

Figure 4. Planning, Permitting and Implementing Authorities

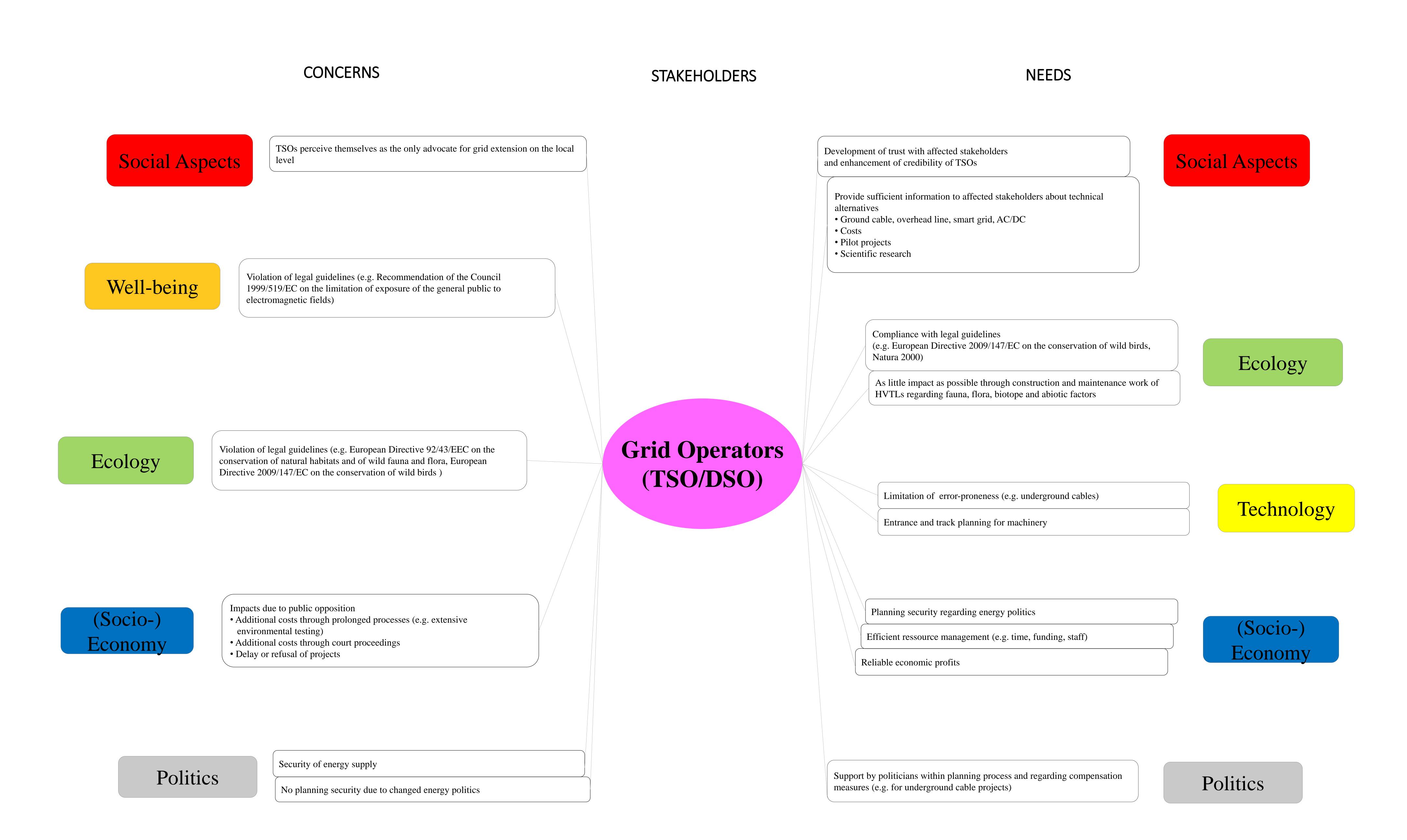


Figure 5. Grid Operators

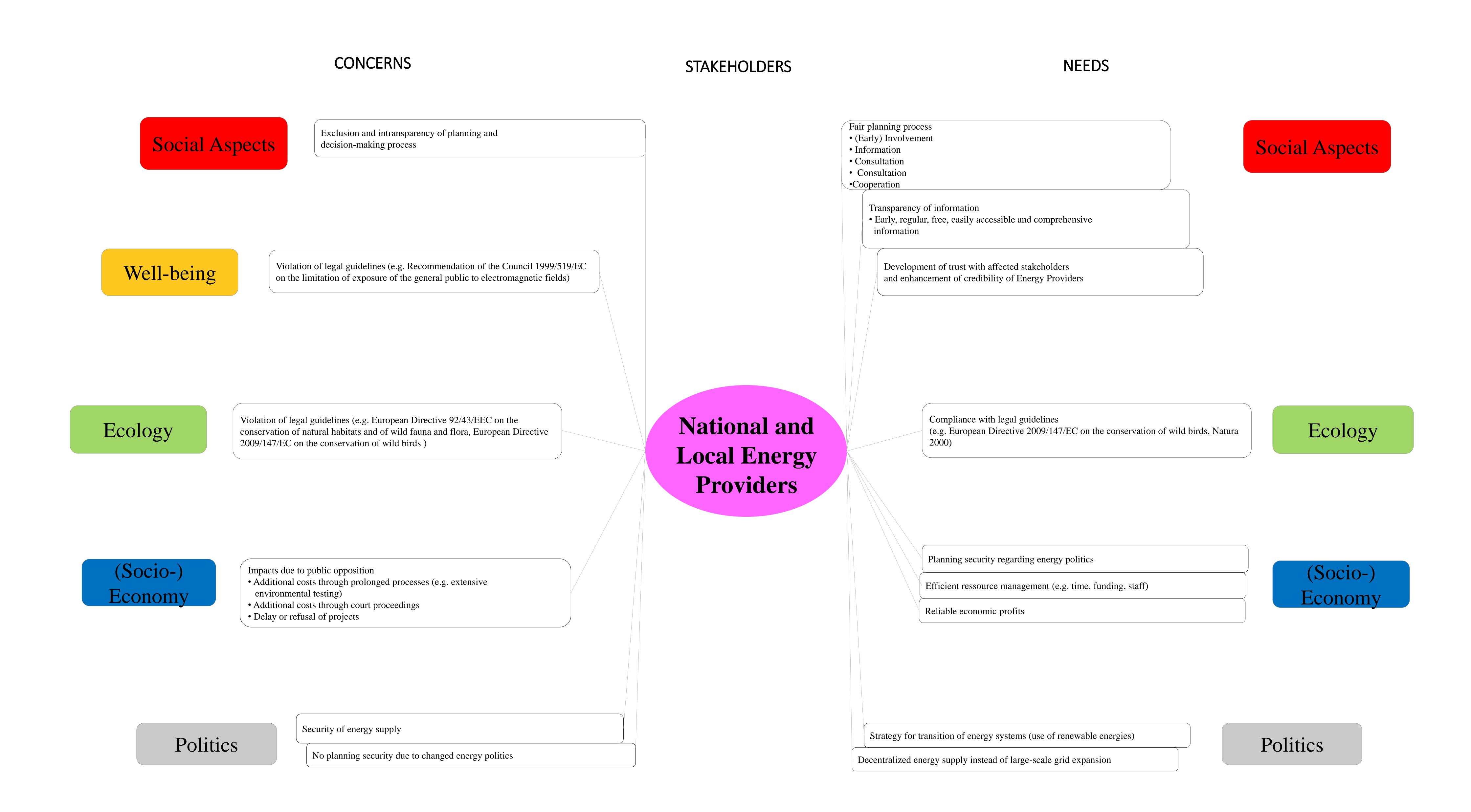


Figure 6. National and Local Energy Providers

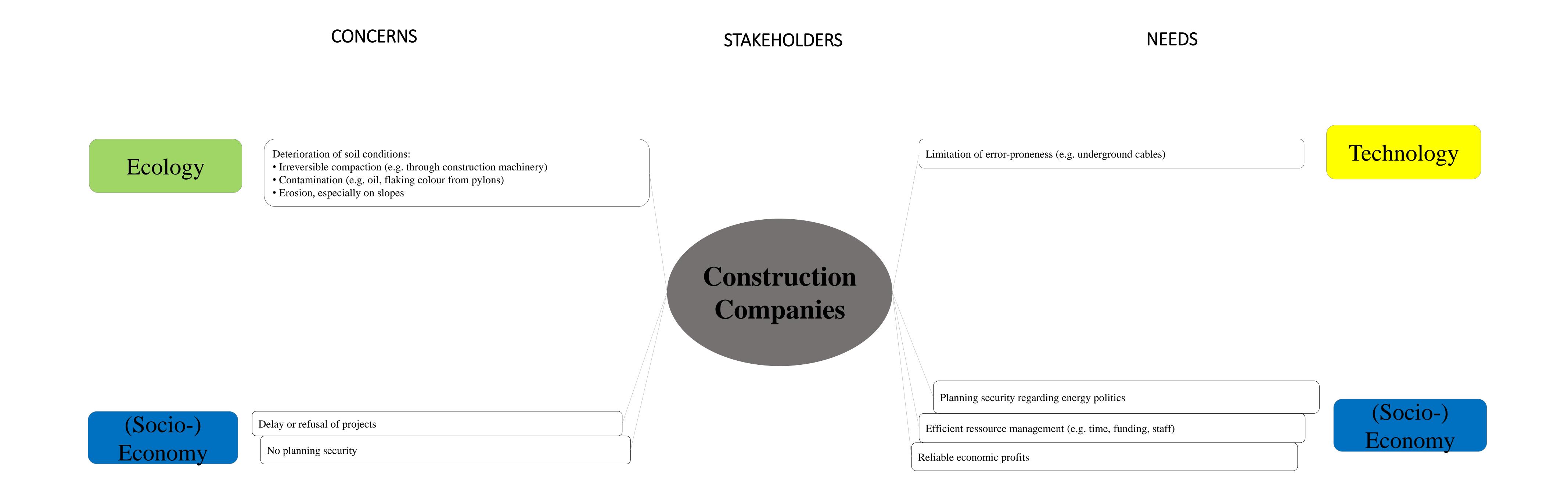
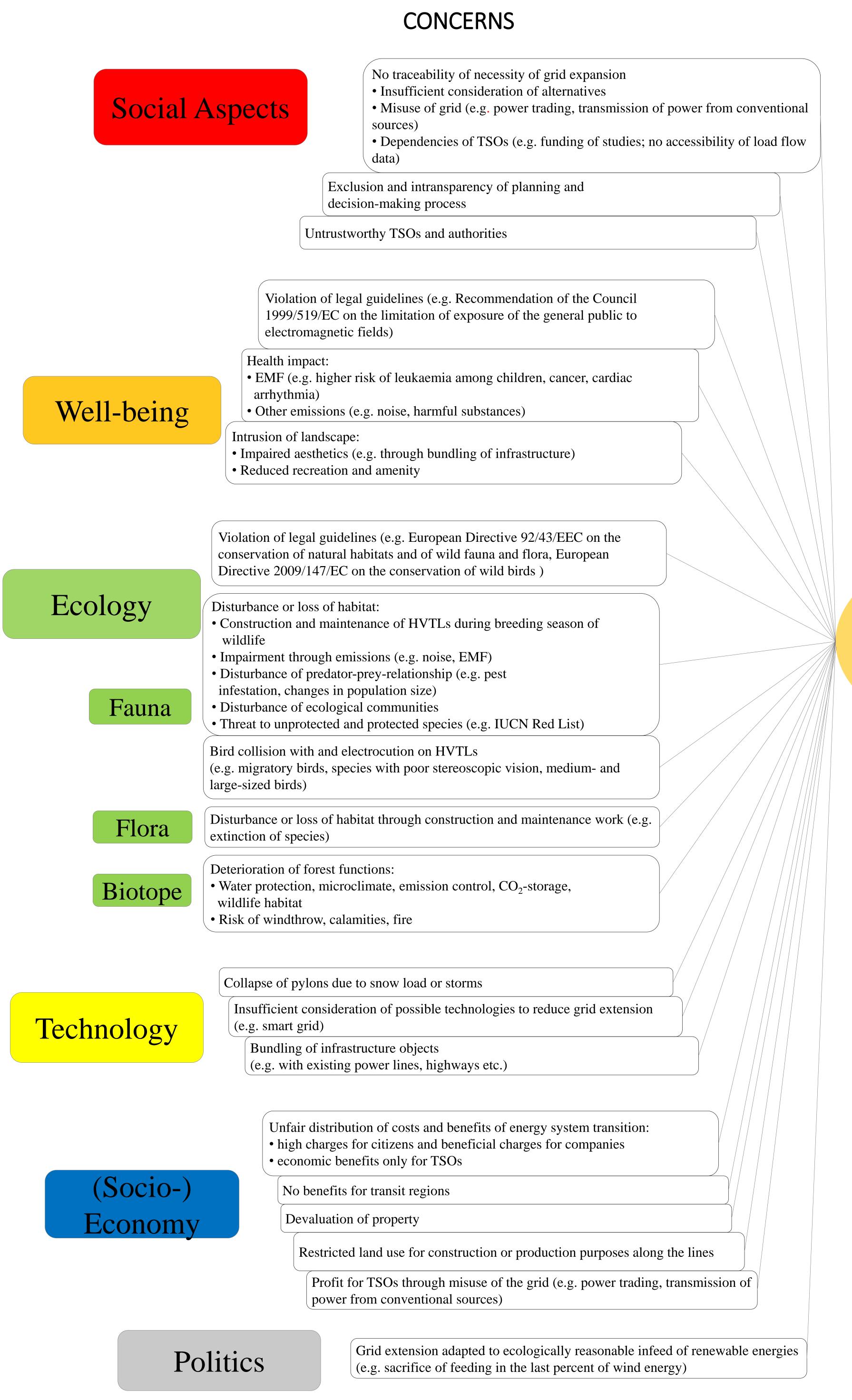
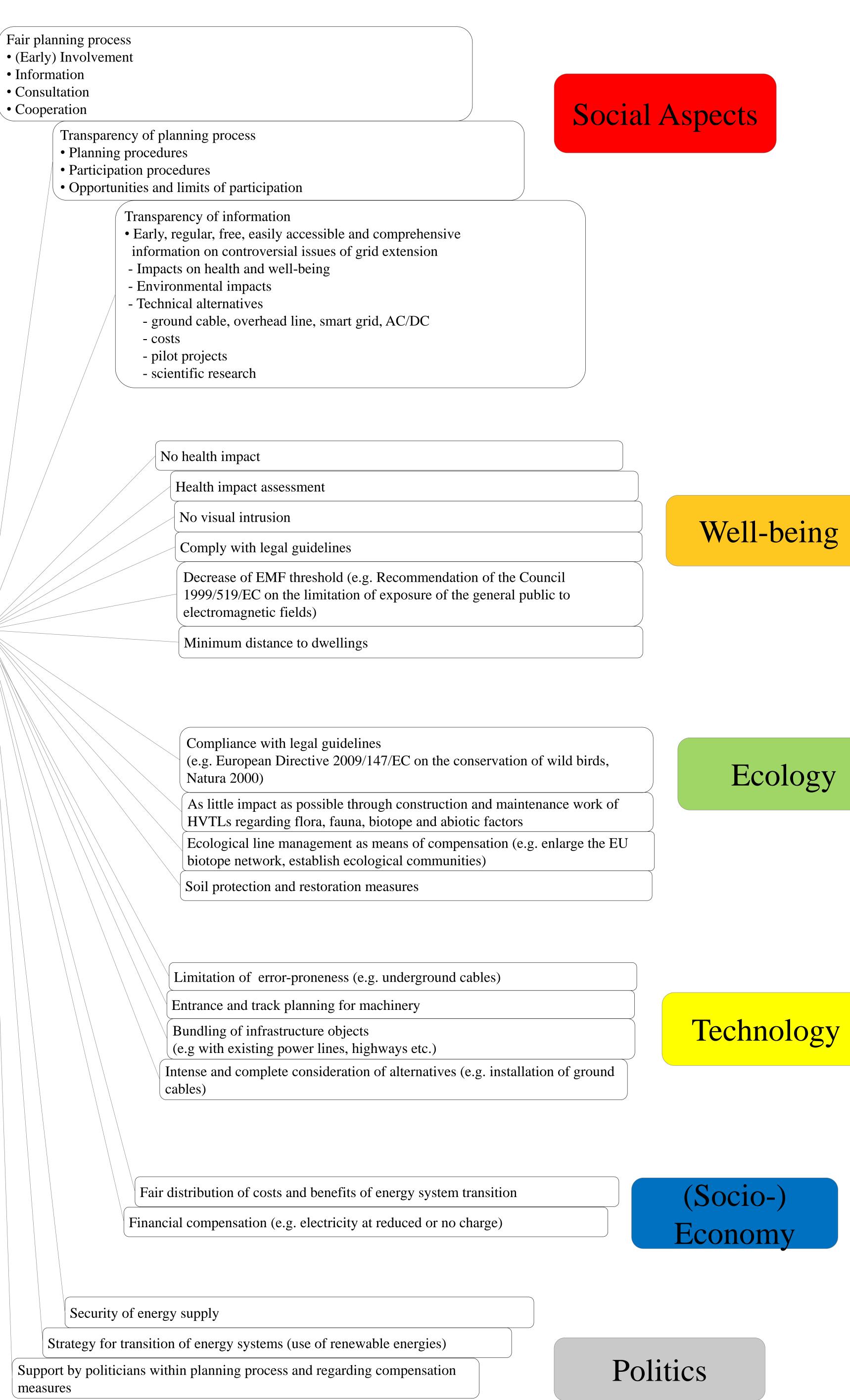


Figure 7. Construction Companies



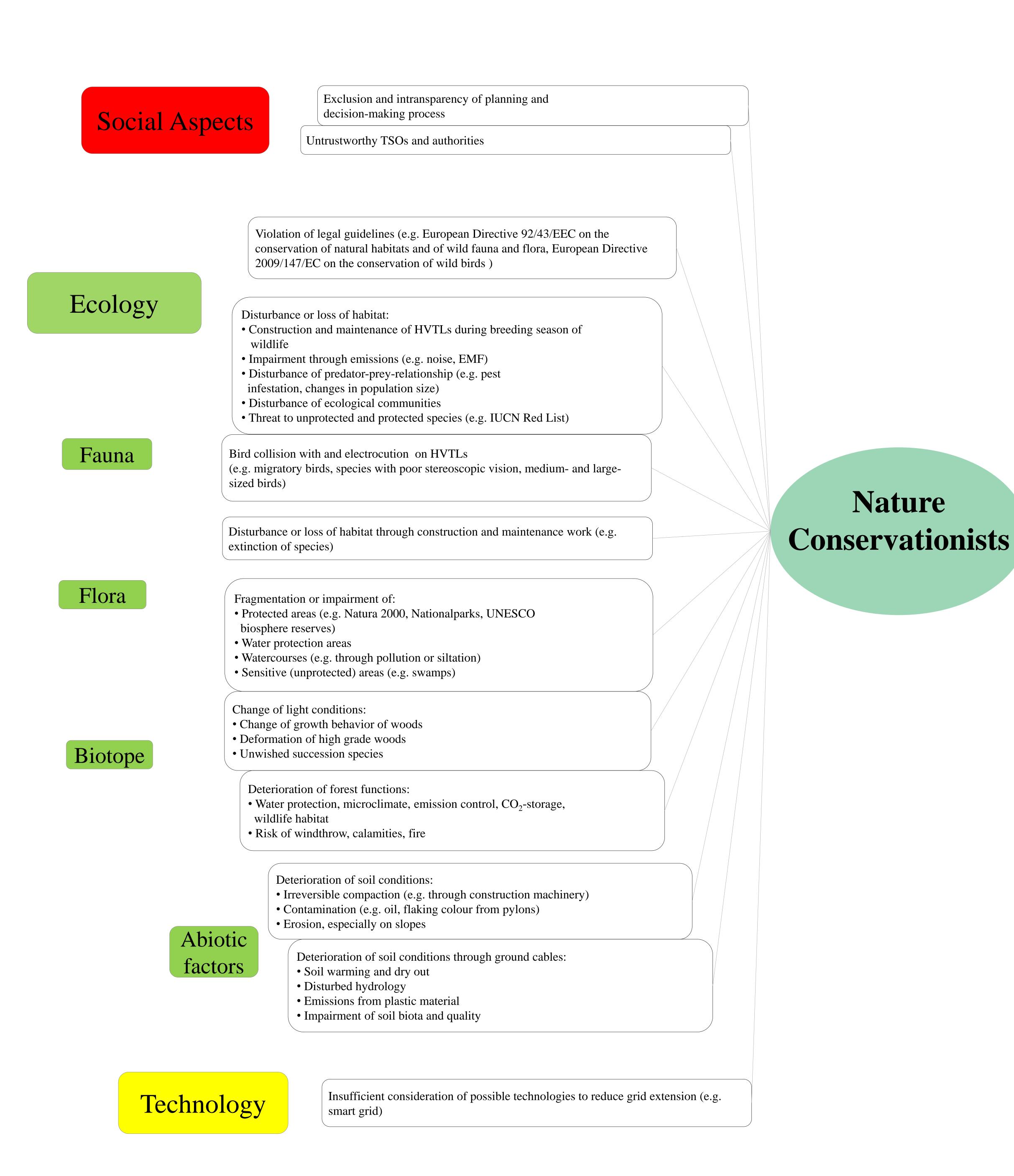
## STAKEHOLDERS NEEDS



Broad public Residents
Civil Initiatives

CONCERNS STAKEHOLDERS **NEEDS** 

Nature



Fair planning process • (Early) Involvement Social Aspects Information Consultation Cooperation Transparency of planning process Planning procedures Participation procedures Opportunities and limits of participation Transparency of information • Early, regular, free, easily accessible and comprehensive information on controversial issues of grid extension - Impacts on health and well-being - Environmental impacts - Technical alternatives - ground cable, overhead line, smart grid, AC/DC - costs pilot projects - scientific research Compliance with legal guidelines (e.g. European Directive 2009/147/EC on the conservation of wild birds, Natura As little impact as possible through construction and maintenance work of HVTLs Ecology regarding flora, fauna, biotope and abiotic factors Ecological line management as means of compensation (e.g. enlarge the EU biotope network, establish ecological communities) Soil protection and restoration measures Limitation of error-proneness (e.g. underground cables) Entrance and track planning for machinery Technology Bundling of infrastructure objects (e.g with existing power lines, highways etc.) Strategy for transition of energy systems (use of renewable energies) Support by politicians within planning process and regarding nature compensation Politics Grid extension adapted to ecologically reasonable infeed of renewable energies

(e.g. sacrifice of feeding in the last percent of wind energy)

Figure 9. National Conservationists

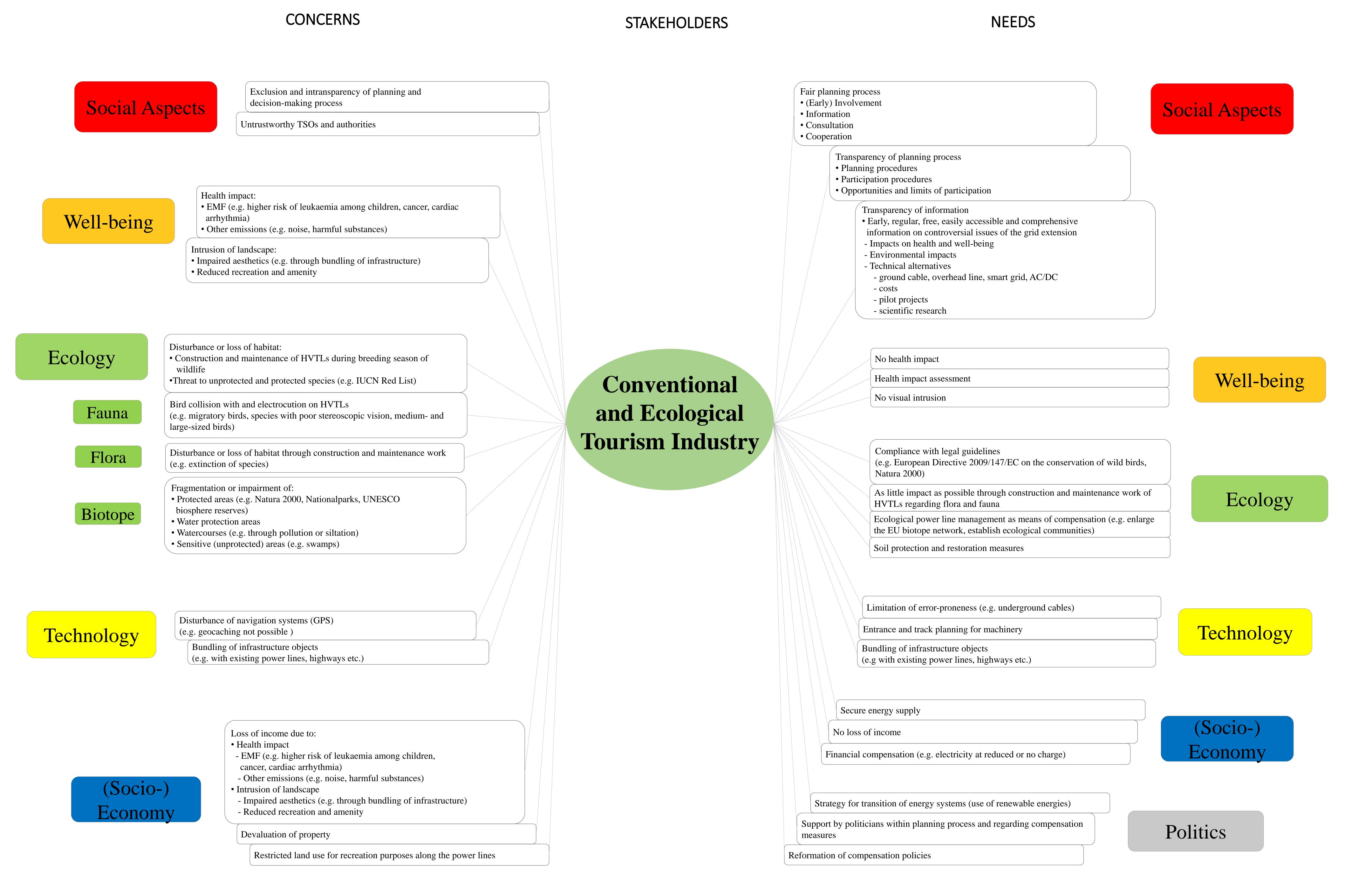
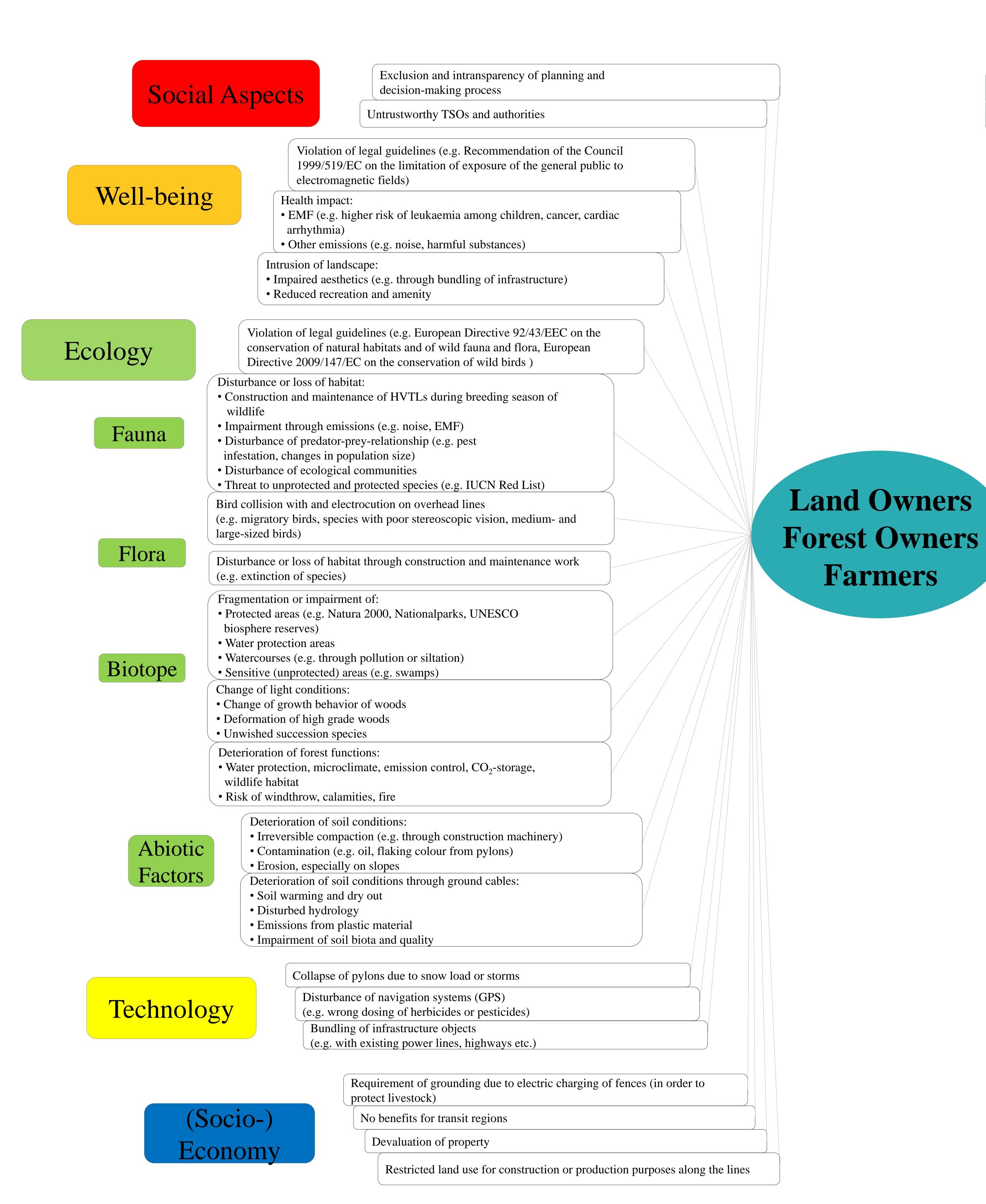


Figure 10. Conventional and Ecological Tourism Industry

CONCERNS **NEEDS** STAKEHOLDERS

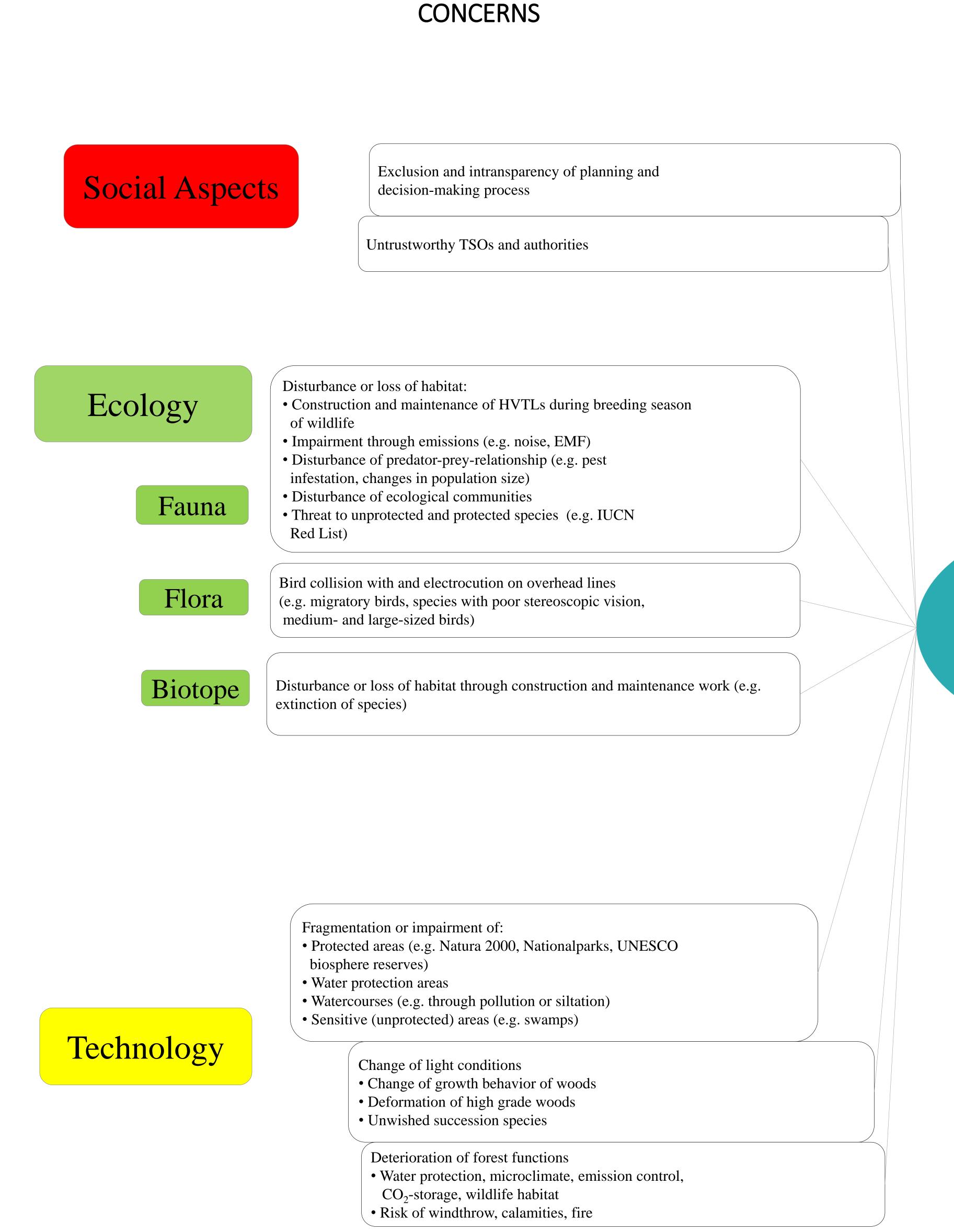
**Farmers** 

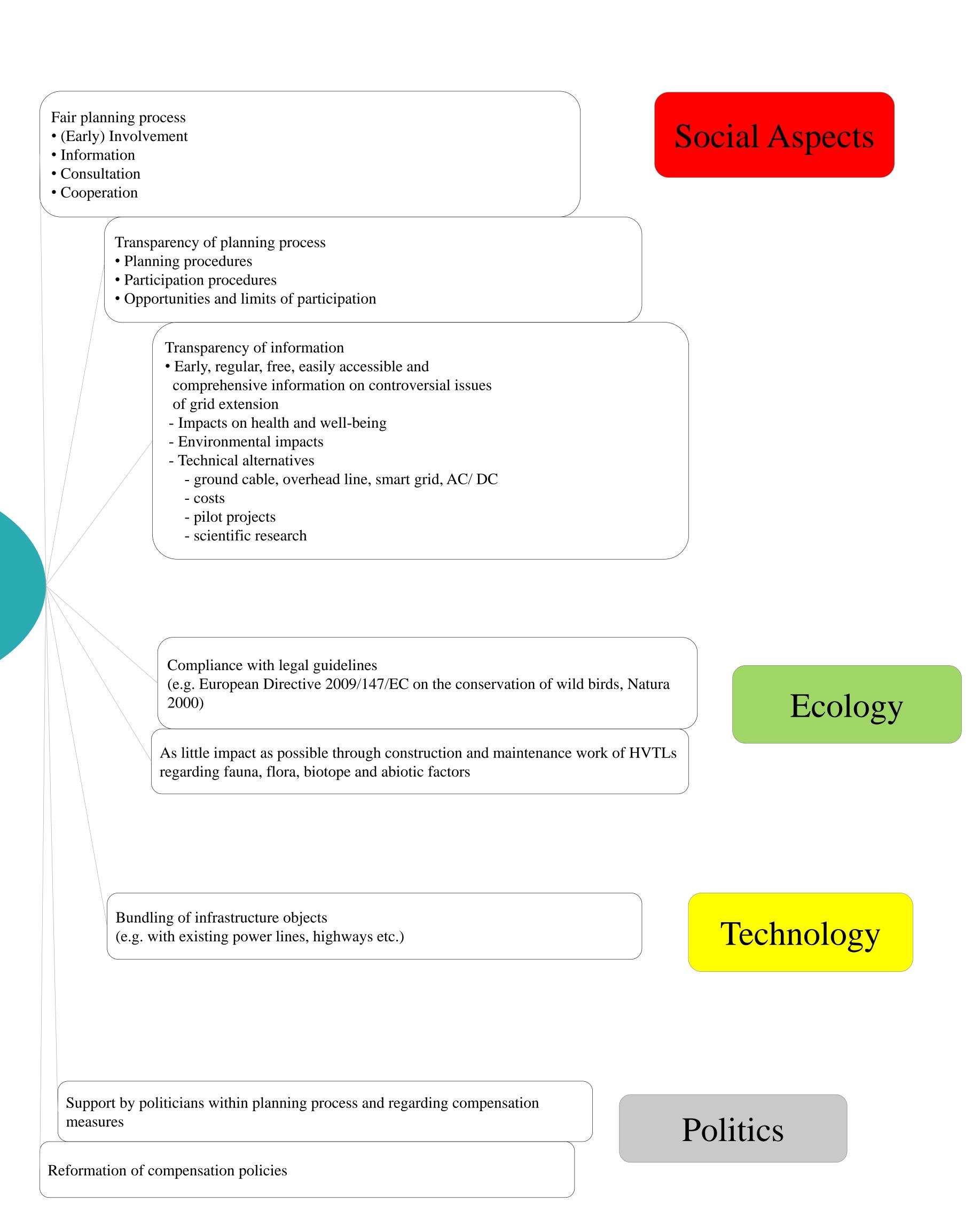


Fair planning process • (Early) Involvement Social Aspects Information Consultation Cooperation Transparency of planning process Planning procedures Participation procedures Opportunities and limits of participation Transparency of information • Early, regular, free, easily accessible and comprehensive information on controversial issues of grid extension - Impacts on health and well-being - Environmental impacts - Technical alternatives - ground cable, overhead line, smart grid, AC/DC - costs - pilot projects - scientific research No health impact Well-being Health impact assessment No visual intrusion Compliance with legal guidelines (e.g. European Directive 2009/147/EC on the conservation of wild birds, Natura 2000) As little impact as possible through construction and maintenance work of HVTLs regarding fauna, flora, biotope and abiotic factors Ecology Ecological line management as means of compensation (e.g. enlarge the EU biotope network, establish ecological communities) No consumption of arable land as means of compensation for conservation purposes Soil protection and restoration measures Limitation of error-proneness (e.g. underground cables) Entrance and track planning for machinery Technology Bundling of infrastructure objects (e.g with existing power lines, highways etc.) Land use under HVTLs (e.g. traditional orchards, livestock, (Socio-) Forest use under HVTLs (e.g. short rotation, coppice, production of Christmas trees) Economy Financial compensation: • Shareholding (e.g. dividends, loans) • Electricity at reduced or no charge Strategy for transition of energy systems (use of renewable energies) Support by politicians within planning process and regarding compensation Politics measures

Reformation of compensation policies (e.g. regular loan)

Figure 11. Land Owners, Forest Owners and Farmers





**NEEDS** 

STAKEHOLDERS

Hunters

Exclusion and intransparency of planning and CONCERNS **NEEDS** STAKEHOLDERS Fair planning process decision-making process • (Early) Involvement Information Untrustworthy TSOs and authorities Consultation Perceived as assistant for TSOs and not independent institution Cooperation TSOs perceive themselves as the only advocate for grid extension on the local level Social Aspects Transparency of planning process **Planning authorities:** No traceability of necessity of grid expansion • Planning procedures • Insufficient consideration of alternatives Participation procedures EU, national, federal • Misuse of grid (e.g. power trading, transmission of power from conventional sources) • Opportunities and limits of participation states, communal • Dependencies of TSOs (e.g. funding of studies; no accessibility of load flow data) Transparency of information Violation of legal guidelines (e.g. Recommendation of the Council 1999/519/EC on the • Early, regular, free, easily accessible and comprehensive limitation of exposure of the general public to electromagnetic fields) information on controversial issues of grid extension **Permitting authorities:** Social Aspects Health impact: - Impacts on health and well-being • EMF (e.g. higher risk of leukaemia among children, cancer, cardiac EU, national, federal - Environmental impacts Well-being - Technical alternatives arrhythmia) states, communal • Other emissions (e.g. noise, harmful substances) - ground cable, overhead line, smart grid, AC/DC Intrusion of landscape: - costs - pilot projects • Impaired aesthetics (e.g. through bundling of infrastructure) **Implementing** - scientific research • Reduced recreation and amenity authorities: EU, national, Development of trust with affected stakeholders Violation of legal guidelines (e.g. European Directive 92/43/EEC on the conservation of and enhancement of credibility of own institution federal states, communal natural habitats and of wild fauna and flora, European Directive 2009/147/EC on the Ecology conservation of wild birds) Provide sufficient information to affected stakeholders about technical alternatives • Ground cable, overhead line, smart grid, AC/DC Disturbance or loss of habitat: • Construction and maintenance of HVTLs during breeding season of • Costs • Pilot projects wildlife • Scientific research • Impairment through emissions (e.g. noise, EMF) Fauna • Disturbance of predator-prey-relationship (e.g. pest **Grid Operators** infestation, changes in population size) • Disturbance of ecological communities (TSO/DSO) • Threat to unprotected and protected species (e.g. IUCN Red List) No health impact Bird collision with and electrocution on overhead lines (e.g. migratory birds, species with poor stereoscopic vision, medium- and large-sized birds) Health impact assessment Disturbance or loss of habitat through construction and maintenance work (e.g. extinction of species) No visual intrusion Well-being **National and Local** Fragmentation or impairment of: Comply with legal guidelines (e.g. Recommendation of the Council 1999/519/EC on the **Energy Providers** Flora • Protected areas (e.g. Natura 2000, Nationalparks, UNESCO limitation of exposure of the general public to electromagnetic fields) biosphere reserves) • Water protection areas Decrease of EMF threshold (e.g. Recommendation of the Council 1999/519/EC on the • Watercourses (e.g. through pollution or siltation) limitation of exposure of the general public to electromagnetic fields) Sensitive (unprotected) areas (e.g. swamps) Minimum distance to dwellings Change of light conditions: • Change of growth behavior of woods • Deformation of high grade woods Construction • Unwished succession species Compliance with legal guidelines **Companies** Biotope Deterioration of forest functions: (e.g. European Directive 2009/147/EC on the conservation of wild birds, Natura 2000) • Water protection, microclimate, emission control, CO<sub>2</sub>-storage, As little impact as possible through construction and maintenance work of HVTLs wildlife habitat regarding fauna, flora, biotope and abiotic factors • Risk of windthrow, calamities, fire Ecology Ecological line management as means of compensation (e.g. enlarge the EU biotope Deterioration of soil conditions: network, establish ecological communities) • Irreversible compaction (e.g. through construction machinery) Abiotic • Contamination (e.g. oil, flaking colour from pylons) No consumption of arable land as means of compensation for conservation purposes **Broad public** • Erosion, especially on slopes Residents Soil protection and restoration measures Factors Deterioration of soil conditions through ground cables: **Civil Initiatives** • Soil warming and dry out • Disturbed hydrology Limitation of error-proneness (e.g. underground cables) • Emissions from plastic material • Impairment of soil biota and quality Entrance and track planning for machinery Collapse of pylons due to snow load or storms Technology Bundling of infrastructure objects Disturbance of navigation systems (GPS) Nature (e.g with existing power lines, highways etc.) (e.g. wrong dosing of herbicides or pesticides) Technology Conservationists Bundling of infrastructure objects Intense and complete consideration of alternatives (e.g. installation of ground cables) (e.g. with existing power lines, highways etc.) Insufficient consideration of possible technologies to reduce grid extension (e.g. smart grid) Planning security regarding energy politics Impacts due to public opposition • Additional costs through prolonged processes (e.g. extensive Secure energy supply environmental testing) No loss of income Additional costs through court proceedings **Conventional and** • Delay or refusal of projects Fair distribution of costs and benefits of energy system transition Loss of income due to: **Ecological Tourism** Efficient ressource management (e.g. time, funding, staff) • Health impact **Industry** Land use under HVTLs (e.g. traditional orchards, livestock, - EMF (e.g. higher risk of leukaemia among children, cancer, cardiac arrhythmia) Economy - Other emissions (e.g. noise, harmful substances) Reliable economic profits • Intrusion of landscape Forest use under HVTLs (e.g. short rotation, coppice, production of - Impaired aesthetics (e.g. through bundling of infrastructure) Christmas trees) - Reduced recreation and amenity **Land Owners** No benefits for transit regions Financial compensation: **Forest Owners** Economy • Shareholding (e.g. dividends, loans) Devaluation of property **Farmers** • Electricity at reduced or no charge Restricted land use for construction or production purposes along the lines Requirement of grounding due to electric charging of fences (in order to protect livestock) Delay or refusal of projects Reelection No planning security Hunters Unfair distribution of costs and benefits of energy system transition: Strategy for transition of energy systems (use of renewable energies) • high charges for citizens and beneficial charges for companies • economic benefits only for TSOs Support by politicians within planning process and regarding compensation measures Profit for TSOs through misuse of the grid (e.g. power trading, transmission of power from Reformation of compensation policies (e.g. regular loan) Politics conventional sources) Comply with legal guidelines Grid extension adapted to ecologically reasonable infeed of renewable energies (e.g. Media sacrifice of feeding in the last percent of wind energy) Decentralized energy supply instead of large-scale grid expansion Politics No reelection Grid extension adapted to ecologically reasonable infeed of renewable energies (e.g. sacrifice of feeding in the last percent of wind energy) No planning security due to changed energy politics

Figure 13. Joint Stakeholder Map

Figure 14. Stakeholder Map for a Specific Region

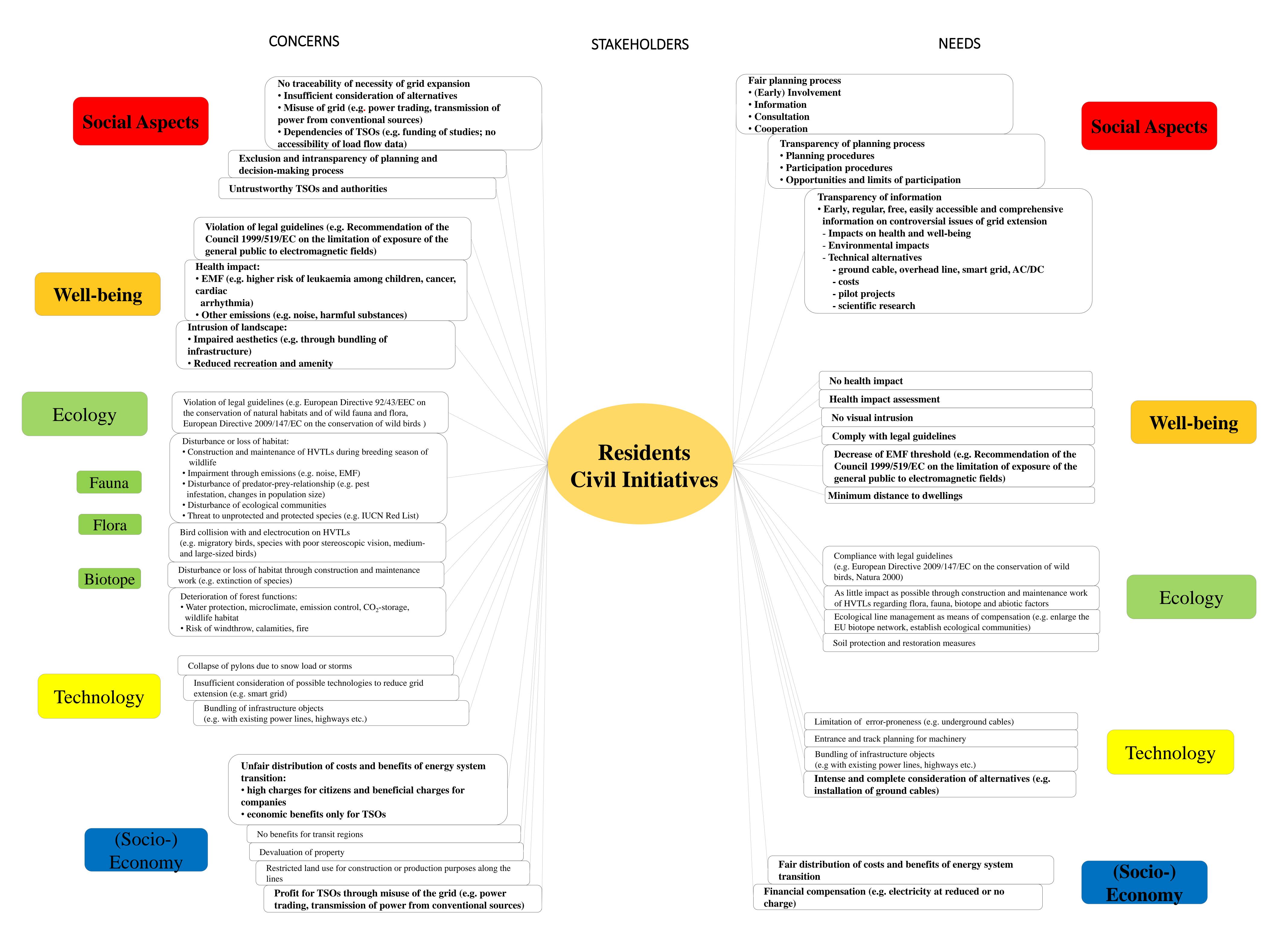


Figure 15. Concerns and Needs of Residents and CIs in a Specific Region

CONCERNS		NEEDS
<ul> <li>Exclusion and intransparency of planning and decision-making process</li> <li>Untrustworthy TSOs and authorities</li> <li>Perceived as assitant for TSOs and not independent institution</li> <li>TSOs perceive themselves as the only advocate for grid extension on the local level</li> <li>No traceability of necessity of grid expansion <ul> <li>Insufficient consideration of alternatives</li> <li>Misuse of grid (e.g. power trading, transmission of power from conventional sources)</li> <li>Dependencies of TSOs (e.g. funding of studies, no accessibility of load flow data)</li> </ul> </li> </ul>	Social Aspects	<ul> <li>Fairly planning process (Early Involvement, Information, Consultation, Cooperation)</li> <li>Transparency of planning process (Planning procedures, Participation procedures,         Opportunities and limits of participation)     </li> <li>Transparency of information (early, regular, free, easily accessible and comprehensive information on controversial issues of grid extension):         <ul> <li>impacts on health and well-being</li> <li>environmental impacts</li> <li>technical alternatives (ground cable, overhead line, smart grid, AC/DC; costs; pilot projects; scientific research)</li> </ul> </li> <li>Development of trust with affected stakeholders and enhancement of credibility of own institution</li> <li>Provide sufficient information to affected stakeholders about technical alternatives (ground cable, overhead lines, smart grid, AC/DC; costs; pilot projects; scientific research)</li> </ul>
<ul> <li>Violation of legal guidelines (e.g. Recommendation of the Council 1995/519/EC on the limitation of exposure of the general public to electromagnetic fields)</li> <li>Health impact:         <ul> <li>EMF (eg. higher risk of leukaemia among children, cancer, cardiac arrhythmia)</li> <li>Other emissions (e.g. noise, harmful substances)</li> </ul> </li> <li>Intrusion of landscape:         <ul> <li>Impaired aesthetics (e.g. through bundling of infrastructure)</li> <li>Reduced recreation and amenity</li> </ul> </li> </ul>	Well-being	<ul> <li>No health impact</li> <li>Health impact assessment</li> <li>No visual intrusion</li> <li>Comply with legal guidelines (e.g. Recommendation of the Council 1999/519/EC on the limitation of exposure of the general public to electromagnetic fields)</li> <li>Decrease of EMF threshold (e.g. Recommendation of the Council 1999/519/EC on the limitation of exposure of the general public to electromagnetic fields)</li> <li>Minimum distance to dwellings</li> </ul>
Violation of legal guidelines (e.g. European Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, European Directive 2009/147/EC on the conservation of wild birds)  Disturbance or loss of habitat:  Construction and maintenance of HVTLs during breeding season of wildlife, Impairment through immissions (e.g. noise, EMF) Disturbance of predator-prey-relationship (e.g. pest infestation, changes in population size), Disturbance of ecological communities Threat to unprotected and protected species (e.g. IUCN Red List) Bird collision with and electrocution on overhead lines (e.g. migratory birds, species with poor stereoscopic vision, medium- and large-sized birds) Disturbance or loss of habitat through construction and maintenance work (e.g. extinction of species) Fragmentation or impairment of: Protected areas (e.g. Natura 2000, Nationalparks, UNESCO biosphere reserves) Water protection areas and watercourses (e.g. through pollution or sittation) Sensitive (unprotected) areas (e.g. swamps) Change of light conditions: Change of light conditions: Unwished succession species Deterioration of light grade woods Unwished succession species Deterioration of forest functions: Water protection, microclimate, emission control, CO <sub>2</sub> -storage, wildlife habitat Risk of windthrow, calamities, fire Deterioration of soil conditions: Protected hydrology Deterioration of soil conditions through ground cables Soil warming and dry out Disturbed hydrology Emissions from plastic material Impairment of soil bious and quality	Ecology	Compliance with legal guidelines (e.g. European Directive 2009/147/EC on the conservation of wild birds. Natura 2000) As little impact as possible through construction and maintenance work of HVTLs regarding fauna, flora, biotope and abiotic factors. Ecological line management as means of compensation (e.g. enlarge the EU biotope network, establish ecological communities) No consumption of arable land as means of compensation for conservation purposes Soil protection and restoration measures
<ul> <li>Collapse of pylons due to snow load or storms</li> <li>Disturbance of navigation systems (GPS) (e.g. wrong dosing of herbicides or pesticides)</li> <li>Bundling of infrastructure objects (e.g. with existing power lines, highways etc.)</li> <li>Insufficient consideration of possible technologies to reduce grid extension (e.g. smart grid)</li> </ul>	Technology	<ul> <li>Limitation of error-proneness (e.g. underground cables)</li> <li>Entrance and track planning for machinery</li> <li>Bundling of infrastructure objects (e.g with existing power lines, highways etc.)</li> <li>Intense and complete consideration of alternatives (e.g. installation of ground cables)</li> </ul>
<ul> <li>Impacts due to public opposition <ul> <li>Additional costs through prolonged processes (e.g. extensive environmental testing)</li> <li>Additional costs through court</li> <li>Delay or refusal of projects</li> </ul> </li> <li>Loss of income due to: <ul> <li>Health impact: EMF (e.g. higher risk of leukaemia among children, cancer, cardiac arrhythmia), other emissions (e.g. noise, harmful substances)</li> <li>Intrusion of landscape: Impaired aesthetics (e.g. through bundling of infrastructure), reduced recreation and amenity</li> <li>No benefits for transit regions</li> </ul> </li> <li>Devaluation of property</li> <li>Delay or refusal of projects</li> <li>No planning security</li> <li>Restricted land use for construction or production purposes along the lines</li> <li>Requirement of grounding due to electric charging of fences (in order to protect livestock)</li> <li>Profit for TSOs through misuse of the grid (e.g. power trading, transmission of power from conventional sources)</li> <li>Unfair distribution of costs and benefits of energy system transition: <ul> <li>high charges for citizens and beneficial charges for companies</li> <li>cconomic benefits only for TSOs</li> </ul> </li> </ul>	(Socio-) Economy	<ul> <li>Planning security regarding energy politics</li> <li>Secure energy supply</li> <li>No loss of income</li> <li>Fair distribution of costs and benefits of energy system transition</li> <li>Efficient resource management (e.g. time, funding, staff)</li> <li>Land use under HVTLs (e.g. traditional orchards, livestock, meadows)</li> <li>Forest use under HVTLs (e.g. short rotation, coppice, production of Christmas trees)</li> <li>Reliable economic profits</li> <li>Financial compensation: <ul> <li>Shareholding (e.g. dividends, loans)</li> <li>Electricity at reduced or no charge</li> </ul> </li> </ul>
<ul> <li>Grid extension adapted to ecologically reasonable infeed of renewable energies (e.g. sacrifice of feeding in the last percent of wind energy)</li> <li>No reelection</li> <li>No planning security due to changed energy politics</li> </ul>	Politics	<ul> <li>Secure energy supply</li> <li>Reelection</li> <li>Transition of energy system (use of renewable energies)</li> <li>Support by politicians within planning process and regarding compensation measures</li> <li>Reformation of compensation policies (e.g. regular loan)</li> <li>Comply with legal guidelines</li> <li>Decentralized energy supply instead of large-scale grid expansion</li> <li>Grid extension adapted to ecologically reasonable infeed of renewable energies (e.g. sacrifice of feeding in the last percent of wind energy)</li> </ul>

Figure 18. Overview over all Concerns and Needs