efficiency policies and measures with facts and data.
- Relevant agencies and in particular MOE and SSC should appoint and train expert staff (engineers and statisticians) responsible for the data collection, modelling and compilation of Energy Efficiency Indicators;
- The working group on Energy Efficiency Indicators could include representatives from the various stakeholders involved in energy efficiency policy making in Azerbaijan:
    - Ministry of Energy (leading agency)
    - State Statistical Committee (energy data collection and statistical surveys)
    - State Agency on Alternative and Renewable Sources of Energy (additional energy data collection and possibly compilation of energy efficiency indicators)
    - State Committee on Urban Development and Architecture
    - State Agency on Standardisation, Metrology and Patents
    - Main energy companies (GNKAR, Azerenergy, Azerishyg, etc.)
    - Other Ministries (transport, agriculture, housing, industry, etc.)

1.7 Impact Matrix

1.7.1 Impact assessment by ITS experts (2012-2016)

The table below shows, for selected ESAP indicators, a summary of the progress made by Azerbaijan since 2012 in the field of energy statistics.

Azerbaijan: Key ESAP Indicators 2012-2016

Indicator	Sept. 2012	Feb. 2016	Observations
Legal framework in place	●	●	
Available methodology for EB	●	●	
Energy statistics plans in place at NSI	●	●	
# of Energy Statisticians (at NSI)	4	4	
# of trained gov. staff in last year	2	7	
Stakeholder meetings	○	●	Improve interagency cooperation for EEIs
Household energy survey	○	◔	Under implementation
EB follow international standards	●	●	
IEA/Eurostat/UNECE questionnaires	● (5)	● (5)	
Monthly Statistics	○	○	Not in ESAP
Energy Price Statistics	○	○	Not in ESAP
Energy Efficiency Indicators	○	◐	Work in progress
Official statistics used for planning	N/A	◐	No integrated planning

Source: ITS Experts

1.7.2 Impact assessment by the main beneficiary (2012-2016)

Impact assessment of the INOGATE project according to SSC and MOE

Key areas of impact	Impact level (1 to 5 scale)	Comment
Improvement of interagency cooperation	**3/5**	With the INOGATE project, the cooperation between stakeholders in the area of Energy Statistics has improved. SSC has built formal and informal contacts that benefited the process of knowledge sharing and exchange of opinions. This was particularly the case in the work conducted on the household survey. Overall, the level of cooperation has increased between SSC and MOE
Harmonisation of the Energy Data Collection System with international standards (Eurostat, IEA, UN…)	**4**	The harmonization process was already in progress when INOGATE started. The same could be said about the convergence with international standards. However, The INOGATE project assisted SSC in reviewing the process of Energy Balance compilation, identifying SCC's weak points and in sharing approaches for improvement of the reporting process.
Improvement of the quality of energy balances and the 5 joint questionnaires	**4**	Same as above.
Development of energy efficiency indicators	**3/5**	The impact is moderate not because of the INOGATE project but because it is a complex issue that will require some weaknesses to be addressed (e.g. lack of disaggregated data on final energy consumption) before progress becomes significant. This process will take time. SCC deemed the impact very high. So far, SSC has developed a limited number of high level indicators based on the in Energy balance. Thanks to the household energy consumption survey, SSC is now working on EEIs in the household sector at a higher level of disaggregation.
Improvement of public dissemination of energy statistics, energy balances, etc.	**3**	Impact is rated moderate because the publication of the Energy Balance was already in place before the project started. However, Energy Statistics published by SSC are used more frequently by different international organisations working in Azerbaijan, which indicates an increasing in the credibility of our statistics.
Use of statistics in energy policy and decision-making	**N/A**	.
Overall impact	**4**	Thanks to INOGATE, SSC has initiated work on final energy consumption in households. This was very important for the completeness of statistical data on Energy Efficiency. Another impact of INOGATE was the increase in the quality of energy statistics, data and surveys. The project led to an increase in the number of statistical energy indicators being produced by SSC. Azerbaijan also benefited from the knowledge sharing with other partner countries' statistical agencies.

Source: ITS, Baseline Monitoring Interviews with INOGATE beneficiaries, January 2016

2 PART 2 – BENEFICIARIES

2.1 Executive Summary (English)

SSC produces comprehensive, advanced and good quality energy statistics, energy balances as well as statistics on CO2 emissions. Provided the right instruments and framework are established, Azerbaijan has the necessary potential in terms of knowledge and staff to develop good quality energy efficiency indicators.

Key findings

Although Azerbaijan is self-sufficient in terms of energy resources, its government intends to further develop energy efficiency. Activity CWP.17.AZ was implemented for the most part during the regional workshop on the calculation of energy efficiency indicators (RWP.12) to which Azerbaijan was invited to participate and partly through remote assistance provided during the preparation and follow-up phases of the workshop. It should be noted that ITS did not organise a mission to Azerbaijan in 2015-2016.

During the workshop in Minsk, Azerbaijan was provided with adequate methodologies, tools and models to develop data collection strategies for the residential and industry sectors with the view to calculate appropriate energy efficiency indicators in these sectors. ITS and IEA experts also introduced the key concepts and objectives underlying the development of energy efficiency indicators including data requirements, data collection methodologies, calculation methodologies, modelling methodologies, etc.

Azerbaijani representatives have received ready-to-use Excel based models developed by the Energy Institute Hrvoje Požar (EIHP). These models have been explained in great detail during the workshop and can be used by SSC and MOE to develop their own system of energy efficiency indicators. These models are compatible with international best practices and in particular the IEA and ODYSSEE methodologies. They were also given IEA material: a well-established Excel template for the compilation of energy efficiency indicators and several high quality handbooks on the topic in the Russian language.

Unfortunately, SSC was not able to send representatives to the workshop in Minsk in September 2015. The workshop was only attended by representatives from the Energy Efficiency Department of the Ministry of Industry and Energy of the Republic of Azerbaijan. The Energy Efficiency Department was established in 2014 as a result of INOGATE involvement. The role of the Energy Efficiency Department is to monitor Energy Savings in the country and to support the Ministry in the area of Energy Efficiency. The Department is also in charge of conducting trainings and study tours related to energy efficiency issues. It also provides analytical research in the energy efficiency and energy sectors. The MOE representatives have passed the Excel models provided and explained during the workshop in Minsk to SSC.

In Azerbaijan, the development of Energy Efficiency Indicators is still in its infancy. Selected energy efficiency indicators were calculated and given in the Energy Balance for 2014. The successful implementation of a full-fledged system, one of the most complex tasks as far as energy statistics are concerned, will require significant additional work as well as the clarification of the role and responsibilities of various stakeholders including SSC and MOE.

In 2015, ITS experts provided technical assistance to Azerbaijan in the preparation of a survey on energy consumption in the household sector. They gave recommendations on questionnaire design, sample size and energy units that should be applied. Also, they explained that all the energy forms and technologies used in households for housing purposes must be captured by the survey. Ques-

tions on energy consumption from the use of personal cars can be added in the questionnaire to collect energy statistics on the transport sector. The results of this survey are expected to be fully available in 2016 and to be a key input in the development of a pilot for EEIs in the household sector.

It should also be noted that Azerbaijan has the ambition to develop the concept of green economy and SSC is interested in developing related indicators. The "green economy" is a concept that is promoted by a number of International Organisation including the UNEP. ITS experts shared with SSC a number of UNEP reports on the methodology of Green Economy Indicators.

Main challenges

Some fundamental components for the development of an effective system of energy efficiency indicators in Azerbaijan are still missing:

- The institutional framework and inter-agency coordination which are fit for purpose for energy statistics and energy balances are not fully in place yet for the calculation of energy efficiency indicators. As far as energy efficiency indicators are concerned, the Ministry of Energy is in the lead and the State Statistics Committee is involved but the roles and responsibilities for the collection and processing of data for the calculation of Energy Efficiency Indicators need to be more clearly defined.
- There is still a lack of disaggregated data at the level of the final energy consumption in demand sectors other than households i.e. industry, services and transport.

Conclusions and recommendations

Azerbaijan representatives are invited to follow the general recommendations for the development of Energy Efficiency Indicators given during the Minsk workshop in September 2015 (see annex 2.4.2.)

ITS experts make the following specific recommendations to Azerbaijan with the aim to improve further the quality of their energy statistics and to start the implementation of a system for the calculation of energy efficiency indicators.

- SSC should start the preparation of comprehensive surveys of final energy consumption in key sectors of the economy (industry, services and transport) in order to collect disaggregated consumption data by end-use or sub-sectors. SSC should make sure that these surveys on final energy consumption are conducted on a regular basis (e.g. every 3 to 5 years);
- Using disaggregated consumption data collected through surveys, Azerbaijan should start the modelling and calculation of Energy Efficiency Indicators;
- A transparent and more practical institutional setup is needed in order to improve the collaboration between the Ministry of Energy and the State Statistical Committee. This institutional setup could be formalised in a Memorandum of Understanding which clearly defines the roles and responsibilities of each agency/stakeholder;
- The Ministry of Energy should set up a task force or working group on Energy Efficiency Indicators to develop and implement a system for the calculation of energy efficiency indicators and ensure that they are used to support and monitor energy efficiency policies and measures with facts and data.
- Relevant agencies and in particular MOE and SSC should appoint and train expert staff (engineers and statisticians) responsible for the data collection, modelling and compilation of Energy Efficiency Indicators;

- The working group on Energy Efficiency Indicators could include representatives from the various stakeholders involved in energy efficiency policy making in Azerbaijan:
    - Ministry of Energy (leading agency)
    - State Statistical Committee (energy data collection and statistical surveys)
    - State Agency on Alternative and Renewable Sources of Energy (additional energy data collection and possibly compilation of energy efficiency indicators)
    - State Committee on Urban Development and Architecture
    - State Agency on Standardisation, Metrology and Patents
    - Main energy companies (GNKAR, Azerenergy, Azerishyg, etc.)
    - Other Ministries (transport, agriculture, housing, industry, etc.)

2.2 Краткий обзор (на русском языке)

Государственный комитет по статистике Азербайджанской Республики (ГКС) производит всеобъемлющую, передовую, высококачественную энергетическую статистику, энергетические балансы, а также статистику выбросов CO_2. При условии наличия соответствующих инструментов и установленной структуры, Азербайджан обладает необходимым потенциалом в плане знаний и персонала для разработки качественных показателей энергоэффективности.

Основные результаты

Хотя Азербайджан является самодостаточной страной в плане энергетических ресурсов, правительство страны намерено продолжать развивать направление энергоэффективности. Деятельность CWP.17.AZ была реализована по большей части во время регионального семинара, посвященного вопросам расчета показателей энергоэффективности (RWP.12), в котором Азербайджану предлагалось принять участие, а также отчасти посредством дистанционной поддержки, предоставленной в ходе подготовки семинара и на последующих этапах. Следует отметить, что в 2015-2016 годах миссии технической помощи ITS в Азербайджане не осуществлялись.

В ходе семинара в Минске Азербайджану были предоставлены соответствующие методики, инструменты и модели для разработки стратегий сбора данных в бытовом и промышленном секторах для расчета соответствующих показателей энергоэффективности в этих секторах. Эксперты МЭА и ITS также представили основные концепции и цели, лежащие в основе разработки показателей энергоэффективности, включая требования в отношении данных, методик сбора данных, расчета, моделирования и т.д.

Представители Азербайджана получили готовые к использованию модели на основе таблиц Excel, разработанные Институтом энергетики им. Хрвое Пожара (EIHP). Эти модели подробно объяснялись в ходе семинара, и могут использоваться ГКС и Министерством энергетики для разработки их собственной системы показателей энергоэффективности. Эти модели совместимы с образцами передового международного опыта и, в частности, с методиками МЭА и ODYSSEE. Азербайджану были также предоставлены материалы МЭА: надёжно отработанный шаблон Excel для составления показателей энергоэффективности и несколько высококачественных справочников по данной теме на русском языке.

К сожалению, ГКС не смог направить своих представителей в Минск на семинар в сентябре 2015 года. В этом семинаре приняли участие только представители Департамента по энергоэффективности Министерства промышленности и энергетики Азербайджанской Республики. Департамент по энергоэффективности был создан в 2014 году при помощи INOGATE. Задача Департамента по энергоэффективности заключается в мониторинге энергосбережения в стране и в оказании поддержки Министерству в области энергоэффективности. Департамент также отвечает за проведение обучения и учебно-ознакомительных поездок по вопросам энергоэффективности. Он также занимается аналитическими исследованиями в области энергоэффективности и в энергетическом секторе. Представителям Министерства энергетики были переданы модели на основе таблиц Excel, которые были представлены и описаны в ходе семинара в Минске.

В Азербайджане разработка показателей энергоэффективности (ПЭЭ) все еще находится на этапе становления. Отдельные показатели энергоэффективности были рассчитаны и приводились в энергетическом балансе за 2014 год. Успешное внедрение полноценной системы явля-

ется одной из самых сложных задач в энергетической статистике и потребует значительной дополнительной работы, а также уточнения ролей и обязанностей различных заинтересованных сторон, включая ГКС и Министерство энергетики.

В 2015 году эксперты ITS оказывали техническую поддержку Азербайджану в подготовке обследования энергопотребления в бытовом секторе. Они предоставили рекомендации относительно структуры вопросника, размера выборки и энергетических единиц измерения, которые должны использоваться. Также эксперты объяснили, что все формы энергии и технологии, используемые в домохозяйствах для бытовых целей, необходимо учитывать в обследовании. Вопросы энергопотребления используемых личных автомобилей можно добавить в вопросники для сбора энергетических данных в транспортном секторе. Ожидается, что результаты этого обследования будут полностью доступны в 2016 году и станут ключевым вкладом в разработку экспериментального проекта по ПЭЭ в бытовом секторе.

Следует также отметить, что Азербайджан стремится к развитию концепции «зеленой экономики», а ГКС заинтересован в разработке соответствующих показателей. «Зеленая экономика» является концепцией, которую продвигает ряд международных организаций, в том числе Программа ООН по окружающей среде (ЮНЕП). Эксперты ITS предоставили коллегам из ГКС ряд отчётов ЮНЕП по методике разработки показателей «зеленой экономики».

Основные проблемы

В Азербайджане по-прежнему отсутствуют некоторые основные компоненты для разработки эффективной системы показателей энергоэффективности:

- Институциональная структура и межведомственная координация, соответствующие целям энергетической статистики и энергетических балансов, пока еще не в полной мере созданы для расчета показателей энергоэффективности. В отношении показателей энергоэффективности ведущую роль играет Министерство энергетики при участии Государственного комитета по статистике, но роли и обязанности в отношении сбора и обработки данных для расчета показателей энергоэффективности должны быть определены более четко.
- По-прежнему отсутствуют детализированные данные на уровне конечного энергопотребления по секторам потребления, за исключением домашних хозяйств, т.е. в промышленности, в секторе услуг и транспорта.

Выводы и рекомендации

Представителям Азербайджана предлагается соблюдать общие рекомендации по разработке показателей, предоставленные в ходе семинара в Минске в сентябре 2015 года (см. Приложение 2.4.2.).

Эксперты ITS дают следующие конкретные рекомендации Азербайджану с целью дальнейшего повышения качества энергетической статистики страны и внедрения системы расчета показателей энергоэффективности.

- ГКС должен начать подготовку комплексных обследований конечного энергопотребления в ключевых секторах экономики (промышленности, услуг и транспорта) с целью сбора детализированных данных о потреблении по видам конечного использования энергии или по подсекторам. ГКС должен удостовериться, что эти обследования ко-

нечного энергопотребления проводятся на регулярной основе (например, каждые 3 или 5 лет);

- Используя детализированные данные о потреблении, собранные в ходе обследований, Азербайджан должен начать моделирование и расчет показателей энергоэффективности;
- Необходима прозрачная и более практичная институциональная структура для того, чтобы улучшить сотрудничество между Министерством энергетики и Государственным комитетом по статистике. Такая институциональная структура может быть официально закреплена в Меморандуме о взаимопонимании, в котором чётко будут определены роли и обязанности каждого учреждения / заинтересованной стороны;
- Министерству энергетики следует создать целевую или рабочую группу по показателям энергоэффективности для разработки и внедрения системы расчета показателей энергоэффективности, и обеспечить их использование для поддержки и мониторинга политики и мер по энергоэффективности за счёт фактов и данных;
- Соответствующие учреждения и, в частности, Министерство энергетики и ГКС, должны назначать и проводить обучение специалистов (инженеров и специалистов по моделированию), отвечающих за сбор данных, моделирование и составление показателей энергоэффективности;
- Рабочая группа по показателям эффективности использования энергии может включать представителей различных заинтересованных сторон, участвующих в процессе выработки политики энергоэффективности в Азербайджане:

    - Министерство энергетики (ведущее учреждение);
    - Государственный комитет по статистике (сбор энергетических данных и статистические обследования);
    - Государственное агентство по альтернативным и возобновляемым источникам энергии (сбор дополнительных энергетических данных и, возможно, составление показателей энергоэффективности);
    - Государственный комитет по градостроительству и архитектуре;
    - Государственное агентство по стандартизации, метрологии и патентам;
    - Основные энергетические компании (GNKAR, Азерэнержи, Azerishiq и т.д.);
    - Другие министерства (транспорта, сельского хозяйства, жилищного хозяйства, промышленности и т.д.)

2.3 Main Report

This section of the report provides some guidance on the development of energy efficiency indicators including data collection methodologies and procedures, modelling techniques and the calculation of indicators.

2.3.1 Calculation of Energy Efficiency Indicators for the residential sector

Overview of the EIHP model used for the calculation of EEI in the household sector

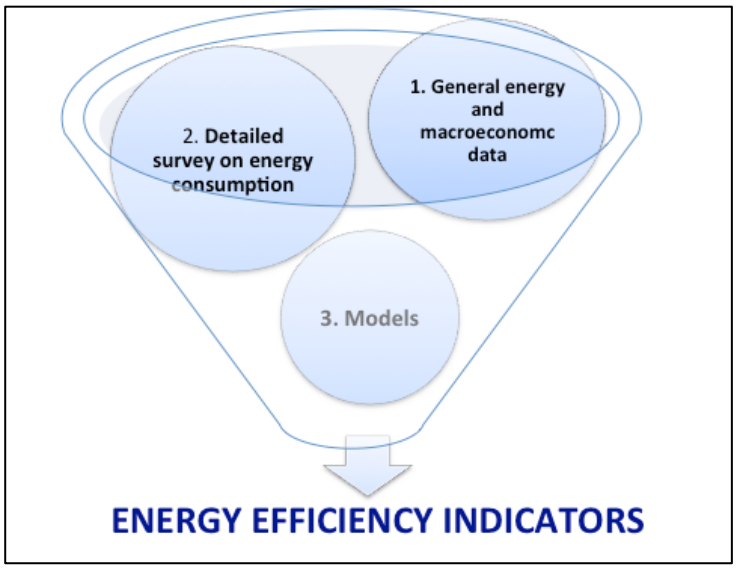
Azerbaijan beneficiaries have received a MS Excel model for the calculation of energy efficiency indicators in the residential sector that was developed by the EIHP (model 1). Azerbaijan beneficiaries are encouraged to make use of this model when they start using the results of their national household energy consumption survey and start developing their energy efficiency indicators system.

The main purpose and aim of the EIHP Model is to assist users in the compilation of data collected through surveys on energy consumption and to calculate the final energy consumption by end-uses in households. In the household sector, end-uses are as follows:

(i) Heating,
(ii) Hot water,
(iii) Cooking,
(iv) Cooling,
(v) Electrical Appliances and Lighting

Model 1 is complementary with the EIHP model proposed for the compilation of Energy Efficiency Indicators (Model 2). It can also provide direct inputs to the IEA template, the EU Odyssee-Mure database or the EC Model for the M&V of Energy Efficiency Indicators. It is recommended that the compilation of EEIs in Azerbaijan should follow the process described in the chart below. This recommendation is based on the experience of drawn from ITS' technical assistance missions conducted in 2013 and 2014 in a number of INOGATE PCs.

Proposed process for the compilation of EEIs in INOGATE PCs



Source: ITS Experts

Model 1 for the calculation of Energy Efficiency Indicators in the household sector is based on the results from a survey. The structure and contents of the model are shown in the table below.

Contents of the EIHP model for the calculation of the Final Energy Consumption in households

I- GENERAL ENERGY STATISTICS DATA

1. **Energy Balance**
   - Table 1. Households - Final Energy Consumption in natural units
   - Table 2. Households - Final Energy Consumption in energy units (TJ)
   - Table 3. Calorific values of the fuels
2. **Data on Demography and Households**
   - Table 1. Population size, thousand persons
   - Table 2. Number of households, thousand
   - Table 3. Average size of households
   - Table 4. Number of **living** units - dwellings
   - Table 5. Number of living units - dwellings which are permanently occupied by households

II - RESULTS FROM SURVEY

3. **Households by types of dwellings and technologies and appliances in use**
   - Table 1a. Number of households by type of living units, technology for heating and by energy products used as main source for heating
   - Table 2. Number of households by type of living units, technology for heating and by energy products used for hot water production
   - Table 3. Distribution of the households according to the type of living units, technology for heating and by energy products used for cooking
   - Table 4. Distribution of the households according to the type of living units, technology for heating and by energy products used for cooking in ovens
   - Table 5. Distribution of the households according to the use of electricity for cooling
4. **Population by type of dwellings**
   - Table 1. Total population
   - Table 2. Persons per households
5. **Surface area of dwellings**
   - Table 1. Surface area of dwellings, m2
   - Table 2. Heated area in dwellings, m2
   - Table 3. Cooled areas in dwellings, m2

III - MODELS

7. **Useful energy consumption norms**
   - Table 1. Useful energy norms for heating - primary & secondary energy sources: calculated from survey and estimated based on expert's experience
   - Table 2. Useful energy norms for hot water production
   - Table 3. Useful energy norms for cooking - cooker
   - Table 3a. Useful energy norms for cooking - oven

Table 4. Useful energy norms for cooling

Table 5. Useful energy norms for non thermal consumption (appliances)

8. **Energy efficiencies of appliances in households**

Table 1a. Energy efficiencies of technologies for heating

Table 2. Energy efficiency of technologies for hot water production

Table 3. Energy efficiency of technologies for cooking

Table 3a. Energy efficiency of ovens

Table 4. Efficiency of the air conditioners

9. **Final energy consumption norms**

Table 1. Final energy norms for heating - primary & secondary energy sources: calculated from survey and estimated based on expert's experience

Table 2. Final energy norms for hot water production

Table 3. Final energy norms for cooking - cooker

Table 3a. Final energy norms for cooking - oven

Table 4. Final energy norms for cooling

Table 5. Final energy norms for non thermal consumption (appliances)

IV - RESULTS

10. **Final end use energy consumption**

Table 1. Final end-use consumption for heating

Table 2. Final end-use consumption for hot water

Table 3. Final end-use consumption for cooking - cooker

Table 3a. Final end-use consumption for cooking - oven

Table 4. Final end-use consumption for cooling

Table 5. Final end-use consumption for appliances and lighting

Table 6. Total final energy consumption by types of households

Table 7. Total final energy consumption by end uses

Table 8. Calibration of results to energy balance

Table 9. Shares of final end-use energy consumptions in total consumption

11. **Useful end-use energy consumption**

Table 1. Useful end-use energy consumption for heating

Table 2. Useful end-use energy consumption for hot water

Table 3. Useful end use energy consumption for cooking - cooker

Table 3a. Useful end use energy consumption for cooking - oven

Table 4. Useful end-use energy consumption for cooling

Table 5. Useful end use energy consumption for appliances and lighting

Table 6. Total useful energy consumption

Regarding Section I of the model (General Energy Statistics Data), the main prerequisite for the calculation of the final energy consumption (FEC) by end-use is to collect correct and consistent data on the total final energy consumption in the household sector. At the end of the modelling phase, the results from the survey will be compared and calibrated to the total FEC by sector (e.g. residential) as shown in the energy balance.

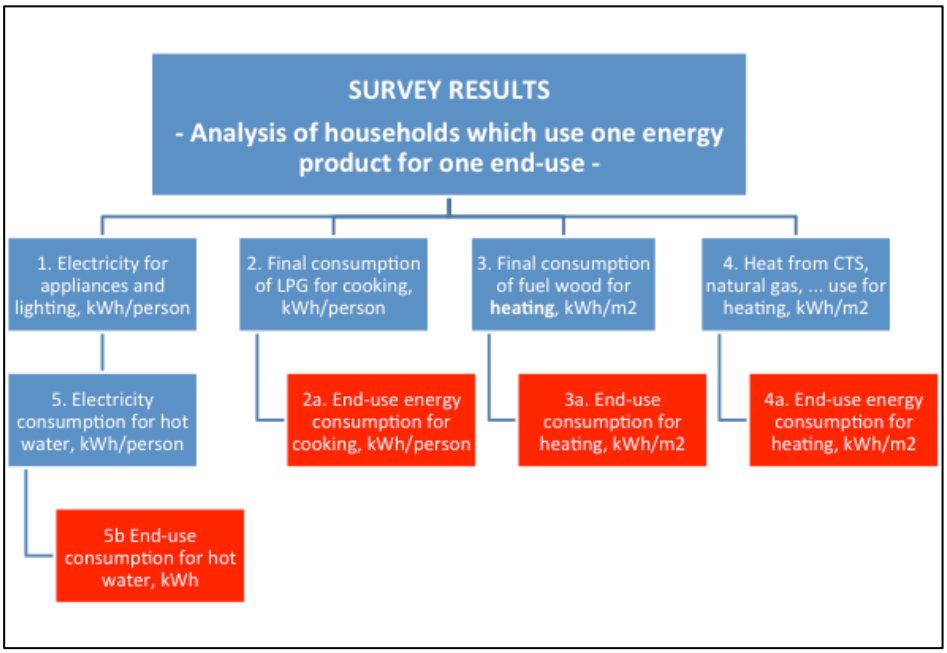
Concerning statistics on population and households, it is important to consider the following definitions:

- Population – total number of persons living permanently in a country
- Household – consists of one or more persons living in the same dwelling and sharing food, and living accommodation. A household may consist of members of a single family or some other groupings of people.
- Dwelling – self-contained "housing units" permanently used by one or several households (Dwellings should be distinguish from "living units" used for other purposes).

Section II of the model deals with the statistical analysis needed to calculate the main results from the energy survey. The analysis is based on the compilation of results for households that use one form of energy only (e.g. natural gas) for one specific end-use (e.g. cooking).

The model also explains how to calculate the values for the cases when one household uses more than one energy products for one end-use.

Modelling process for the calculation of useful and final norms for end-use consumption



Source: ITS Experts

The modelling of useful energy and final norms for end-use consumption comes next. In this context, modelling means finding the values which simulate the theoretical/expected values based on statistical methodologies by using iterative approximations and expert estimates and conclusions. The following USEFUL and FINAL consumption end –use norms should be calculated and assumed for energy consumptions in households:

- Heating – kWh/m2 of heated surface area
- Hot Water – kWh/person
- Cooking – kWh/person
- Cooling – kWh/m2 of cooled surface area
- Non-thermal - kWh/person

Key definitions:

- Final Energy Consumption (FEC): measures only the final amount of energy used by end-use equipment.
- Useful Energy Consumption (UEC): measures the final amount of heat available for use excluding losses in end-use equipment. The UEC depends on the energy efficiency of a given appliance (η). The UEC is needed for the calculation of equivalents of end-use consumption for different energy forms used for same purpose.
- UEC = η * FEC

Calculation of Energy Efficiency Indicators for the industry sector

Model 2 ("Model for Monitoring and Valorisation of Energy Efficiency Indicators: Top-down Indicators of Energy Savings») can be used by Azerbaijan to calculate key energy efficiency indicators in all consumption sectors and particularly in the industry sector.

The EIHP developed this Model based on the European Commission's *Recommendations on measurement and verification methods in the framework of Directive 2006/32/EC on energy end-use energy efficiency and energy savings*.

The model includes the calculation of 24 of Energy Efficiency Indicators for households, services, transport and industry and that of Energy Efficiency Indicators in each consumption group are split in two categories:

- preferred indicators (P);
- main indicators (M).

The model also includes additional formulas for the calculation of energy savings for the reference period.

2.4 Annexes

2.4.1 Key contact persons

Mr. Yusifov Yusif Khasay
Deputy Chairman, Board Member
The State Statistical Committee of the Republic of Azerbaijan
AZ1136 Inchaatchilar Avenue
Baku, Azerbaijan
Phone: (+994 12) 537-10-89
Email: yusify@azstat.org

Mr. Hajibala Dadashov (ESN Member)
Head of Industry and Construction Statistics Department
The State Statistical Committee of the Republic of Azerbaijan
AZ1136 Inchaatchilar Avenue
Baku, Azerbaijan
Phone: (+994 12) 539-87-17
Email: hajibalad@azstat.org

Mr. Abulfaz Karimov
Deputy Head of the Industry and Construction Statistics Department
The State Statistical Committee of the Republic of Azerbaijan
AZ1136 Inchaatchilar Avenue
Baku, Azerbaijan
Phone: (+994 12) 538-87-83
Email: abulfazk@azstat.org
Email: abulfaz17@yandex.ru

Mr. Iftikhar Huseynov (Country Coordinator)
Head of Administration
Ministry of Energy
40 Uzeyir Hajibayov Str.
House of Government
5th Entrance, 11th Floor
Baku AZ1000
Azerbaijan Republic
Phone: (+994 12) 498-98-04
Email: iftixar.huseynov@minenergy.gov.az

Ms. Nurangiz Faradzhullaeva
Leading Consultant
Ministry of Energy
40 Uzeyir Hajibayov Str.
House of Government
5th Entrance, 11th Floor
Baku AZ1000
Azerbaijan Republic
Phone: (+994 12) 598-16-53
Email: fnurengiz@mail.ru

2.4.2 Recommendations for the development of Energy Efficiency Indicators given during the Minsk workshop (RWP.12)

Recommendation 1: Develop and use energy efficiency indicators to design and implement evidence-based energy efficiency policies and measures

INOGATE PCs should use energy and energy efficiency indicators as important tool for future policy developments. Energy Efficiency Indicators have a very high practical value for policy design and monitoring of energy efficiency policies and measures. They should be given a high priority and an appropriate legal and institutional framework.

Recommendation 2: Set priorities and adopt a gradual approach to developing Energy Efficiency Indicators

INOGATE PCs should adopt a gradual approach to the calculation of Energy Efficiency Indicators. PCs should prioritise their efforts and address first the highest energy consumption sectors. In principle, PCs should first start with the collect of the data and the calculation of energy efficiency indicators in the residential and industry sectors. The transport and services sectors are also very important but data collection is significantly more challenging and demanding. Also, it makes sense to start with aggregated indicators and expand gradually more disaggregated indicators at sector level as shown in the pyramid of indicators. This expansion should be driven by data opportunities and the public/political interest for a specific sector or issue.

Recommendation 3: Establish an appropriate legal and institutional framework to develop Energy Efficiency Indicators

The development of a comprehensive and long lasting system of Energy Efficiency Indicators requires dedication and sustained efforts from a large number of stakeholders (NSIs, Ministries, Energy Efficiency Agencies, Energy regulators, energy companies, Universities and research centres, NGOs, etc.). Energy data tend to be scattered across many sectors and organisations. Good data are often available at National Statistics Institutes, line ministries and agencies but accessing them is a difficult and a slow process. INOGATE PCs should define clearly the responsibilities of various stakeholders in the collection of data and the compilation and dissemination of indicators. Because data collection involves many parties, there should be a practical and efficient platform for inter-agency cooperation and coordination (e.g. Energy Efficiency Working Group or Energy Statistics Working Group). Secondary legislation or other institutional arrangements (e.g. MoUs) can provide a strong legal basis and help establish the legitimacy of the agencies in charge of data collection, compilation or dissemination. It should be noted that it is not possible for NSIs to collect all the energy and activity data needed to create all Energy Efficiency Indicators.

Recommendation 4: Develop and launch detailed energy consumption surveys in the household, services and transport sectors

Several INOGATE PCs have launched energy consumption surveys in the residential sector. Where this is not yet the case, INOGATE PCs should launch detailed energy consumption surveys in order to collect data on final energy consumption by end-use (space heating, space cooling, water heating, lighting, cooking, appliances) in households. Similar surveys should also cover the services and transport sectors. PCs will then be in the position to develop disaggregated energy efficiency indicators. This data will also contribute to improve greatly the accuracy of final energy consumption estimates in energy balance of the country.

Recommendation 5: Keep abreast of methodological developments and best practices

The international methodological framework for energy efficiency indicators is not fully mature yet. International standards, although quite advanced, are still under development. INOGATE PCs should take part actively in the work on “Best practices” in the field of energy efficient indicators.

Recommendation 6: Allocate sufficient financial and human resources to the development and dissemination of Energy Efficiency Indicators

Energy Efficiency Indicators are a crosscutting activity that requires both statistical expertise and a good knowledge of energy efficiency programmes and technologies. INOGATE PCs should train NSI's and other Agencies' staff appropriately in data collection methods (e.g. survey design, sampling…) and analytics (compilation, analysis and interpretation of Energy Efficiency Indicators).

Recommendation 7: Dissemination of Energy Efficiency Indicators

Dissemination is key to gain traction and support. At a national level it is important to work and communicate with the users of data and energy efficiency indicators. INOGATE PCs should ensure that users are encouraged to provide their feedback. Energy Efficiency Indicators should be published regularly and made accessible to the broader public.