

Extreme weather events impact on Romanian railway transport

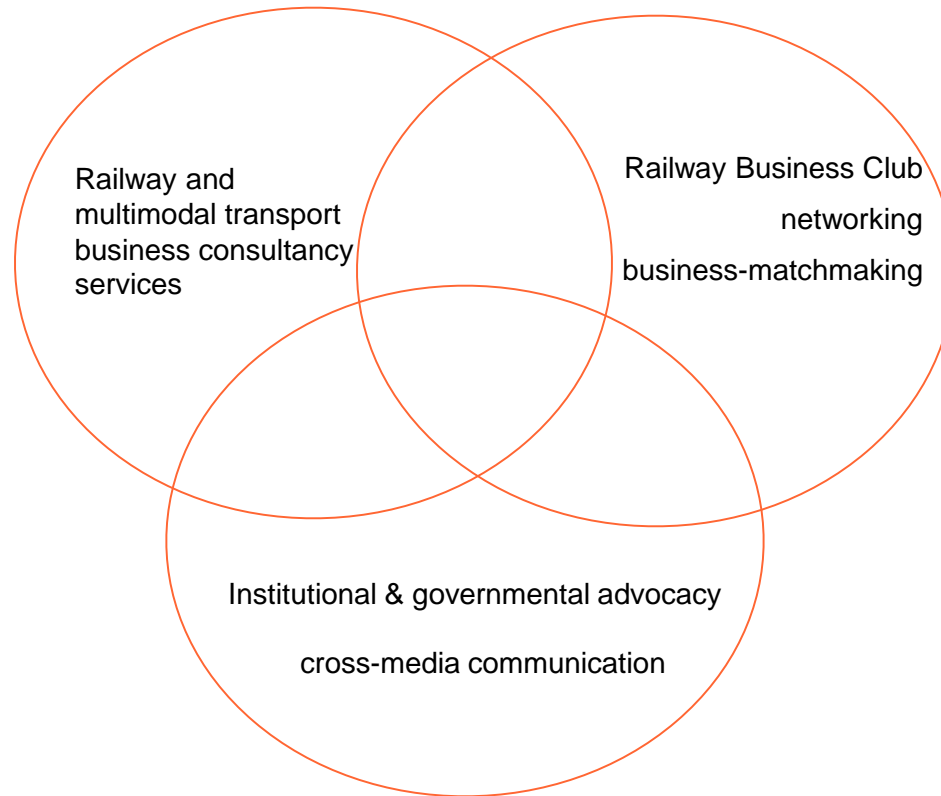
Ștefan Roșeanu, Club Feroviar

**Group of Experts on Climate Change impacts and adaptation for transport
networks and nodes, 7th session, UNECE, Geneva**

AGENDA

1. About Club Feroviar
2. Romanian climate change policy
3. Floods impact on railway network
4. Blizzards impact on railway network
5. Network effect
6. Railways can cope with some weather events

1. About Club Feroviar



Member of:



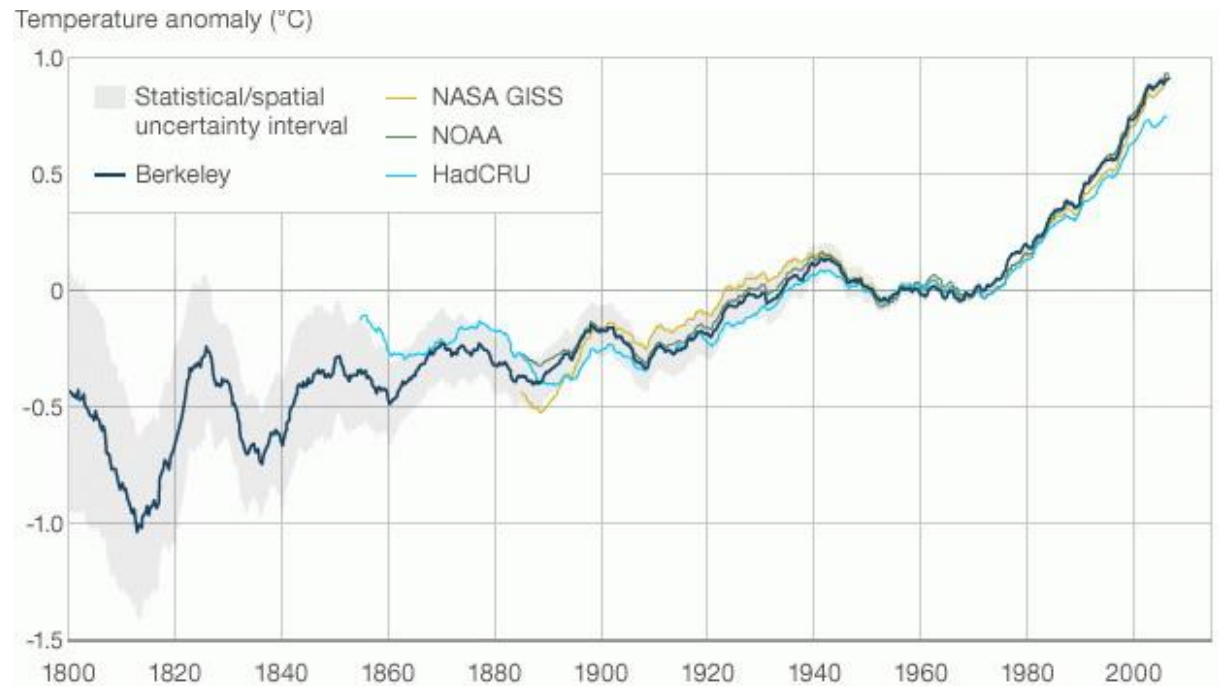
Club Feroviar
June 3, 2015, Geneva

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2. Romanian climate change policy

Earth surface is warmer and warmer, according to a study performed by Berkeley Earth Surface Temperature



Source: *Meteo.ro*

2. Romanian climate change policy

Climate Change Strategy 2013 - 2020 (Government Decision 529/2013) - Main policy for transport sector -

Promote railways as an alternative to road transport; switch road freight transport to railways

Private cars on low emission internal combustion engines; Private cars on alternative fuels internal combustion engines; Private cars on alternative energy source; Improve flight management; Optimize flight routes; Develop multimodal transport solutions; Promote non-motorized transport means; Develop a reliable cycling infrastructure

Fall 2013 – Climate Change Strategy to be updated for Horizon 2050

2. Romanian climate change policy

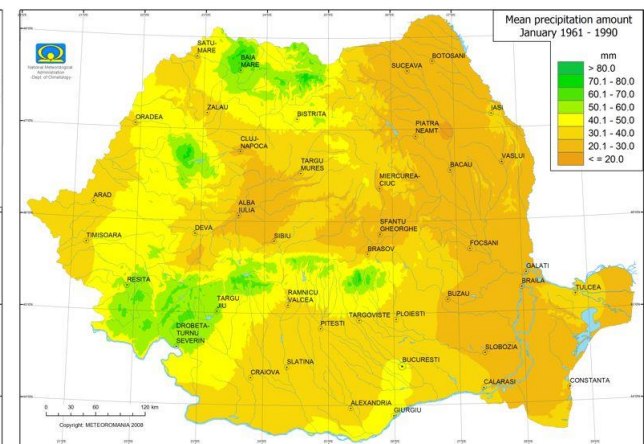
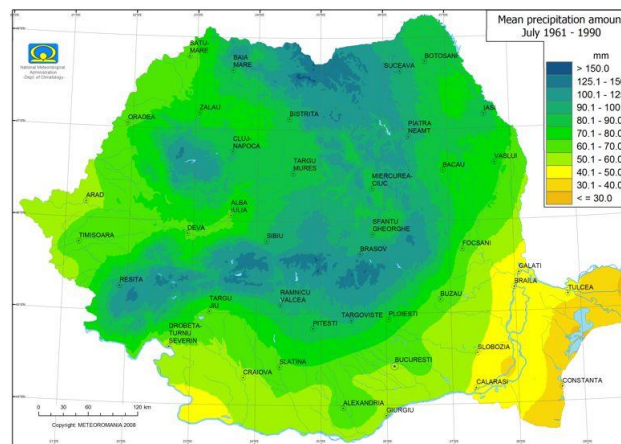
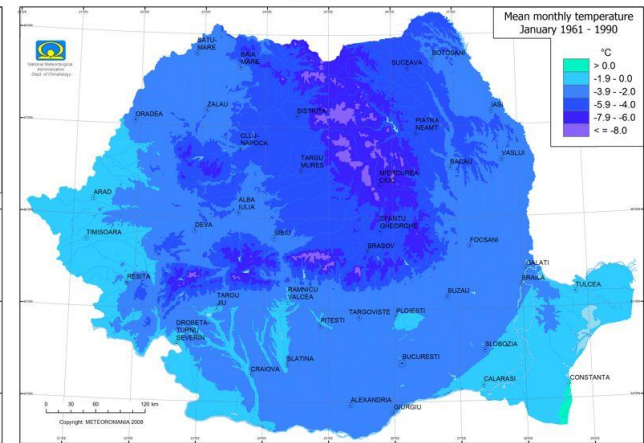
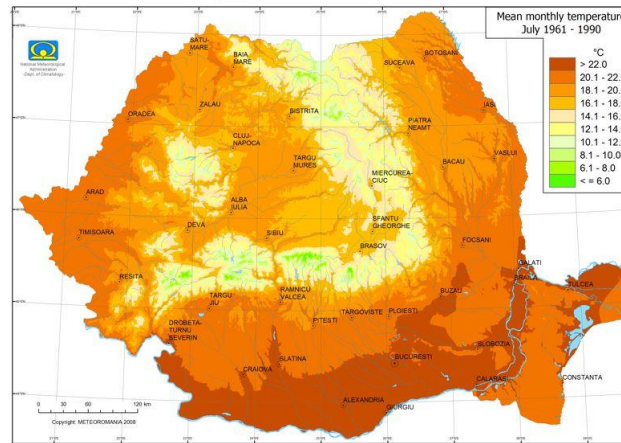
**1954, winter:
Bucharest tramway
runs though heavy
snow**



Source: Evenimentul Zilei, http://www.evz.ro/image-original-605-388/2012-02/iarna_1954.jpg

2. Romanian climate change policy

**Romania:
 Main climate
 characteristics**

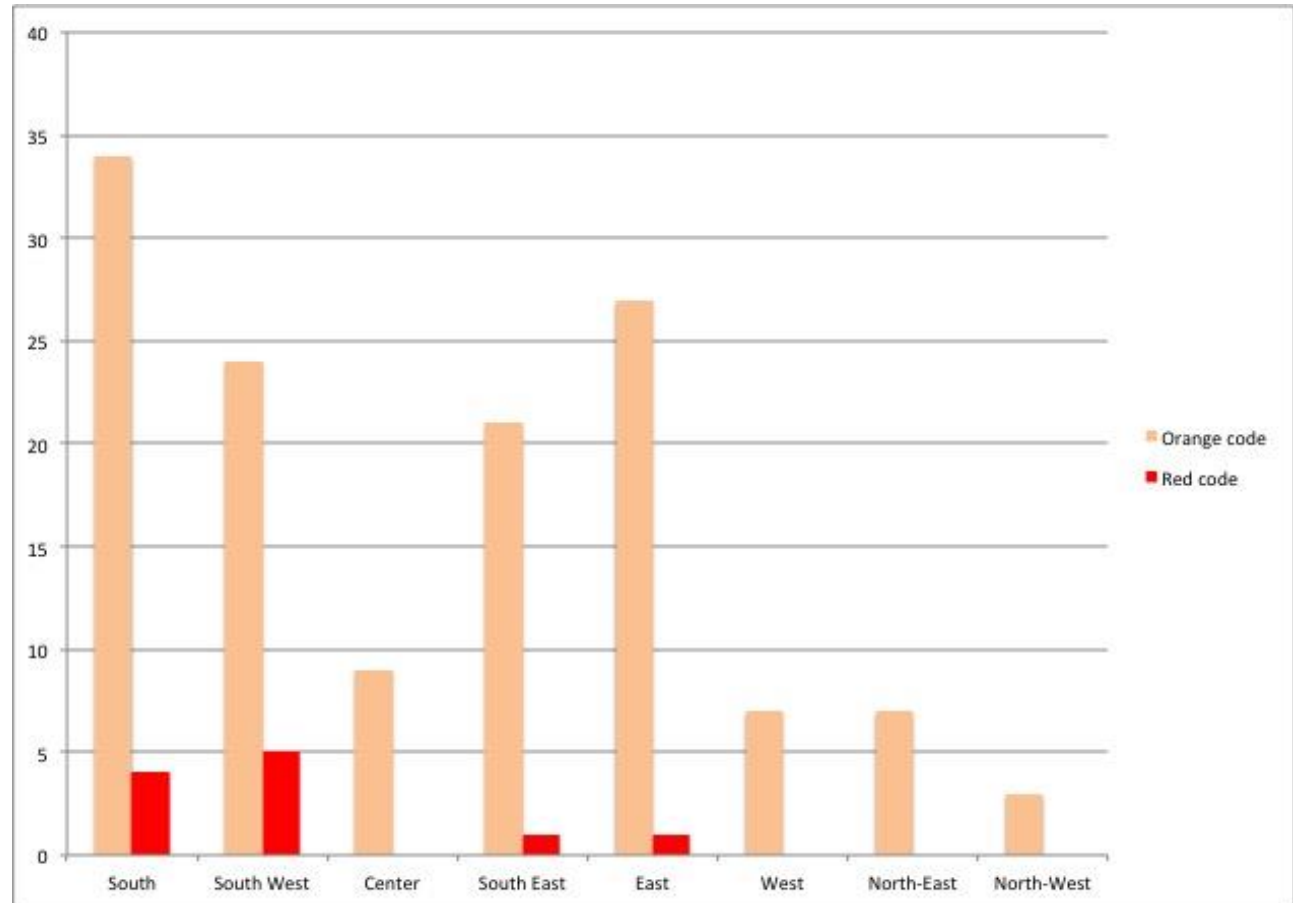


Source: Meteo Romania

2. Romanian climate change policy

Extreme weather events in Romania, Jan 2011 – Jan 2015

No. of severe weather warning codes per region

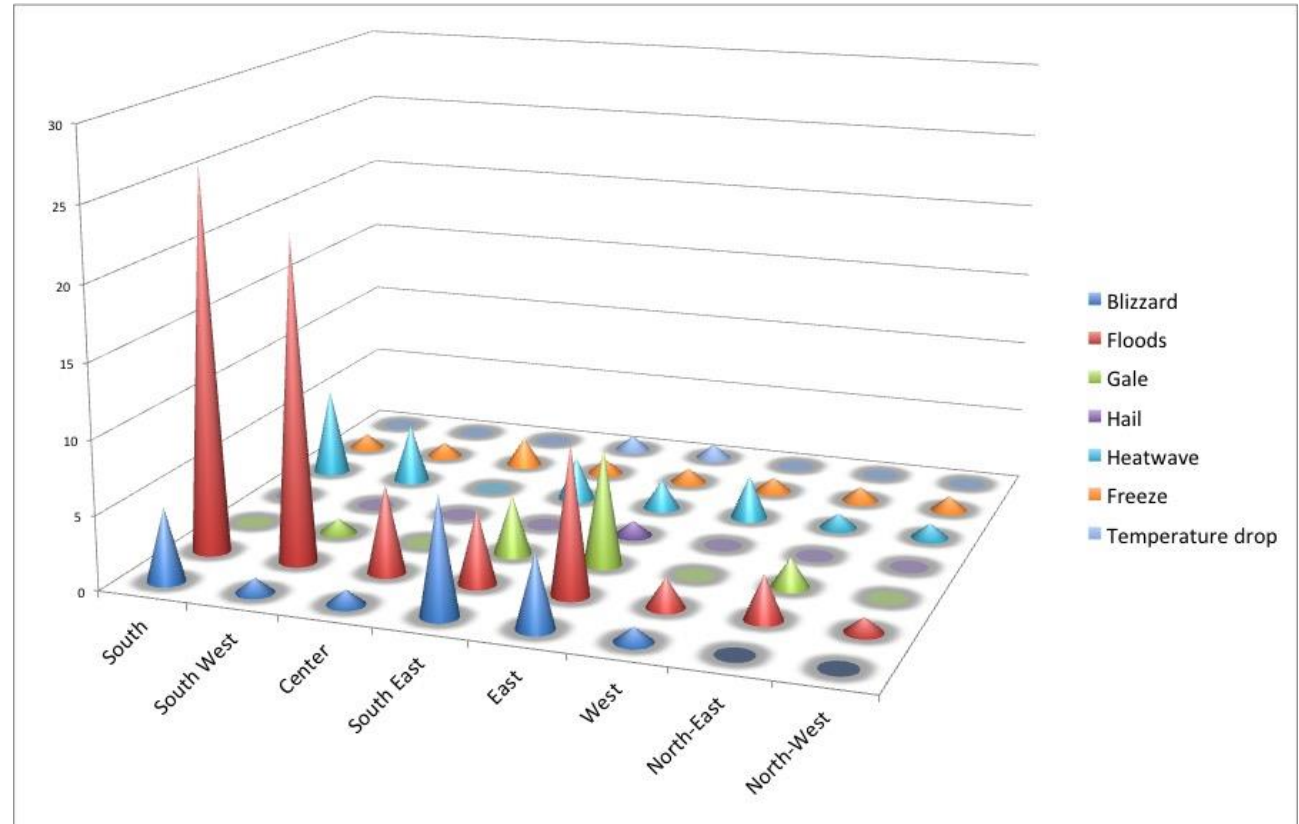


Club Feroviar chart based on Meteo.ro data

2. Romanian climate change policy

Extreme weather events in Romania, Jan 2011 – Jan 2015

Type of events per region



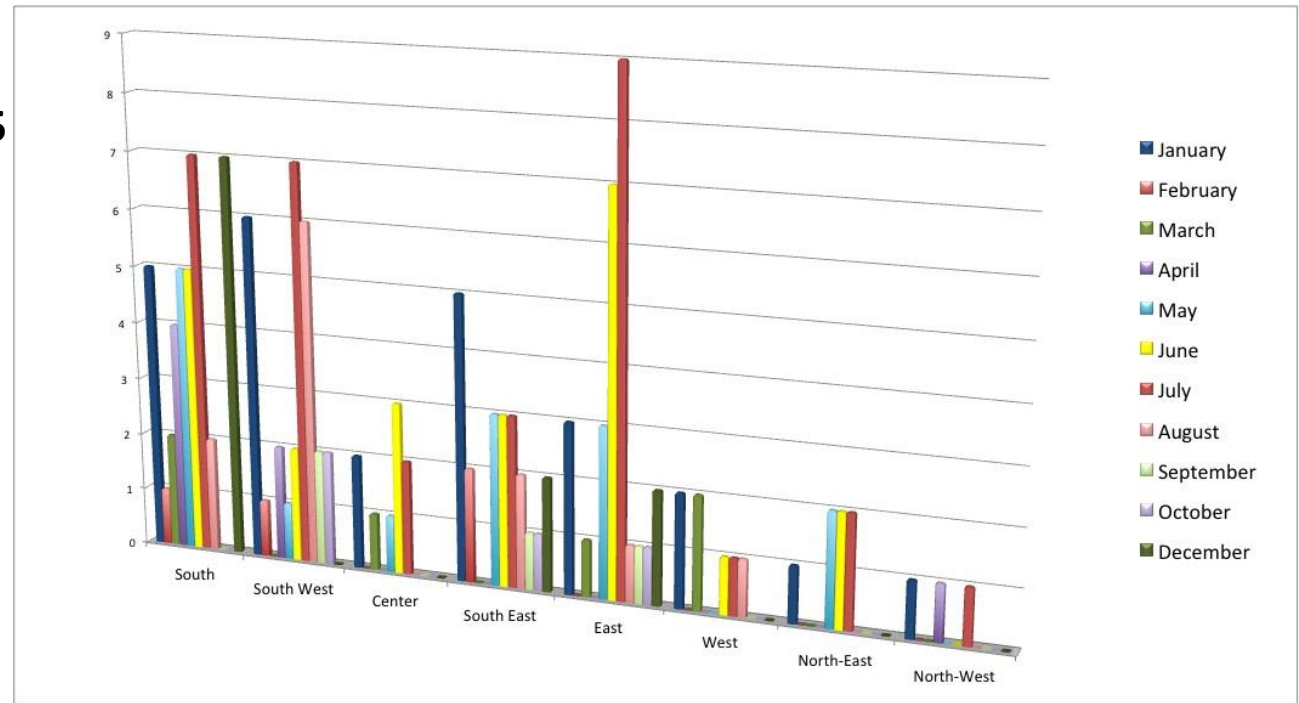
Club Feroviar chart based on Meteo.ro data

Club Feroviar
 June 3, 2015, Geneva

2. Romanian climate change policy

Extreme weather events in Romania, Jan 2011 – Jan 2015

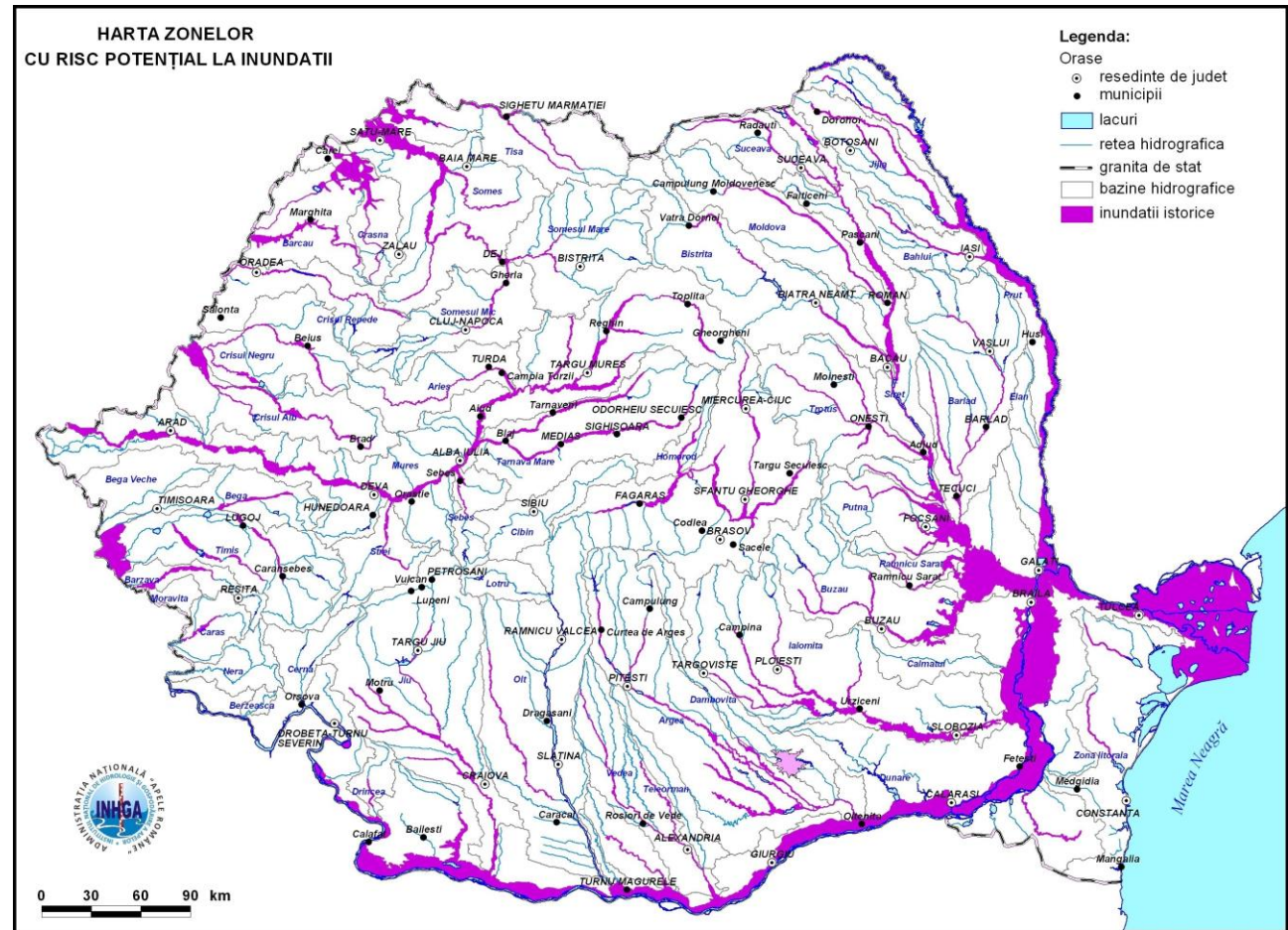
No. of events per region and month of the year



Club Feroviar chart based on Meteo.ro data

2. Romanian climate change policy

**Romania:
 Areas with highest
 flood risk**

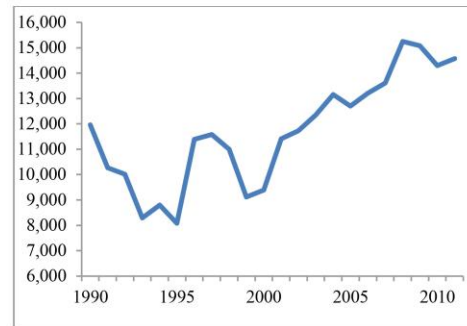


Source: Meteo.ro

2. Romanian climate change policy

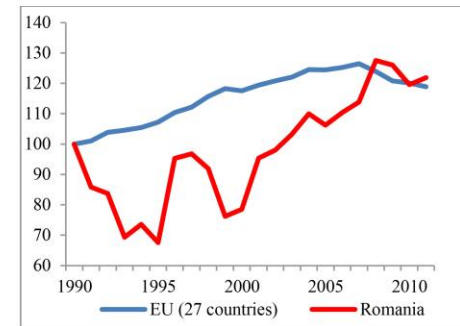
‘While GHG emissions percentage (11.8%) is smaller than the EU’s average of 20.2 percent, it is rising more quickly than the EU average, driven in part by the declining modal share of rail and increased motorization. Among the different transport modes, road transport is the source of the great majority of GHG emissions in the transport sector, being responsible for 93 percent of domestic transport emissions. This is a similar proportion to the EU-27 average of 94 percent.’ (p. 21)

GHG Emissions from Domestic Transport in Romania (1,000 tons CO₂)²⁹



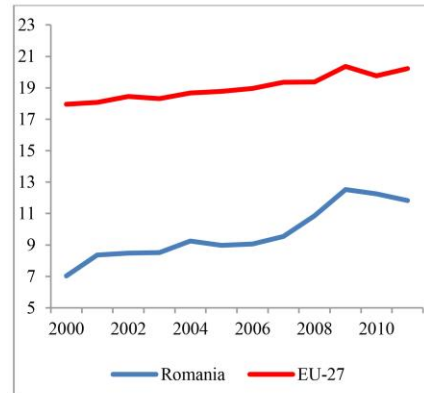
Source: EEA.

Trends in Emissions Compared to EU-27 (2000=100)



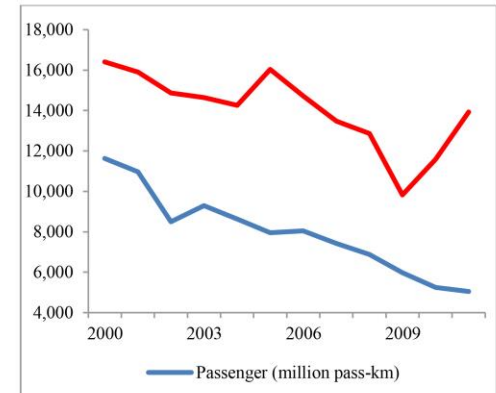
Source: EEA.

Transport GHG Emissions as a Percentage of Total GHG Emissions³⁰



Source: EEA.

Rail Traffic in Romania (2000-2012)

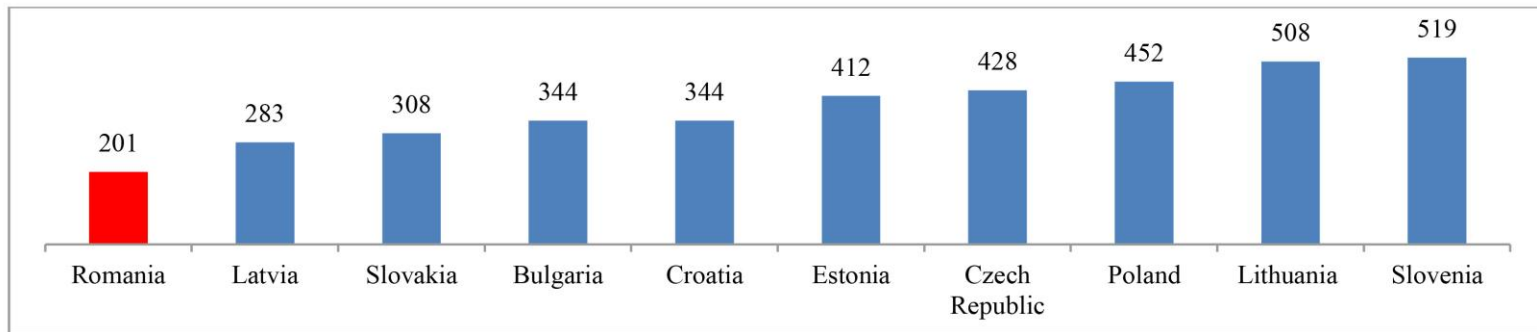


Source: UIC.

Source: Carolina Monsalve et. al., *Romania. Climate Change and Low Carbon Green Growth Program. Component B Sector Report. Transport Sector Rapid Assessment.* January 2014

2. Romanian climate change policy

Motorization Rates in Selected EU Countries (passenger cars/1,000 inhabitants, 2010)



Source: Eurostat.

‘Although car mode share in Romania is at a similar level to the EU average, the motorization (or car ownership) rate in Romania is the lowest in the EU at 201 cars per 1000 inhabitants in 2010, but has grown significantly in recent years, up from 150 cars per 1000 inhabitants in 2004. Experience across the world suggests that as the Romanian economy grows, it will continue to grow in future. Without intervention to provide better transport alternatives and encourage their use, as car ownership grows, car use is also likely to grow.’ (p. 23)

Source: Carolina Monsalve et. al., *Romania. Climate Change and Low Carbon Green Growth Program. Component B Sector Report. Transport Sector Rapid Assessment.* January 2014

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3. Floods impact on railway network

**08/2005:
Heavy rain South of
Romania (Danube
plain, 30 km south
of Bucharest, Pan-
European Corridor
IX, TEN-T Core
Network)**



Source: Club Feroviar

3. Floods impact on railway network

**08/2005:
Heavy rain East of
Romania (Moldova
region, Pan
European Corridor
IX, TEN-T Core
Network)**



Source: Club Feroviar

3. Floods impact on railway network

**2008:
Heavy rain East of
Romania (Moldova
region, Pan-
European Corridor
IX, TEN-T Core
Network)**



Source: Youtube

3. Floods impact on railway network

**08/2009:
Heavy rain SW of
Romania (Jiu Valley,
TEN-T
Comprehensive
Network)**



Source: Gandul, <http://storage0.dms.mpinteractiv.ro/media/1/186/3927/4798534/1/viitura-mediafax-foto-resize.jpg>

3. Floods impact on railway network

**06/2012:
Floods effects
Center of Romania
(Olt Valley, TEN-T
Comprehensive
Network)**



Source: *Bambuser*

3. Floods impact on railway network

**02/2013:
Land fall effects East
of Romania (Galati-
Barlada railway line)**



Source: Romania Libera

3. Floods impact on railway network

**02/2013:
Land fall effects East
of Romania (Galati-
Barlada railway line)**



Source: Vremea Noua

3. Floods impact on railway network

**06/2013:
Floods effects North
of Romania (Salva-
Viseu)**



Source: Mesagerul de BN

3. Floods impact on railway network

**06/2013:
Floods effects
North-East of
Romania (Vatra
Dornei, TEN-T Core
Network)**



Source: Adevarul

3. Floods impact on railway network

**09/2013:
Floods effects East
of Romania (Galati-
Barlad)**



Source: Viata Libera

3. Floods impact on railway network

**07/2014:
Floods effects
South-West of
Romania (Banat
Area)**



Source: National

3. Floods impact on railway network

**07/2014:
Floods effects
South-West of
Romania (Banat
Area, Pan-European
Corridor IV, TEN-T
Core Network)**



Source: Opinia Timisoarei

3. Floods impact on railway network

**09/2014:
Floods effects
South-West of
Romania (Banat
Area, Pan-European
Corridor IV, TEN-T
Core Network)**



Source: de Banat

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4. Blizzards impact on railway network

**01/2012:
Heavy snow in
South-East of
Romania (Constanta
Area, Medgidia-
Tulcea line)**



Source: Antena1, Youtube

4. Blizzards impact on railway network

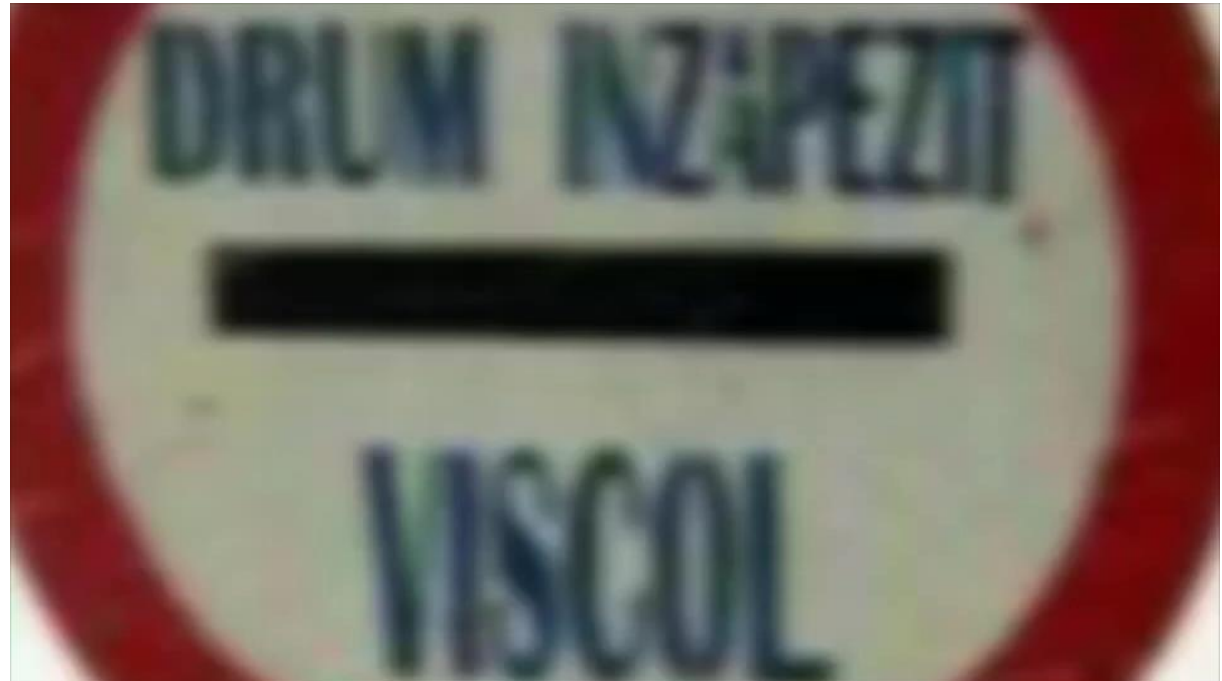
**02/2012:
Heavy snow in
South-West of
Romania (Banat
Area)**



Source: ProTV

4. Blizzards impact on railway network

**02/2012:
Heavy snow in
South-East of
Romania
(Bucharest-
Constanta main
line)**



Source: Youtube

4. Blizzards impact on railway network

**02/2012:
Heavy snow in
South-East of
Romania (Constanta
Area, Pan-European
Corridor IV, TEN-T
Core Network)**



4. Blizzards impact on railway network

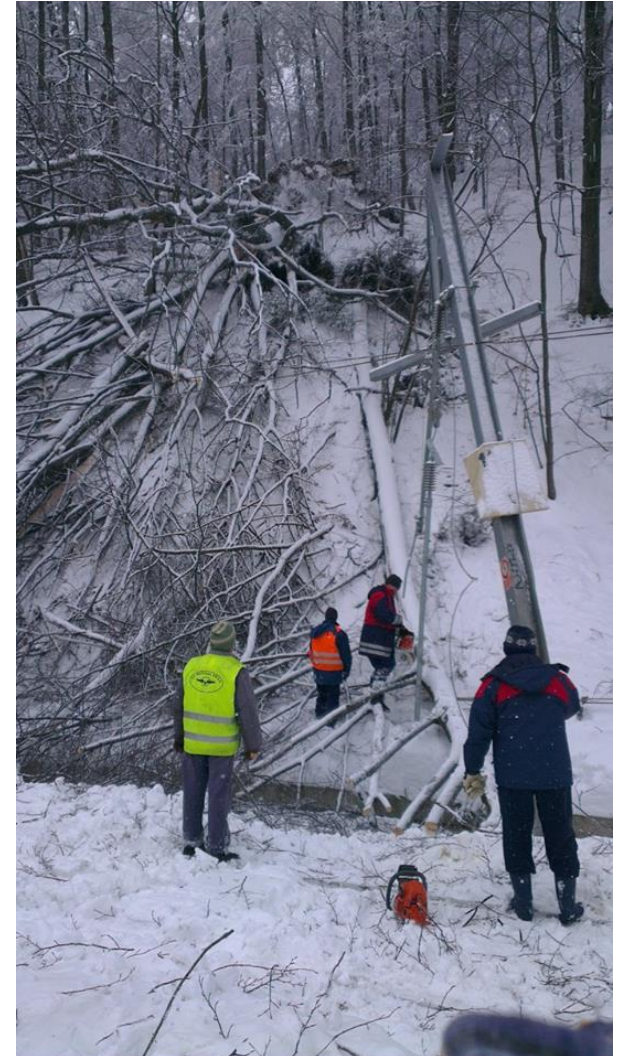
**10/2013:
Heavy snow in
Center of Romania
(Bucharest-Brasov
main line, Pan-
European Corridor
IV, TEN-T Core
Network)**



Source: B1TV, Youtube

4. Blizzards impact on railway network

**01/2014:
Heavy wind in
Center of Romania
(Prahova Valley,
Pan-European
Corridor IV, TEN-T
Core Network)**



Source: News BV

4. Blizzards impact on railway network

**01/2014:
Heavy snow in
South of Romania
(Nucet, Dambovita
Area)**



Source: Ziar Dambovita

4. Blizzards impact on railway network

**01/2014:
Heavy snow in
South-East of
Romania (Calarasi
Area)**



Source: Incomod Media

4. Blizzards impact on railway network

12/2014:

**Low temperature in
East of Romania
(Constanta Area,
Pan-European
Corridor IV, TEN-T
Core Network)**



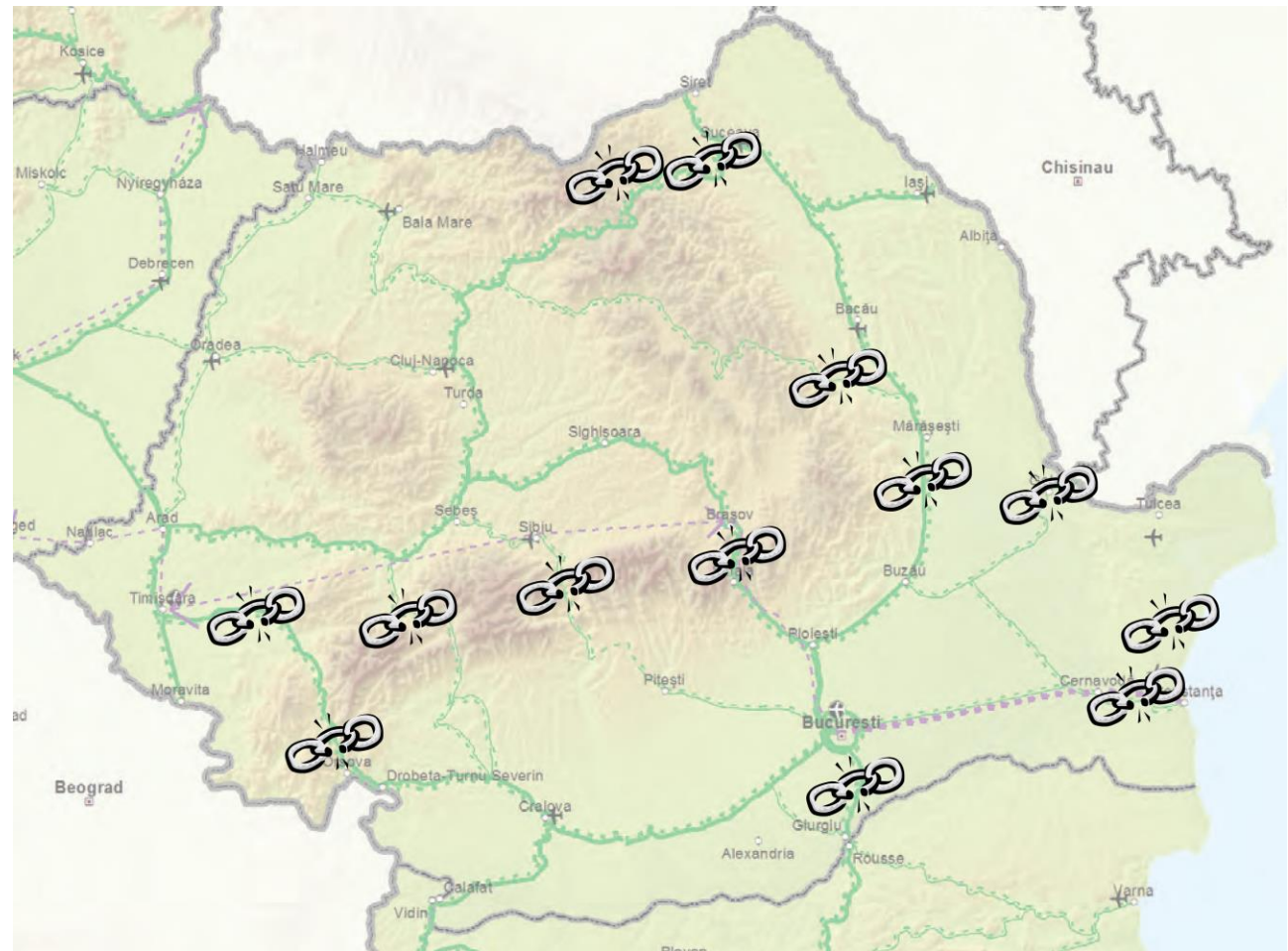
Source: Radio Romania Constanta

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5. Network effect

Extreme weather events impact on Romanian sector of TEN-T railway network.
Highlighted points in our study



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6. Railways can cope with some weather events

09/2009:

**Heavy rain SW of
Romania (Banat
area, Pan-European
Corridor IV, TEN-T
Core Network)**



Source: Mondonews, <http://www.mondonews.ro/wp-content/themes/mondonews/timthumb/720/0/wp-content/uploads/2014/09/tren-inundatii.jpg>

6. Railways can cope with some weather events

**07/2010:
Heavy rain SE of
Romania (Galati
area, Galati-Barbosi
main line,
TEN-T
Comprehensive
Network)**



Source: Youtube

6. Railways can cope with some weather events

**01/2012:
Heavy rain SW of
Romania (Jiu Valley,
TEN-T
Comprehensive
Network)**



Source: Youtube

**Thank you
for your attention!**



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