COMMON CHALLENGES IN COLLABORATIVE RESEARCH ON SHALE GAS IN EUROPE

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JOINT PROGRAM ON SHALE GAS

- Combine national initiatives on R&D on shale gas development
- Align and stimulate EU research on shale gas exploration and production
- Address specific European issues which are different from US experiences
- Share experimental facilities and numerical tools
- Support policy makers in EU with independent R&D

www.eera-shalegas.eu

Coordinated by TNO

Participating Institutes JP Shale Gas

28 institutes from 15 EU members
New members: BRGM, ENEA, INERIS
FOCUS AREAS OF JOINT R&D SHALE GAS

Sub programs in EERA JP Shale Gas

1. Assessment of shale gas potential
2. Technology for safe exploitation
3. Environmental impact
4. Energy and carbon efficiencies
5. A social license to operate?

In collaboration with EERA, EuroGeoSurveys, and the European Commission.
ACTIVITIES EERA SHALE GAS:

Knowledge sharing meetings
2013 Shale gas research inventory – A’dam
2014 Induced seismicity - Rome
2015 Well Integrity – Krakow

Technical expert exchange meetings on subprogram level, annually

National Research inventories

Exchange of tools, data, facilities, reports

Initiate H2020 Joint Research projects

Develop joint testing sites
SHALE GAS RESEARCH AND DEVELOPMENT

- **economics**
- **resource**
- **characterization**
- **sweet spots**
- **smart development**
- **safe production**
- **public perception**
- **regulations**
- **networks**
DECLINE IN US NATURAL GAS PRICE DRIVES TECHNOLOGY DEVELOPMENT FOR EFFICIENT SHALE GAS PRODUCTION
SHALE GAS PRODUCTION IN EUROPE LARGELY ON HOLD WITH UNSURE POTENTIAL FOR ECONOMIC PRODUCTION

UK: 4 wells, supportive government – expects 20-40 (fracced) wells in next 5 years

NL: no commercial shale gas in next 5 years. R&D program announced in 2016

FR: ban on commercial hydraulic fracturing

ES: several new exploration permits. Court overruled regional ban.

DE: proposed law to allow fracking under tight restrictions after moratorium of 4 years

DK: 1 exploration well – abandoned in 2/2015

LIT: no new shale tender round. Chevron pulled out previous one

PL: over 70 wells, continuing efforts - economic shale gas production unsure.

RM: lifted ban on fraccing in 2013, few wells.
WELL SELECTION TOUGH IN DENSELY POPULATED REGIONS

TAKING CARE OF:
- CITIES
- PROTECTED AREAS
- NATURA 2000
- WATER EXTRACTION
- ALTERNATIVE USE
UK NOW MOST ACTIVE IN EU
SHALE GAS RESOURCE MAPS EUROPE
NO COMMON VIEW ON EU RESOURCE BASE
NEED FOR A COMMON EU METHODOLOGY ON BASELINE MONITORING

METHANE IS PRODUCED ON COMMERCIAL BASIS AT DRINKING WATER PRODUCTION SITES IN NL

THERE IS NO LINK TO ANY OIL OR GAS PRODUCTION
Safe production

Top 5 concerns US (Environmental Defence Fund):
1. General safety: Traffic & transport around well site
2. Methane emissions
3. Improper drilling, completion, operation or abandonment of wells
4. Surface spills and leaks
5. Produced water disposal

Others:
- Changing landscape (wildlife, biotopes)
- Availability water resources
- Induced seismicity: Hydraulic fracturing & waste water injection

Modified from Althous et al. 2012 & EERA Shale gas JP
INDUCED SEISMICITY FROM STIMULATION IN NATURAL FRACTURED NETWORKS

Geert de Bruin (TNO)
OUTLOOK TOWARDS NEW TECHNOLOGIES TO REDUCE ENVIRONMENTAL IMPACT AND RISKS OF SHALE GAS EXTRACTION

- Inventory of technology development which can reduce the risks of shale gas development
- Commissioned to TNO by the Dutch government
- Presents the state of the art in shale gas extraction
- Qualifies the innovative technologies on TRL maturity level
- Issued July 2015

Report available via www.tno.nl/shalegas
CONCLUDING REMARKS

- (Shale) Gas is a recognized fuel in a low carbon energy system by the EU
- EU should develop a common resource assessment methodology and estimates on a basin to basin scale (JRC and EGS)
- Innovation focus in EU
  - Understanding geology of EU shales (heterogeneity, natural faults)
  - Develop best practices for minimising environmental and societal impact
  - Finding alternatives for fracking/chemicals/water use
- Balance public resistance, realising “a social license to frack”
  - Balance risk and reward on local and national level
  - Need for unbiased communication, monitoring and transparency
  - Learning from other energy technologies (Nuclear/CCS/Geothermal/Wind)
- Strengthen R&D efforts on EU level
  - Use international networks EERA, JRC, EGS, H2020, IEA GOT IA
  - Leverage on national programs within EU (UK, NL, PL,…)
  - Develop common test sites to validate new technologies
THANK YOU FOR YOUR ATTENTION

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