The Oslo case: Handling environmental risk with urban planning

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1. Overview: Oslo, the capital of Norway
2. 1850-1980: Industrialization and environmental crisis
3. 1980-today: Redevelopment and the green city
4. Remaining challenges and future plans

Oslo today

- Oslo municipality: 640 000 pop.
- Oslo Metropolitan Area: 1 500 000 pop.

- The economic and governmental centre of Norway
- A hub of Norwegian trade, banking, industry and shipping.
- An important European centre for maritime industries and trade (shipping companies, shipbrokers, maritime insurance brokers).

- Oslo is considered a global city (an important node in the global economic system) and ranked ”Beta World City” (2012).
- For reference: Guangzhou is ranked ”Beta+ World City” (above Oslo) and Shenzhen is ranked ”Beta- World City” (below Oslo).

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- 1850-1930: The Industrial City emerges
  - *Factories and sevenfold increase in population*
- 1930-1970: Urban Expansion and the Car Age
  - *Urban growth, housing shortages, environmental crisis*
- 1970-1980s: Decline and mobilization
  - *Deindustrialization, depopulation, environmental crisis*
  - *Mass group incidents, policy development*

Agers Kirke
Frydenlund
Skramstuen
Bergslökken
Steensberg
Frydendal
Cecilienlyst
Udsigten
Ned. Fos
Præstegd
Byens Kgd
Bakkehuset
Berg
Fjerdingen
Delen Engen
Engels borg
Slottet
Lakkegaard
HAMMERSBORG
FJERDINGEN
Reberbane
Ruselökken
GRÆNDSEN
LAKKEGADEN
Bergslökken
Sophienberg
PIPERVIGEN
Sommerfryd
GRÖN-LAND
Enerhou
VATERLAND
Bord Tomt
Munkeklostergaard
Ageberg
Holmen
Pipervigs-
Bugten
Hovi
Bæk
Kranen
Ladegaard
AGERSHUUS
Bjärvigen
OPSLO
Bispegaard
FÆSTNING
Observatorium
Saxegaard
Löen Elv.
Opslo Kir
Dolhuus
CHRISTIANIA FJORD

Oslo 1840

1850-1930: The industrial city emerges

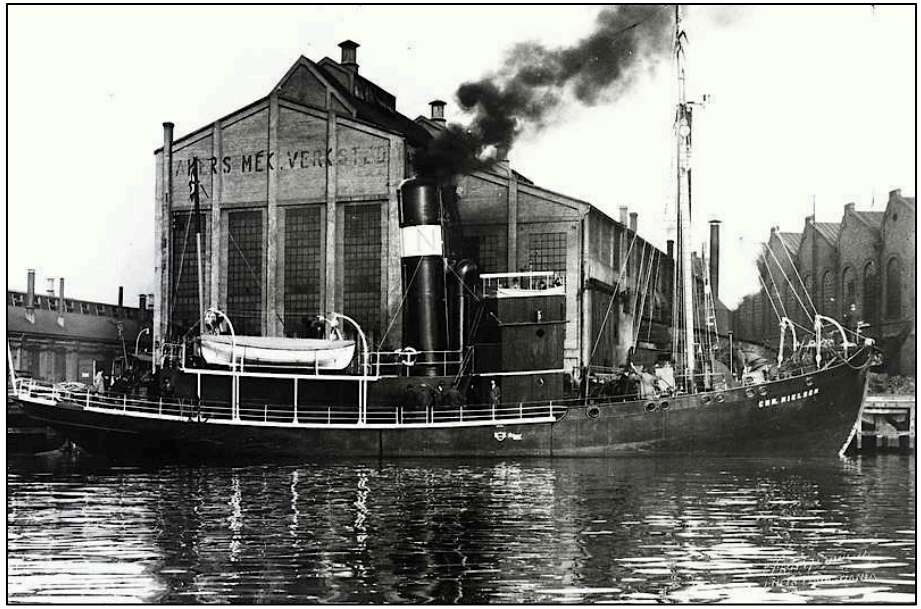
- Initially based on hydropower from the city rivers
- Sevenfold increase in population
  - *From ca. 45 000 in 1850 til 330 000 in 1925*
- New working class neighbourhoods around factories
  - *Slums*

- Increasing pollution levels (air and water)
  - *Air: Increasing reliance on coal and gas (black fumes)*
  - *Water: Wastewater mostly untreated until 1930s; sludge is towed out and dumped in the fjord.*
  - *Urban waste is deposited on Langøya island.*

- Drinking water is secured by municipality buying up surrounding forest with lakes; piping of water to the city

Factories at Akerselva, ca. 1860

Mechanical workshop, 1908



Shipyard and workshop, 1925

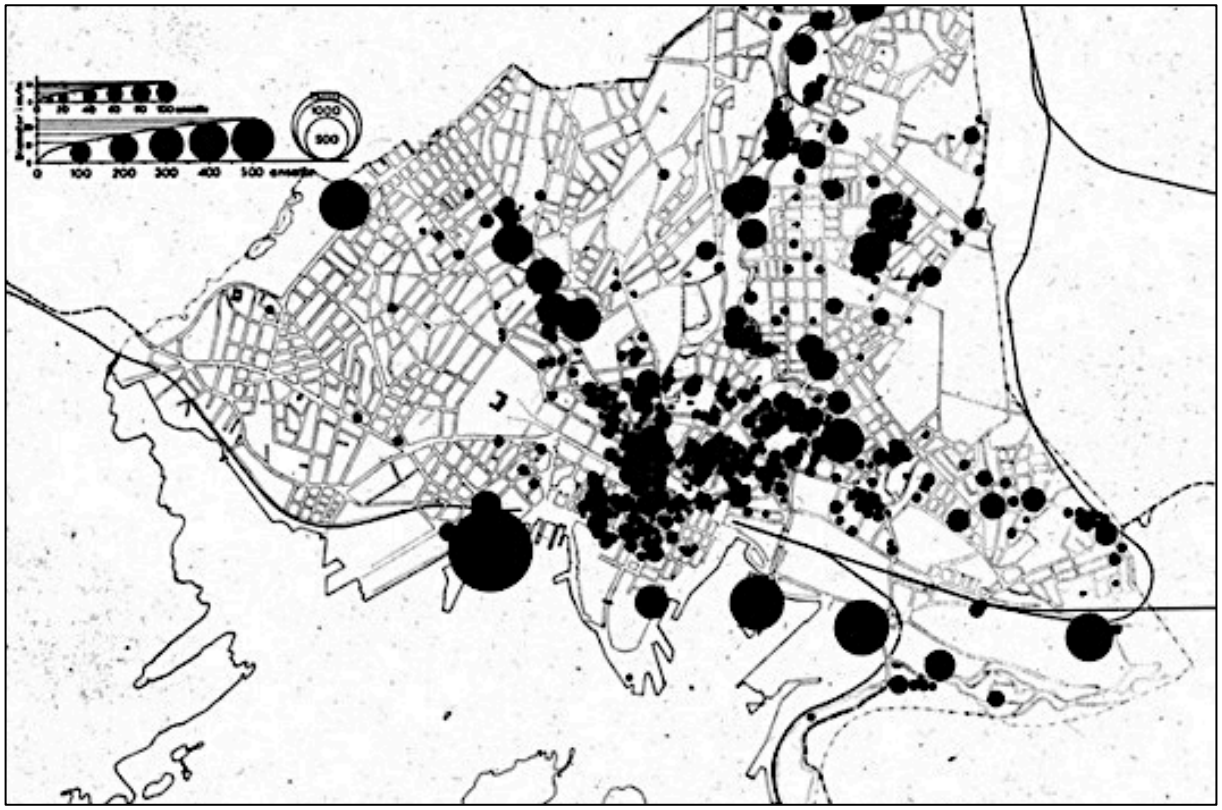
Municipal waste on the island Langøyene, 1930

Map of Oslo 1938, with main industrial zones indicated with blue circles.

The Oslo Harbour (Bjørvika) 1930s, an industrial area between the city and the fjord. In the foreground a coal deposit, in the background a shipyard.

1930-1970: Urban expansion and the car

- Continued urban growth (50%) and industrial development
  - *From 330 000 in 1925 to 488 000 in 1969*
- Large scale urban planning introduced (1929) to handle problems (e.g. slums, pollution) and facilitate growth.
- Severe housing shortages (aggravated by war 1940-45) leads to building boom 1950s – 1970.
- Power needs secured by the municiplaity investing in hydropower in far-away valleys (phase out of coal/gas for energy production)
- Increasing ecological crisis
  - *Fast growing car trafick (doubling 1948-1959) increase air pollution levels*
  - *Lack of wastewater and waste treatment kills off river trout, and makes it a health risk to swim in rivers and the inner fjord basin, and to eat fish from the fjord. Landfills moved onto land is not enough.*



Location of industry in Oslo, 1946

Metal smelting, Oslo 1946.

Measuring dust particles at the station, Oslo 1956.

Polluted wastewater, Oslo (Lambertseter) 1958

Oslo harbour (Akers. Mek.), 1961

1970-1980s: Decline and mobilization

- Population decline 1969-1984 of almost 10%
  - *From 488 000 in 1969 to 448 000 in 1984*
  - *Mains reason: Housing shortages and environmental problems*

- Environmental crisis
  - *Air pollution (SO2, NO2, PM10)*
  - *Increasing motor traffick congesting the city; pollution, noise*
  - *Water pollution; rivers and the fjord not fit for use*
  - *Increasing waste production (5-7%/year) and lack of land-fill capacity*
  - *The building boom 1950-1970 (urban development) has destroyed urban green structure and traditional small-scale neighbourhoods. Urban sprawl.*
  - *Industrial forestry destroyed biodiversity and recreational values around the city*

- Environment on the political agenda
  - *Norwegian Ministry of Environment established in 1972. Policy tools.*

Oslo harbour (Akers. Mek.), 1975.

The town hall square, Oslo 1970.

Slum in central Oslo (Rathkesgate), 1981.

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1980s: A transition time

Challenges

- Environmental crisis.
- Industrial decline (shut-downs or relocation inland or abroad)
  - *Large former industrial areas vacant*
- The ”flight from the city” leads to a weaker tax base.

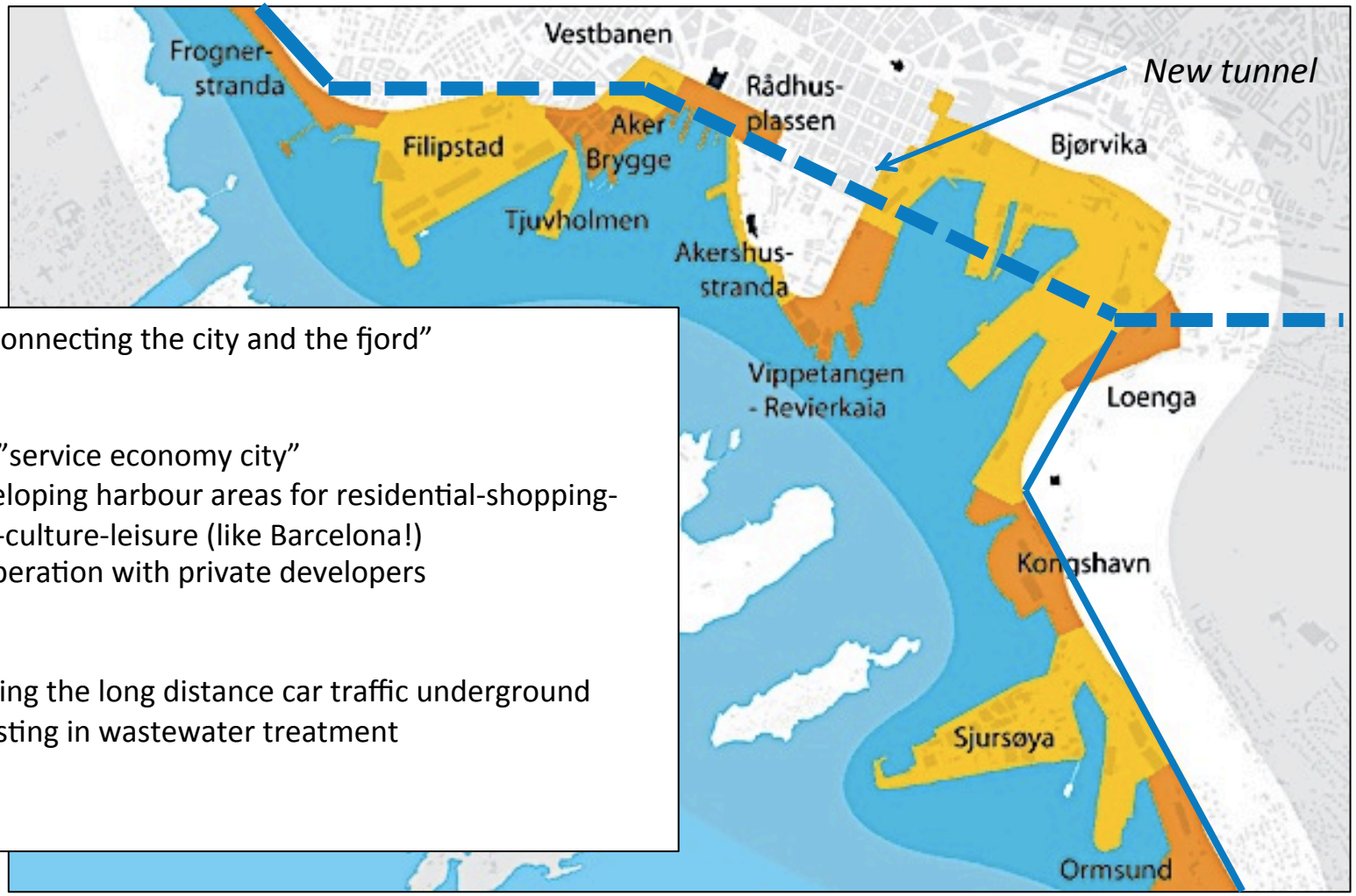
New ideas

- 1982: An NGO launches a competition ”The City and the Fjord: Oslo towards year 2000”.
- Winning solution (1984): Develop former harbour areas into mixed residential-shopping-office areas.

Environmental policy development

- 1986: Municipal Environment Commissioner established
- 1991: First environmental policy strategy (focus on air pollution)

1990s: The vision of the ”Fjord city”



- ”Reconnecting the city and the fjord”

- The ”service economy city”
- Developing harbour areas for residential-shopping-office-culture-leisure (like Barcelona!)
- Cooperation with private developers

- Moving the long distance car traffic underground
- Investing in wastewater treatment

Improved planning

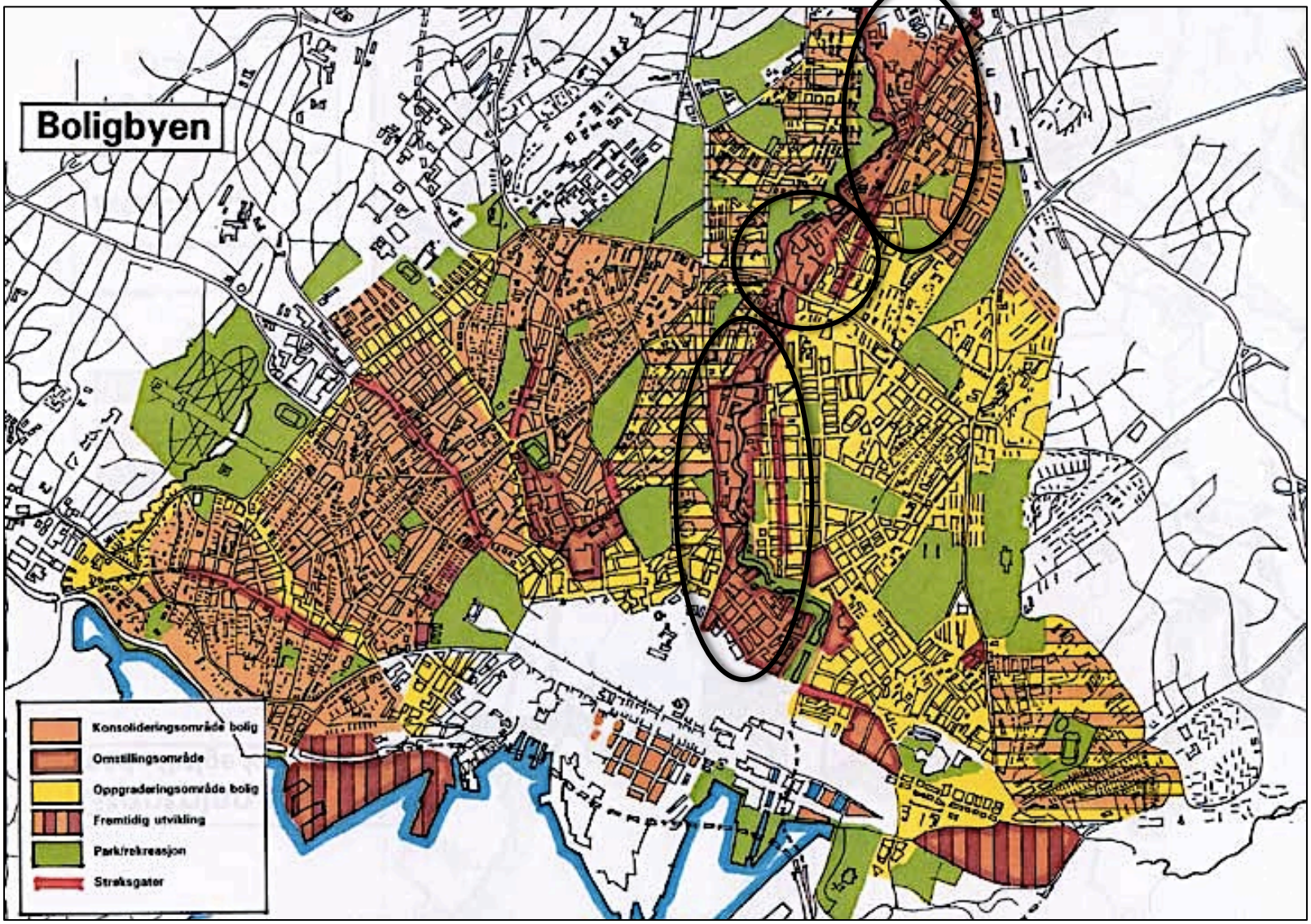
A more robust Municipal Development Plan (since 1990s)

- *Provides "One Vision" for the development of the city in a 15 to 25 year perspective, incl. a land-use plan.*
- *Includes mapping of relevant factors and trends.*
- *Updated every 4-8 years. Increasing refinement.*

Urban Ecology Programme (first 1998)

- *10-15 year perspective, incl. 6 prioritised areas, strategy, actions and indicators.*
- *Updated towards the end of each planning period*

Transformation areas for housing: Dark red colour (1998)



Former industrial areas along the Aker river; now to become attractive and green residential areas.

A long list of measures (traffick examples)

Toll fee on vehicles entering Oslo (introduced late 1980s)

- *Immediate reduction of car traffick with 5-10%.*
- *Finances (+50% of revenue) development of public transport.*

Increased focus on public transport

- *Subways, trams and buses: Increased frequency and more lines.*
- *Increasing market share since 2007.*

Biogas

- A biogas production plant outside the city produces methane (and garden soil) from wet-organic waste; the methane fuels 250 city buses.


Oslo kommune
Renovasjonsetaten
”I am not making a mess.
I am making fuel!”
Jeg søler ikke.
Jeg lager drivstoff.
Matavfall i grønn pose. Alt starter i kjøkkenbenken din.
Kilde-sortering i Oslo


Oslo kommune
Renovasjonsetaten
(Chinese text)
Jeg søler ikke.
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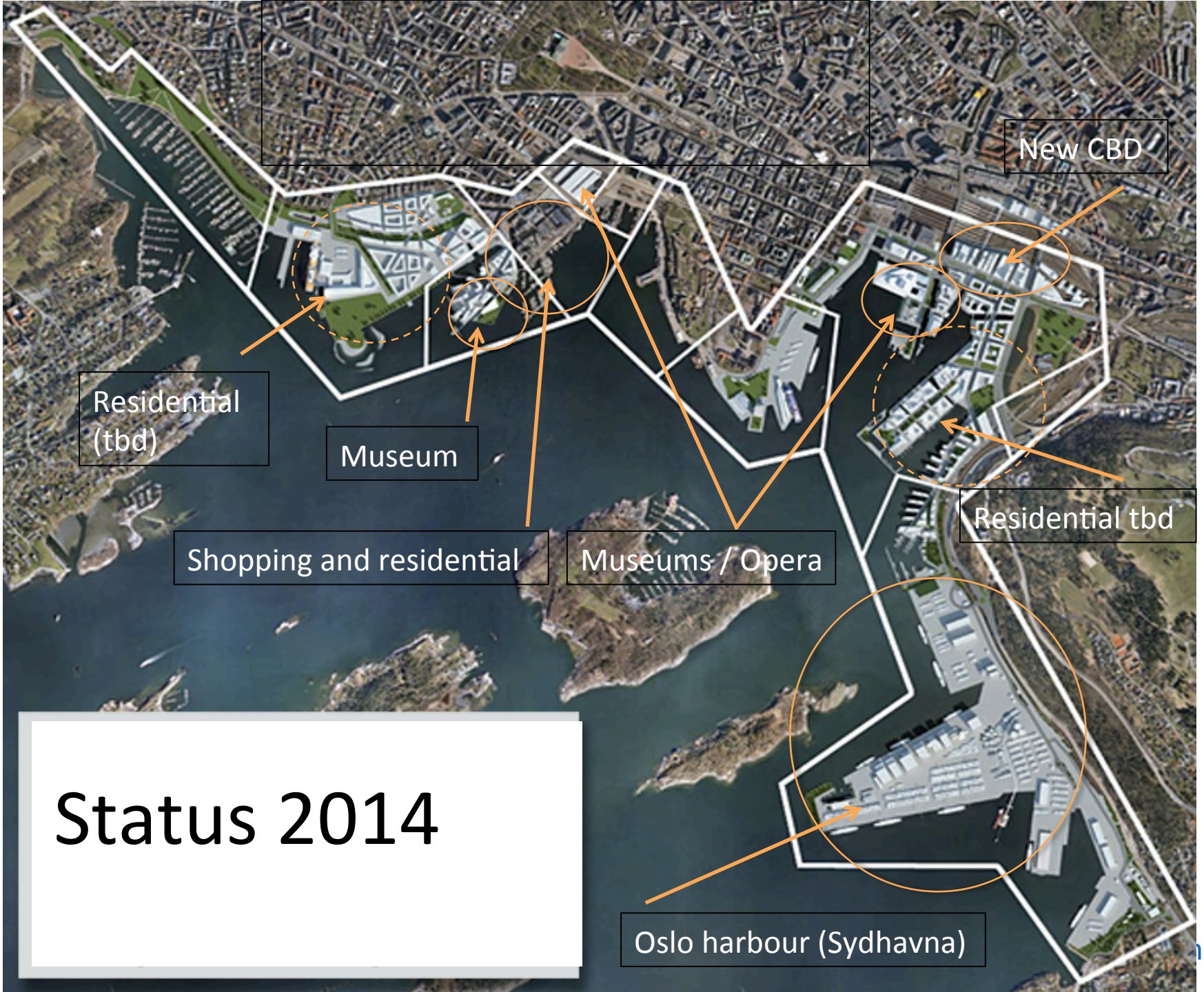
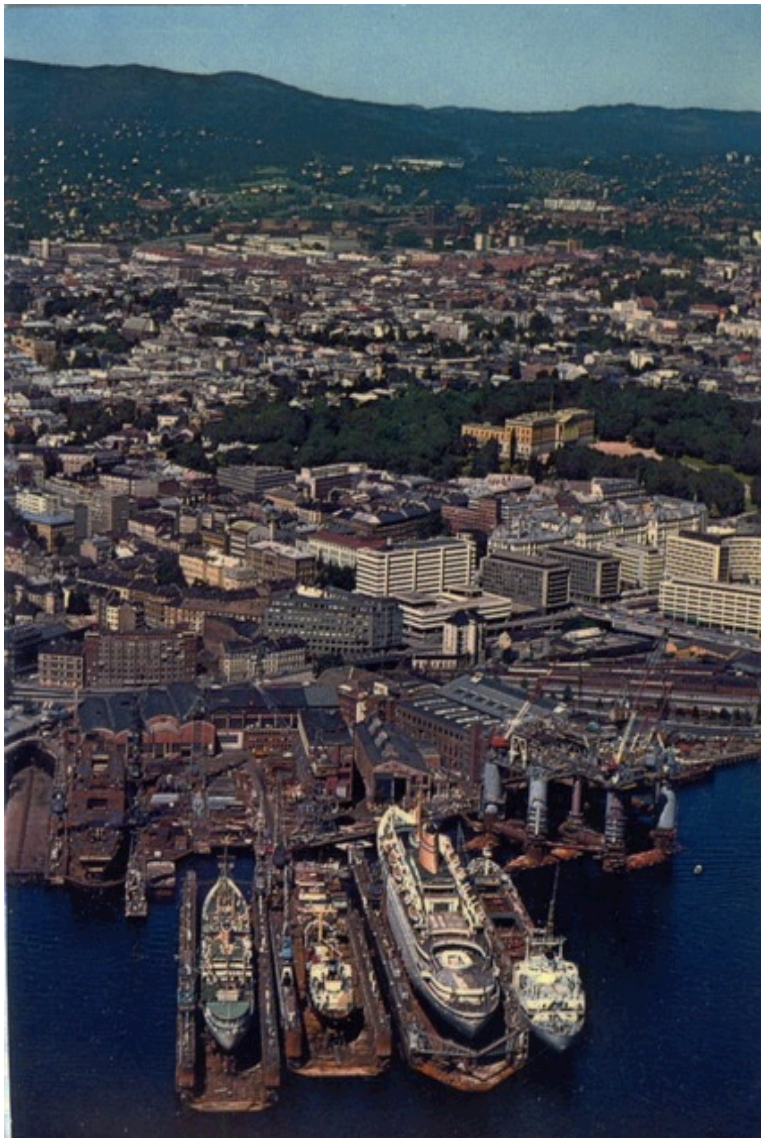

New CBD
Residential (tbd)
Museum
Shopping and residential
Museums / Opera
Residential tbd
Oslo harbour (Sydhavna)

Status 2014

1975



2014

From shipyard and workshop to art museum, apartments, shopping and leisure

Oslo is today a leading sustinable and green city

2003: Oslo European Sustainable City Award Winner.

2010, 2011, 2014: Oslo finalist (top-5) to become European Green Capital.

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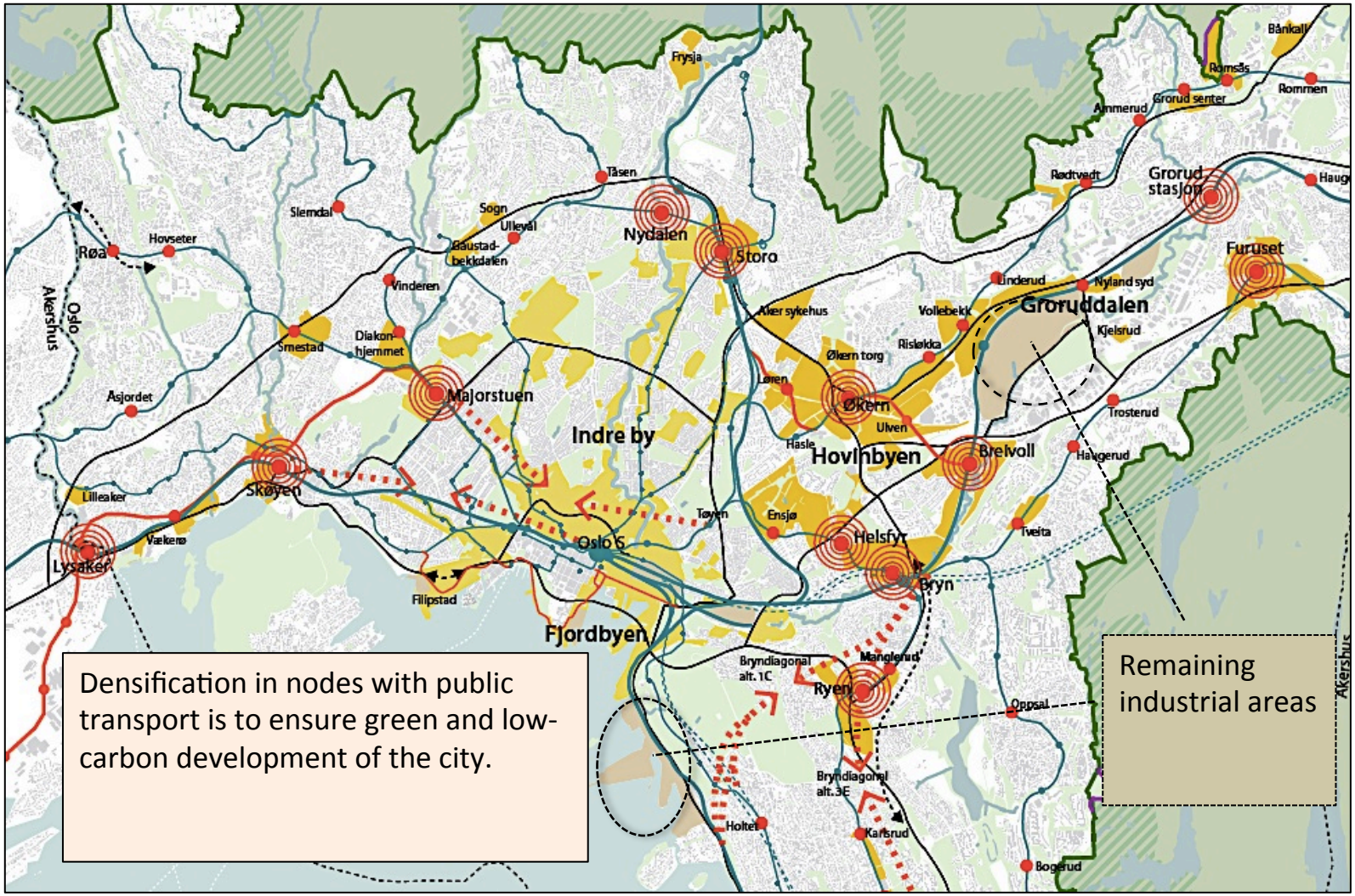
Remaining env. risk challenges

- Air pollution
  - *Problems with NO^2 and PM_{10}, especially in winter.*
  - *Sources: Car emissions (diesel), studded tires, heating with wood.*
- Oslo harbour
  - *A major harbour handling dangerous goods, close to central Oslo*
- Sustainable growth
  - *Oslo is one of the fastest growing cities in Euope (2% per year)*
  - *Estimated Oslo Metropolitan Area pop. 2030: 2 million*

Oslo towards 2030



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Oslo harbour - an ”increased risk site”

Definition of ”increased risk” site:

- *A site with several risk factors/ activites*
- *A site with potential for ”domino effects”*
- *A site where consequenses for people located around the area may be severe.*
- *A site where the total risk is higher than the sum of the risk from individual activites.*

- Located 3 km from the city centre.
- Residential development adjacent to the harbour

- Norway's largest container harbour, receives 40% of all imported fuel.
- Receives and stores all aviation fuel for Oslo International Airport.
- Fuel is transported from the harbour on petrol tankers and freight trains

DSB's independent assessment

In Norway, DSB (the Directorate for Civil Protection) is responsible for civil protection, covering national, regional and local preparedness and emergency planning, fire and electrical safety, safety in handling and transport of hazardous substances.

- *DSB reports to the Ministry of Justice and Public Security.*

DSB published an independent risk assessment of Oslo harbour (Sydhavna), in February 2014.

- *Based on publicly available data and data requested from involved parties.*
- *Based on interviews and meetings with involved parties.*
- *Based in in-depth investigations into certain topics*

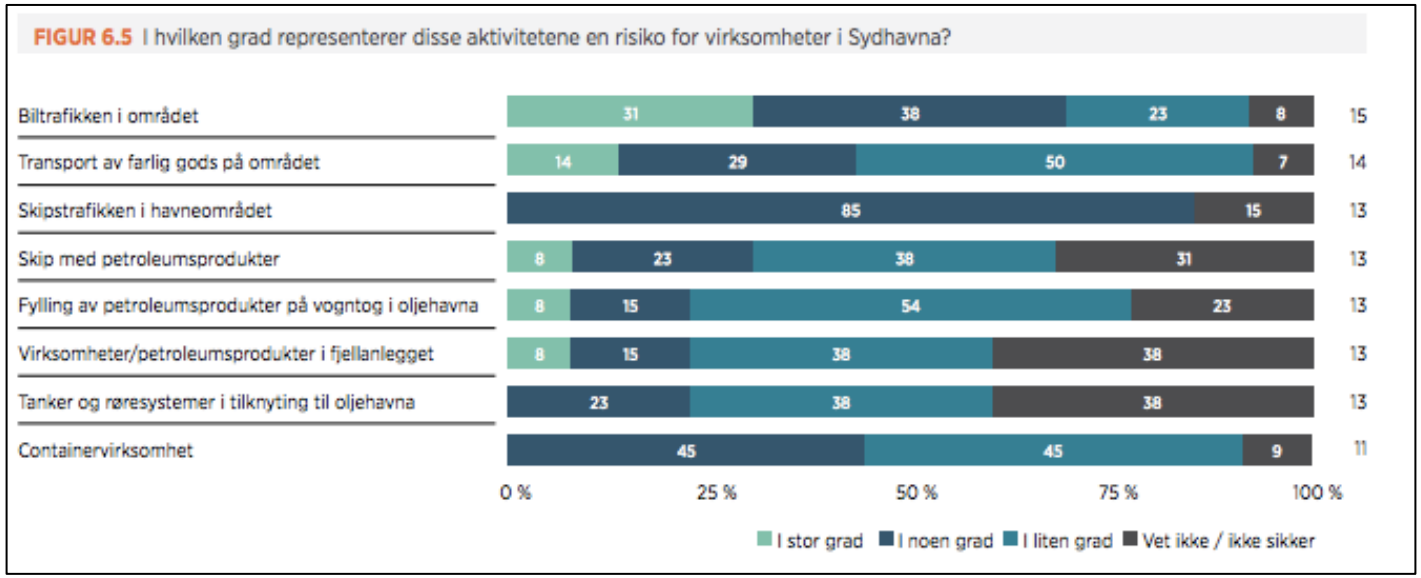
DSB's findings (selected)

- Many involved parties and different types of activities make coordination a challenge.
- Extensive information flows, but not filtered to ensure that the right person will have the right information in case of an emergency.
- Different risk management systems among different operators; need for better coordination.
- Many different risk assessments made for different activities (made when permission was sought), but lack of a risk assessment looking at the totality.
- Lack of a system for continous risk assessment
  - When assumptions for a risk assessment changes, a new risk assessment is not automatically carried out

Risk factors

From the anonymous survey conducted with harbour operators

- *85% considered the ship-trafick risky "to some extent"*
- *69% considered the car traffick risky "to a significant extent (31%) or "to some extent" (38%)*
- *45% considered container operations risky "to some extent"*



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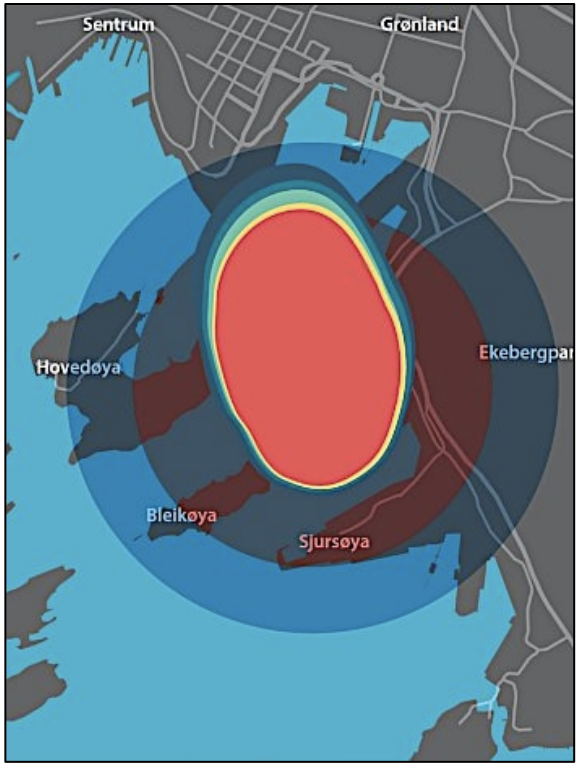
Risk scenario

A ship transporting fuel collides with another ship or runs aground by Hovedøya/Bleikøya islands. This results in a fuel leak which is ignited and begins drifting towards central Oslo. Southern wind direction, 2 m/s.



The map shows dispersal of fumes.

- *Red colour: Exposure for +1h gives life-threatening health effects.*
- *Blue colour: Exposure for +1h gives temporary negative health effects.*

The scenario is based on an incident in New York harbour, 1973.

Recommendations and follow-up

- Stronger involvement of the municipality to ensure overall risk management.
- Improved communication and coordination between ”external” stakeholders; municipality, harbour authorities, relevant ministries etc.
- Improved communication and coordination between ”internal” stakeholders at the site.

- HarbourEx15 (April 2015): A full-scale emergency exercise
  - *A serious accident scenario is played out*
  - *All emergency response agencies respond as in-real-life*
  - *The response is documented and evaluated to improve response*
  - *EU support and international participation*

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