



Dynamics of Energy System Transition in Iran

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**INSF Workshop on Urban Resilience through
Applied Systems Analysis**

Tuesday 3 Aban 1401; Tehran, Iran



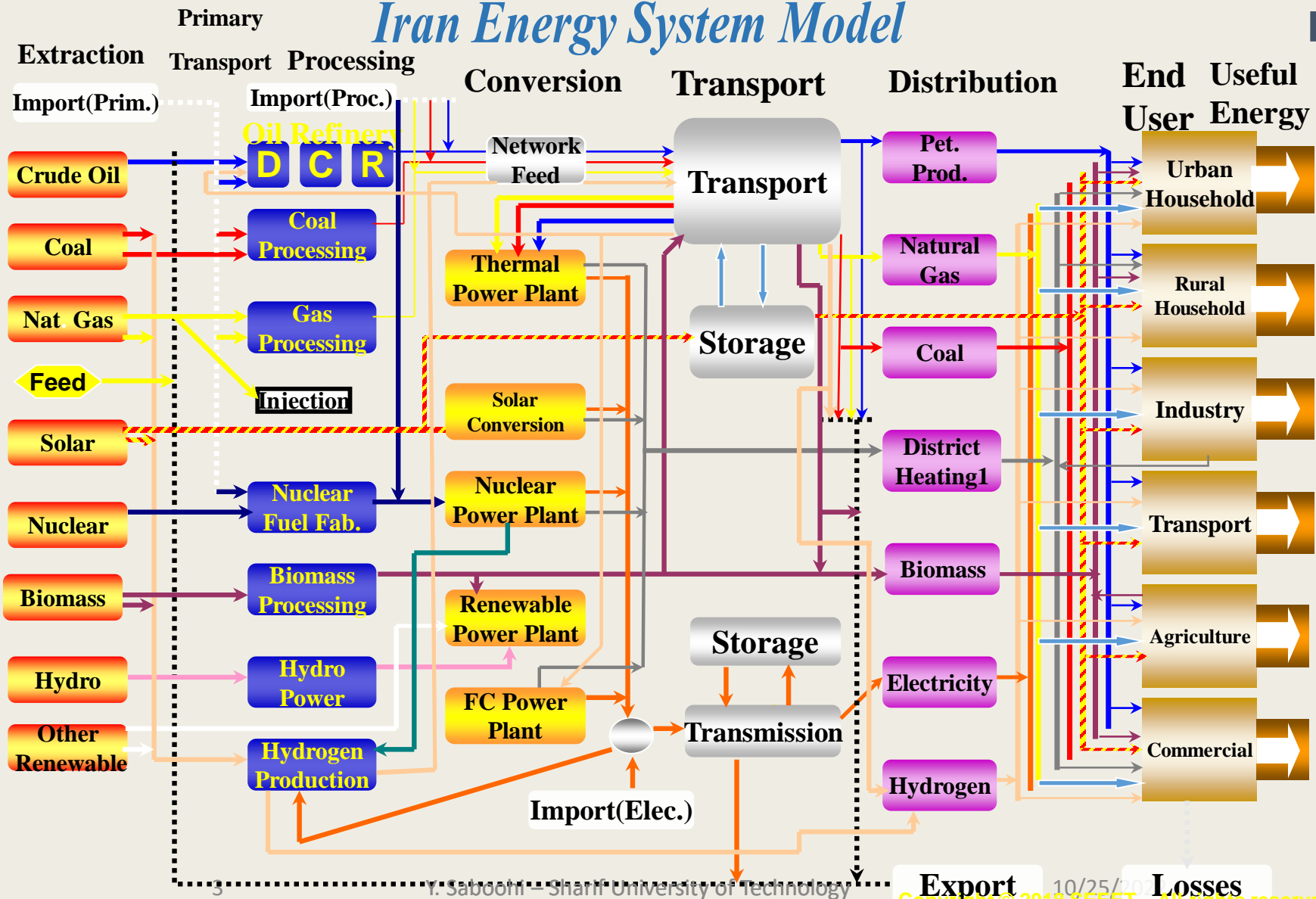
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Energy Reference System

Conceptual Model for Systems Analysis





Mathematical Modeling

Dynamics of Energy System of Iran

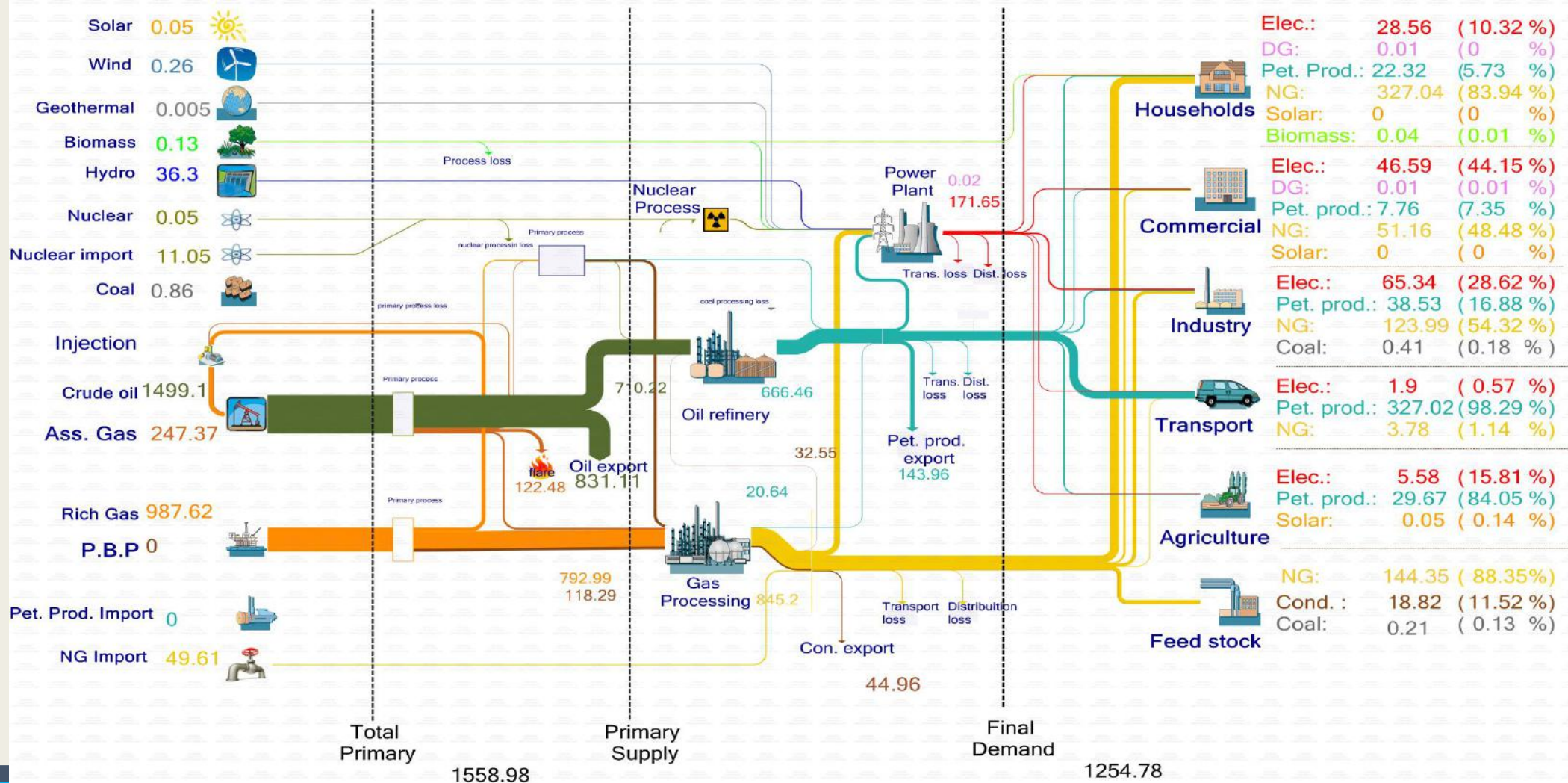
- **Developing Conceptual Model of the System**
 - **Reference Energy Systems**
- **Application of Laws of Physics to Develop the Model**
 - **First and Second Law of Thermodynamics and Mass Conservation**
- **Modelling Existing and New Technologies**
 - **Performance and Constraints of Existing and New Technologies and the Constraint on Penetration Path of New Technologies**
- **Social, Economical and Environment Dimensions**
 - **Related Constraints and their Dynamics**
- **Institutional and other Constraints**
 - **Related Constraints and their Dynamics**
- **Criteria of Dynamic Development**
 - **Economic Affordability, Environment, Resiliency, Social Acceptability**



Dynamics of Energy System of Iran

Unit: MBOE/a

IESM's Energy Balance Scenario: BASE Year: 1390



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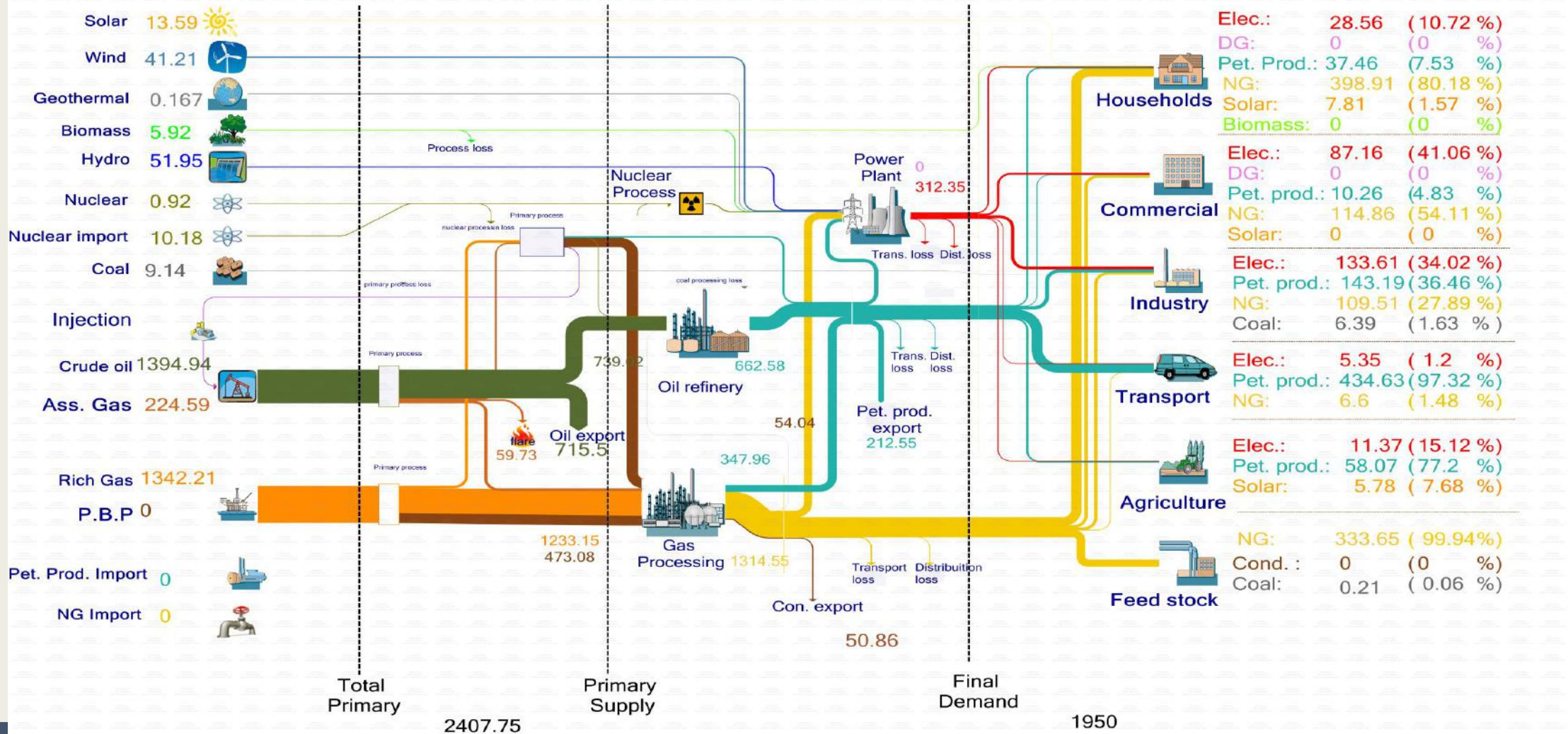
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Dynamics of Energy System of Iran

Unit: MBOE/a

IESM's Energy Balance Scenario: BASE Year: 1404



Sector	Energy Type	Value (MBOE/a)	Percentage (%)
Households	Elec.:	28.56	(10.72 %)
	DG:	0	(0 %)
	Pet. Prod.:	37.46	(7.53 %)
	NG:	398.91	(80.18 %)
Commercial	Elec.:	87.16	(41.06 %)
	DG:	0	(0 %)
	Pet. prod.:	10.26	(4.83 %)
	NG:	114.86	(54.11 %)
Industry	Elec.:	133.61	(34.02 %)
	Pet. prod.:	143.19	(36.46 %)
	NG:	109.51	(27.89 %)
	Coal:	6.39	(1.63 %)
Transport	Elec.:	5.35	(1.2 %)
	Pet. prod.:	434.63	(97.32 %)
	NG:	6.6	(1.48 %)
Agriculture	Elec.:	11.37	(15.12 %)
	Pet. prod.:	58.07	(77.2 %)
	Solar:	5.78	(7.68 %)
Feed stock	NG:	333.65	(99.94%)
	Cond. :	0	(0 %)
	Coal:	0.21	(0.06 %)

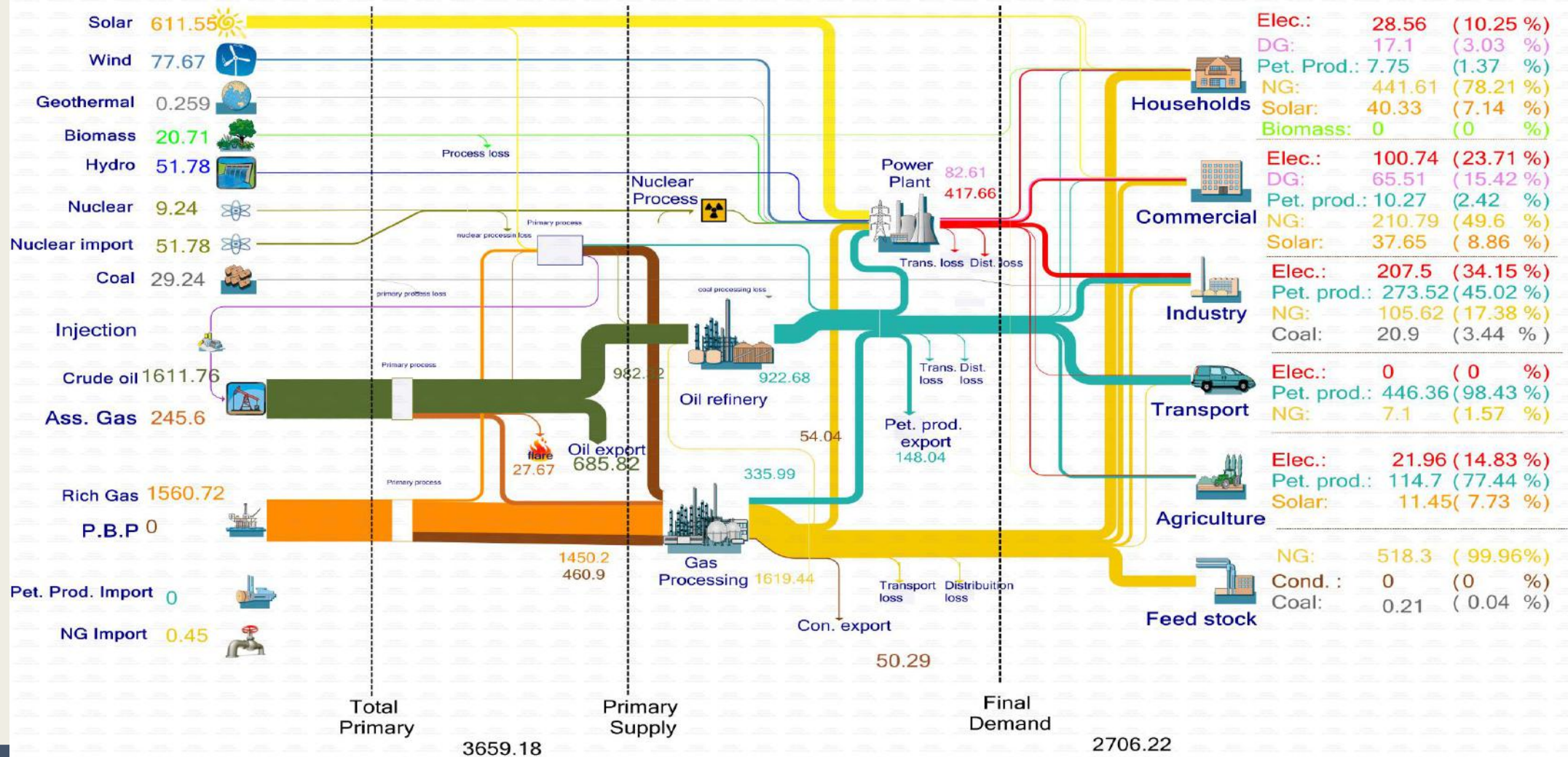




Dynamics of Energy System of Iran

Unit: MBOE/a

IESM's Energy Balance Scenario: BASE Year: 1419



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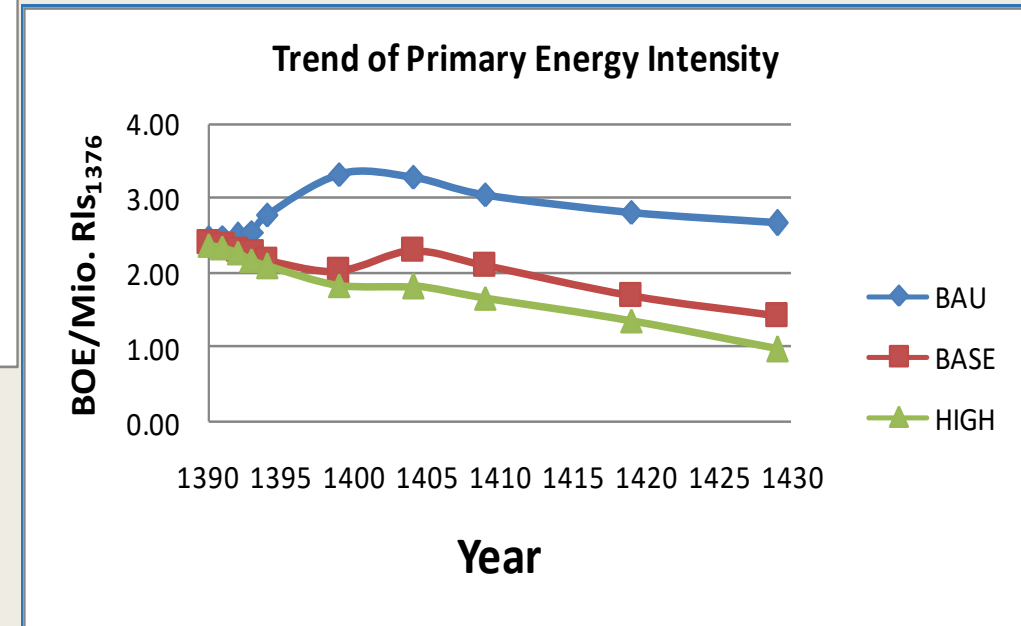
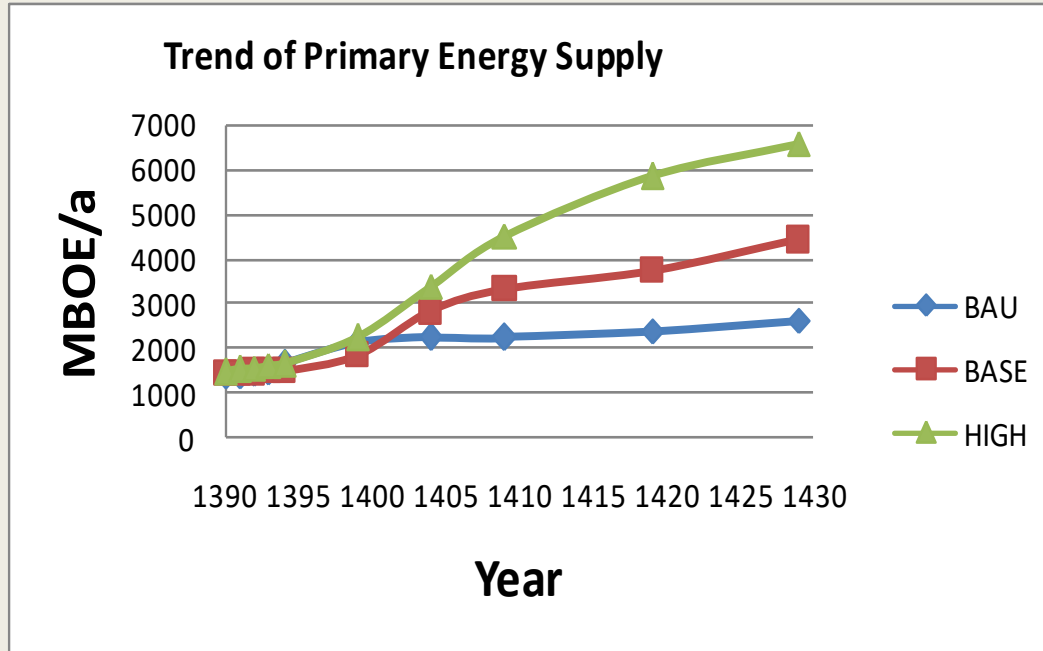
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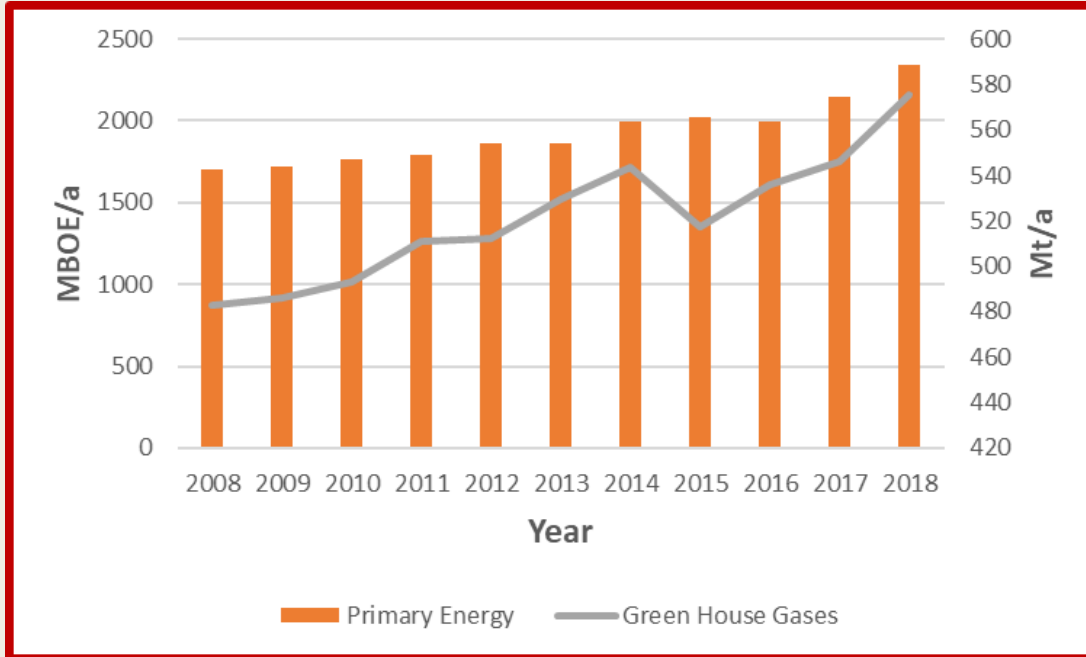
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Dynamics of Energy System of Iran

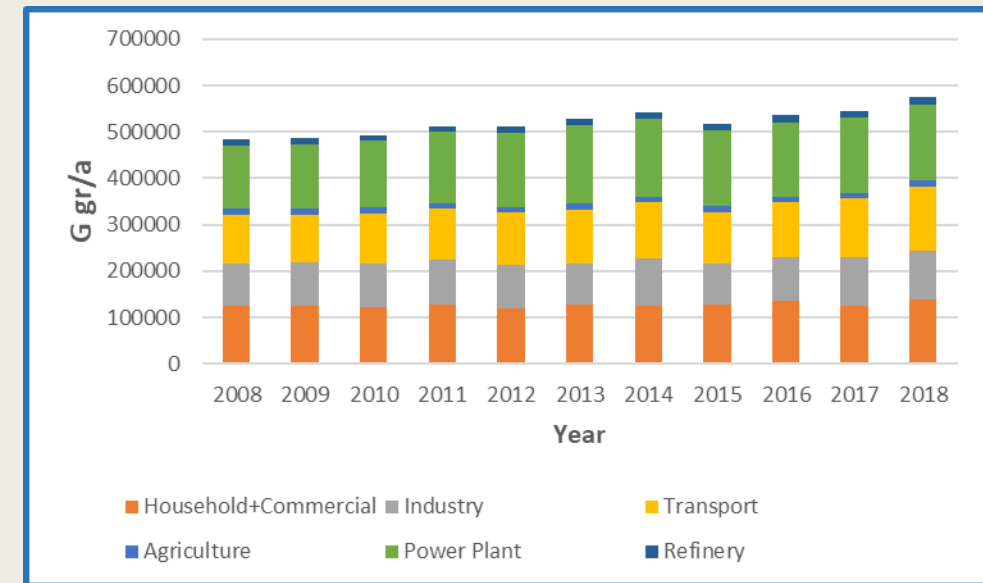


Energy Use and Emission of Green House Gases



Primary Energy Consumption and GHG emission in energy sector

Data Source: Hydrocarbon balances, IIES



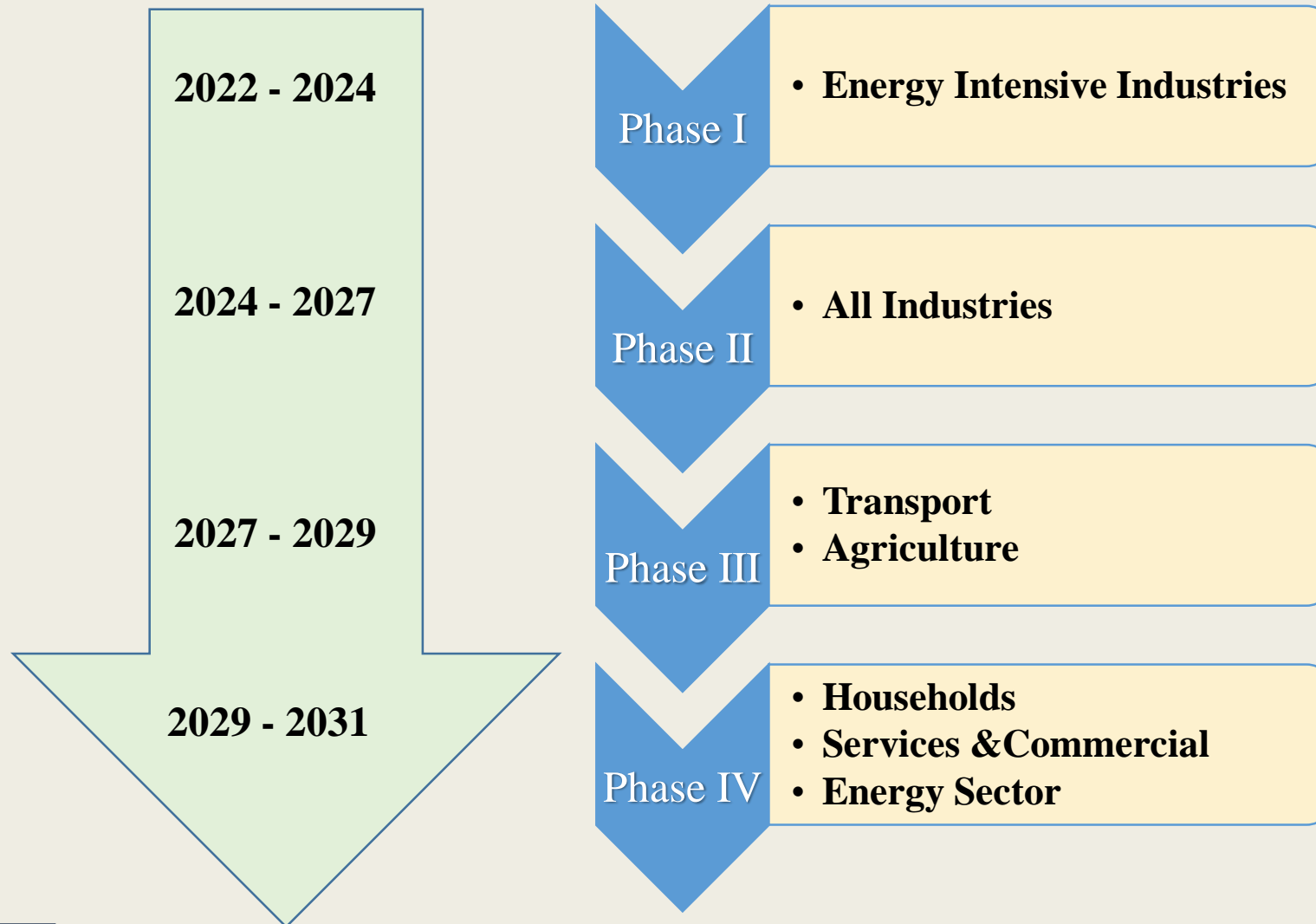
Sectoral breakdown of emission

Data Source: Hydrocarbon balances, IIES

Policy Implication of Systems Approach



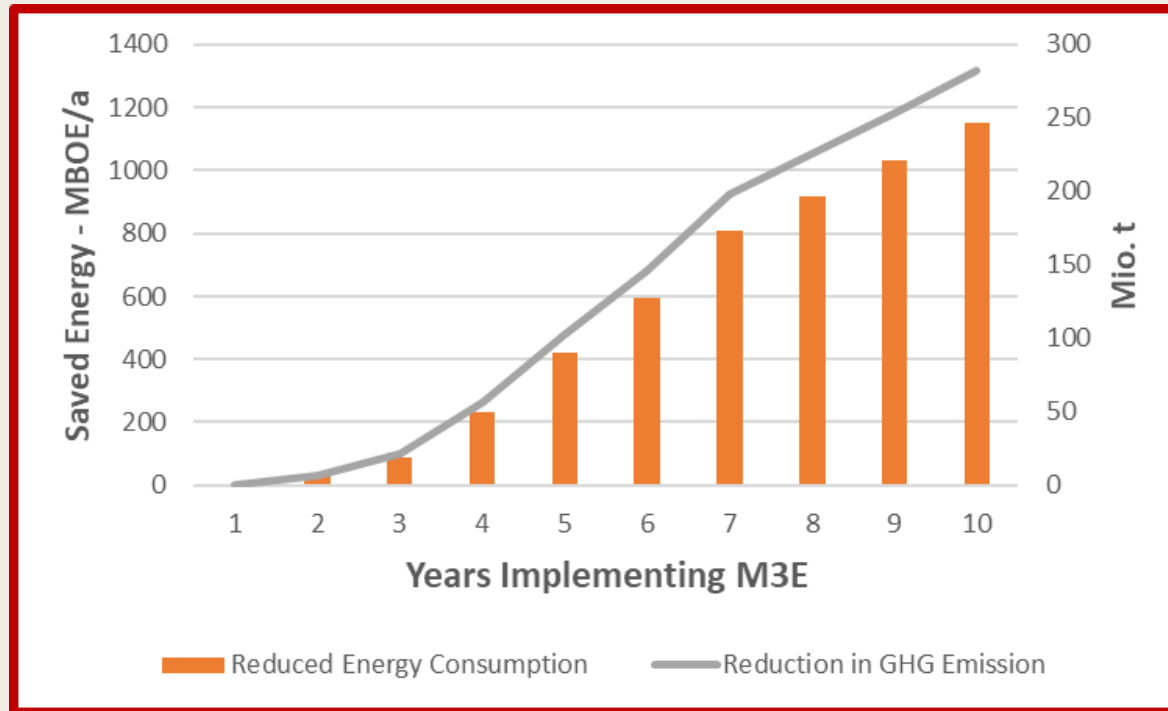
Implementation of Market for Energy Efficiency and Environment (M3E)





Impact of Transition

Efficient and Green Energy System of Iran



Generated Economic Resource:

PE opportunity Costs: 390 Mrd. Euro

Investment for Energy Efficiency: 77 Mrd. Euro

Investment for Green Economy: 20 Mrd. Euro

R&D and New Technologies: 15 Mrd. Euro

Social Infrastructure: 85 Mrd. Euro

Energy, Transport and Water Infrastructure: 53 Mrd. Euro

New Jobs: 3 Mio.

Economic Stability: 60 Mrd. Euro

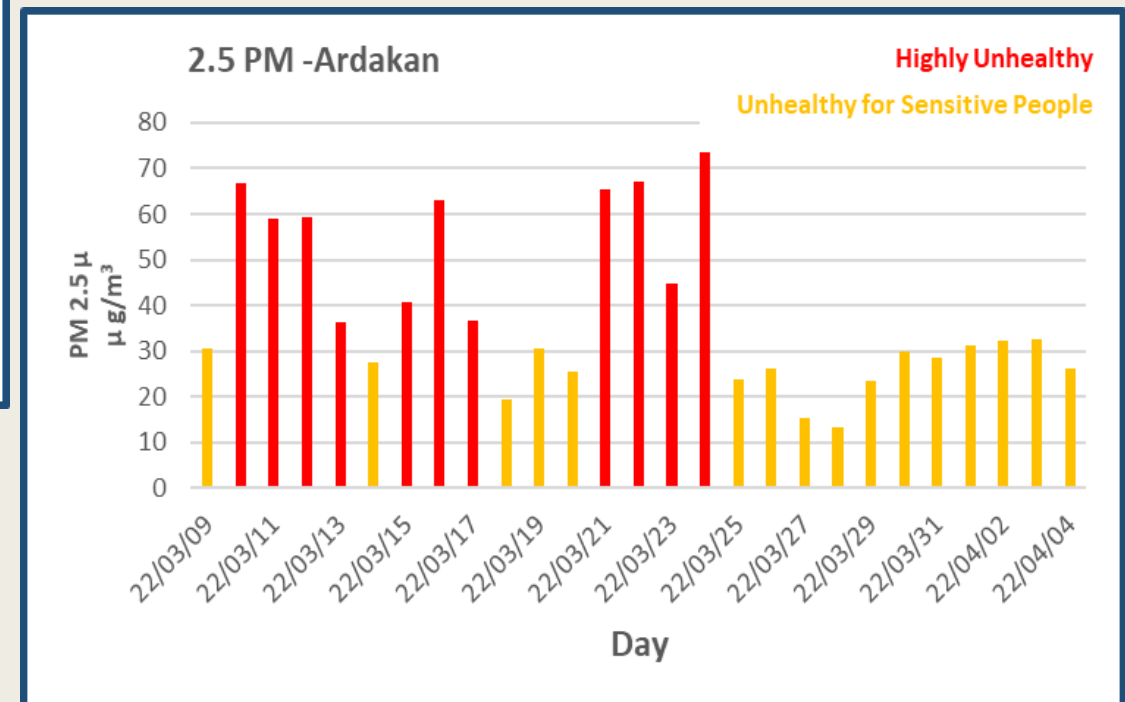
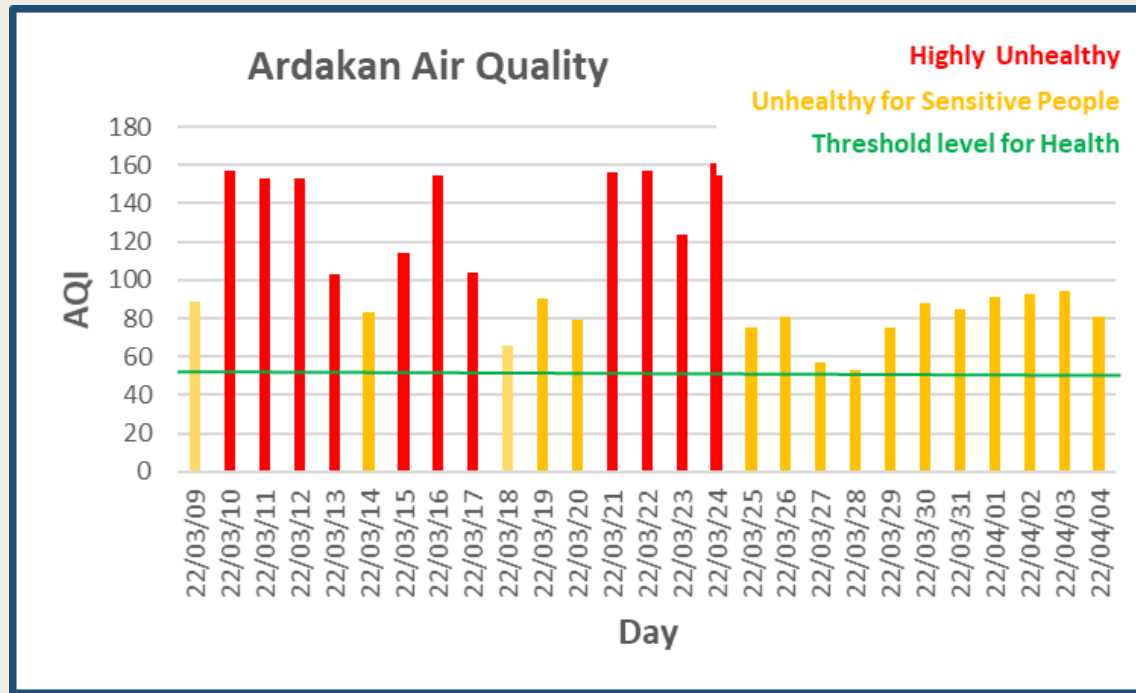


Application of Systems Approach to Urban Energy Resilience

Dynamics of Transition to Efficient and Green Urban Energy System



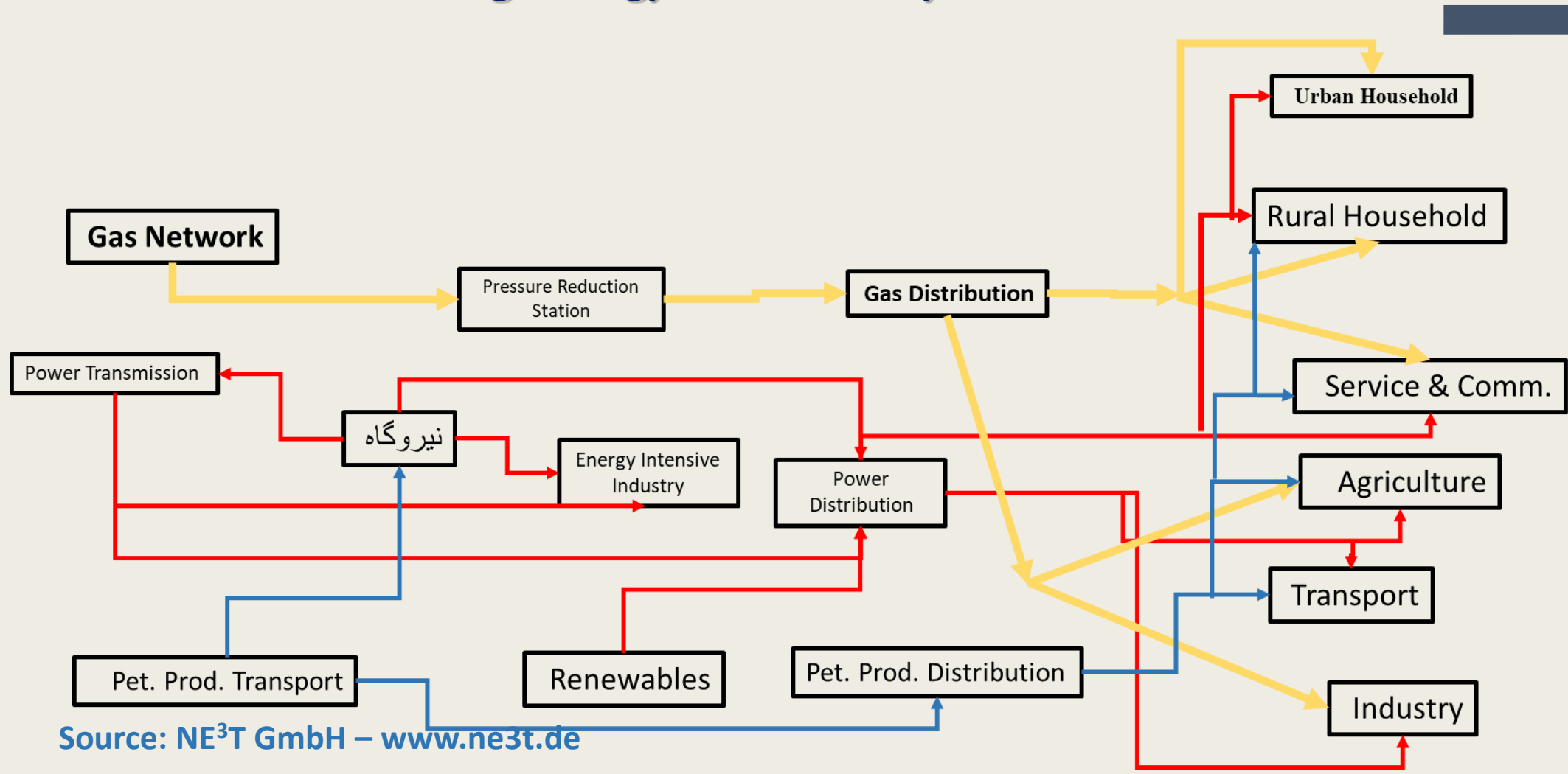
Ardakan – Highly Polluted City



Application of Systems Approach to Urban Energy Resilience



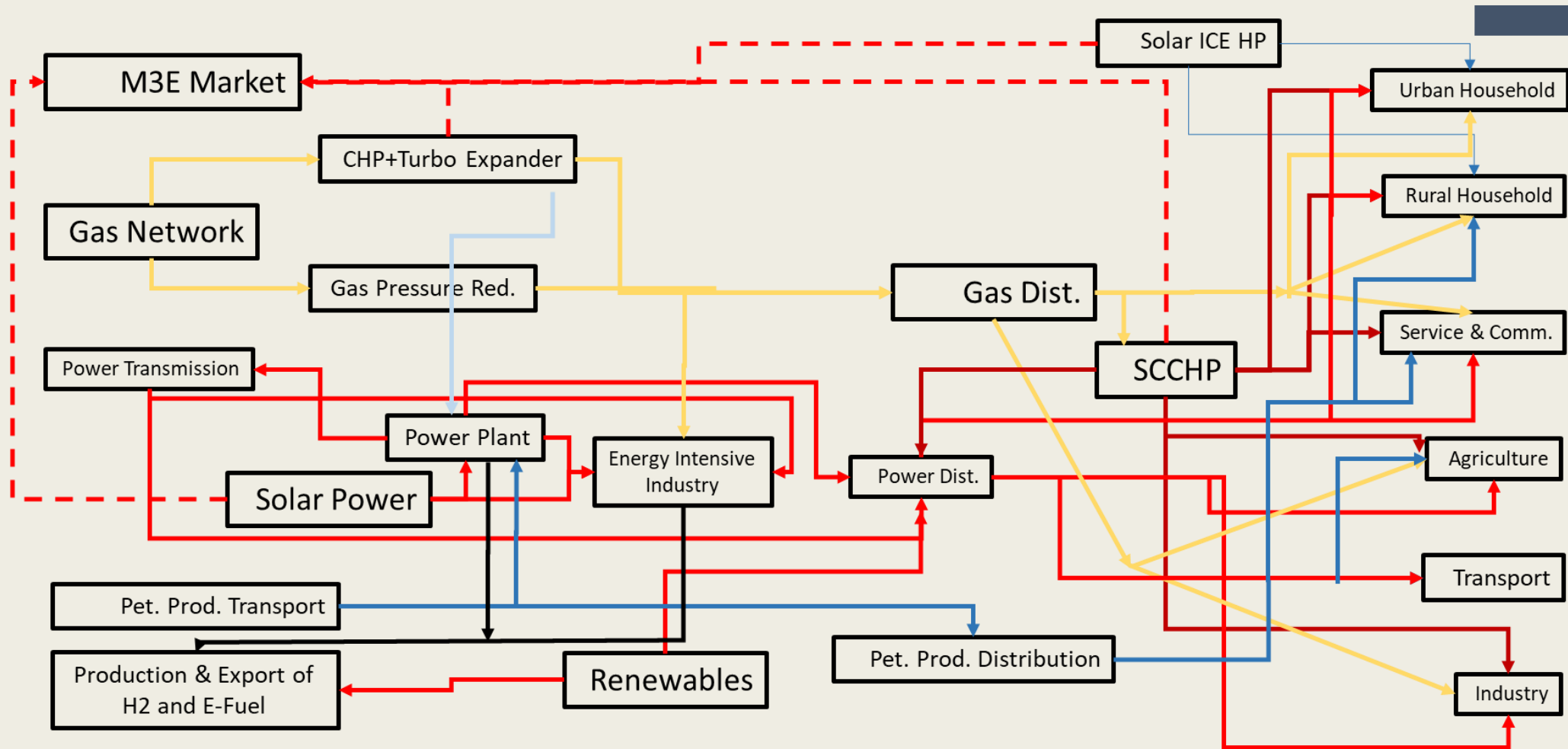
Existing Energy Reference System



Application of Systems Approach to Urban Energy Resilience



Dynamics of Transition to Efficient and Green Energy System



Source: NE³T GmbH – www.ne3t.de



Thank You

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