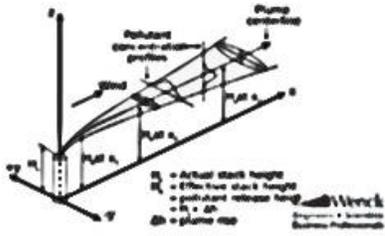


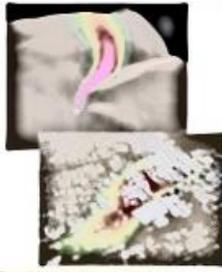
Gaussian Dispersion Model



Dispersion Models – Gaussian Puff

Cases/uses

- Represent plume as superposition of multiple Gaussian spatial distributions for contaminant mass
- Time and space-varying dispersion σ coupled to appropriate meteorological data
- Physical representation of physics such as corner-effect or urban effects



Runs on a stand-alone PC with real-time meteorological feed
License: University of London

Gaussian Dispersion



Practical Harmonisation of Dispersion Modelling in The Real World - 'The ERM Way'

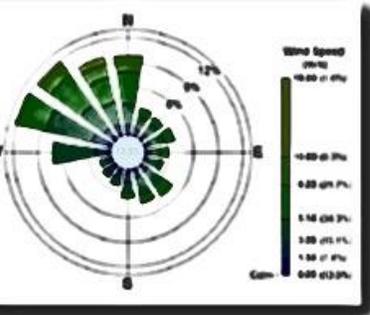
Presented to:
Presented by:

HARMO19
Yves Verlinden
Senior Consultant
MIEnvSc, MIAQM

3rd June 2019



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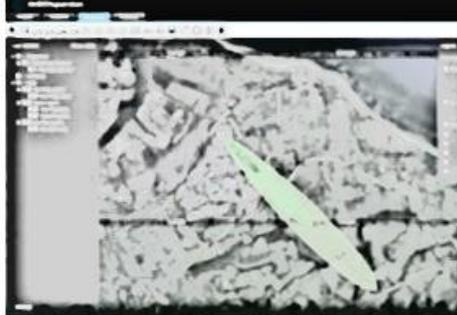


Gaussian Dispersion Models

- Most widely used
- Based on the assumption
 - plume spread results primarily by molecular diffusion
 - horizontal and vertical pollutant concentrations in the plume are normally distributed (double Gaussian distribution)
- Plume spread and shape vary in response to meteorological conditions



720 x 540 www.slideserve.com



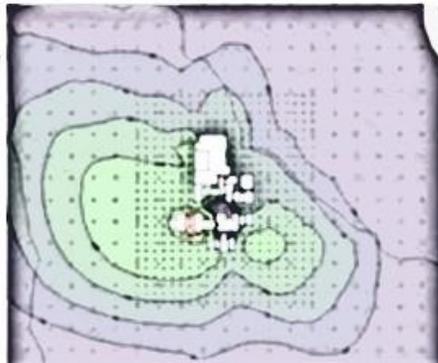
Toxic Release and Dispersion Models

Gaussian Dispersion Models

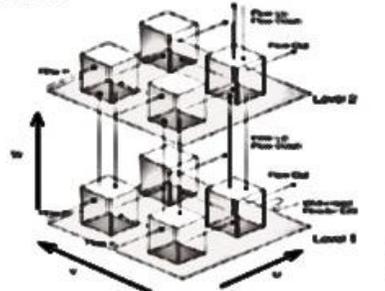


Summary For Major Releases, Dispersion Modeling Systems Transform Incident Information into Actionable Information

| Incident Information | Dispersion Modeling System | Actionable Information |
|---|--|--|
| <ul style="list-style-type: none"> • Meteorological data (pressure, temp, wind, height, humidity, ...) • Meteorological data and observations | <ul style="list-style-type: none"> • Release characteristics (source, height, flow, direction, ...) • Characteristics of model (physics, temp, 3-D wind field, terrain, ...) • Transport and dispersion model | <ul style="list-style-type: none"> • Hazard areas (based on public exposure guidelines, equipment capabilities, etc.) • Public safety guidance • Planning and consequence assessments |



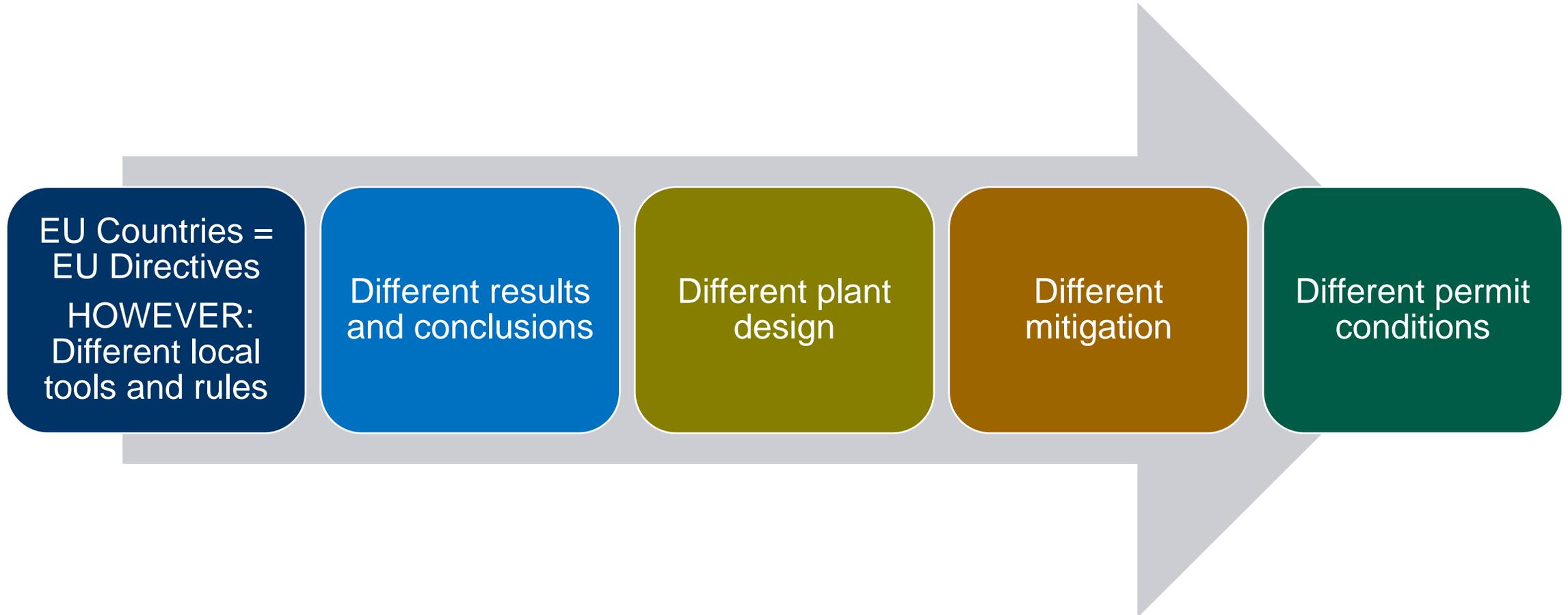
STRUCTURE OF BASIC EULERIAN MODEL



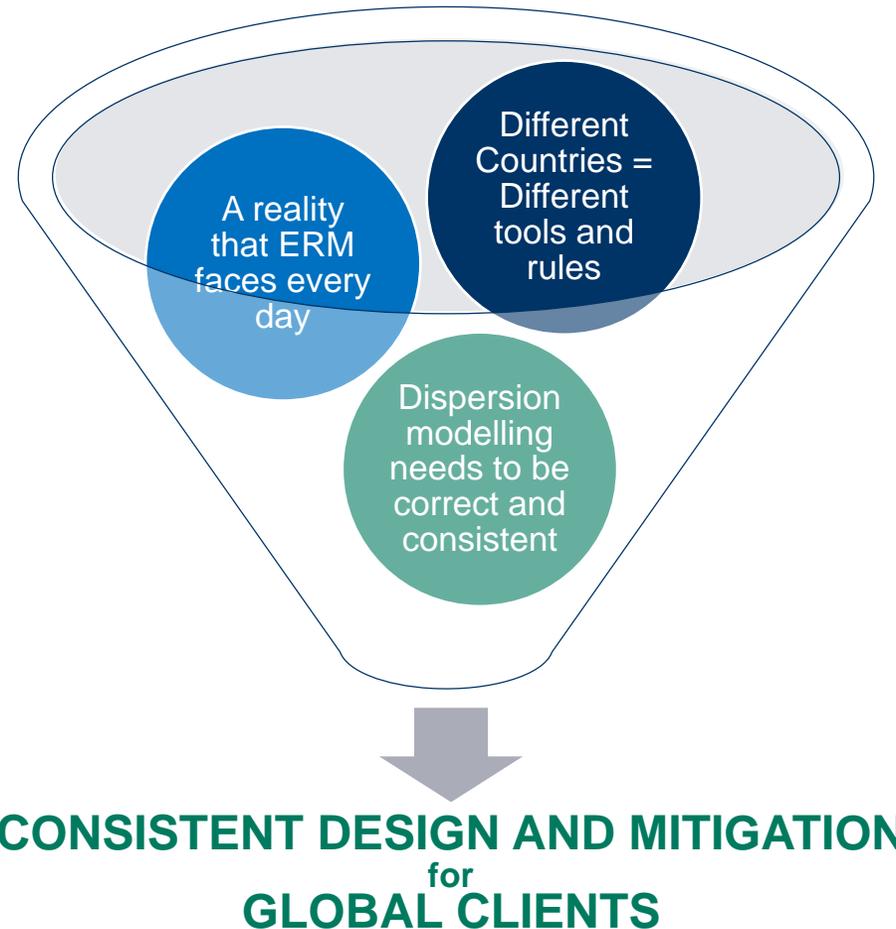
Introduction

Why Harmonise?

Introduction - Why Harmonise?



Introduction - Why Harmonise?

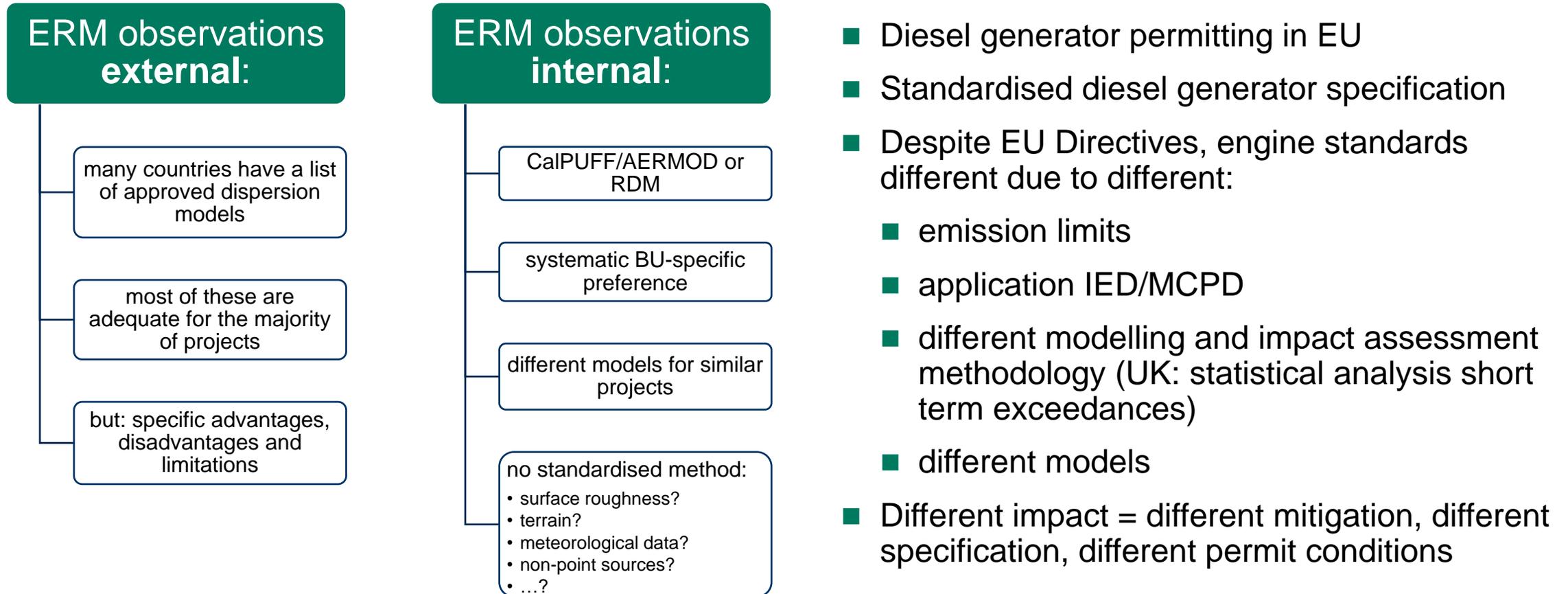


How does ERM address these issues?

ERM Observations

How does ERM address these issues?

ERM Observations



How does ERM address these issues?

Model Selection - Decision Tree

How does ERM address these issues?

Model Selection - Decision Tree

Decision Tree:

dispersion model most fit-for-purpose

same model for the same project

across geographies

Taking into account:

local regulations
(eg. use of RDM)

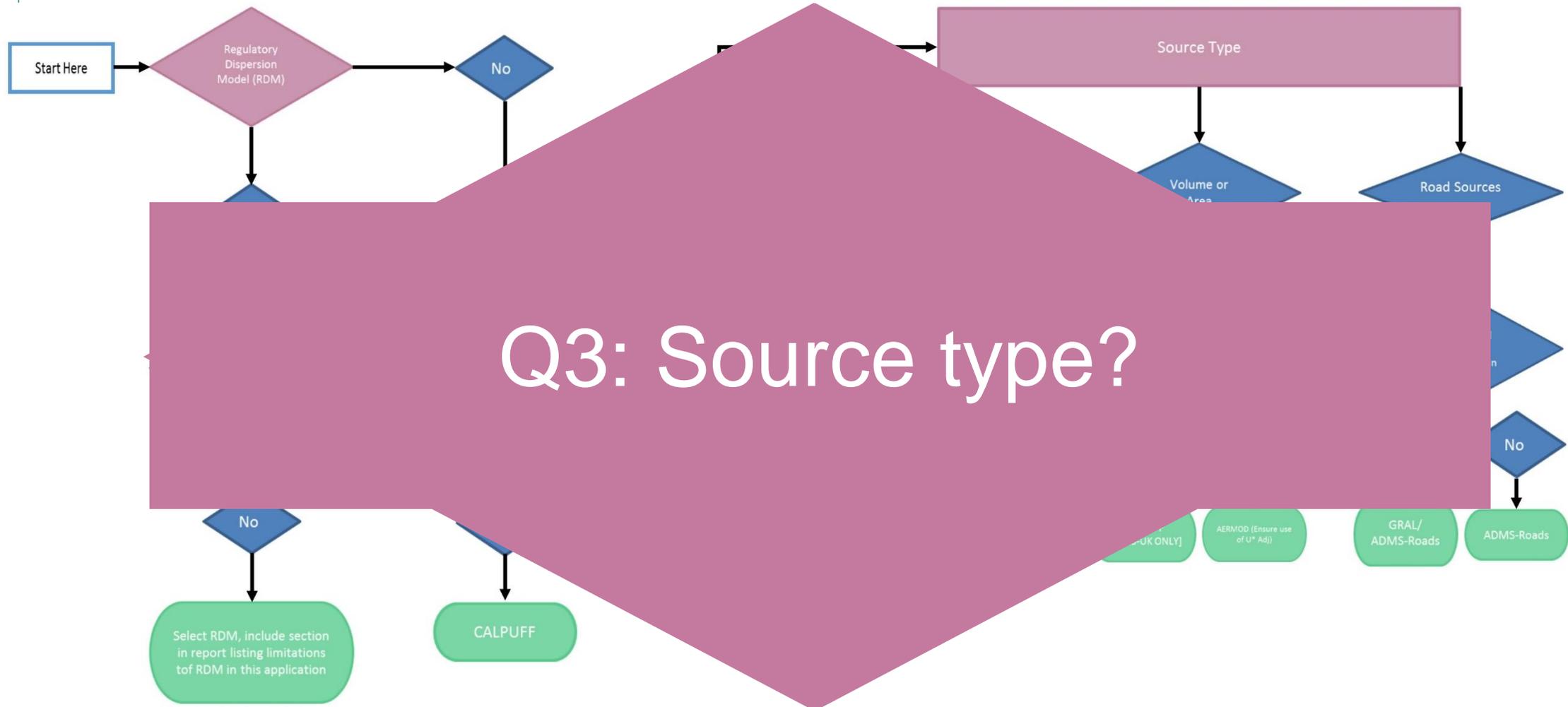
required model domain size

local environment
(eg. topography)

project specifics (eg. type of emission sources)

How does ERM address these issues?

Model Selection - Decision Tree



How does ERM address these issues?

Other Challenges - ERM Air Quality Technical Community

How does ERM address these issues?

Other Challenges - ERM Air Quality Technical Community

Consistency in model choice is only one of several measures to assure best practice project delivery

model inputs?

how to work
model of
choice?

significance
framework?

what needs to
be assessed ?

purpose of the
modelling job?

ERM Air Quality Technical Community

Project experience

Expert judgment

Gateway to knowledge

Platform to:

- discuss ideas and challenges
- gain insights and align solutions to specific modelling conundrums

Guidelines on Modelling Best Practice

ensure consistency
and technical
robustness

standardise modelling
and AQIA worldwide
within project limits

How does ERM address these issues?

Case Study – TMT Sector

- Standardised Engine
 - Air Quality Standards are main driver
 - Best Practice design is critical
 - Without NO_x abatement, breaches of short term NO₂ standards are likely
 - Minimum requirements defined with regards to best practice and emission limits
 - **Starting point for discussion with local regulator**
- Standard Model Methodology
 - Aermom = least regulatory barriers
 - Methodology: need to reflect highly specific local conditions, results need detailed expert evaluation
 - **Starting point for discussion with local regulator**

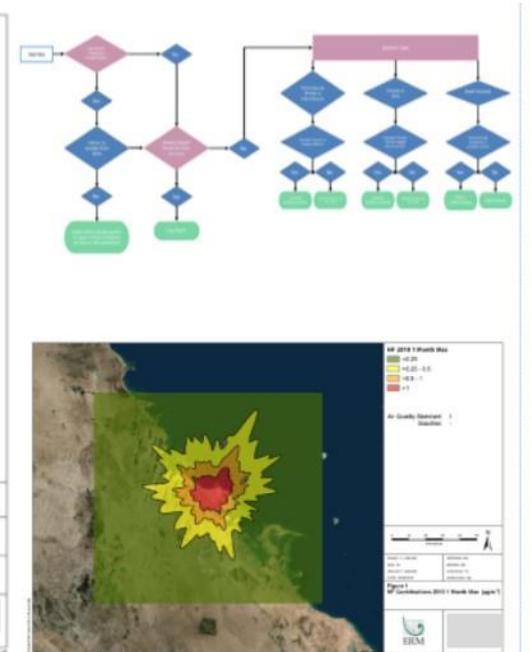
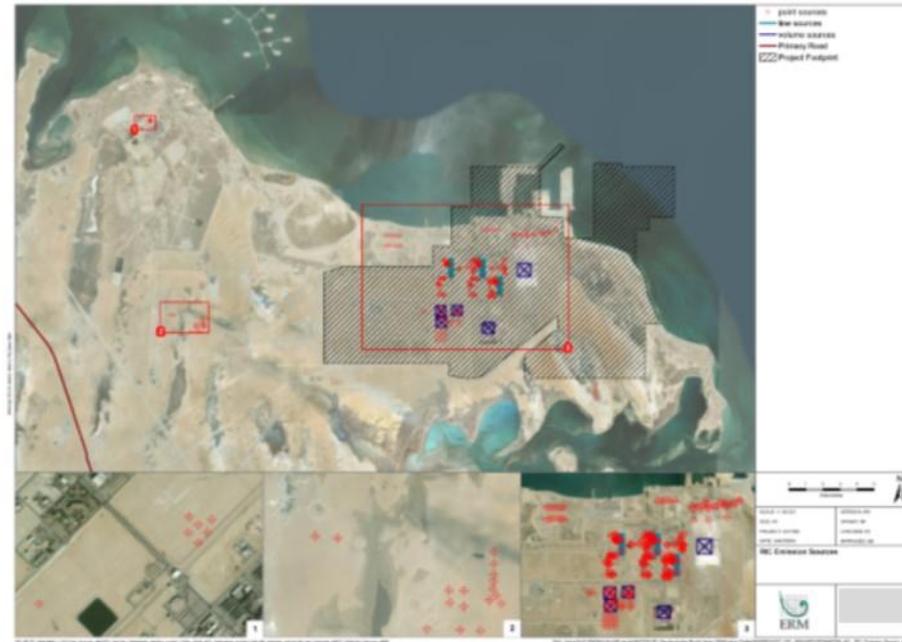
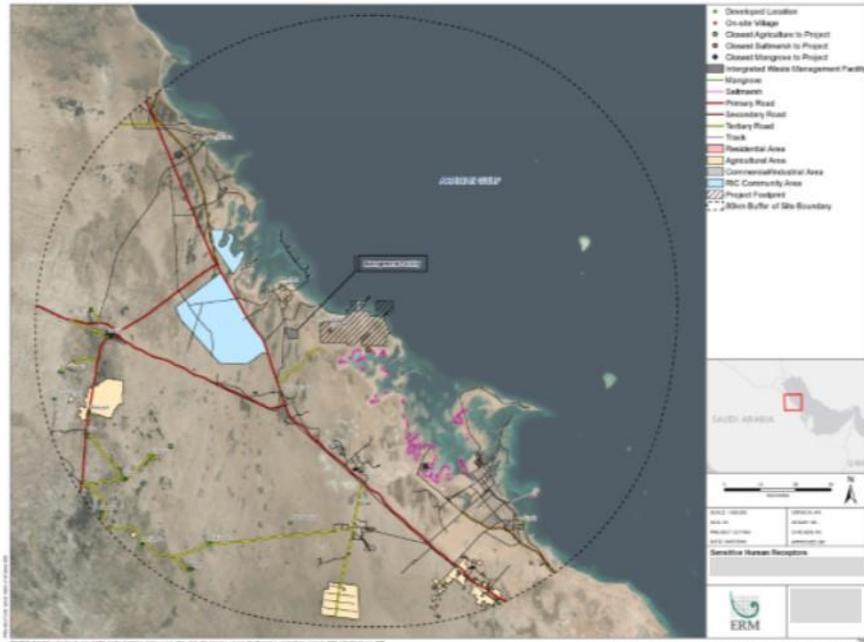
Conclusion

'the ERM Way'

Conclusion

'the ERM Way'

- EU Countries = EU Directives
 - HOWEVER: Different local tools and rules
 - Different plant design
 - Different mitigation
 - Different permit conditions
 - Consistency in modelling is crucial so that global clients can implement design and mitigation consistently
- *ERM Air Quality Technical Community* has found a way to harmonise dispersion modelling and impact assessment on a *global scale*:
 - *Decision Tree*
 - *Guidelines on Modelling Best Practice*
 - Widespread knowledge sharing
 - Makes for a fascinating and rewarding job



Thank you

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