



Phase 2: Action Plan & Monitoring *Specific monitoring indicators and key measures*

Towards a Smart City Goris, 10 - 11 April 2015, Goris, Armenia



The Smart city process

- Phase 1: Pyramid Workshop
 - Key measures and key indicators were developed.
- Phase 2: Monitoring, Indicators and Action Plan
 - Monitoring indicators for future monitoring are recommended (this presentation)
 - Recommended key measures will be converted into an action plan



- Phase 3: Implementation & Evaluation
 - Implementation of sustainable solutions and publishing of regular progress report

Dimension 'Environment'

| Indicator name | Unit | Data availability | Relevance | Explanation & Comments |
|---|----------------------------|-------------------|-----------|---|
| Ambient concentrations of air pollutants in urban areas | [PM10 and PM2.5] | | low | Air pollutants are monitored in neighbour cities, It can be assumed that air pollution is not a major problem, due to the lack of heavy industry and low traffic. |
| Total greenhouse gas emissions from transport sector. | [% of total GHG emissions] | | low | Greenhouse gas accounts are calculated only on a national basis |
| Percentage of protected natural area | [%] | | medium | No protected areas within the city boundaries |
| Heat exposure: Combined number of hot days (>35°C) and tropical nights (minimum temperature, T _{min} >20 °C) | [days] | | medium | Goris is exposed to extreme temperatures. Solar power is hardly used. Inefficient heating systems are prevalent. |
| Percentage of households connected to piped water | [%] | | high | Access to safe water is a millenium development goal and is fulfilled in the case of Goris |
| Compliance with drinking water standards | [% of sample tests] | | high | Access to safe water is a millenium development goal and is fulfilled in the case of Goris |
| Water consumption per capita | [L/cap day] | | high | Water consumption was referred to 100 lit. per capita and day. This value would below average African standards. |
| Water system leakages: Percentage of water lost in the water distribution system. | [%] | | medium | Obtained information seems reasonable. However, Goris is not suffering from water shortages. Water exists in sufficient quantities |
| Soil Sealing (low or non permeable layers) per capita | [m ² /cap] | | low | No data available. Goris is neither suffering from land take nor is it a fast growing city. In the contrary, Goris population was shrinking in recent years and land take was not an issue. |
| Eutrophication: algal bloom events, nutrient levels (algal bloom events) | [km ² /yr] | | medium | Waste water is directly drained to Goris river without treatment. Eutrophication is an issue downstream of Goris. River biodiversity is affected and fish from the river cannot be exploited. |
| Green areas per capita | [ha/cap] | | high | There is a clear lack of public green areas in Goris. |
| Change in number of native species | | not discussed | medium | |
| Policy, rules and regulations re. local biodiversity . | | not discussed | medium | |
| Disaster prevention and mitigation instruments (checklist) | checklist | | medium | Flooding occurs frequently in the city area and has an impact on the topography of the city (i.e. changes of soil levels etc.). The existing flood control facility is in bad condition and does not work |
| Air pollution is a major problem | perception survey | not discussed | medium | It can be assumed that air pollution is not a major problem, due to the lack of heavy industry and low traffic. |
| Fisheries (Over-exploitation of resources): Annual catch of major fish target species | | not discussed | low | |
| Tourism intensity: Value of tourism & employment in the sector tourism | | not discussed | high | |

| Development Field | Sub Topic | Core / Alternative Indicator | Indicator name | Unit | Data availability | Relevance | In/Out | Why |
|--------------------------------|-------------------------|------------------------------|---|-----------------------|-------------------|-----------|--------|---|
| Air & Climate Change & Natural | Air quality | Alternative indicator | Air pollution is a major problem | perception survey | not discussed | medium | in | Recommended alternative indicator, as long as air pollution is not directly measures in Goris. |
| Air & Climate Change & Natural | Natural hazards | Core indicator | Vulnerability to heat, drought, flooding, earth quakes and other natural hazards | checklist | not discussed | high | in | Flooding was reported to occur frequently. Other incidents like earthquakes, land slides etc. were not discussed |
| Air & Climate Change & Natural | Natural hazards | Alternative indicator | Heat exposure | [days] | | medium | in | Alternative indicator relevant for additional cooling systems and specific protection for elder population. |
| Air & Climate Change & Natural | Natural hazards | Core indicator | Disaster prevention and mitigation instruments (checklist) | checklist | | medium | in | Disaster prevention and in particular mitigation measures can save lives. Educational measures are very cost effective |
| Freshwater & Oceans | Water quality | Core indicator | Percentage of households connected to piped water | [%] | | high | in | Access to safe water is a millenium development goal |
| Freshwater & Oceans | Water quality | Alternative indicator | Compliance with drinking water standards | [% of sample tests] | | high | in | Access to safe water is a millenium development goal |
| Freshwater & Oceans | Water quantity | Core indicator | Water consumption per capita | [L/cap day] | 100 | high | in | Key indicator of UN Habitat |
| Freshwater & Oceans | Water quantity | Alternative indicator | Water system leakages: Percentage of water lost in the water distribution system. | [%] | 52.4 | medium | in | Water losses in the distribution system are considerable, Repair of the system could contribute to more use efficiency and lower prices or financing of water treatment |
| Land & Biodiversity | Eutrophication | Core indicator | Eutrophication: algal bloom events, nutrient levels (algal bloom events) | [km ² /yr] | | medium | in | Goris has an issue with untreated waste water. Eutrophication is an indicator for river biodiversity |
| Land & Biodiversity | Recreation | Core indicator | Green areas per capita | [ha/cap] | 0.009 | high | in | There is a clear lack of public green areas in Goris. |
| Land & Biodiversity | Biodiversity Management | Core indicator | Percentage of protected natural area | [%] | | medium | in | Goris plans to expand their tourism sector. The protection and conservation of natural heritage is a benefit for the local citizens and attracts tourists |
| Land & Biodiversity | Biodiversity | Core indicator | Change in number of native species | | not discussed | medium | in | In the case of Goris at least a number of key species should be monitored |

Air & Climate Change & Natural Hazards

| | Indicator | Unit | Relevance | Comment |
|---|--|-------------------|-----------|--|
| A | Air quality | Perception survey | medium | Until direct measurement |
| C | Vulnerability to heat, drought, flooding, earth quakes and other natural hazards | Checklist | high | Flooding was reported to occur frequently. |
| A | Heat exposure | [days] | medium | Cooling, elderly people |
| C | Disaster prevention and mitigation instruments | Checklist | medium | Life-saving and cost-efficient measure |

A...Alternative indicator C...Core indicator

Freshwater & Oceans

| | Indicator | Unit | Relevance | Comment |
|---|---|---------------------|-----------|---|
| C | Percentage of households connected to piped water | [%] | high | Access to safe water is health and quality of live. |
| A | Compliance with drinking water standards | [% of sample tests] | high | ...Millennium development goal. |
| C | Water consumption per capita | [L/cap day] | high | UN Habitat key indicator |
| A | Water system leakages: Percentage of water lost in the water distribution system. | [%] | medium | Losses are high. Efficient system could raise funds for lower pricing or water treatment. |

A...Alternative indicator C...Core indicator

Land & Biodiversity

| | Indicator | Unit | Relevance | Comment |
|---|--|-----------------------|-----------|---|
| C | Eutrophication: algal bloom events, nutrient levels (algal bloom events) | [km ² /yr] | medium | Waste water is directly drained to Goris river. River biodiversity is affected and fish from the river cannot be exploited. |
| C | Green areas per capita | [ha/cap] | high | There is a clear lack of public green areas in Goris. |
| C | Percentage of protected natural area | [%] | medium | No protected areas within the city boundaries -> tourism |
| C | Change in number of native species | [x] | medium | In the case of Goris at least a number of key species should be monitored. |

A...Alternative indicator

C...Core indicator

| Recommended Key Measure | Impl. | Benefits | Resources, Effort | Priority |
|--|-------------|----------|-------------------|----------|
| Create new green public areas | Short term | High | Low | 1 |
| Establish waste management (i.e. collection and treatment) | Short term | High | Medium | 1 |
| Public awareness program "waste is a resource" | Short term | High | Low | 1 |
| Build a waste water treatment plant | Medium term | High | Medium | 2 |
| Repair the current flood control facility | Medium term | Medium | High | 2 |
| Restore and maintain the stock of cultural heritage | Medium term | High | High | 2 |
| Monitor air and water quality | Medium term | Medium | Low | 3 |

short term: < 2 years

medium term: 2 - 5 years

long term: > 5 years

Dimension 'Society'

| Indicator name | Unit | Data availability | Relevance | Assessment |
|---|---------------------------------------|-------------------|-----------|--|
| Unemployment rate by sex and age | [%], [1,000 cap] | | high | Partial data collected: cause of migration - it is linked to very low salary - feeling of lack of opportunity -very very important |
| Percentage of city population living in slums | [%] | | medium | This is not felt like important but it relates to refugees who mainly live in temporary shelters - 200 people are without any shelter and 67 families live in temporary shelters |
| Percentage of households connected to electricity / Share of households | [%] | | low | Good average, not a problem |
| Price of water | [US\$/1,000 L] | not discussed | | |
| Population with access to drinking water and sanitation | [%] | | low | Good average, not a problem |
| Perception of safety: Respondents feel safe in their neighbourhood; | [% of respondents] | not discussed | | Not asked in the questionnaire |
| Violent crime rate per 100,000 population | [x/ 100,000] | | low | Goris is safe - not felt as important |
| Citizens participation | | | high | |
| Voter's participation | [%] | not discussed | | |
| Share of female city representatives | [%] | | low | Not considered a problem - there are jokes regarding the discrimination of men since apparently gender equality is not an issue in general in Armenia |
| Local government revenue | [US\$/yr] | | high | There is a lack of public infrastructure and scarce maintenance of public buildings included the historical heritage sites |
| Tax collected as percentage of tax billed | [%] | not discussed | | |
| Average life expectancy of urban population [yr] | [yrs] | | medium | The average in Goris is slightly higher than the national average of 71.5 (WHO 2011) |
| Under-five mortality | [%] | | medium | The share in Goris is slightly lower the national average of 12.4 (UNICEF 2013) |
| Health expenditure per capita | [US\$/cap] | | high | Misleading indicator, it should be explained - if we take the definition of the World Bank the result is negative since the country (or the city) spends very low amount per capita (it includes prevention); if we consider the indicator as the money spent by the people then it is either positive because it can mean that people are healthy and don't need to spend money on their healthcare or negative since it can mean that they cannot afford to pay for their healthcare |
| Number of in-patient hospital beds per 100,000 population | [x/100,000 cap] | | low | Participants referred to 2 hospitals, one of which is specialized in cardiology and that they worked fine |
| Major diseases (HIV, malaria, tuberculosis) | [x/100,000 cap] | | high | The presence of an hospital specialized in cardiology made me think that heart diseases can be an issue here, in fact by looking at the results of the world health ranking the major cause of death in Armenia is coronary heart diseases (29%) followed by stroke (16%) - by looking at the causes of these two issues I can deduce that main problems here are smoking, high blood pressure, hohesity, cholesterol and diabetes |
| Satisfaction with quality of educational system | | not discussed | | Not asked in the questionnaire |
| Number of higher education degrees per 100,000 | [x/ 100,000 cap] | | low | Not considered as a problem - education is very important and many people graduate |
| Percentage of students completing primary education | [%] | | low | Not considered a problem - good average |
| Percentage of male and female school-aged population enrolled in school | [%] | | low | Not considered a problem - good average |
| Number of libraries per 100,000 population | [x/100,000 cap] | | low | Not considered a problem -2 libraries for 22.000 inhabitants is a good average |
| Literacy rates, Percentage of the population, male and female, aged 15 | [%] | | low | Not considered a problem |
| Share of senior citizens (> 65y) / Heat and drought sensitivity | [%] | | medium | It was not considered per se a big issue in fact the share of the seniors is 1.5% |
| Resident population density (met_d3dens), heat exposure | [cap /km ² urbanised area] | | low | Not considered a problem |
| Urban population growth | [%/yr] | | high | Goris's population is slightly shrinking, which is linked to unemployment, migration and feeling this lack of opportunities |
| Share of foreigners; Share of nationals born abroad | [%] | | medium | The main issue for this indicator are the refugees (discussed above) who are mainly left to live in slums due to the lack of social housing |

| Development Field | Sub Topic | Core / Alternative Indicator | Indicator name | Unit | Data availability | Relevance | In / Out | Why |
|-------------------|---------------------------|------------------------------|---|-------------------|-------------------|-----------|----------|---|
| Social Issues | Employment | Core indicator | Unemployment rate by sex and age | [%], [1,000 cap] | | high | in | Habitat Agenda Goal 16 |
| Social Issues | Housing | Core indicator | Percentage of city population living in slums | [%] | | medium | in | Habitat Agenda Goal 1: Promote the right to adequate housing |
| Social Issues | Housing | Core indicator | Social housing as percentage of total housing | [%] | not discussed | high | in | An indicator on social housing was specifically asked for by the workshop participants |
| Social Issues | Poverty | Core indicator | Percentage of households connected to electricity / Share of households | [%] | | low | in | Habitat Agenda Goal 5: Promote access to basic services |
| Social Issues | Poverty | Core indicator | Price of water | [US\$/1,000 L] | not discussed | | in | Habitat Agenda Goal 10: Manage supply and demand for water in an effective manner |
| Social Issues | Water quality | Core indicator | Population with access to drinking water and sanitation | [%] | | low | in | Habitat Agenda Goal 5: Promote access to basic services |
| Governance | Participation & Awareness | Core indicator | Citizens participation | [checkboxlist] | | high | in | Workshop participants emphasised the general lack of citizen participation but also awareness that citizens can actively participate in issues related to their city |
| Governance | Participation & Awareness | Core indicator | Voter's participation | [%] | not discussed | | in | This indicator would contribute to the topic citizens participation |
| Governance | Safety and Security | Additional indicator | Violent crime rate per 100,000 population | [x/ 100,000] | | low | in | |
| Governance | Social Equity | Alternative indicator | Share of female city representatives | [%] | | low | in | |
| Governance | Social Equity | Alternative indicator | City budget per year | [US/yr] | not discussed | high | in | This indicator was proposed by workshop participants instead of "Local government revenue " |
| Health | Diseases | Core indicator | Major causes of death | [% of key causes] | not discussed | high | in | Alternative indicator , this indicator was proposed by workshop participants as alternative indicator instead of "Major diseases (HIV, malaria, tuberculosis)" |
| Health | Life Expectancy | Core indicator | Average life expectancy of urban population [yr] | [yrs] | | medium | in | Habitat Agenda Goal 6: Provide equal opportunities for a safe and healthy life |
| Health | Life Expectancy | Core indicator | Under-five mortality | [%] | | medium | in | Habitat Agenda Goal 6: Provide equal opportunities for a safe and healthy life |
| Health | Medicare | Core indicator | Number of in-patient hospital beds per 100,000 population | [x/100,000 cap] | | low | in | This indicator provides information on the comprehensiveness sufficiency of the medical system |
| Education | Higher education | Core indicator | Higher education degrees according to graduation types | [%] | | low | in | Workshop participants asked for a more detailed specification; i.e. university degrees, high school degrees, etc. --> to be further elaborated with local experts |
| Education | Literacy | Additional indicator | Literacy rates | [%] | | low | in | Habitat Agenda Goal 8: Promote gender equality in human settlements development |
| Education | Primary Education | Additional indicator | Percentage of students completing primary education | [%] | | low | in | This indicator was considered as basic information and not an issues for Goris |
| Education | Skills & Training | Core indicator | Training opportunities for adults | [?] | not discussed | high | in | This indicators was suggested by WS participants. Skills and training is considered a very important topic by the people since they feel there is a lack of training courses or in general a lack of skilled/qualified people better indicator. To be further elaborated with local experts |
| Demography | Aging | Core indicator | Share of senior citizens (> 65y) | [%] | | medium | in | This indicator provides additional information with regard to sensitivity to heat and drought |
| Demography | Population Stat. | Alternative indicator | Urban population growth | [%/yr] | | high | in | |
| Demography | Population Stat. | Alternative indicator | Share of foreigners; Share of nationals born abroad | [%] | | medium | in | social housing was conceived as a bad problem, people cannot afford to buy/rent a house |

Social Issues

| | Indicator | Unit | Relevance | Comment |
|---|---|-------------------------|-----------|---------------------------------|
| C | Unemployment rate by sex and age | [%] | High | very important issue |
| C | Percentage of city population living in slums | [%] | Medium | It is related to social housing |
| C | Share of households without electricity or other modern energy services | [%] | Low | Cooling, elderly people |
| C | Price of water | [US \$/m ³] | Low | not discussed |
| C | Share of population with access to drinkwater and sanitation | [%] | Low | |

A...Alternative indicator C...Core indicator

Governance

| | Indicator | Unit | Relevance | Comment |
|---|--|-------------|-----------|---|
| P | Perception of safety | [%] | low | not discussed |
| C | Violent crime rate per 100.000 inhabitants | [x/10 0000] | low | Goris is very safe |
| C | Citizens participation | [%] | high | not asked in the questionnaire, but very important |
| C | Voter's participation | [%] | medium | not discussed |
| A | Share of female city representatives | [%] | Low | |
| A | Local government revenue | [US\$/yr] | high | Lack of public infrastructure investments and maintenance |
| A | Tax collected as percentage of tax billed | [%] | Low | not discussed |

A...Alternative indicator

C...Core indicator

P...Perceptive indicator

Health

| | Indicator | Unit | Relevance | Comment |
|---|---|---------------|-----------|--|
| C | Average life expectancy of urban population [yr] | [yrs] | medium | the average in Goris is slightly higher than the national average of 71.5 (WHO 2011) |
| C | Under-five mortality | [%] | medium | the share in Goris is slightly lower the national average of 12.4 (UNICEF 2013) |
| C | Health expenditure per capita | [US\$/cap] | high | It includes expenditure for prevention, but misleading |
| C | Change in number of native species | [x] | medium | In the case of Goris at least a number of key species should be monitored. |
| C | Number of in-patient hospital beds per 100000 inhabitants | [x/100000cap] | low | There are two hospitals in Goris, one is specialized |
| C | Major diseases (HIV, malaria, tuberculosis) | [x/100000cap] | high | |

Education

| | Indicator | Unit | Relevance | Comment |
|---|--|-----------------|------------|--|
| P | Satisfaction with quality of educational system | [%] | low | not discussed |
| A | Number of higher education degrees per 100.000 inhabitants | [x/100 000cap] | Low/medium | Education is important for economy development too |
| C | Share of students completing primary education | [%] | low | good average |
| A | Share of male and female school-aged population enrolled in school | [%] | low | good average |
| C | Number of libraries per 100000 population | [x/100 000cap] | Low | 2 libraries for about 22000 inhabitants |
| C | Literacy rate | [%] | high | Share elder as 15, who is able to read and write |

Demography

| | Indicator | Unit | Relevance | Comment |
|---|--|---|-----------|-------------------------------------|
| C | Share of citizens (>65y) (Heat and draught sensitivity) | [%] | medium | The share of seniors is about 1.5 % |
| C | Resident population density (met_d3dens), heat exposure | [cap/k m ² urba nised] | low | |
| A | Urban population growth | [%/yr] | high | |
| A | Share of foreigners (Share of nationals born abroad) | [%] | medium | relevant for the refugees in Goris |

A...Alternative indicator

C...Core indicator

P...Perceptive indicator

| Recommended Key Measure | Impl. | Benefits | Resources, Effort | Priority |
|--|-------------|----------|-------------------|----------|
| Attract foreign investments (employment) | Long term | High | High | 1 |
| Facilitate entrepreneurship and the opening of new businesses (employment) | Medium term | High | Medium | 1 |
| Construction of social houses (housing) | Long term | High | High | 1 |
| Creation of a proper framework for growth | Long term | High | High | 1 |
| Encourage co-housing (housing) | Medium term | Medium | High | 2 |
| Awareness program 'healthy mind for healthy people' | Short term | Medium | Low | 2 |

short term: < 2 years

medium term: 2 - 5 years

long term: > 5 years

| Recommended Key Measure | Impl | Benefits | Resources, Effort | Priority |
|---|------------|----------|-------------------|----------|
| Creation of professional courses for young and adults | Short term | Medium | Low | 2 |
| Maintain the historical buildings (housing) | Long term | Medium | High | 3 |
| Decentralization of national investments (social equity) | Long term | High | Medium/High | 3 |
| Conversion of existing buildings in recreation centers (diseases/life expectancy) | Short term | High | Medium | 3 |

short term: < 2 years

medium term: 2 - 5 years

long term: > 5 years

Dimension 'Economy'

Economy

Tested Indicators

| Development Field | Sub Topic | Score | Indicator name | Unit | Data availability | Relevance | Explanation & Comments |
|--------------------------|-------------|-------------------------------------|---|---------------------------|-------------------|-----------|---|
| Economy & Prosperity | Innovation | Alternative Indicator | Municipal R & D expenditure | [% of normal city budget] | | medium | Althought the level seems to be low by 0.3 % it's high compared to 0.02 % R & D of national GDP, R & D kann be an important leverage effect; The value 0.3 % has been estimated by |
| Economy & Prosperity | Housing | Core Indicator | Internet penetration at households | [%] | | medium | 75% household penetration estimated by participants of city administration at the first workshop in Goris. This is a quite high value and is similar to the average value all of |
| Economy & Prosperity | Housing | Core Indicator | Housing price and rent-to-income | [%] | | high | The value of about 60 % has been intensively discussed (leading up to 100 % in the winter for some households caused by energy costs) and estimated by participants of city |
| Economy & Prosperity | Economy | Core Indicator | Gross Domestic product (GDP) per capita of the City | [Euro/cap] | | medium | Goris is in the range of average economical performance and income in Armenia with is about 12.5 Mio. Drum or 2500 Euro per month. Compared with other smaller cities and |
| Production & Consumption | Energy | Core Indicator | Electricity consumption of households per capita | [kWh/(cap.year)] | | high | Representatives from city administration committed at the Smart City workshop in Goris to the value of 572,5 kWh/cap from national statistics for Goris households. |
| Production & Consumption | Transport | Core Indicator | Modal split of passenger transport in person kilometers in the city area | [% of sample tests] | | medium | No data available |
| Production & Consumption | Transport | Alternative Indicator | Car owners of city inhabitants per 1000 capita | [x/1000cap] | | medium | Representatives from city administration committed at the Smart City workshop in Goris to the value of about 100 cars/1000cap from national statistics for Goris. |
| Production & Consumption | Waste | Core Indicator | Regular solid waste collection | [%] | | high | Representatives from city administration committed at the Smart City workshop in Goris to the value of 100% from national statistics for Goris. But there is a problem to see all around in |
| Production & Consumption | Safety | Core Indicator | Number of road accidents per 1000 capita | [x/1000cap] | | low | Representatives from city administration committed at the Smart City workshop in Goris to the value of 0.02 accidents per 1000 cap from national statistics for Goris. The definition of an |
| Production & Consumption | Transport | Alternative Indicator 1 | Pedestrian infrastructure | [km/km ²] | | low | The value of 80/0.02 from the national statistics hasn't been understood clear without definitions and explanations. |
| Production & Consumption | Transport | Alternative Indicator 2 | Share of pedestrian friendly infrastructure | [%] | | low | The value of 71% is derived by a model of Umweltbundesamt using information from the city planner about street width at smart city workshop in Goris and maps of Goris and estimations |
| Production & Consumption | Transport | Alternative Indicator 3 | Street quality for pedestrians | [%] | | low | The value of 23,5% is derived by a model of Umweltbundesamt using information from the city planner about street width at smart city workshop in Goris and maps of Goris and |
| Production & Consumption | Transport | Alternative Indicator | Bicycle infrastructure | [km/km ²] | | low | There is no bicycle infrastructure in Goris. |
| Production & Consumption | Environment | Core Indicator | Greenhouse gas emissions measured in tonnes of CO2 equivalents per capita | [t CO2eq/cap] | | high | No data available |
| Production & Consumption | Transport | Alternative Indicator | Superior public transport network | [km/km ²] | | medium | There is a public transport system by bus in Goris. The value of 40/0.04 from the national statistics hasn't been understood clear without definitions and explanations. |
| Economy & Prosperity | Economy | Additional Indicator asked by Goris | Number of SME per 1000 capita | [SME/1000cap] | | high | About 60 registered SMEs per 1000 capita; Informalino of city representatives at the smart city workshop in Goris (1200 registered SMEs but only a view are active and about 20000 |
| Economy & Prosperity | Economy | Additional Indicator asked by Goris | Unemployment of young people | [%] | | high | 38,3 % (www.destatis.de; national average) share of unemployed inhabitants younger than 35 years of all inhabitants able to work and younger than 35 years |

Economy & Prosperity

| | Indicator | Unit | Relevance | Comment |
|---|--|----------------|-----------|--|
| A | Share of municipal R & D expenditure to normal budget (Innovation) | [%] | medium | 0.3 % in Goris; 0.02 % R & D of national GDP |
| C | Internet penetration at households (Housing) | [%] | medium | 75% (high value) |
| C | Housing price and rent-to-income (Housing) | [%] | high | 60% (similar to the national average) |
| C | Gross Domestic Product (GDP) per capita of the City (Economy) | [Euro /cap] | medium | About 2500 Euro/cap (similar to the national average, average income 12,5 Mio Drum/year) |
| L | Number of SME per 1000 capita (Economy) | [SME /1000cap] | high | About 52/cap (1200 registered but only some are active) |
| L | Unemployment of young people, age<35 (Economy) | [%] | high | 38,3 % (national average), have to be measured by city |

Production & Consumption 1/2

| | Indicator | Unit | Relevance | Comment |
|---|--|---------------------|-----------|--|
| C | Electricity consumption of households per capita (Energy) | [kWh / (cap. year)] | high | 572,5 kWh/cap from national statistics, have to be measured by Goris |
| C | Modal split of passenger transport in person kilometers in the city area (Transport) | [%/%/ %/ %] | medium | no data available, have to be measured by Goris |
| A | Car owners of city inhabitants per 1000 capita (Transport) | [x/1000cap] | medium | National about 100 cars/1000 inhabitants, have to be measured |
| C | Regular solid waste collection (Waste) | [%] | high | 100% is the official value of the city |
| C | Number of road accidents per 1000 capita (Safty) | [x/1000cap] | low | National value: 0.02 accidents per 1000 capita |

Production & Consumption 2/2

| | Indicator | Unit | Relevance | Comment |
|---|---|---------------------------------------|-----------|--|
| A | Pedestrian infrastructure (Transport) | [km/km ²] | low | The value of 80/0.02 is from the national statistics |
| A | Share of pedestrian friendly infrastructure (Transport) | [%] | low | The value of 71% is derived by a map model |
| A | Street quality for pedestrians (Transport) | [% km ² /km ²] | low | The value of 23,5% is derived by a map model |
| A | Bicycle infrastructure (Transport) | [km/km ²] | low | There is no bicycle infrastructure in Goris. |
| C | GHG emissions per capita (Environment) | [tCO ₂ eq/cap] | high | not available |
| A | Superior public transport network (Transport) | [km/km ²] | medium | The value of 40/0.04 is from the national statistics |

| Recommended Key Measure | Impl. | Benefits | Resources, Effort | Priority |
|--|-------------|----------|-------------------|----------|
| Technology investment program to improve infrastructure and environment | Medium term | High | High | 1 |
| Tourism and culture information and promotion program | Short term | Medium | Low | 1 |
| Goris as an Environmental Centre | Short term | Medium | Medium | 2 |
| Settlement of science based industry | Medium term | High | Medium/High | 2 |
| Land and buildings with attractive infrastructure for new or activated SMEs | Short term | Low | Low | 3 |
| Intensive advertising of regional products and services (e.g. at "Day of Goris") | Short term | Low | Low | 3 |

short term: < 2 years

medium term: 2 - 5 years

long term: > 5 years

Elements of a technology investment program to improve infrastructure and environment

| Priority | Measure | Comment |
|----------|--|---|
| 1. | Biological sewage plant | or alternative a normal cleaning facility |
| 2. | Solid waste management including some recycling for second use | This measure needs waste separation and awareness support |
| 3. | Use of regional natural stones for buildings and infrastructure including flood protection | |
| 4. | Windows and roofs energy efficiency improvement program | |
| 5. | Lighting efficiency program for public and private infrastructure | |
| 6. | Solar thermal program for hot water preparation | |

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