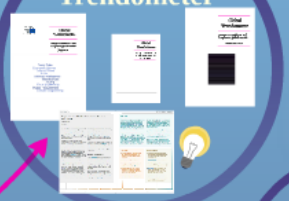
STRATEGIC FORESIGHT IN THE EUROPEAN PARLIAMENT: *THE GLOBAL TRENDS UNIT*

Providing the Members of the European Parliament with expertise on global trends

Global Trendometer



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The EU's Foresight System

- Enhancing foresight and anticipation -

ESPAS European Strategy and Policy Analysis System

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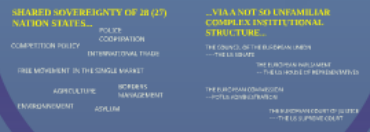
THE EUROPEAN UNION, A FORWARD-LOOKING PROJECT BY ESSENCE



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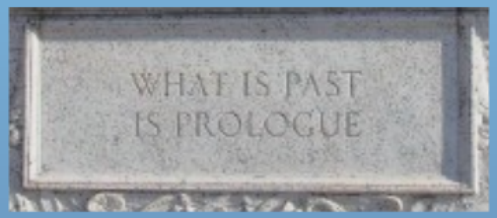

THE EUROPEAN UNION, A FORWARD-LOOKING PROJECT BY ESSENCE

SHARED SOVEREIGNTY OF 28 (27) NATION STATES...

POLICE COOPERATION

COMPETITION POLICY

INTERNATIONAL TRADE

FREE MOVEMENT IN THE SINGLE MARKET

BORDERS MANAGEMENT

AGRICULTURE

ENVIRONNEMENT

ASYLUM

...VIA A NOT SO UNFAMILIAR COMPLEX INSTITUTIONAL STRUCTURE...

THE COUNCIL OF THE EUROPEAN UNION
~~~THE US SENATE

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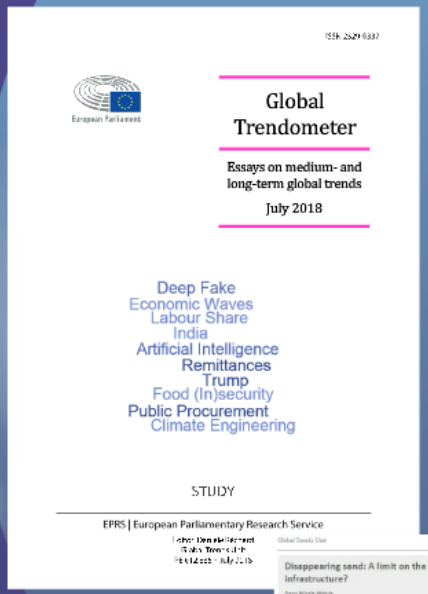

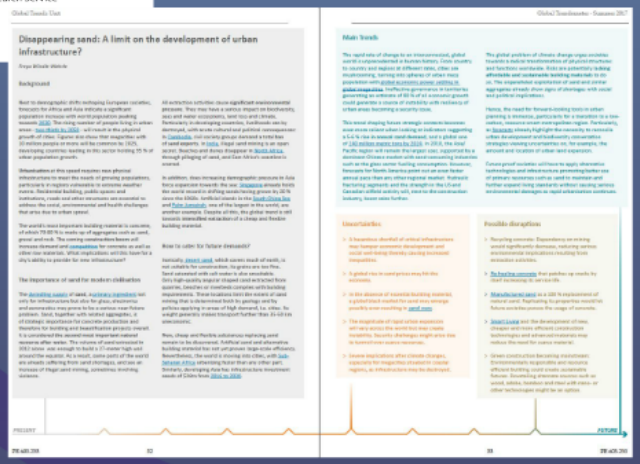

FOR

Disappearing sand: A limit on the development of urban infrastructure?

Freya Windle-Wehrle

Background

Next to demographic shifts reshaping European societies, forecasts for Africa and Asia indicate a significant population increase with world population peaking towards 2030. The rising number of people living in urban areas - two-thirds by 2050 - will result in the physical growth of cities. Figures also show that megacities with 10 million people or more will be common by 2025, developing countries leading in this sector holding 95 % of urban population growth.

Urbanisation at this speed requires new physical infrastructure to meet the needs of growing populations, particularly in regions vulnerable to extreme weather events. Residential building, public spaces and institutions, roads and other structures are essential to address the social, environmental and health challenges that arise due to urban sprawl.

The world's most important building material is concrete, of which 70-80 % is made up of aggregates such as sand, gravel and rock. The coming **construction boom** will increase demand and competition for concrete as well as other raw materials. What implications will this have for a city's ability to provide for new infrastructure?

The importance of sand for modern civilisation

The dwindling supply of **sand**, a primary ingredient not only for infrastructure but also for glass, electronics and aeronautics may prove to be a serious near-future problem. Sand, together with related aggregates, is of strategic importance for concrete production and therefore for building and beautification projects overall. It is considered **the second most important natural resource after water**. The volume of sand extracted in 2012 alone was enough to build a 27-meter high wall around the equator. As a result, some parts of the world are already suffering from sand shortages, and see an increase of illegal sand mining, sometimes involving violence.

All extraction activities cause **significant environmental pressure**. They may have a serious impact on biodiversity, seas and water ecosystems, land loss and climate. Particularly in developing countries, livelihoods can by destroyed, with acute cultural and political consequences: In Cambodia, civil society groups demand a total ban of **sand exports**. In India, illegal sand mining is an open secret. Beaches and dunes disappear in North Africa through pillaging of sand, and East Africa's coastline is scarred.

In addition, does increasing demographic pressure in Asia force expansion towards the sea: Singapore already holds the world record in shifting sands having grown by 20 % since the 1960s. Artificial islands in the South China Sea and Palm Jumeirah, one of the largest in the world, are another example. Despite all this, the global trend is still towards **intensified extraction** of a cheap and flexible building material.

How to cater for future demands?

Ironically, desert sand, which covers much of earth, is not suitable for construction; its grains are too fine. Sand saturated with salt water is also unsuitable. Only high-quality angular shaped sand extracted from quarries, beaches or riverbeds complies with building requirements. These locations limit the extent of sand mining that is determined both by geology and by policies applying in areas of high demand, i.e. cities. Its weight generally makes transport further than 35-50 km uneconomic.

New, cheap and flexible substances replacing sand remain to be discovered. Artificial sand and alternative building material has not yet proven large-scale efficiency. Nevertheless, the world is moving into cities, with Sub-Saharan Africa urbanising faster than any other part. Similarly, developing Asia has infrastructure investment needs of $26tn from 2016 to 2030.

Main Trends

The rapid rate of change to an interconnected, global world is unprecedented in human history. From country to country and regions at different rates, cities are mushrooming, turning into spheres of urban mass population with global economic power settling in global megacities. Ineffective governance in territories generating an estimate of 80 % of all economic growth could generate a source of instability with resiliency of urban areas becoming a security issue.

This trend shaping future strategic contexts becomes even more salient when looking at indicators suggesting **a 5-6 % rise in annual sand demand**, and a global one of 240 million metric tons by 2024. In 2018, the Asia/Pacific region will remain the largest user, supported by a dominant Chinese market with sand-consuming industries such as the glass sector fuelling consumption. However, forecasts for North America point out an even faster annual pace than any other regional market. Hydraulic fracturing segments and the strength in the US and Canadian oilfield activity will, next to the construction industry, boost sales further.

The global problem of climate change urges societies towards a radical transformation of physical structures and functions worldwide. Risks are potentially **lacking affordable and sustainable building materials** to do so. The unparalleled exploitation of sand and similar aggregates already show signs of shortages with social and political implications.

Hence, the need for forward-looking tools in urban planning is immense, particularly for a transition to a low-carbon, resource-smart metropolitan region. Particularly, as forecasts already highlight the necessity to reconcile urban development and biodiversity conversation strategies viewing uncertainties on, for example, the amount and location of urban land expansion.

Future proof societies will have to apply alternative technologies and infrastructure promoting better use of primary resources such as sand to maintain and further expand living standards without causing serious environmental damages as rapid urbanisation continues.

Uncertainties

- A hazardous shortfall of critical infrastructure may hamper economic development and social well-being thereby causing increased inequalities.
- A global rise in sand prices may hit the economy.
- In the absence of essential building material, a global black market for sand may emerge possibly even resulting in sand wars.
- The magnitude of rapid urban expansion will vary across the world but may create instability. Security challenges might arise due to turmoil over scarce resources.
- Severe implications after climate changes, especially for megacities situated in coastal regions, as infrastructure may be destroyed.

Possible disruptions

- Recycling concrete: Dependency on mining would significantly decrease, reducing serious environmental implications resulting from extraction activities.
- Re-healing concrete that patches up cracks by itself increasing its service life.
- Manufactured sand as a 100 % replacement of natural sand. Replicating its properties would let future societies pursue the usage of concrete.
- Smart Living and the development of new, cheaper and more efficient construction technologies and advanced materials may reduce the need for scarce material.
- Green construction becoming mainstream: Environmentally responsible and resource efficient building could create sustainable futures. Dovetailing alternate sources such as wood, adobe, bamboo and steel with nano- or other technologies might be an option.

FUTURE

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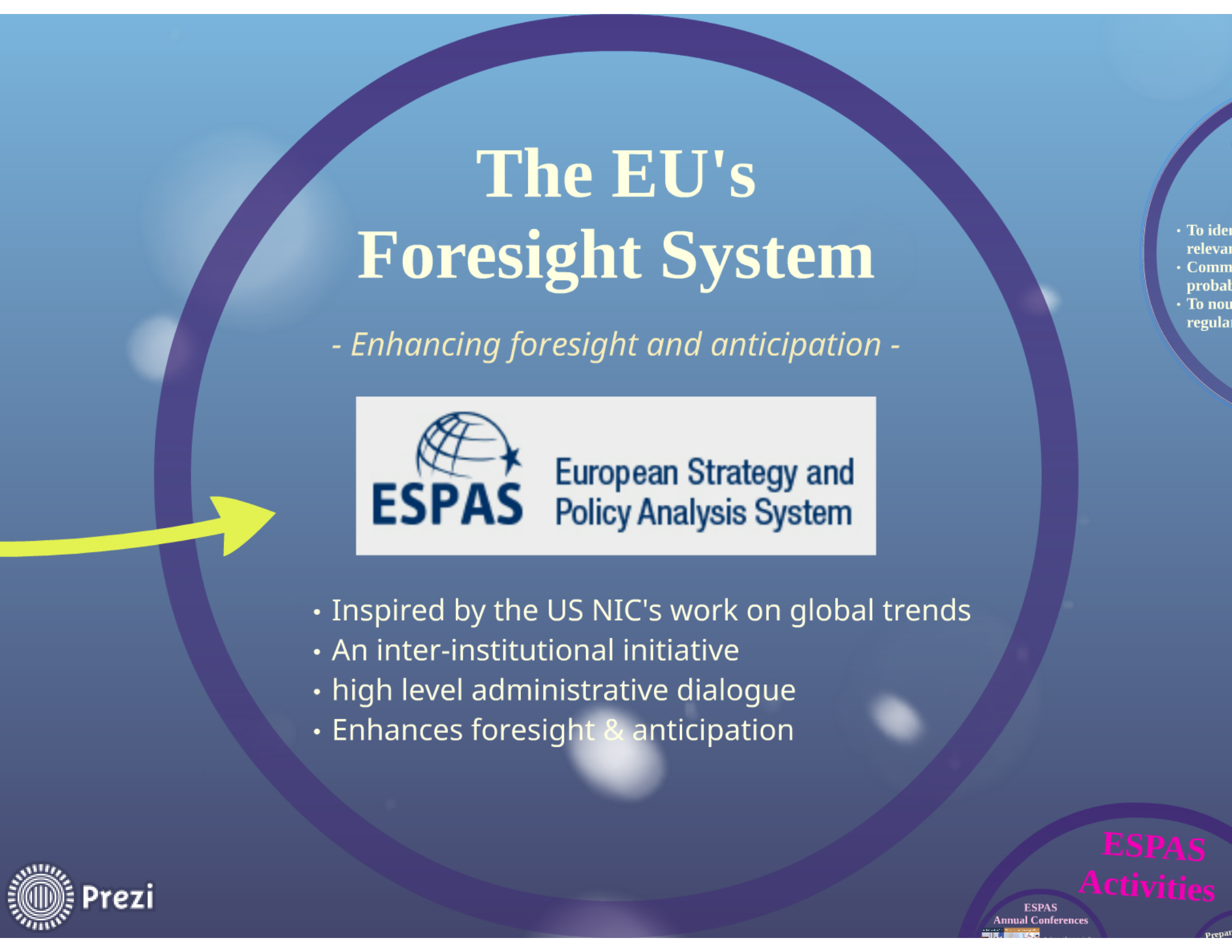

Objectives of ESPAS

- To identify global long-term trends relevant to the EU
- Common inter-institutional analysis of probable outcomes for policy makers
- To nourish strategic thinking through regular input to the EU institutions

Structure of ESPAS

Steering Group

Young Talent Network

ESPAS teams of each participating entity

ESPAS Activities

ESPAS Annual Conferences

- 2-day conference in the European Parliament and European Commission
- High-level experts
- International, multiperspective approach

28-29 November 2018:

Wapping up the foresight work done since 2014

Preparation of the 2019 ESPAS report

ESPAS Regular Activities

- ESPAS High Level Speakers Series
- Young Talent Network: "Breaking the silos at an early stage"
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ESPAS PLUS

KEY ASSUMPTIONS CHECK

Preparation of the 2019 ESPAS report

2015

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