



# Transforming major project delivery in government

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## Scale of the Challenge

People

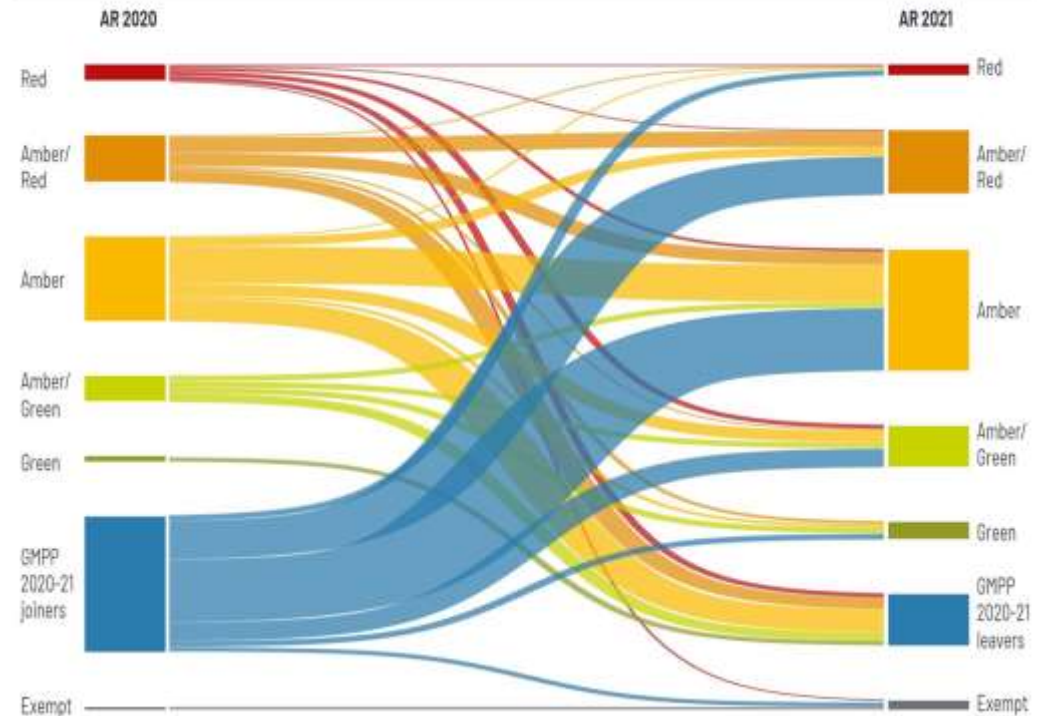
Performance

Principles

Benchmarking

Questions

Figure 8: DCA changes between AR 2020 and AR 2021



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### Overall Delivery Confidence Assessments



**£330bn (52%) currently red or amber/red**



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# Scale of the Challenge

## People

## Performance

## Principles

## Benchmarking

## Questions



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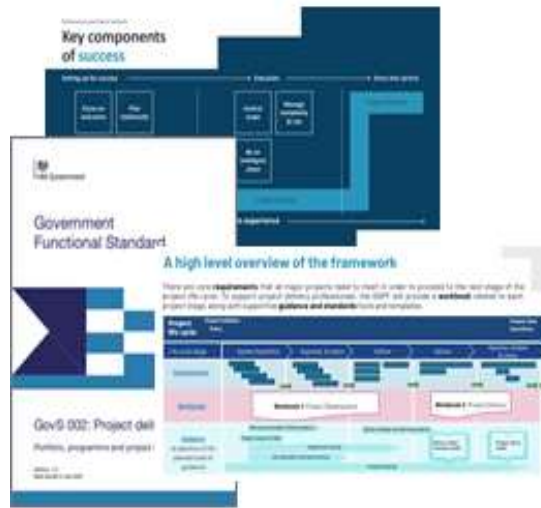


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## The ambition: a systemic framework for government project delivery



### Principles

Setting principles for government project delivery -  
*Government project delivery standard, framework, guidance and tools*

### People

Building capability so that projects have the right people and skills -  
*Government Projects Academy, Resourcing & talent, profession & community*

### Performance

Improving performance of government major projects -  
*strategy, advice & support, assurance & approvals, data & analysis, research & innovation*



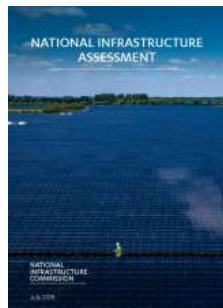


# TIP within the HMG infrastructure landscape

## Policy

### National Infrastructure Assessment - NIC

- Assesses long-term infrastructure needs
- Provides independent expert recommendations to government
- Advises on which projects and policies should be prioritised
- Has a fiscal remit agreed with HMT (currently 1.2% of GDP)
- Refreshed each Parliament



### National Infrastructure Strategy - HMT

- Responds to NIA recommendations and sets the strategic direction for infrastructure policy
- Decides which infrastructure projects to fund / which policies to take forward
- Sets budgets and long term fiscal framework
- Supports private investment through stable regulatory environment



## Delivery

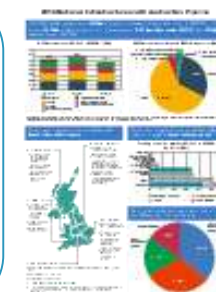
### Transforming Infrastructure Performance - IPA

- Long term change programme to improve delivery performance
- Implements some of the delivery measures announced in the NIS and advances Speed workstreams on technology and carbon
- Embedded in IPA delivery advice, support and assurance
- Delivered in partnership with BEIS, Depts and industry



### National Infrastructure & Construction Pipeline - IPA

- Core deliverable included in the NIS and Construction Playbook; setting out planned investment (21/22-24/25) and planned procurements (21/22) for infra & construction
- Captures workforce demand, projects which will use MMC and opportunities for private/project finance
- Visibility and consistency of demand is a key ask of industry to support recovery and renewal



### Construction Playbook - GCF

- Commercial best practice and reform to reset government's relationship with the construction industry
- Seeking to deliver public works better, faster and greener, and support the industry to be safer, more productive, invest in skills and reduce carbon emissions
- Mandated for public sector clients on a comply or explain basis



# The Built Environment Model



The Built Environment Model has been developed in partnership with government, industry and academia. It describes a new approach to decision making, founded on an understanding of the **interlinked nature of our infrastructure systems**, which are rooted in the **natural environment** and encompass the **built environment and the services** on which we all depend.

In this new approach:

- We must understand the **societal outcomes** that are needed in the context of this system
- Outcomes must be translated into **delivery strategies**, balancing the addition of new assets and the need to intervene in existing ones
- The success of our strategies in delivering the desired outcomes **must be tracked and fed back into decision making**



# Why is this important?

- Improve **delivery performance** in the near term - better quality projects, on time and budget
- **Increase government and market capability to deliver** our large and complex portfolio in the medium term - **c.£640bn of investment planned to 2030**; monetised benefits of GMPP infra/construction portfolio currently **£349bn**
- Support projects to exploit the opportunities presented by **industry 4.0** in pursuit of better productivity, quality and outcomes for citizens
- Begin the **transformation required** to deliver long term policy objectives through infrastructure investment - **net zero GHG emissions, levelling up across the UK, improving our natural environment**





# Focus areas

**We have chosen five focus areas which represent the most significant transformations required in how we intervene in our built environment.**

## 5. Optimisation

Given finite resources, adding to the built environment can't be our main way of improving the outcomes we derive from it. Insight into a dynamic system must underpin the interventions we make. The effectiveness of the interventions in achieving desired strategic outcomes must be monitored, with relevant stakeholders incentivised to adapt accordingly.

## 4. Platform approaches

Through platform approaches the government will generate greater societal outcomes from its pipeline, by enabling a disaggregated manufacturing industry that creates stable and inclusive employment across all regions of the UK

## 3. Retrofitting

Through public-private collaboration, enabling a self-sustaining retrofit market, the government will create the means to adapt our buildings to address sustainability imperatives and a market for green jobs appropriate for varying regional adaptation needs

## 1. Outcomes

The starting point for all of our interventions in the built environment should be defining and incorporating strategic outcomes (that address a range of societal challenges – from changing patterns of use to the need for adaptation and resilience) into longer term collaborative delivery models in which industry partners are incentivised to deliver them



Each of these has been developed in collaboration with partners from government, industry and academia. More detail is at Annex A.

## 2. Place based decision making

Strategic outcomes should be rooted in an understanding of local context and enabled by data and decision making structures so that interventions can be joined-up across departmental, national, regional, and local silos





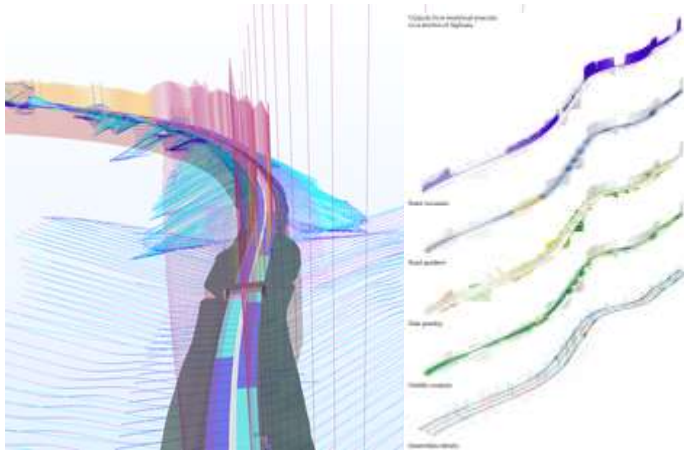
# The project of the future

## Project definition and design

## Manufacturing and construction

## Operations

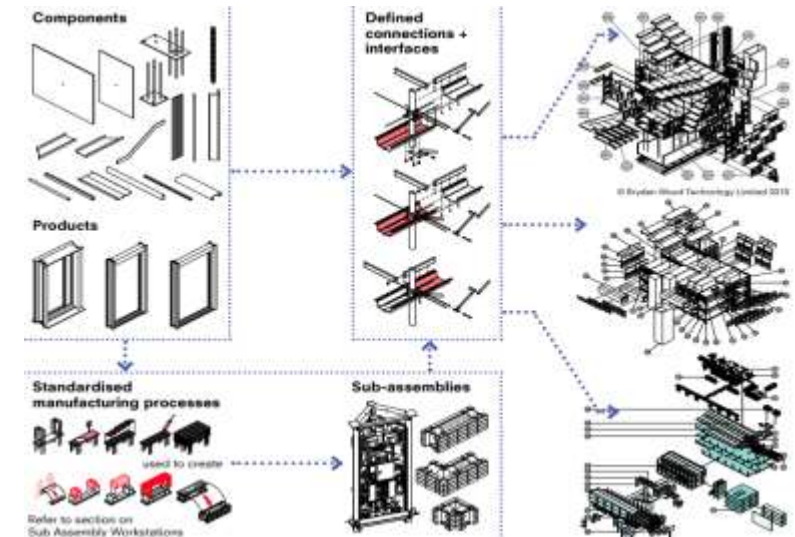
- The **design process is automated** through the use of rules-based engines, which interface with **digital product catalogues** to provide insight into industry solutions that meet the rules.
- **5D BIM** is used to plan the construction schedule, providing clash detection, capacity planning, and integrated work package planning.



- **5D BIM** provides resource management and coordination of construction. Costed components and materials are linked to availability, enabling automated earned value management and optimised use of resources.
- **Sensor technology** identifies and tracks components as they move through the supply chain and installation process, linking to the information model.
- **Engineering-grade augmented reality technology** enables the information model to be viewed onsite to millimetre accuracy to eliminate errors.



- Monitoring technologies are installed with the asset and are linked to the information model, which interfaces with operational systems to provide a **digital twin** for the ongoing operations and maintenance.
- The insight from operations is fed back into the system, so that the learning improves not just a single asset, but the design and delivery of all future assets created using the same **platform/rules**, and any products from the relevant catalogues.



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# Key actions for government and industry

Theme	Actions
<b>Data &amp; insight</b> <i>Consistently utilise data, insight and emerging technology to deliver better societal outcomes for the UK</i>	<ul style="list-style-type: none"> <li>Support development of a future <b>Digital Twin Mandate</b> and the development of the <b>IPA benchmarking hub</b> to provide the baseline for continuous improvement and should cost modelling.</li> <li>Develop and embed agreed <b>Construction Metrics</b> and a <b>Project Outcome Profile</b> for all public projects.</li> <li>Implement the <b>Information Management Mandate</b>.</li> </ul>
<b>Business &amp; delivery models</b> <i>Apply robust delivery model assessments and use delivery models that are aligned to desired outcomes</i>	<ul style="list-style-type: none"> <li>Implement the <b>Construction Playbook</b> and develop model partnerships for public and private sector delivery based on aligned principles and outcomes for construction and in operation.</li> <li>Support a future <b>mandate for Construction Platform approaches</b> for relevant assets.</li> <li>Harmonise, digitalise and rationalise specifications and standards.</li> <li>Increase uptake of <b>government-funded R&amp;D/innovation via the Transforming Construction Challenge</b> and the Construction Innovation Hub.</li> </ul>
<b>Market capacity &amp; productivity</b> <i>Optimise delivery through a robust understanding of market capacity and risk appetite</i>	<ul style="list-style-type: none"> <li>Leverage the information provided through the <b>IPA Infrastructure Pipeline</b> to provide visibility of size, scale and nature of future projects.</li> <li>Drive the use of technology to improve productivity in design, delivery and operations of infrastructure assets.</li> <li>Invest in UK skills, technology and innovation to improve industry capacity and increase economic activity across the country.</li> </ul>
<b>Environment &amp; sustainability</b> <i>Embed environmental sustainability and enhancement across the asset lifecycle</i>	<ul style="list-style-type: none"> <li>Develop solutions that reduce carbon emissions during construction and operations of assets.</li> <li>Develop and implement methodologies to <b>measure whole life carbon performance</b> for public projects and major built assets.</li> <li>Decarbonise the construction industry and develop solutions that accelerate our transition to net zero.</li> <li>Work creatively to embed the natural environment in business models.</li> </ul>
<b>Building expertise &amp; capability</b> <i>Our people have the skills, expertise and capability to support high quality outcomes in a complex environment</i>	<ul style="list-style-type: none"> <li>Continue to improve professional expertise in government, including through the <b>Major Projects Leadership Academy and Commercial Assessments Center</b>.</li> <li>Allocate expert resources to reflect project requirements/complexity, including having dedicated project leaders for all major projects.</li> <li>Implement best practice in <b>cost estimation</b>.</li> </ul>



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Case Study: Benchmarking tunnelling costs and production rates in the UK



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# Data Performance - Benchmarking Hub

The IPA will create a Benchmarking Hub and make benchmarking data available on key assets to underpin and challenge project investment cases (IPA Mandate 2021)

- The hub will leverage data from across government projects, empowering projects with UK Gov project portfolio and removing the need to “buy back” and “buy across” our data from 3rd parties
- The availability of quality **data** is a key blocker and issue for our projects for developing robust estimates and benchmarking. The hub will address this.
- The Hub will be a web-based application where users can log in and access the data they need and download. The Hub will also allows users to upload their data and connect their current system with the hub.
- The benchmarking hub is currently going through the CDIO Alpha stage process. The Hub will go into BETA (live testing) in Q4 this year

Assets	Sample	£Value
Tunnels	19	£3.5B
Embankments	35	£23.5M
Hospitals	59	£6.5B
IT Projects	252	£4.2B
Prisons	12	£1.2B





# Embankments

## Outturn Cost / Cost Per M2 Length

## Outturn Cost / Cost Per M3 Volume

Length (m)

20.75

700.00

Final Cost (Adjusted)

23,435.00

3,274,644.00

Final Cost Per M3 Volume

27.97

1,304.49

Location (County)

All

Construction End Year

2013

2021

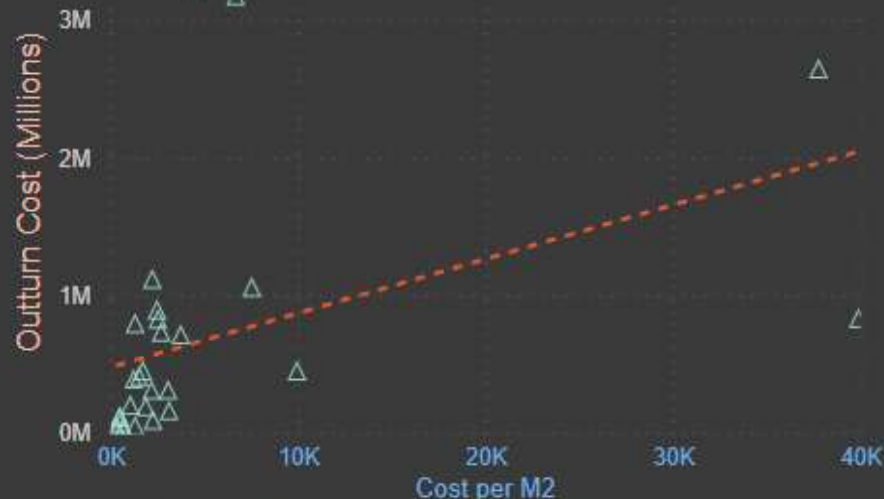
Data Points

29

Outliers

2

☐ Remove Outliers

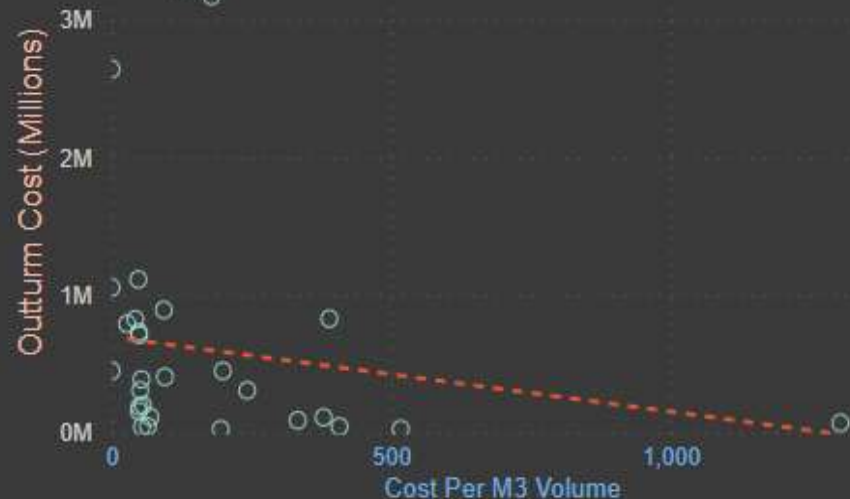


Standard Deviation Cost

260.82

Regression

0.43



Variance

757.77bn

Regression

-0.30

ProjectName	LocationCountry	EndUse	Height	ConstructionEndYear	DurationWeeks	Volume	WidthFootprint
Project 1	North West	Flood	0.40	2018		53.00	2.50
Project 10	North East	Berm Extension	2.04	2014	13.04	2,123.00	
Project 11	North East	Flood	2.59	2021		3,748.00	19.46
Project 12	North East	Flood	1.91	2021		7,217.00	17.66
Project 13	North East	Flood	1.97	2021		737.00	14.76
Project 14	England	Navigable Waterway	15.00	2018	51.00		
Project 15	North East	Flood	3.61	2021		5,987.00	32.21
Project 16	North East	Flood	3.76	2021		3,529.00	28.54
Project 17	Wales	Navigable Waterway	15.00	2018	34.00		
Project 18	Midlands	FAS	3.37	2021		17,717.90	
Project 19	North East	Flood	3.45	2021		23,231.00	29.69
Project 2	North East	Flood	1.59	2021		14,957.00	35.11
Total			105.73	58545	215.80	190,324.76	401.08

# Prisons

Total GFIA (m2)  

1454360248

Total Outturn Construction Cost (£)  

1,482,000.00350,207,045.00

No of Occupants  

2551680

Construction End Date (Year)  

20072021

Project Duration (Months)  

2063

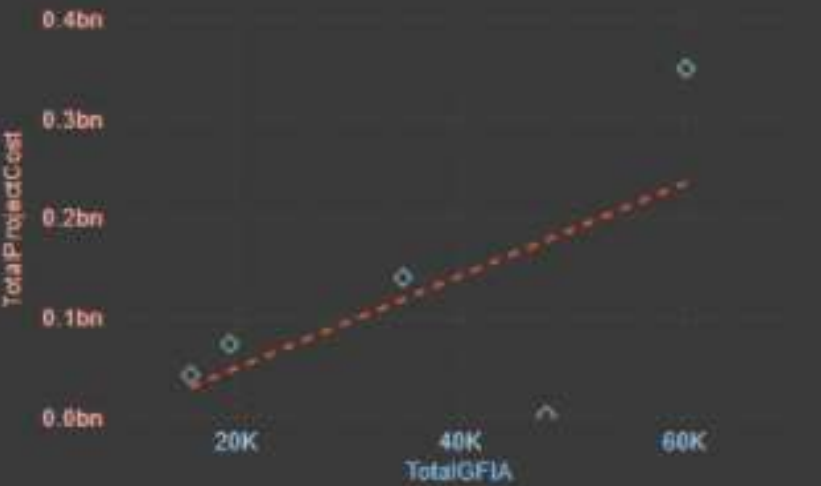
Data Points

6

Outliers

3

Total GFIA / Total Construction Cost



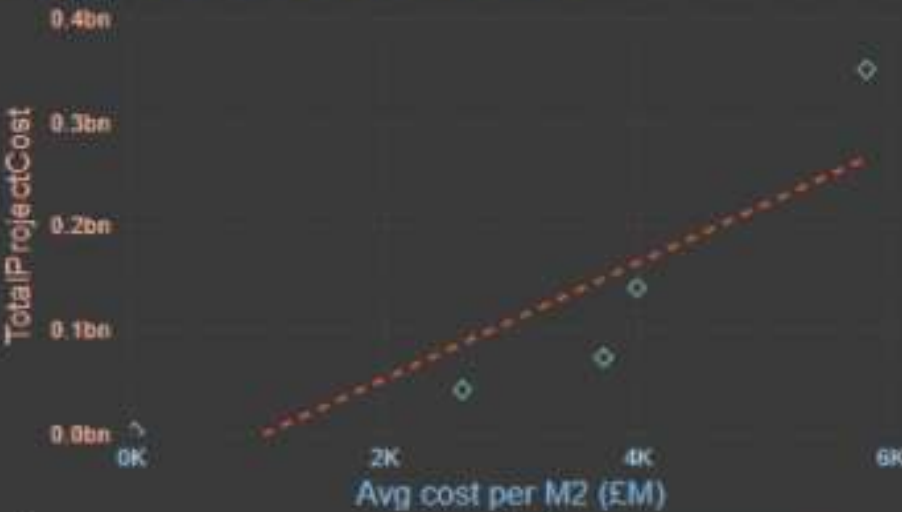
Standard Deviation Cost

123.07M

Regression Value

0.75

Avg Cost per M2 GFIA / Total Cost



Variance of Cost

1.51E+16

Regression Value

0.86

ProjectName	ABarlessWindows	AIPSystemNew	AllMaintenance	AIPSystemExisting	APCInC
German Prison	False	False	110452	False	False
Ankara1	False	False	NA	True	False
New Cork Prison	False	True	Year 2020 €28.62 / m2 (€801,391.00/28000m2)	True	True
Storstrom Fængsel	True	False		False	False
WB	True	True		True	False
Davis House (Maghaberry Prison)	True	True	38	True	True
Total					

# Questions for discussion

- What are the synergies between the TIP Roadmap to 2030 and your work to improve infrastructure delivery?
- Are there specific initiatives we could prioritise for further collaboration?
- Is there more we could collectively do to improve the evidence base for reform through international collaboration?



## Where to find out more

Project Delivery Capability Framework

<https://www.gov.uk/government/publications/project-delivery-capability-framework-for-civil-servants>

Project Delivery Functional Standard

<https://www.gov.uk/government/publications/project-delivery-functional-standard>

Principles for Project Success

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/901126/IPA Principles for Project Success.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/901126/IPA_Principles_for_Project_Success.pdf)

TIP Roadmap to 2030

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1016726/IPA TIP Roadmap to 2030 v6 1 .pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1016726/IPA_TIP_Roadmap_to_2030_v6_1.pdf)

Cost Estimating Guidance

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/970022/IPA Cost Estimating Guidance.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/970022/IPA_Cost_Estimating_Guidance.pdf)

Best Practice in Benchmarking

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1002831/1176-APS-CCS0421465542-001 Best Practice in Benchmarking Web.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1002831/1176-APS-CCS0421465542-001_Best_Practice_in_Benchmarking_Web.pdf)

IPA website: <http://www.gov.uk/IPA>



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