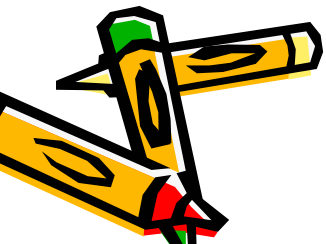


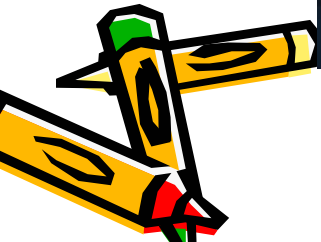
Jean-Michel Glachant
(GRJM at Paris Sud Univ.)
@ IDEI in Toulouse (France)
16 Jan 2007



***Brown Out or Black Out in
Europe in November 2006:
to entertain..... with EU
Colours Out?***

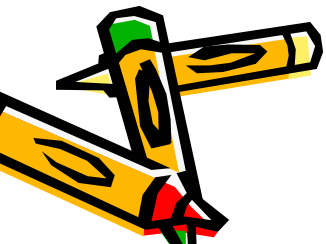


When the US meet the EU in Toulouse...



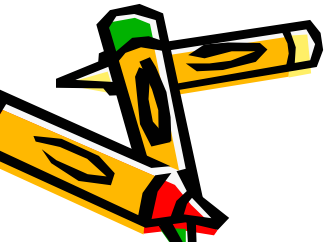
'EU Colours Out' Road Show

- 1: *Hard Facts = Hard to believe = but 100% 4 November 2006 true!*
- 2: *EU Reliability Council -UCTE- self control!*
- 3: *EU Regulators Group self esteem!*
- 4: *Possible consequences for the EU 'Energy Policy' agenda?*



1: *Hard Facts*

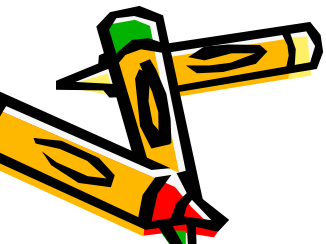
- **September 2006** Shipyard North Germany asks E.ON Net to cut a 380kV double line on Nov 5th 1AM >> E.ON studies & OKs
- **3 November 2006** Shipyard asks to do it on 4 Nov at 10 PM >> E.ON OKs
- **4 Nov @ 9.29 PM** E.ON studies it with fresh data & OKs
- **9.38** E.ON cuts the line
- **9.39** 2 unexpected alarms on other E.ON lines. E.ON decides temporary 'overload' on its own lines.
- **9.41** Neighboring TSO RWE informs E.ON another 380 kV border line being loaded at 1780 A, has 1800 A limit & 1990 A automatic cut off. E.ON didn't know that on the line it shares with RWE (there are 4 TSOs in Germany)



Hard Facts Cted



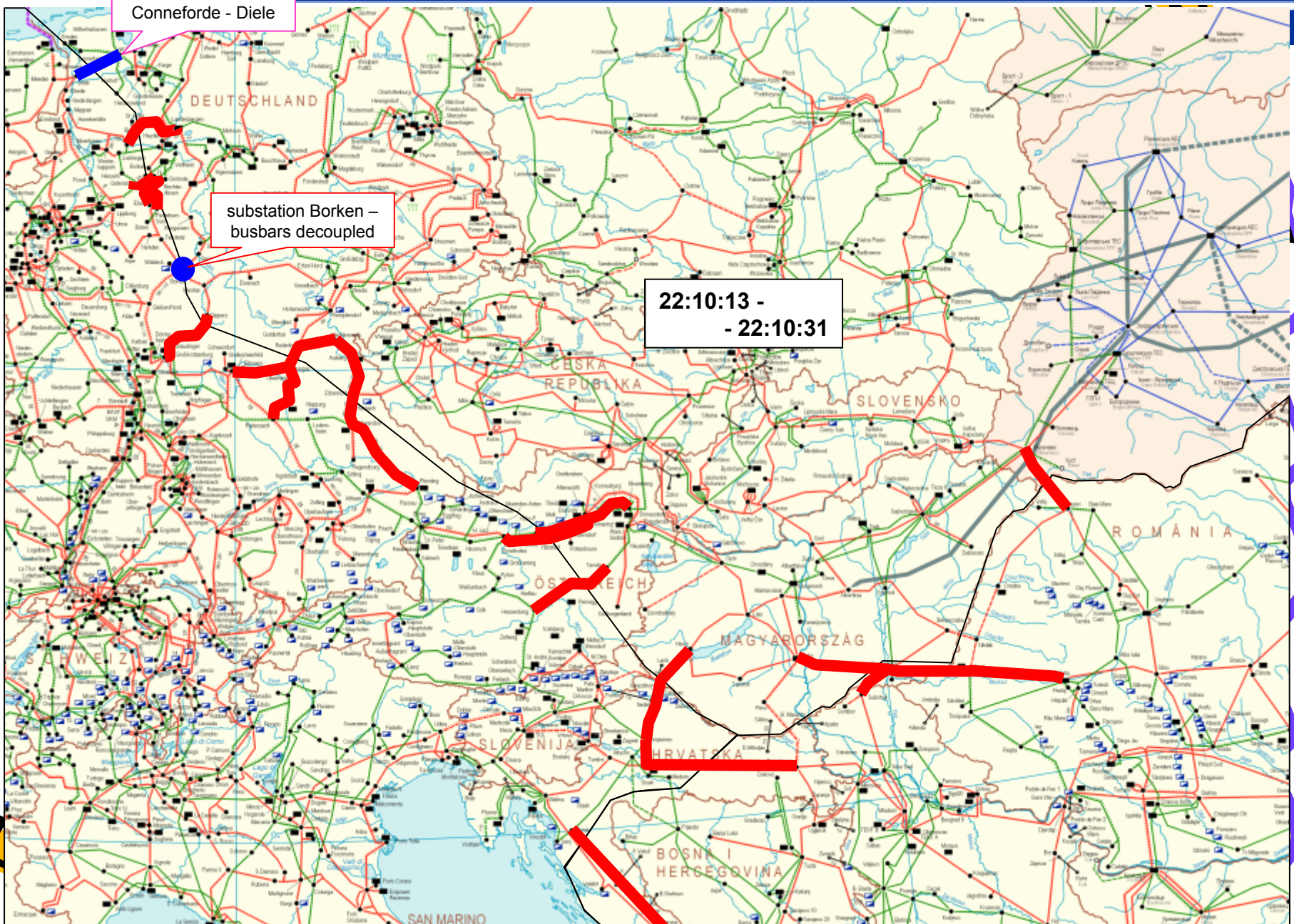
- **10.07** TSO RWE informs E.ON that 380 kV border line overloaded @1900 A with 1 990 A automatic cut off.
- **10.10** E.ON decides changing network topology by 'coupling' busbars in a station. Expecting to reduce Border Line load by 80A.
- **10.10.13 to 10.10.31** Very funny $\frac{1}{4}$ minute show (performance on next slide)



Conneforde - Diele

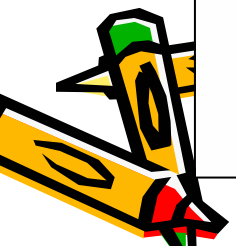
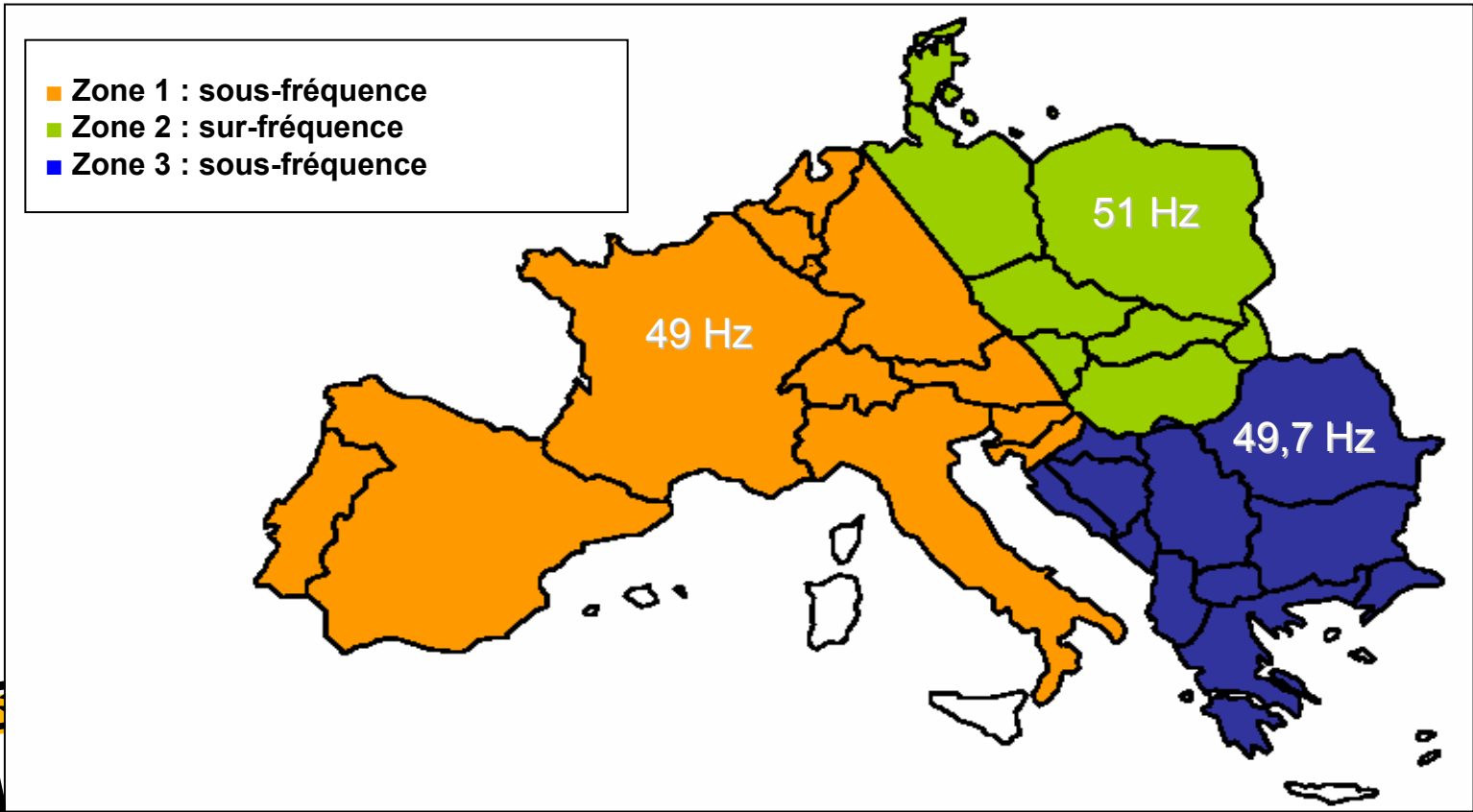
substation Borken –
busbars decoupled

22:10:13 -
- 22:10:31



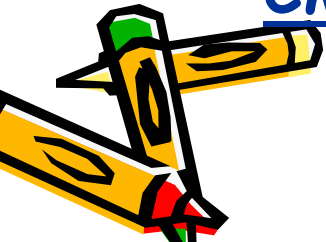


- It resulted in the worst grid crisis Europe has never seen 13 millions customers disconnected - EU continent divided into three zones: West (183 GW), NorthEast (62 GW) and SouthEast (29GW).



2: *EU Reliability Council -UCTE- self control!*

- **UCTE** = Union for the Coordination of Transmission of Electricity = association of Continental Europe TSOs = Reliability Council of TSOs = 50 years old = 23 European countries + EU Commission recognition
- **Year 2002** UCTE upgraded its 'Security package'
- * Operation Handbook (OH) defining security standards
- ** Multilateral Agreement (MLA) = formal contract with TSOs commitment to apply OH
- *** CMEP = ex ante verification process .



2: UCTE- self control Cted

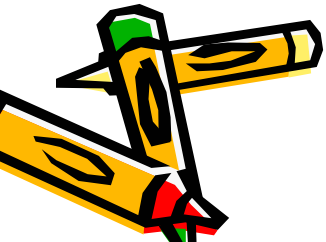
- UCTE Report - 2 main reasons for that crisis
 - 1° No fulfilment of N-1 security criterion by German TSO E.ON
 - >> E.ON ran *NO* N-1 study on 4 Nov and took busbar decision with no simulation at all
 - 2° Insufficient coordination between German TSOs
 - >> 5 Nov. line cut had been prepared by E.ON with NL Tennet & German RWE
 - But **a)** 4 Nov. line cut has not and **b)** E.ON took no care of different protection devices & rules on the cross-border line with RWE



- *UCTE Report*
- 5 other factors worsening the crisis

1° Wind & Cogen uncontrolled (in ex post process) >>
2 000 MW self cut in Spain (6 500 MW Wind in deficit region 183 GW) >> Unknown Wind reconnection & disconnection on German Distribution Grids (8 500 MW Wind in surplus region 62 GW)

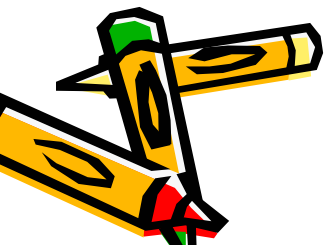
2° Insufficient ex ante congestion tool box of German TSOs >> Grid management, market management, etc. not prepared for crisis handling



3° Insufficient coordination between TSOs & DSOs in restoration process (mainly Germany) >> insufficient ex ante preparation of crisis handling & ex post information & coordination

4° Insufficient coordination of TSOs in restoration process (all over EU) >> insufficient ex ante preparation of crisis handling & ex post information & coordination

5° Insufficient training & equipment of dispatchers >> a) Set of procedures & tools available to dispatchers; b) common knowledge, communication and consultation in emergency situation



3: *EU Regulators' Group*

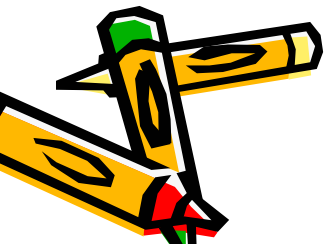
ERGEG [Official advisor of EC and official investigator]

*Provisional report (20 Dec 2006) *Final report (Feb 2007)

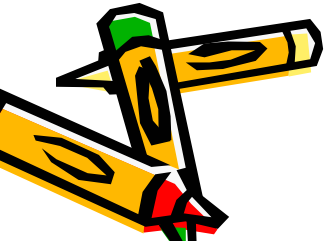
°° creates a Task Force on it (*Ad Hoc Working Group*)

*Deeply dissatisfied with UCTE & TSOs

- ° UCTE doesn't have precised rules & doesn't check *ex ante* actual implementation by TSOs
- ° UCTE too much a 'decentralised' club of gentlemen TSOs
- ° Rules not really binding
 - >> Each TSO can define & apply them its way
 - >> No real consequence if TSOs not applying / not applying firmly the rules



- **Leniency of UCTE:** Switz. exonerated of load shedding in emergency; Spain can restore "Pure frequency" = imports more in emergency, etc.
- **Not all TSOs to be blamed.** German TSOs & UCTE two core dissatisfaction points. But ETSO chairman showed that French RTE & Belgian Elia cannot make such error.
- **However ERGEG** trying to exploit it to take over "control seat" on TSOs (even "strict control"!))
- **True that Italy Black Out 2003 & UCTE 'Upgrade' have been warned by ERGEG:** ERGEG 2005 Recommendations on UCTE Operation Handbook



4: *EU Further Action?*

- *March 2006 EuC Green Paper SoS:* EU needs real Grid Code & an EU council of TSOs in charge of Net. Security + an EU Regulatory Com. for cross-border trade & interco. But EU proposal got:
 - >> '*Niet*' from UK, France & Germany
 - >> '*Not that TSOs' way*' from UK reg.
- *January 2007 EuC Communication:* EU needs stronger Unbundling of TSOs + stronger NRAs + stronger Reg. Rules + Stronger Coordination between NRAs & between TSOs + Stronger oversight from EC.

All this: Specially for cross-border issues .