



Introduction – Heat sector policy, general organisation, regulation and monitoring. The role of the heat sector in sustainable development (4.1.)

Dr. Ilka Lewington

Modern heating sector - international trends and challenges for the Republic of Kazakhstan. Webinar Course in connection with the preparation of the “Law on Heating”

- Introduction to the project and to this training course
- Lecture «Basics of heat sector policy and organisation»
 - Main results of technical and legal due diligence of Kazakhstan's heat sector
 - Legislation for the heat sector
 - Heat sector specifics and the setting of state policy
 - Authority and functions of state bodies
 - Heat sector and sustainable development
- Exchange of opinions and discussion
- Conclusions from this session and overview of the Draft „Law on Heating“

ADB supports the Government of Kazakhstan – specifically the Ministry of Energy – through the project

ADB TA 6564 KAZ Supporting Renewable Technology inclusive Heat Supply Legislation

- Assessment of the existing situation,
- Development of a suitable heat supply sector model,
- draft the new legislative package on heat supply based on international practice replicable in Kazakhstan, with focus on renewable energy integration and participation of the private sector (PPP),

to put the heat supply sector of Kazakhstan on a sure road to financial recovery, economic viability, technical efficiency and environmental sustainability. This shall be achieved by using a higher share of renewable energy sources in the heat sector which is currently dominated by fossil fuels, and increased role of energy efficiency and with the active implementation of Private-Public-Partnerships (PPP).

This training course is delivered within the project component „capacity building and stakeholder engagement“.



As part of DORNIER is implementing the ADB project as a Consultant and has organised the course under the umbrella of DORNIER Academy together with the Deutsch-Kasachische Universität (DKU)








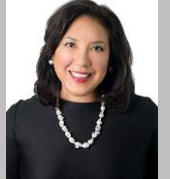


Deutsch-Kasachische Universität

Centre of Natural Resources and Sustainable
Development

Introduction (3)

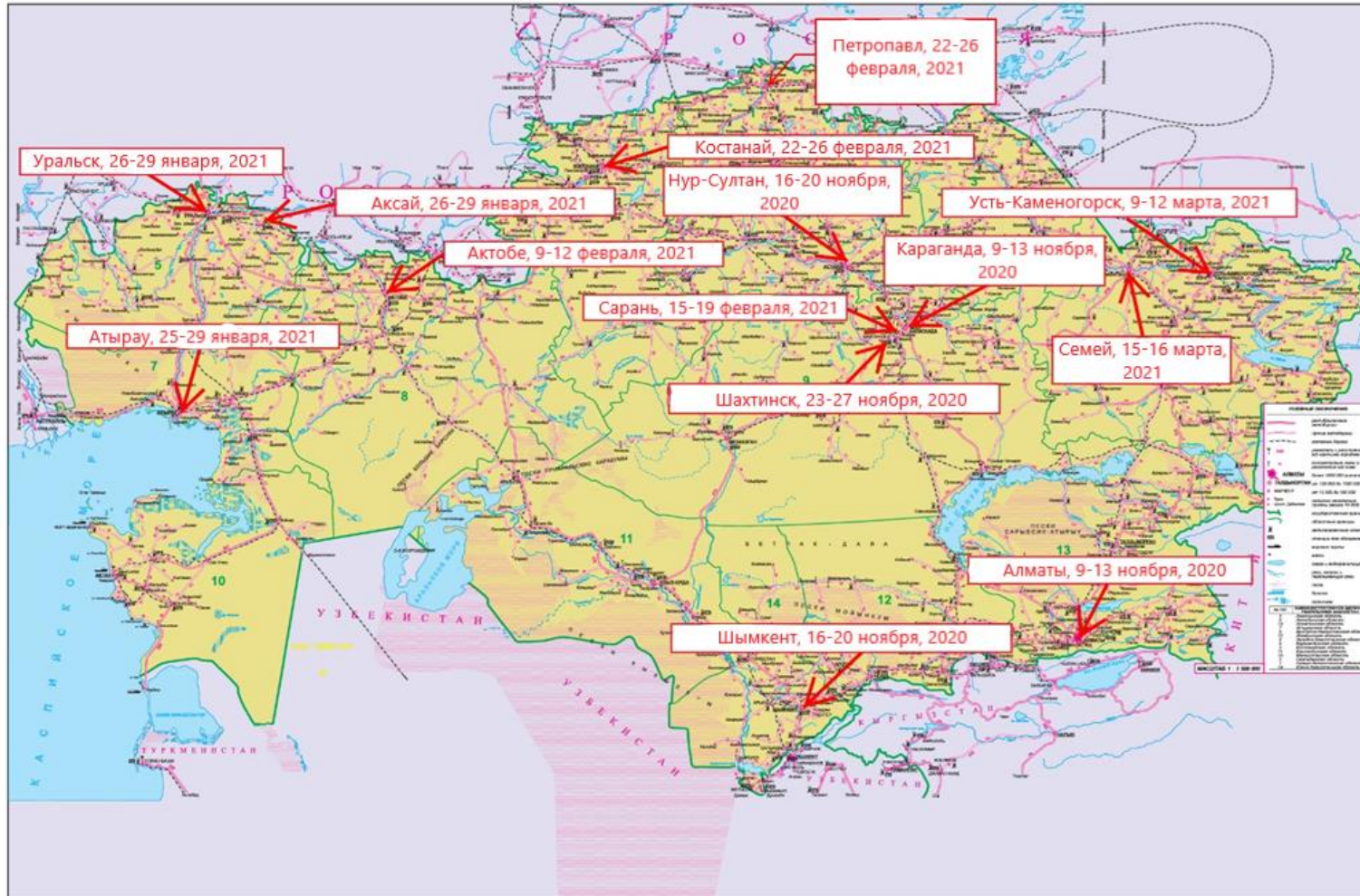
Module 1	Heat sector technologies
Module 2	Heat sector planning
Module 3	Heat sector economics and tariffs
Module 4	Heat sector policy, governance and other institutional aspects

Day/ Date	Topic and link	Main Speakers
Tuesday 17/05	Introduction and 4.1. Heat sector policy organisation, regulation and the sustainability agenda	 Ilka Lewington
Wednesday 18/05	1.1 Heat production (traditional and alternative technologies for district heating; role and advantages of renewable heating technologies)	 Sergei Herzog
Friday 20/05	1.2. Heat distribution systems (Temperature regimes, system design, loss reduction etc.)	 Sergei Polishuk
Tuesday 24/05	1.3. Organisation and administration of heat supply (systems within the buildings, metering, billing)	
Wednesday 25/05	2.1. Heat system planning – Introduction to methodology	 Lennart Larsson
Friday 27/05	2.2. Production system modelling, including the integration of RES and energy efficiency measures	

Day/ Date	Topic and link	Main Speakers
Tuesday 31/05	2.3. Planning the integration of RES and energy efficiency measures in local centralized systems	 Sergei Polishuk
Wednesday 01/06	2.4. Planning the integration of RES and energy efficiency in individual heating systems	 Ilka Lewington
Friday 03/06	2.5. Municipal heat sector planning	
Tuesday 07/06	3.1. Principles, authority and methods of heat tariff regulation	 Oleksandr Rogozin
Wednesday 08/06	3.2. Heat Tariff Methodology for Kazakhstan	
Friday 10/06	3.3. Support for vulnerable customers – methodology and recommendations	
Tuesday 14/06	4.2. Private Public Partnership (PPP) in the Heating Sector	 Maria Tan-Pedersen
Wednesday 15/06	4.3. The role of women in sustainable development of the Heating Sector	 Evgenia Kozyreva  Dinara Tambaeva

Main results of analysis (1)

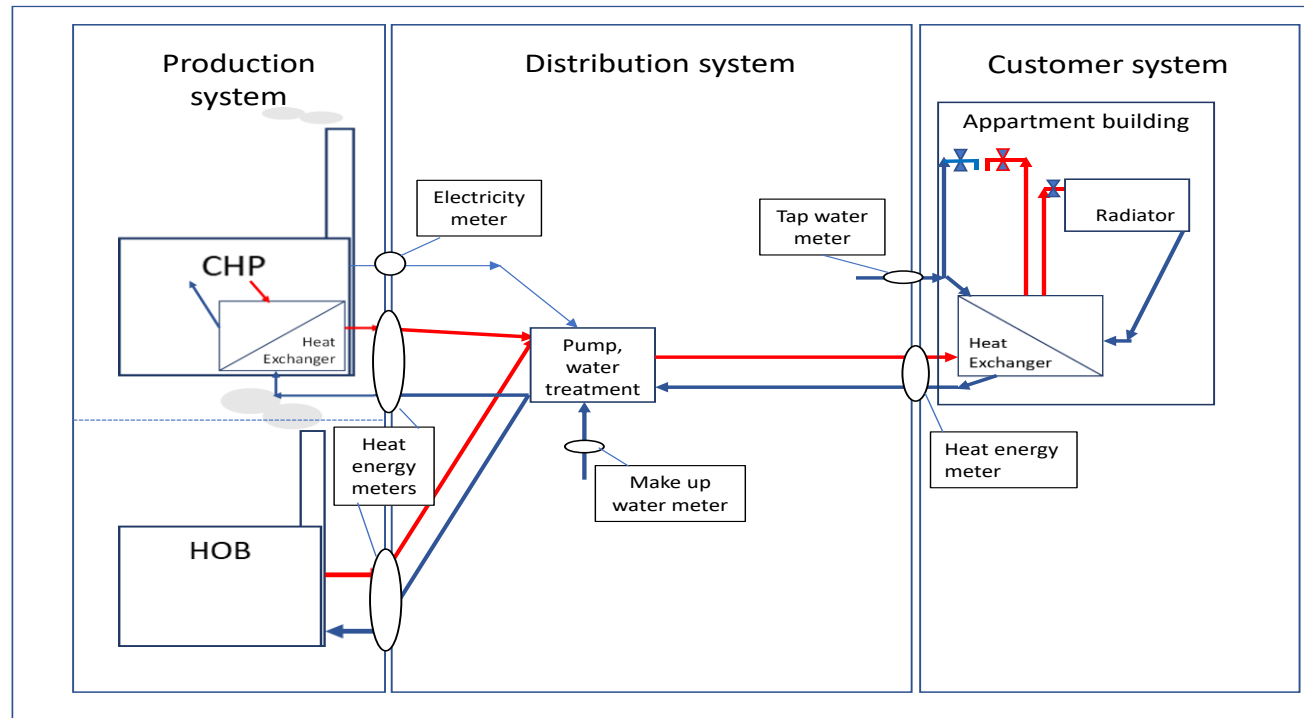
Detailed case studies and site visits for TDD



City	Population	Average temperature (heating season), t°C
Aksay	35 448	-5
Aktobe	500 757	-6,2
Almaty	1 916 822	-0,4
Atyrau	290 700	-1,5
Karaganda	497 777	-4,8
Kostanay	248 267	-7,1
Astana	1 136 156	-6,3
Saran	42 950	-4,8
Semey	324 043	-6,9
Shakhtinsk	37 339	-4,3
Shymkent	1 038 152	3,1
Uralsk	234 155	-4,6
Ust-Kamenogorsk	346 127	-7,2
Petropavlovsk	219 231	-5,0

Main results of analysis (2)

The high share of centralised (district) heating – above 40% - is a positive factor. However, these systems, and also the local heating systems, are in very bad technical and economic condition.



The individual heating systems are also far from satisfactory modern and environmentally satisfactory state.

Main results of analysis (3)

Comparative international analysis identified the main gaps of the Kazakhstan heat sector and modern trends:

- Efficient and effective technologies
- Use of renewable energy sources
- Approaches to planning
- Tariff regulation and tariff structure
- Support of vulnerable consumers
- Professional capacity and gender equality
- Involvement of private sector



Kazakhstan

Criteria of relevance
Climate
Heat sector historic development
Transition country
Share of District Heating
Main fuels used for heating
Sustainability targets



Denmark



Germany



Lithuania



South Korea



Sweden

State policy needs to aim for comprehensive reform of the Kazakhstan heat sector

Heat sector legislation (1)

In Kazakhstan a range of legislative documents refer to the heat sector in some way. However, a system this legislation has substantial weaknesses:

- Lack of specifics and comprehensiveness
- Unclear and contradictory
- Does not address modern challenges

The question is not primarily whether a special Law on Heating exists or not. Internationally, two approaches exist – both potentially successful: centralized or decentralized

The crucial features of successful heat sector legislation are:

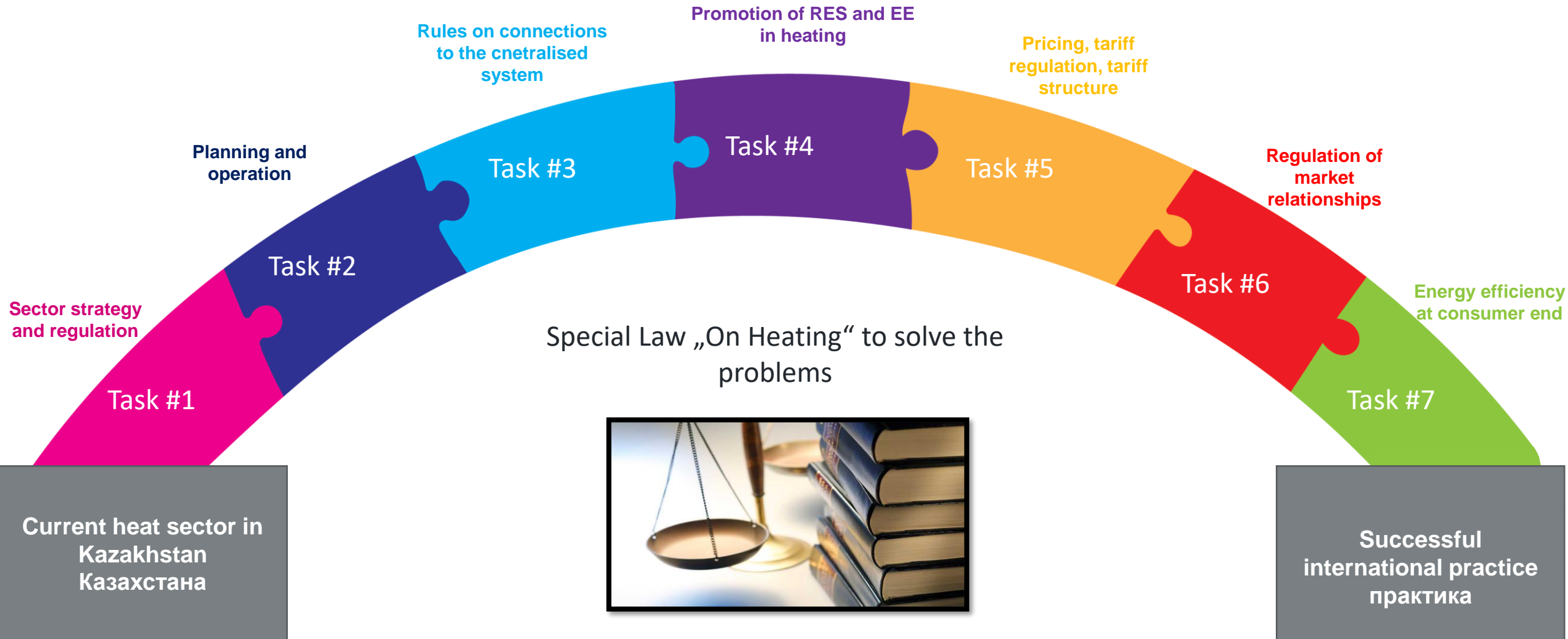
- **Sufficient specifics and comprehensiveness**
- **Clarity – no contradictions between different acts**
- **Solves the issues and challenges of modern heating sector**

<u>Denmark</u>	<u>Germany</u>	<u>Lithuania</u>	<u>South Korea</u>
The Heat Supply Act	The Energy Conservation Act (EnEG) The Energy Conservation Ordinance (EnEV) The Renewable Energies Heat Act (EEWärmG) The Heating Cost Ordinance The Combined Heat and Power Act The Ordinance on CHP Auctions The Energy Collective Act The Ordinance on General Conditions for the Supply of District Heating (AVBFernwärmeV)	The Law on Energy The Law on the Heat Sector	The Rational Energy Utilization Act The Framework Act on Low Carbon, Green Growth The Energy Act The Integrated Energy Supply Act

■ Centralized

■ Dispersed

Heat sector legislation (2)

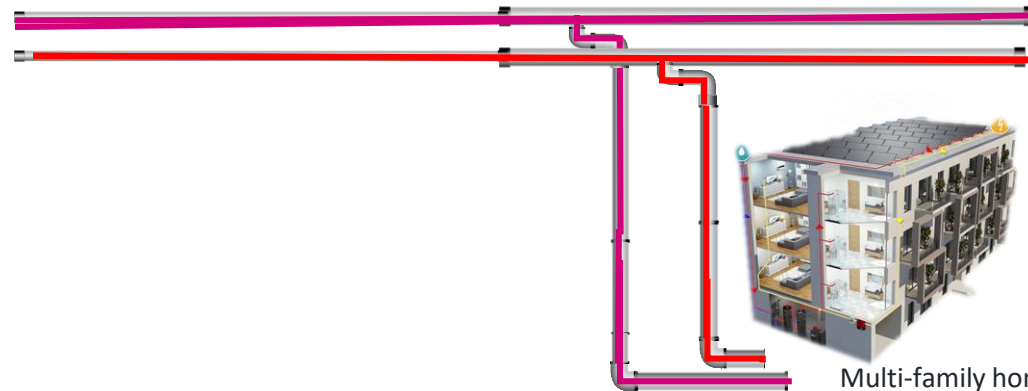


- Technological complexity – requires professional, safe, reliable operation and interaction between entities and actors along the value chain of heat generation, transport and consumption
- Limited range for economically viable transport of heat generated
- Capital intensive sector, long-term lock-in following investment decisions
- Substantial influence of local factors – climate, levels and ground characteristics of local area
- Close connection with the construction/building sector
- Variety of acceptable organisational approaches and business structures
- Social importance
- Impact on the environment

District heating systems with public networks – local natural monopoly



Heat-Only-Plant

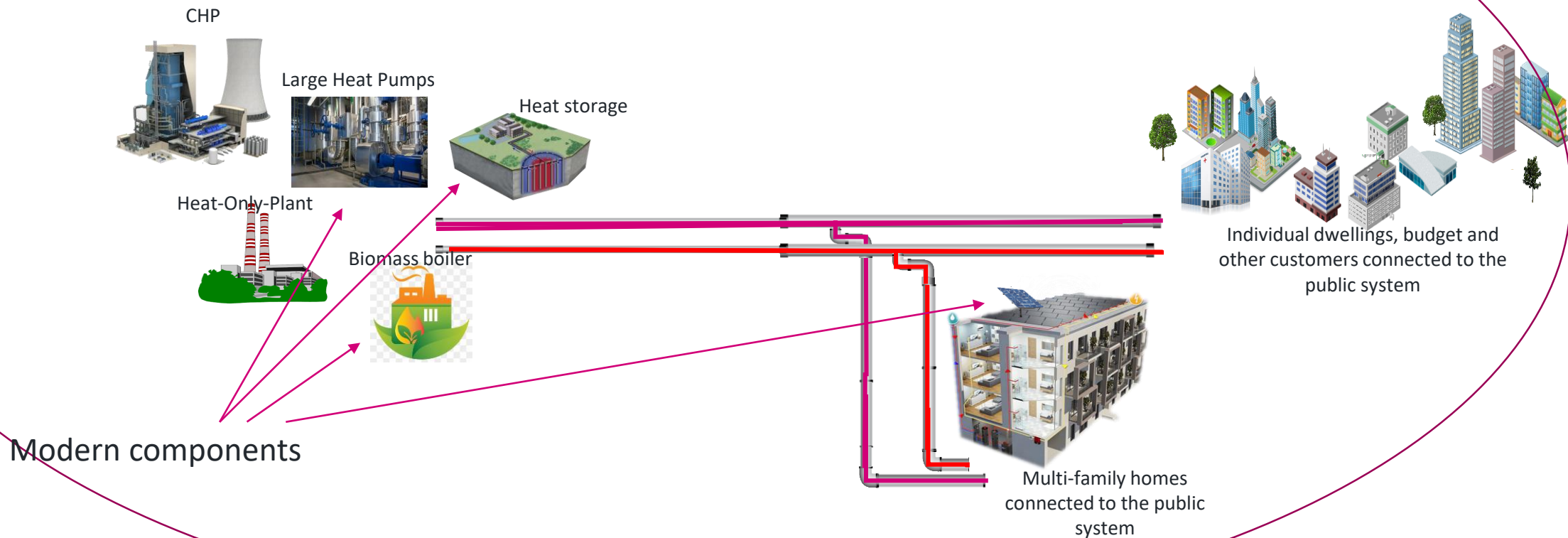


Multi-family homes
connected to the public
system



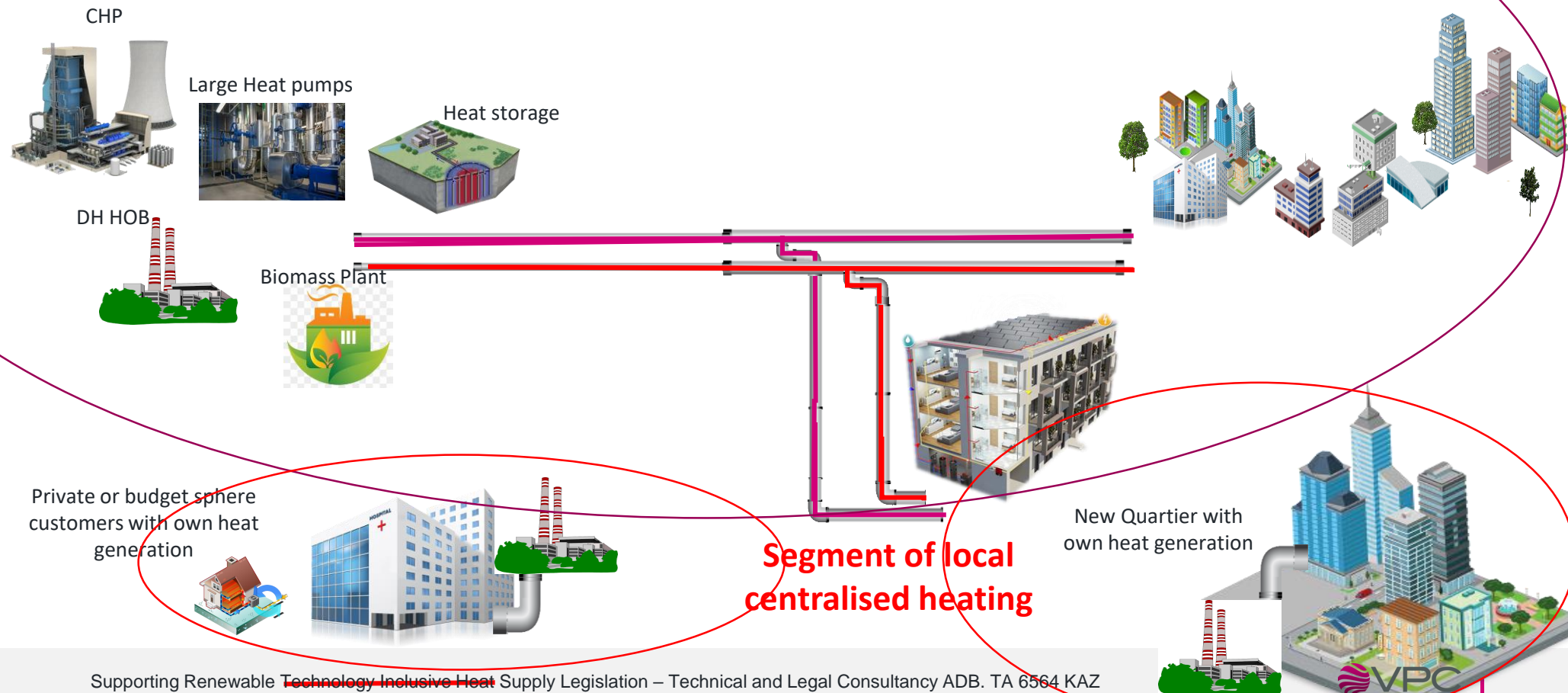
Individual dwellings, budget and
other customers connected to the
public system

District heating systems with public networks – local natural monopoly



Specific characteristics of Heating Sector (3)

District heating systems with public networks – local natural monopoly



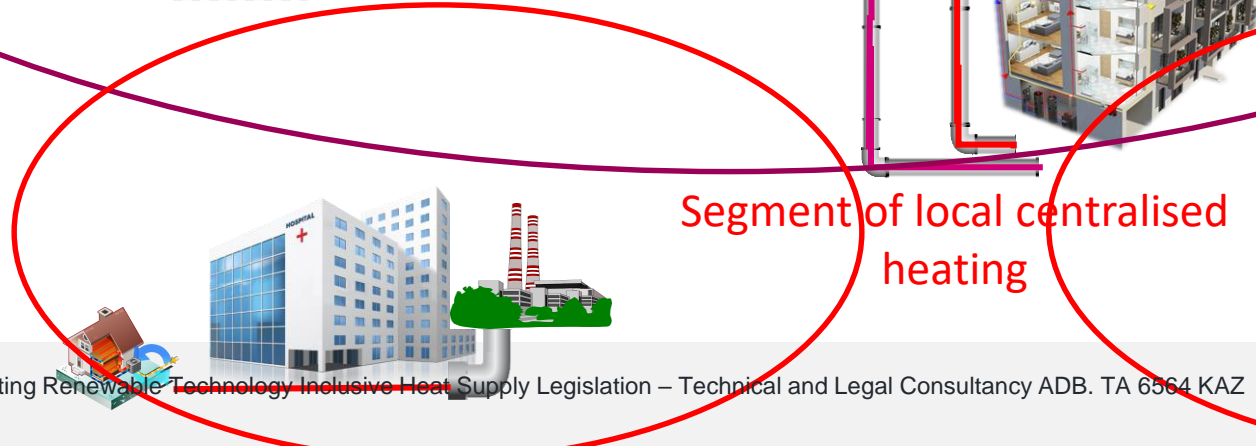
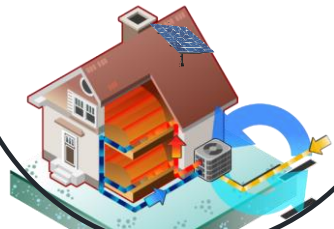
Specific characteristics of Heating Sector (4)

District heating systems with public networks – local natural monopoly

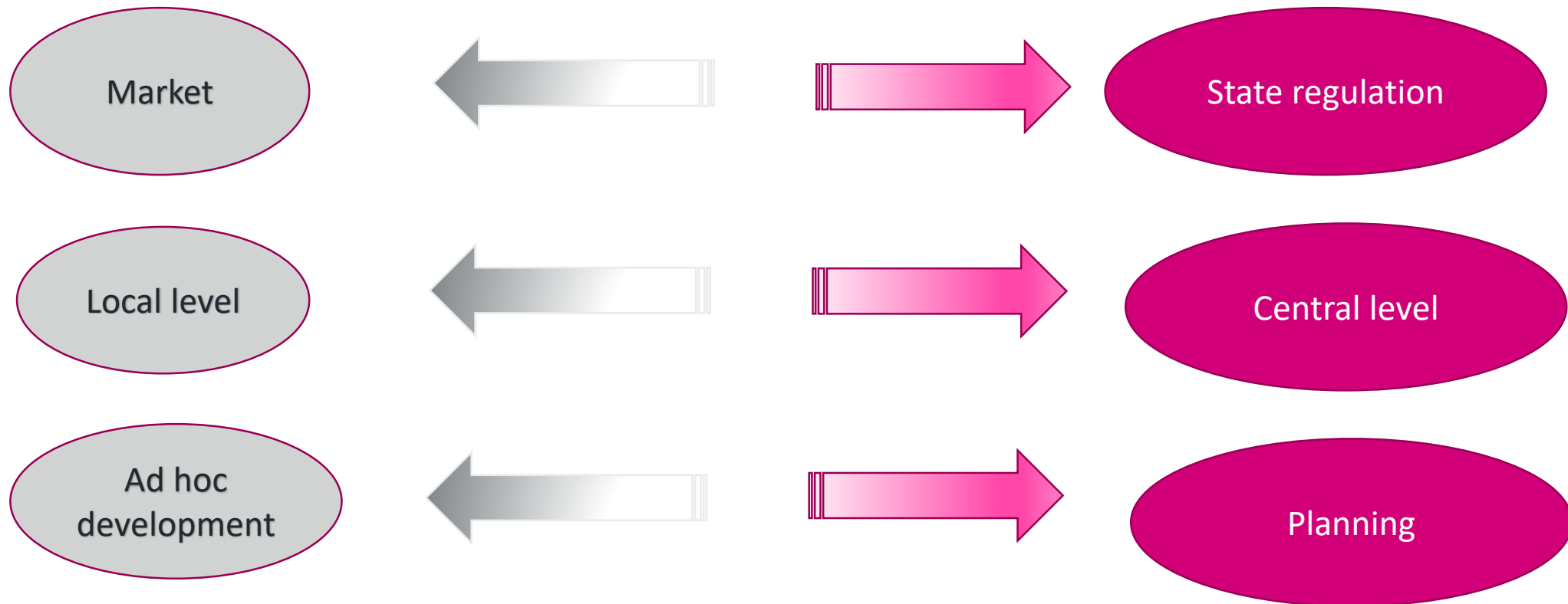


Houses, commercial and budget customers connected to DH

Segment of individual heating



Determining state policy in the Heating sector



The Heating sector specifics require

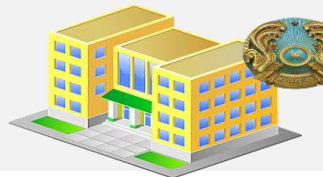
- On the one hand, a clear determination of powers and functions to various state bodies
- On the other hand, responsible and effective co-operation between different central and local state bodies



MINISTRY OF ENERGY



MINISTRY OF ECOLOGY



MINISTRY OF INDUSTRY AND INFRASTRUCTURAL DEVELOPMENT



COMMITTEE ON REGULATION OF NATURAL MONOPOLIES (CRNM) OF THE MINISTRY OF NATIONAL ECONOMY OF THE REPUBLIC OF KAZAKHSTAN



AKIMAT



CRNM LOCAL DEPARTMENT

CHP



Large Heat pumps



Heat storage



DH HOB



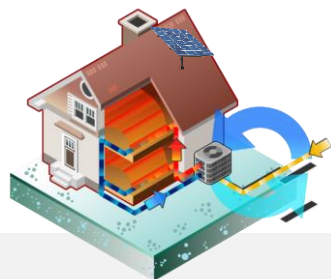
Biomass Plant



Houses, commercial and budget customers connected to DH



Multi-apartment house connected to DH



Single occupancy house



Private or budget Consumer with own heat source



New city quarter with own source

Functions and powers of state bodies (2)

Currently: Unclear or lacking competences and responsibilities of state bodies, unclear or lacking obligations for planning procedures as well as technical and operational standards, lacking enforcement of competences and obligations, unclear definition of heat market segments as well as ownership and contractual relationships

Future: Clear and comprehensive competences and responsibilities of state bodies, clear and comprehensive obligations for planning procedures as well as technical and operational standards, systematic enforcement of competences and obligations, clear definition of heat market segments as well as ownership and contractual relationships

Empty and incomplete



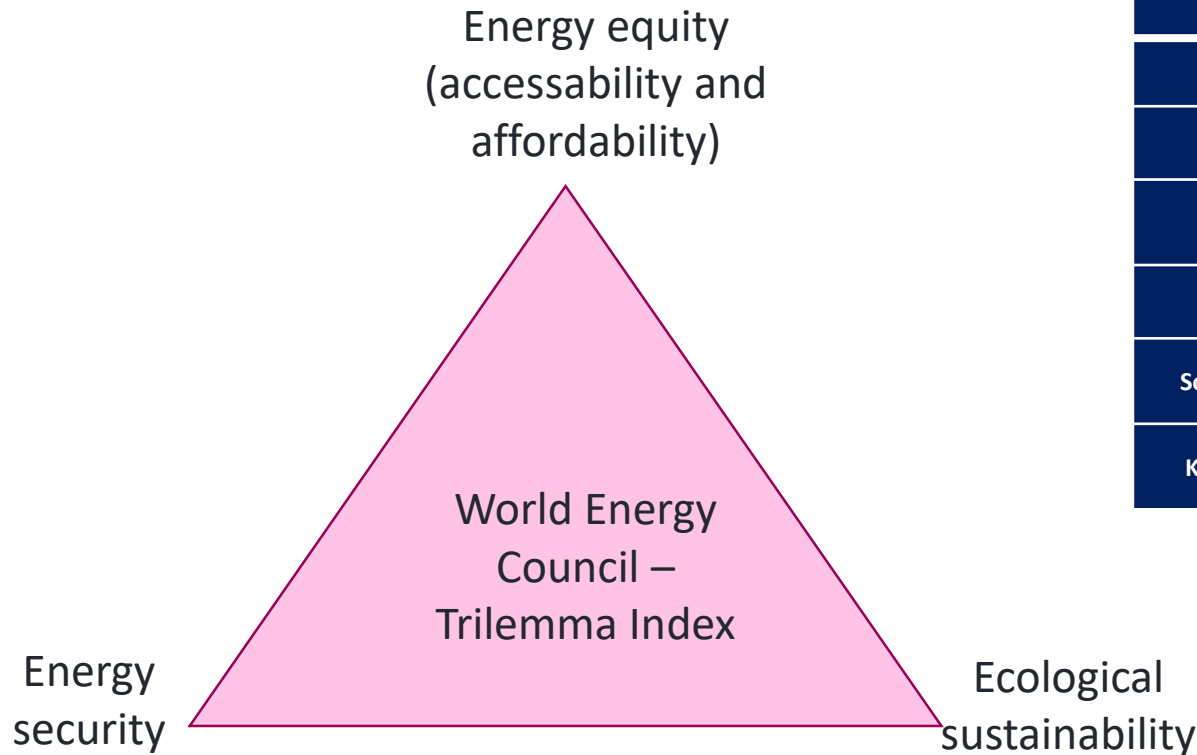
Effective and comprehensive

1. A competence (polnomochie) is only a competence if the responsible body has the professional and personnel capacity to fulfill it
2. If competences are shared between several bodies, which are not subordinated to each other, the co-operation between them has to be clearly mandated.
3. A responsibility/obligation is only a responsibility/obligation if its fulfillment is being monitored and enforced.
4. A requirement/obligation should be put (only) onto a person/body that can influence the fulfillment of the requirement/obligation.

Functions and powers of state bodies (3)

Powers	Example for required action	Required competences and capacities of state body
Setting of overall policy directions	Approval of State Programmes and Development Targets	Highest level of Government
Setting development objectives and being responsible for their achievement	Development and approval of sector development programmes Development and approval of Planning Rules and Methodology	State body responsible for the whole Heating sector
Monitoring the achievement of objectives	Regular gathering and analysis of data and putting together of reports about the achievement of programme objectives	State body responsible for the setting of sector objectives
Setting technical and ecological rules and norms and ensuring fulfillment	Setting and approving requirements for use of fuels, efficiency KPIs, metering standards, allowances for technical losses etc.	State body with capacity and professional understanding of technical and economic issues
Checking fulfillment of technical and ecological rules and standards	Collecting reports from organisations, undertaking checks and inspections, detecting violations, issuing warnings	Body with respective professional capacity
Setting rules for market and contractual relationships	Development and approval of market rules, connection rules, standard contracts, licensing or registration rules and issuance of licenses or maintenance of a register	State body with professional understanding of the market processes and relationships
Monitoring that participants adhere to rules for market and contractual relationships	Requesting regular reports from all licensed or registered entities, conducting inspections, handling disputes between market participants; writing violation reports	Body with respective qualified staff
Undertaking planning	Development of master plans based on the optimization of existing and expected future supply and demand; approval of the decision on planning the thermal sector for the region	Body with regional focus and responsibilities in the area of regional or municipal planning
Monitoring of and responsibility for implementation of planning decisions	Approval of decisions regarding heat sources only on the basis of decisions on heat supply planning; Monitoring the implementation of heat supply schemes, reporting	Body with regional focus and responsibilities in the area of regional or municipal planning

Sustainability is one of the criteria of a successful heating sector



The World Energy Council's 2022 ranking of certain countries.
<https://trilemma.worldenergy.org/>

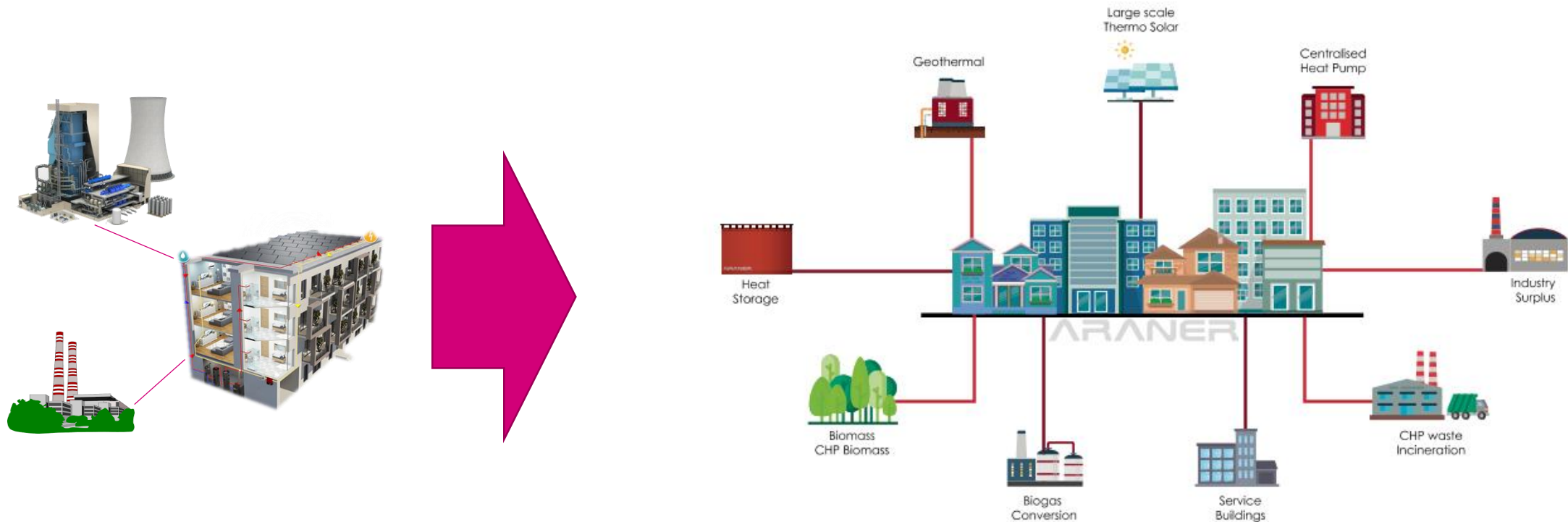
Country	Score	Energy security rank	Energy equity rank	Enviromental sustainability rank
Sweden	1	4	19	1
Denmark	2	14	11	4
Germany	7	6	20	16
Lithuania	21	45	28	27
South Korea	22	37	16	54
Kazakhstan	35	33	36	85

Note: table updated in English version of slides

Heating sector and sustainability (2)

Worldwide, and also in Kazakhstan, there is increased attention to the criteria of ecological sustainability in heating

It is necessary to organise the transition to the new generation of heating sector technologies



Rich body of experiences with promoting renewables in heating



Special program of loans and grants for building sources based on RES



Thermal "turnaround" (or heat transition), as an integral part of the "energy revolution". The target is to reduce carbon emissions from thermal power generation by 80% by 2050. Compared to 1990, the District Heating Systems - Heat Networks 4.0 program provides grant funding for the modernization of centralized systems with a large share of RES and heat from waste



Expensive CO2 tax and "energy tax" penalizes the production of heat from carbon sources or in non-combined mode.



Target setting to achieve 100% renewable energy based heat by 2040



Heat supply organizations are obliged to buy heat from independent renewable energy sources. Gas systems are required to accept biogas. Special program of loans and grants for restructuring based on RES. RES-based sources are exempt from emission tax.

Heating sector and sustainability (4)

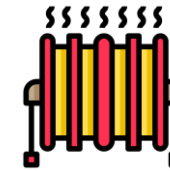
Measures for increased utilisation of RES in the new legislation on heating



TARIFFS CREATE CORRECT PRICE SIGNALS



DEVELOPMENT OF STANDARDS AND PROCEDURES



PLANNING MASTERPLANS AS CENTRAL INSTRUMENT FOR MODERNISATION AND INTEGRATION OF RES



CLEAR RULES FOR CONNECTION AND ACCESS OF RES HEAT GENERATORS



TARGETS, INSTITUTIONAL RESPONSIBILITY AND SPONSORED STATE PROGRAMMES AT CENTRAL AND LOCAL LEVEL



TRAINING

DISSEMINATION OF PRACTICAL EXPERIENCE



TECHNOLOGY TRANSFER



AFFORDABILITY AND LEGAL REGULATORY FRAMEWORK FOR PPP

Discussion questions

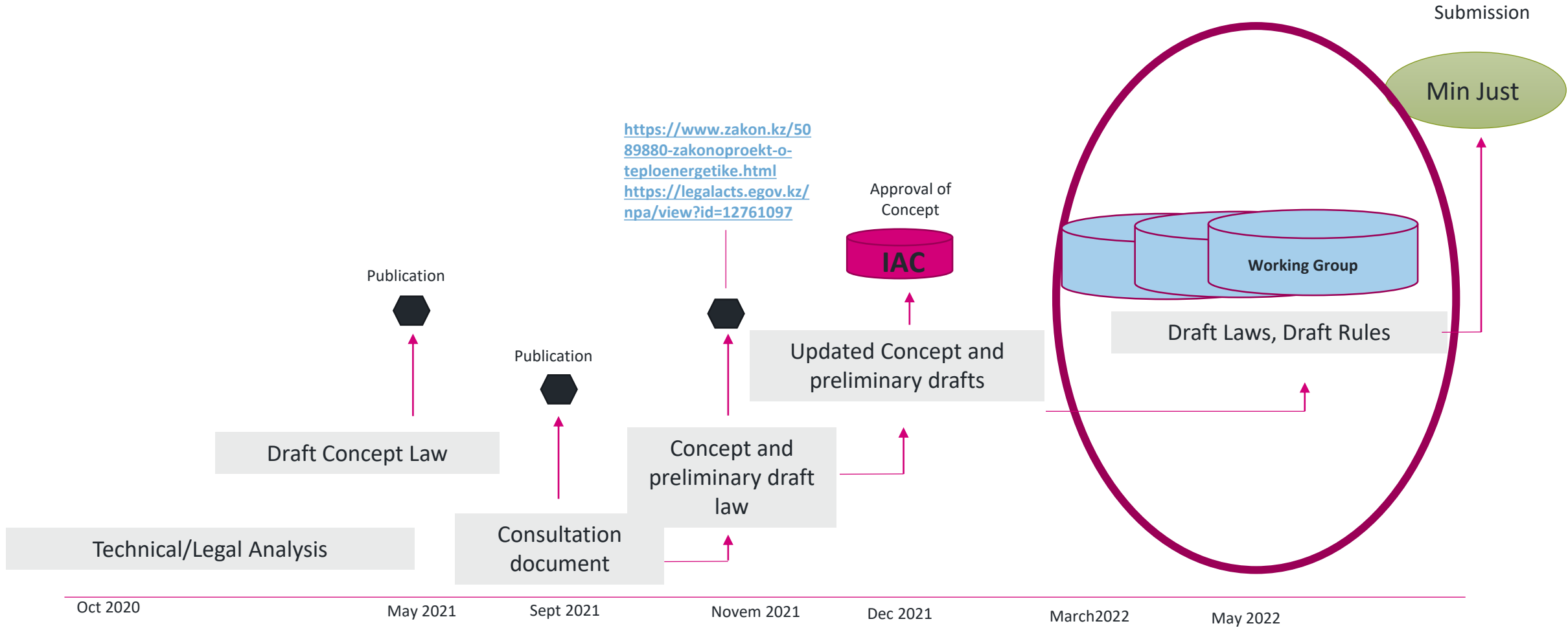
- Name **three actions** regulatory authorities could take that would result in substantial **short-term** improvements of operations of the heating sector
- Name **three actions** regulatory authorities could take that would result in substantial **long-term** improvements of operations of the heating sector
- When we think about the questions of transferring substantial authority for the heating sector to **local authorities**, we might have to beware of **conflicts of interests**. Do you think this is an important question? How could such conflicts of interests be counteracted?

Survey questions

- Preferred heating sector organisation
 - Free market
 - State regulated
- Preferred level of regulatory authority for the heating sector
 - Central state body (Ministry)
 - Local body (akimat)
- Preferred form of ownership in the heating sector
 - Private
 - Public (state) ownership, including municipal
 - Mixed – PPP
- Role of long-term planning for successful development of heating sector
 - Very important
 - Not very important
- For Kazakhstan – which sector has the higher potential for GHG emission reductions?
 - Transport
 - Heating

Results of survey

Overview of Draft Law «On Heating»



- Strategic targets and basic principles
- Sector organisation
- Legal structure
- Technical characteristics
- Planning
- Regulatory methods and allocation of powers
- Regulation of prices and social protection
- Ecological sustainability: energy efficiency and RES
- Professional capacity and gender aspects
- Transition

The proposed heat sector should ensure

- **Reliable, secure, economically efficient and affordable** heat supply to all entities and the population in Kazakhstan.
- At the same time, in accordance with the strategy of Kazakhstan to reduce greenhouse gas emissions (hereinafter referred to as GHG), develop a "green" economy and move towards a modern high-income society, the heat supply system model is built on the approved targets for **energy efficiency and renewable energy sources**.
- Such indicators will become decisive criteria for future planning and investment decisions.
- **Economic incentives**, together with **obligations and standards**, will work hand in hand to gradually achieve the current level of energy efficiency and the use of renewable energy sources in the production and consumption of thermal energy in all segments of the thermal sector and all types of consumers (households, industrial and public consumers).

Sector organisation will be based on existing structures and established practice, with adaptations based on international experience:

- The variety of forms of ownership and commercial structures of subjects engaged in thermal power engineering will remain; Attracting private investors will be encouraged by creating attractive conditions for public-private partnerships (PPPs).
- Independent of ownership, the registration system will ensure uniform standards and accountability, including for efficient operation, sound financial practices and quality of supply.

The model reflects the existence of different segments of the heat market :

1. Public access centralised (district) heating systems
2. Local centralised heating systems
3. Individual heating

Each of the segments will be **properly regulated, taking into account their characteristics** and in order to balance the issues of economic efficiency, sustainability, freedom of business, consumer choice and the need to protect against monopoly. Heat networks of the district heating system of general use must provide third-party access (hereinafter - TTL) based on transparent criteria and procedures as long as this does not interfere with the efficient and reliable operation of the district heating system. A guarantee will be provided for the DTL of large objects of renewable heat production.

The legal framework for the heating sector will be based on the **Law "On Heating"** and related by-laws, laying down clear provisions governing **all aspects and relationships in the heating sector**, eliminating existing gaps, uncertainties and inconsistencies in relationships and contractual agreements.

Secondary legislation

- Rules for heat usage
- Tariff methodology
- Heat planning, Matserplan Rules
- Technical Rules (compendium)
- Rules of organisation of heat market and template contracts
- Regulations for registering and monitoring of the sector

In the future, Kazakhstan's heating sector

- Will utilise **modern and varied technologies** for heat generation
- Will strive to **utilise RES** in all sector segments.
- Will **prioritise** the development of **centralised heating systems**, based on the appropriate optimisation of capacities in terms of base load and peaking, CHP, Heat Only Plants, and industrial surplus heat..

Up to date methods of operation and maintenance of heating networks and customer connections and appliances as well as technical improvements will bring improved reliability and energy efficiency, particularly in terms of **network loss reductions**. This involves:

- The transition to the **variable and lower temperature regimes** in the centralised heating networks,
- Optimisation of operating regimes, including through the installation and refurbishment of heat transmission stations inside the multi-apartment blocks,
- Installation of metering at all points of heat transfer from one entity to another along the value chain: fuel use, wholesale heat energy into network, supply of heat energy to customers (for household customers meters should be installed, at least, in each house).

KPIs for efficiency and quality will be set for all heat sector segments and will be monitored.

Local authorities will plan the heat supply system on a regular basis using a least cost approach and a set of agreed assumptions, including preferences for energy efficiency solutions and the use of renewable heat sources.

The purpose of the planning process is to optimize investment decisions for heat supply in all segments of the heat power industry in each locality. Decisions on heat supply planning by territories will be mandatory for execution, including by private organizations and the population.

The heating sector will be regulated by

- Setting targets for the sustainable development of the network core and key performance and quality indicators and monitoring their implementation-achievements.
- Maintaining a register of all subjects of district heating segments for the purpose of control and monitoring
- Establishment of planning rules, monitoring rules, market organization rules with standard contracts
- Preparation and approval of master plans
- Setting prices and tariffs for heat energy in the presence of characteristics of natural monopolies or abuse of a dominant position
- Establishment of norms and standards for heat consumption for consumers

METHODS OF REGULATION AND ALLOCATION OF RESPECTIVE POWERS (2)

Allocation of some powers still undecided

Setting of State policy for the heating sector will be clearly placed on the Ministry of Energy, together with the following:

- Setting of targets for development and KPIs for efficiency and quality of heat supply,
- Approval of Regulations for planning, monitoring, **heat market rules and template contracts**.

The powers of the State body responsible for housing will include

- development and approval of regulatory and technical documentation related to the consumption of thermal energy, plans for the systematic reduction of heat demand per square meter of housing, rules and requirements for ensuring energy efficiency and energy saving in multi-apartment residential buildings.

The Committee for the Regulation of Natural Monopolies will

- Approve the Tariff Methodology for the heating sector, , **heat market rules and template contracts**.
- **Regulate heat tariffs**.

The Energy Inspection for heating sector will

- issue binding orders to eliminate violations of requirements in the field of thermal power engineering,
- monitor compliance with the requirements of regulatory legal acts, monitors the operation and technical condition, reliability and safety, etc.

The role of local authorities in implementing policy, planning and monitoring of the heating sector will increase. The powers will include

- Development and approval of heat sector masterplans for regions, towns,,
- **Setting of tariffs for heat sector goods based on the methodology approved by the Committee for the Regulation of Natural Monopolies**,
- Regular monitoring of the work and functioning of the sector entities based on principles and methods approved by the Ministry of Energy,
- conducting a regular assessment of the operational reliability and technological and economic accessibility of heating in the region, including the collection and submission of reports to the responsible state authorities on the regions in terms of preparation for the winter period, maintaining a register of entities operating in the field of thermal power, in accordance with the rules approved by the authorized body

Economic regulation in the heating sector will be based on established methods for providing good price signals:

- The price regulation regime will balance the interests of heat suppliers (and fuel used for heating) and their consumers. Pricing will be transparent. Incentive regulation methods will be applied, if possible, but subject to the principle of recovering all justified costs.
- The price regulation regime will ensure that suppliers of heat (and fuel used for heating) recover all economic costs of operation and reasonable investments, including a fair rate of return; at the same time, the regime will create incentives for the efficient operation of heat supply entities.
- End-user prices for heat and fuel used for heating will be free from cross-subsidization and will reflect the respective costs for each consumer category and region. The price structure for thermal energy for the end consumer may consist of several price elements, for capacity and for energy.
- The affordability of heat energy must be guaranteed not through consumption subsidies or cross subsidization of consumers, but through adequate social protection measures financed from the state budget. Social assistance administration procedures will follow established good practice procedures - targeted assistance.
- Certain bonuses or preferences can be applied to stimulate the production of thermal energy from renewable sources in all segments of the thermal energy sector;
- Incentives can also be applied to the production of heat and electricity from high-efficiency CHP plants.

The improvement of environmental performance will be at the center of heating sector policy. GHG emissions and local pollution caused by the thermal power sector will be reduced in line with Kazakhstan's international and national targets.

Target indicators for reducing emissions, using renewable energy sources in heating, norms and plans for reducing the specific heat consumption of a category of consumers, as well as plans for reducing heat losses and own needs are being introduced. These indicators will be taken into account in the masterplans.

It is expected that Kazakhstan will implement the new Heat Sector Model over a period of 10 years. For the transition process, the following actions are envisaged:

- Heat supply planning for each locality, development of optimal plans for investment, reconstruction and improvement of operational performance based on the least cost analysis, taking into account the potential for energy efficiency in terms of both production and consumption. The main planning assumption will be that any investment in new district and autonomous heating production should consider renewable heat as a priority. Renewable heat sources will also increasingly be used for individual heat supply based on a system of state support.
- Based on planning decisions for district heating systems, financial recovery plans will be drawn up, identifying a possible "tariff corridor" and outlining necessary financial needs. The price path will determine the rate of adjustment of the average price level, as well as the price structure for 5-10 years. The price regulation system will reflect the price path.
- Action plans will be developed for each district heating system to implement the operational changes and investments outlined in the Financial Recovery Plans. This includes the application of a wide range of private sector participation models, as well as a system of republican and local funding.



Thank you for attention!

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