AirMonTech

AirMonTech Recommendations and Research Roadmap

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www.airmontech.eu

Introduction

Two main outputs from the AirMonTech project:

- A resource on urban air quality monitoring technologies

  The database http://db-airmontech.jrc.ec.europa.eu/

- A set of recommendations for future regulatory monitoring,

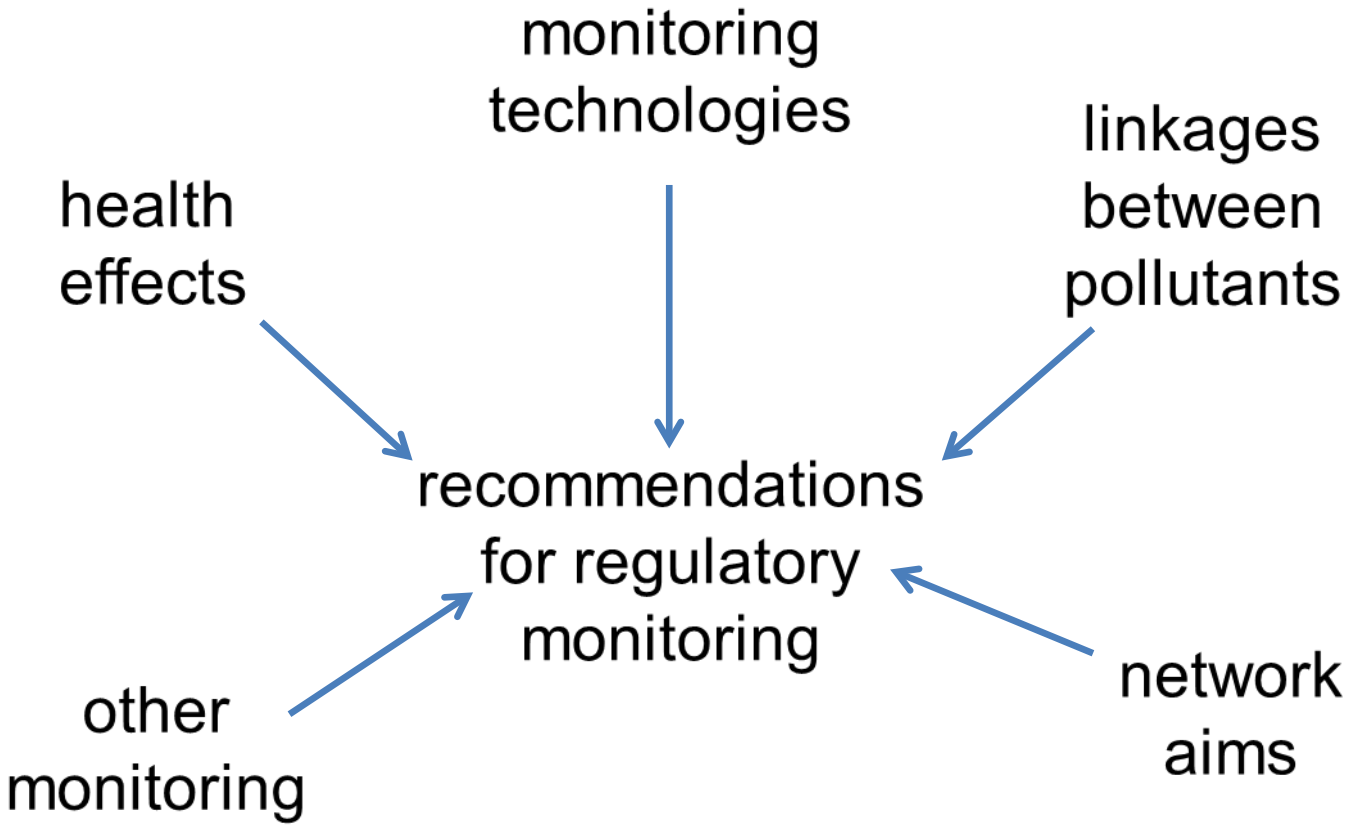
  and a research roadmap for putting them into practice

Introduction

monitoring technologies

recommendations for regulatory monitoring

Introduction



AirMonTech in Context

Some other parallel work:

- REVIHAAP, health effects
- Science Air Quality Research Review
- AQUILA activities

AirMonTech's remit to :

- consider all relevant factors
- produce concise, practical recommendations and roadmap

Some key recommendations

The context of the monitoring (1)

The focus of networks required by the Air Quality Directive should be broad enough at least to include the assessment of compliance with EU standards in background and hotspot sites, and the assessment of population-based exposure appropriate for health effect studies.

There should be explicit supplementary aims of addressing scientific questions about sources, pollution control measures and monitoring for specific studies on health effects, defined in collaboration with the corresponding scientific communities.

Some key recommendations

The context of the monitoring (2)

There needs to be some flexibility in requirements to encourage the uptake of new technologies, to respond to changing priorities, and to reduce "monitoring inertia".

Consideration should be given to moving away from a strategy of comprehensive monitoring networks for each pollutant, to one of having a combination of permanent "research sites" measuring a large range of pollutants in carefully-chosen sites, supplemented by other monitoring techniques and modelling.

In the 2020 timescale, the overarching aim should be better integration of air quality assessment (which includes ambient monitoring, remote monitoring, emissions data, and modelling) and health effects monitoring, addressing a strategy containing regulatory and supplementary aims as set out above.

Some key recommendations

Monitoring technologies (1)

In the longer term, spectroscopic instruments based on, for example, multi-laser cavity ring down spectroscopy, offer potential benefits of high accuracy, compact multi-species gaseous pollutant instruments, and their development should be encouraged.

Low cost gas sensors, such as those based on electrochemistry, have a large potential for enabling high spatial density monitoring which would be beneficial in urban areas. However, there is currently only preliminary evidence of their real world performance in terms of, for example, specificity and stability, the most promising evidence being for ozone sensors. Research in this area should be encouraged.

For the regulated particle metrics PM_{10} and $PM_{2.5}$, there are no automated technologies that are suitable as reference methods to replace the current manual reference methods without this leading to a significant change to the metrics. However, this is largely a consequence of these metrics being method-defined. The investigation of related but better-defined metrics, such as separate chemical components of the same size fractions, or their non-volatile components, is encouraged.

Some key recommendations

Monitoring technologies (2)

Black carbon (BC) is a strong candidate for future regulatory measurement, as a proxy for combustion products. It should be reported both as an optical absorption coefficient, and as a scaled concentration designed to be equivalent to elemental carbon (EC). This is because of the reliability of the measurement technology, and the importance of monitoring this major type of primary particle in terms of its relevance to both health effects and climatic radiative forcing.

Priority parameters for extended field trials are real time methods for ammonia, black carbon, particle surface area concentration, particle number concentration, organic carbon, ROS, and particle composition, specifically simplified Aerosol Mass Spectrometry for organic speciation, and automated analysers for elemental components.

Air Pollution Monitoring Technologies for Urban Areas

The Roadmap task

NPL National Physical Laboratory

Technologies - where we are

Technologies – current developments

Networks and other tools - where we are

Health effects knowledge - where we are

2013 → 2020

Air Pollution Monitoring Technologies for Urban Areas

The Roadmap task

NPL National Physical Laboratory

Technologies - where we are

Technologies – current developments

Networks and other tools - where we are

Health effects knowledge - where we are

Where we would like to be

2013 → 2020

Air Pollution Monitoring Technologies for Urban Areas

Roadmap: the destination

National Physical Laboratory

Scope for new metrics such as BC, particle number concentration, surface area concentration, ROS

Well chosen and well defined AQ metrics

2013 → 2020

Air Pollution Monitoring Technologies for Urban Areas

Roadmap: the destination

National Physical Laboratory

Well chosen and well defined AQ metrics

Scope for multi-laser spectroscopy for gases; low cost sensors for gases; miniature optical particle spectroscopy; particle speciation

New and better instruments and sensors

2013 → 2020

Air Pollution Monitoring Technologies for Urban Areas

Roadmap: the destination

NPL National Physical Laboratory

Well chosen and well defined AQ metrics

New and better instruments and sensors

Concept of “supersites” in urban areas; traffic and background

Flexible processes for evaluating new instruments and metrics

2013 → 2020

Air Pollution Monitoring Technologies for Urban Areas

Roadmap: the destination

National Physical Laboratory

Well chosen and well defined AQ metrics

New and better instruments and sensors

Flexible processes for evaluating new instruments and metrics

Bringing the separate disciplines together synergistically

Better integration of ambient monitoring, remote monitoring, emissions data, and modelling

2013 → 2020

Air Pollution Monitoring Technologies for Urban Areas

Roadmap: the destination

National Physical Laboratory

Well chosen and well defined AQ metrics

New and better instruments and sensors

Flexible processes for evaluating new instruments and metrics

Better integration of ambient monitoring, remote monitoring, emissions data, and modelling

New and better monitoring strategies addressing defined aims

Making it explicit that national monitoring networks have aims beyond compliance monitoring, such as clarification of health effects, source apportionment, and abatement assessment

2013 → 2020

Air Pollution Monitoring Technologies for Urban Areas

Roadmap: the destination

National Physical Laboratory

Well chosen and well defined AQ metrics

New and better instruments and sensors

Flexible processes for evaluating new instruments and metrics

Better integration of ambient monitoring, remote monitoring, emissions data, and modelling

New and better monitoring strategies addressing defined aims

Integration of routine AQ and health effects monitoring (with the other scientific aims)

Making health effect monitoring and health impact assessment integral with national AQ monitoring

2013 → 2020

Air Pollution Monitoring Technologies for Urban Areas

Roadmap: the destination and philosophy

NPL National Physical Laboratory

Coordinated, focussed projects timed to maximise the use of the available expertise and to fit EU funding cycles

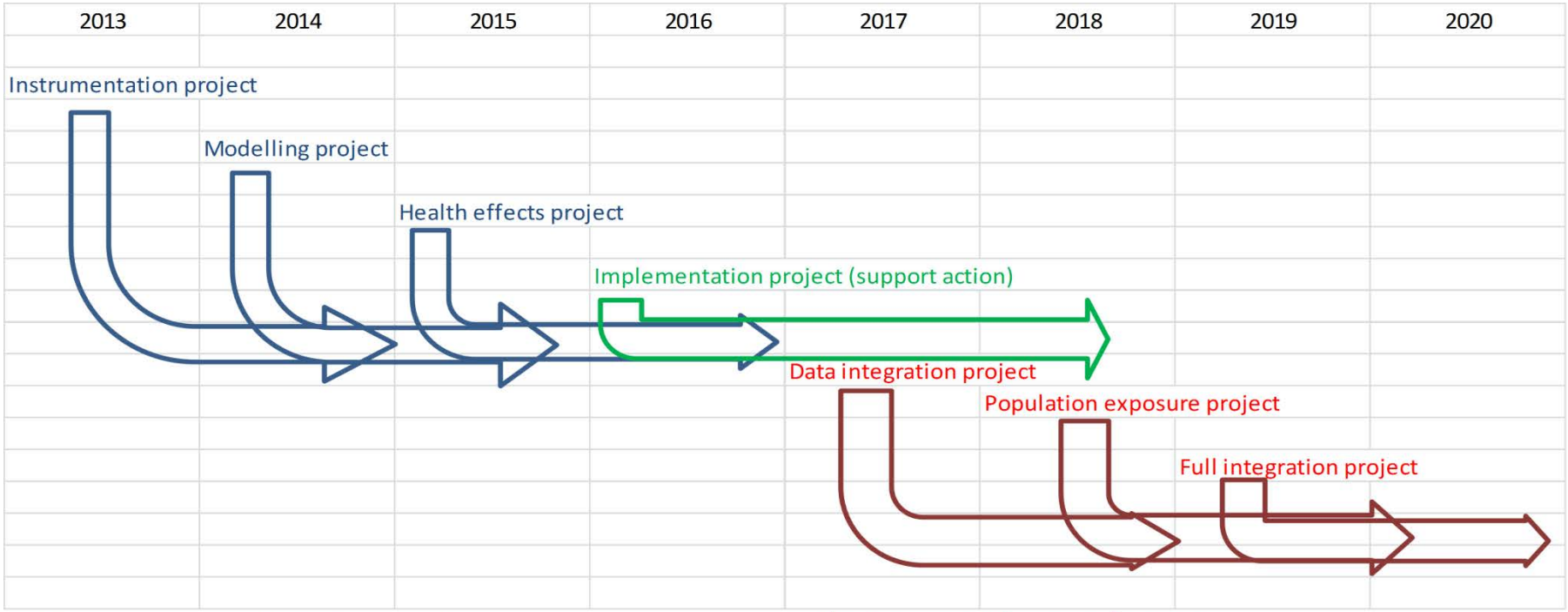
- Well chosen and well defined AQ metrics
- New and better instruments and sensors
- Flexible processes for evaluating new instruments and metrics
- Better integration of ambient monitoring, remote monitoring, emissions data, and modelling
- New and better monitoring strategies addressing defined aims
- Integration of routine AQ and health effects monitoring with other scientific aims

2013 → 2020

Air Pollution Monitoring Technologies for Urban Areas

Roadmap

National Physical Laboratory



Data acquisition phase

Integration phase

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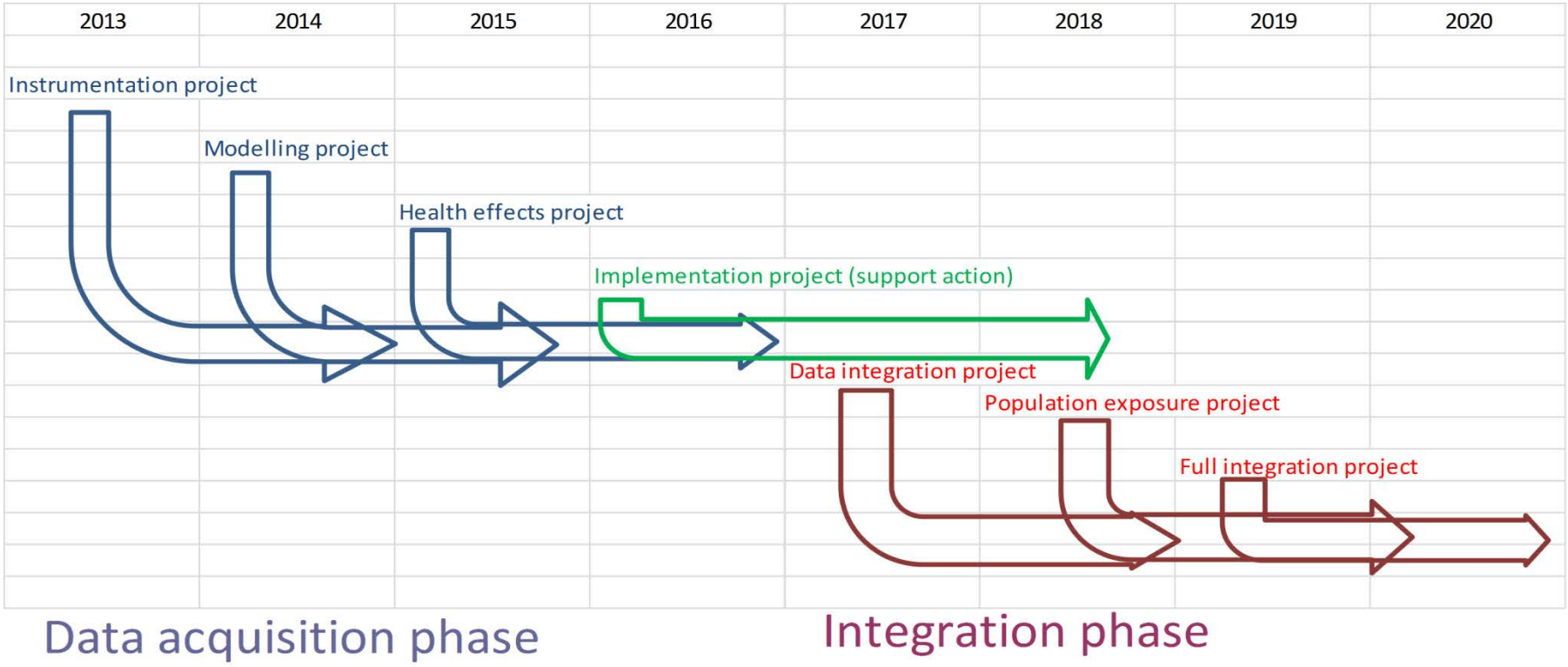
Roadmap

National Physical Laboratory



Instrumentation: leading to new and improved monitoring technologies and procedures for new and alternative metrics that relate to health and source monitoring.

Modelling: leading to the development of a modelling and AQ data integration tool, including for alternative metrics.

Health effects: leading to robust methods to achieve (Europe-wide) routine health effect monitoring and health impact assessments.

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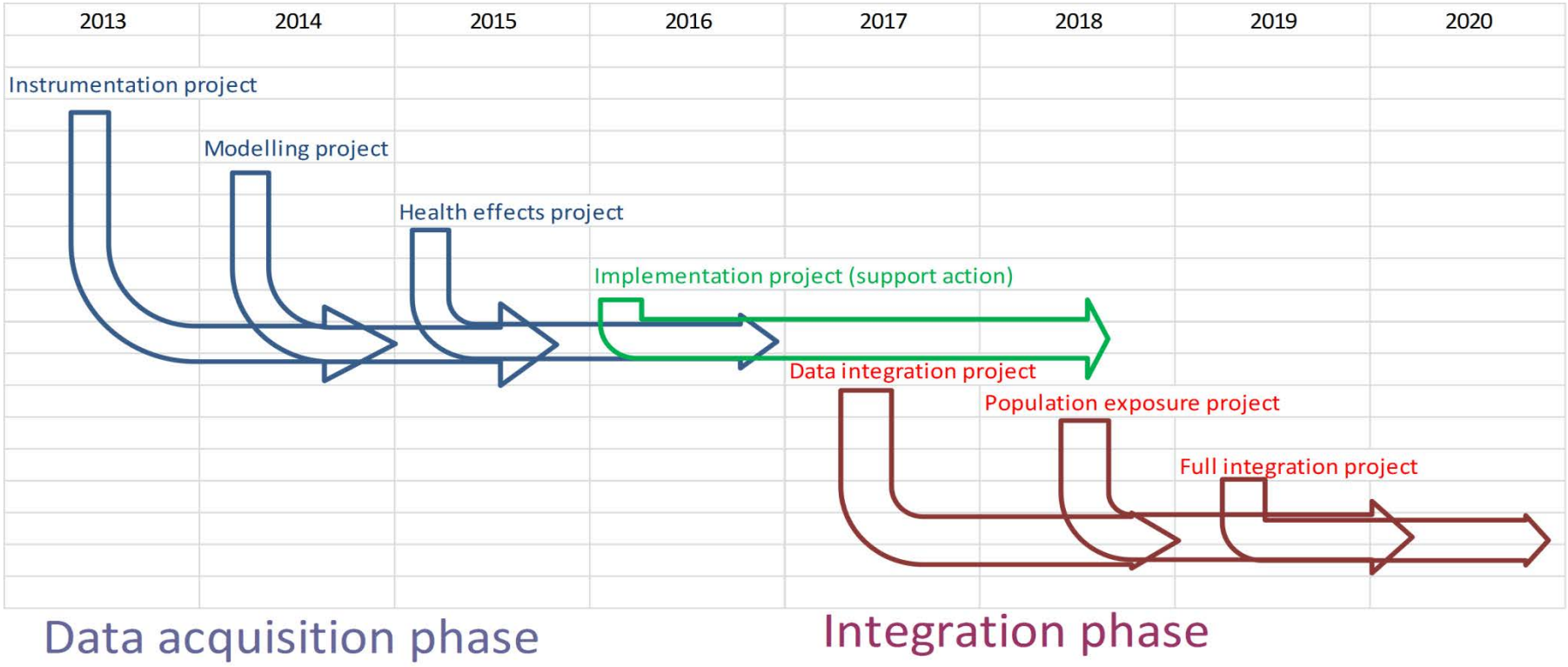
Roadmap

National Physical Laboratory



Implementation (SA): the development of implementation strategies of new AQ network designs, including for new metrics.

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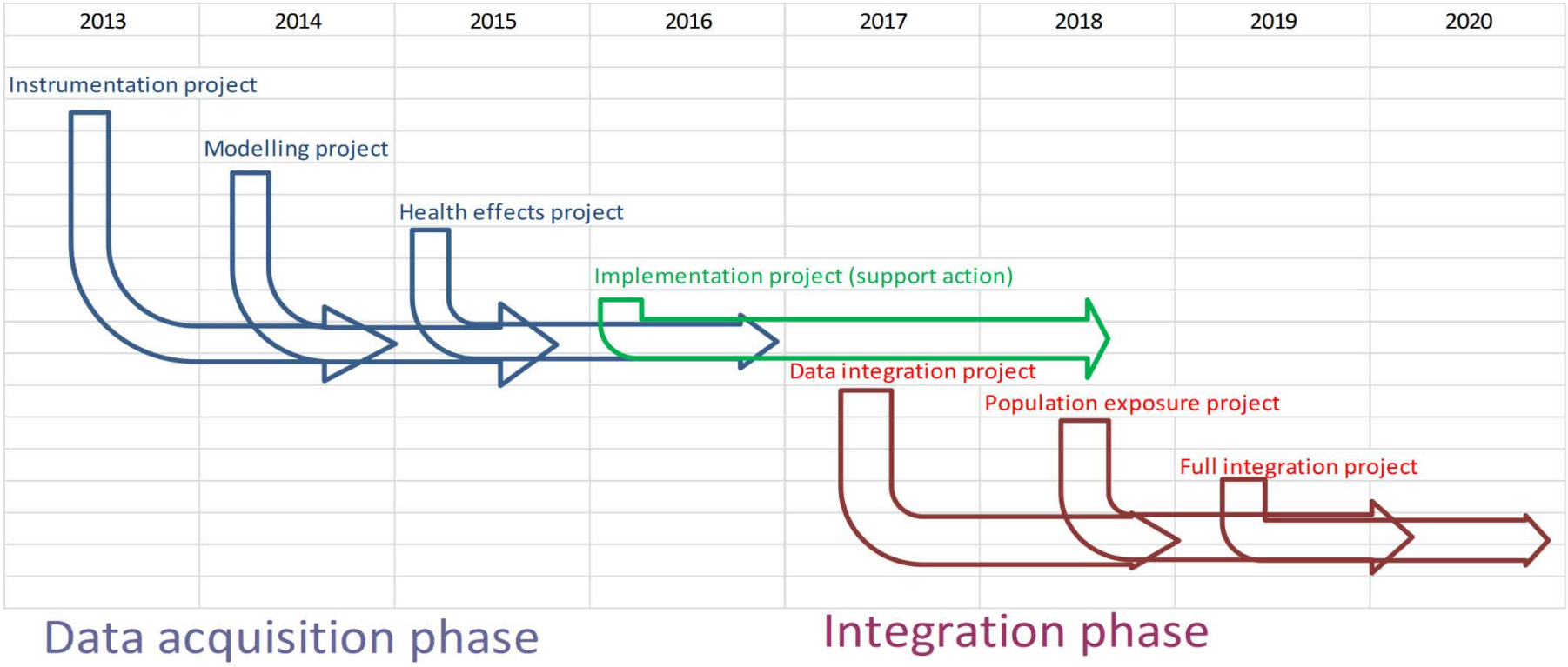

Data integration: leading to methods for optimised use of all monitoring data and modelling outputs, as developed in the *Instrumentation* and *Modelling* projects, to enable routine health, source, abatement and compliance assessment.

Population exposure: leading to methods to improve the estimation of population exposure from ambient concentrations and other data, making use of results from the *Modelling* and *Health Effects* projects.

Full integration: Implemented integration of AQ and health monitoring, together with the supplementary scientific aims, at selected cities.

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SEVENTH FRAMEWORK PROGRAMME

Thank you for your attention

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