

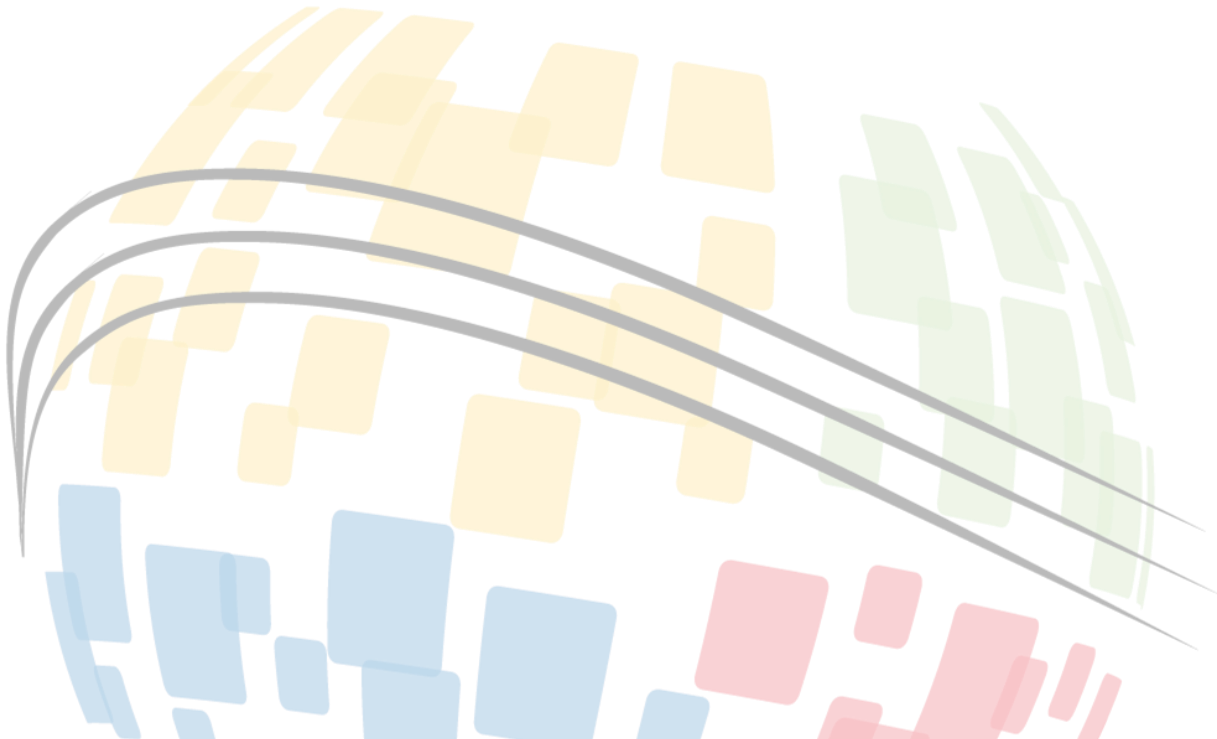
SYSTEMS ENGINEERING AND THE ADVENT OF SCIENCE DIRECTED LAW MAKING

David G. Schrunk
Science of Laws Institute
SELAW Co-Founder

DISCUSSION POINTS

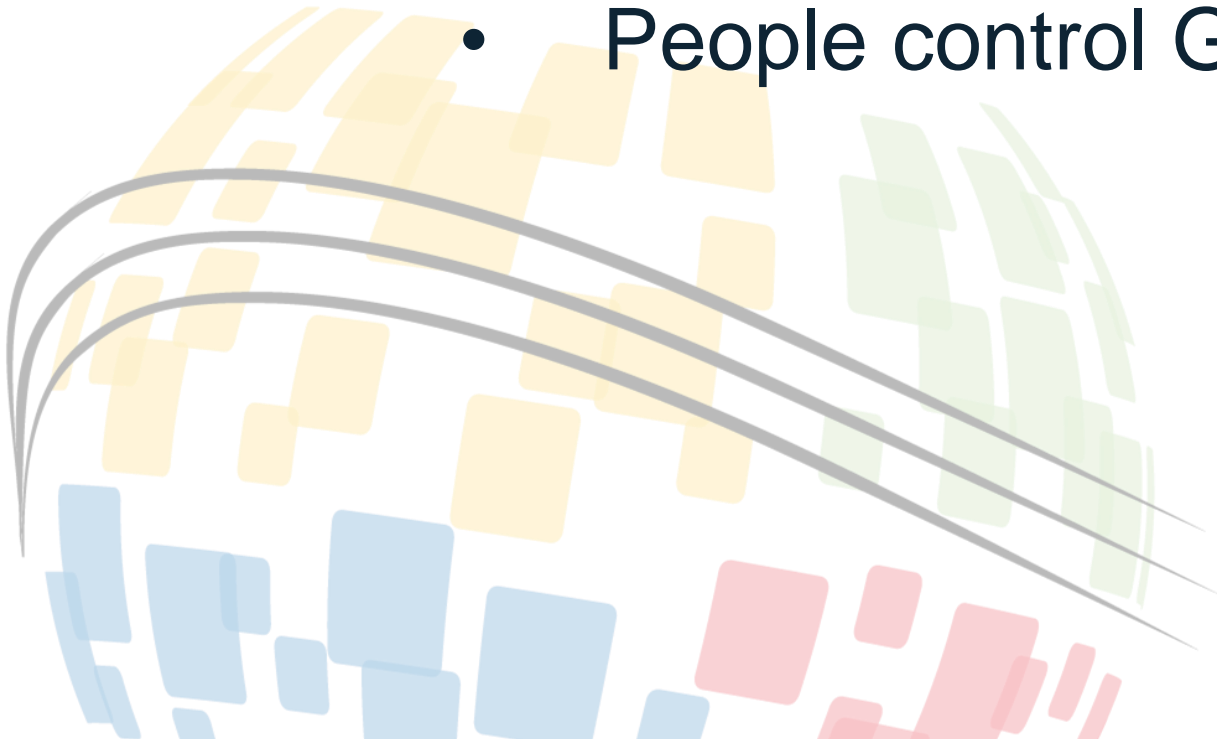
- Democracy
- Laws of Government
- Traditional Lawmaking
- Lawmaking Standards
- SELAW (INCOSE Working Group)
- Science of Laws
- Science-directed Lawmaking

DEMOCRACY



Democracy (~ 50% Governments)

- Sovereignty vested in Citizenry
- People control Government fbo People



Purpose of Democracy

- Secure Rights and Liberty (Dec Ind...)
- Solve Problems* that Degrade or Threaten to Degrade:
 - Human Rights
 - Living Standards
 - Quality of Life

Democratic vs Authoritarian Gov't

- Democracy
 - Goal: Control Problems
- Authoritarian Government
 - Goal: Control People





**GOVERNMENT
MECHANISM FOR
ACHIEVING GOALS?**

LAWS

(Laws and Regulations)

LAWS OF GOVERNMENT

- Human - Made
- Direct / Modify Behavior
- Consume / Divert Resources
- Produce Outcomes (+/-)
- Produce Side Effects

DESIRED PROPERTIES OF LAWS

- Effective in Solving Problems
- Cost-efficient
- Non-intrusive
- Minimal Acceptable Side Effects
- User-friendly
- Positive Net Benefit to Public

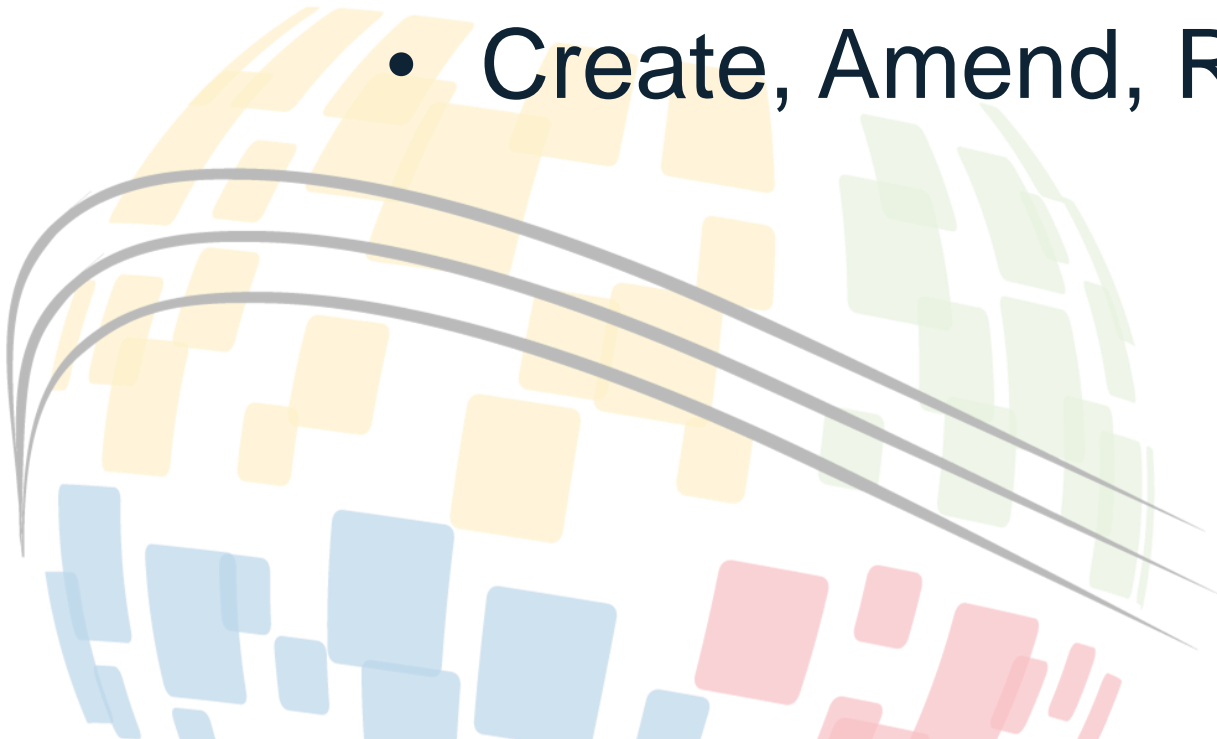
CREATION OF LAWS

LEGISLATIVE BRANCH OF GOVERNMENT



LEGISLATURES

- Traditional Method of Lawmaking
- Create, Amend, Repeal Laws



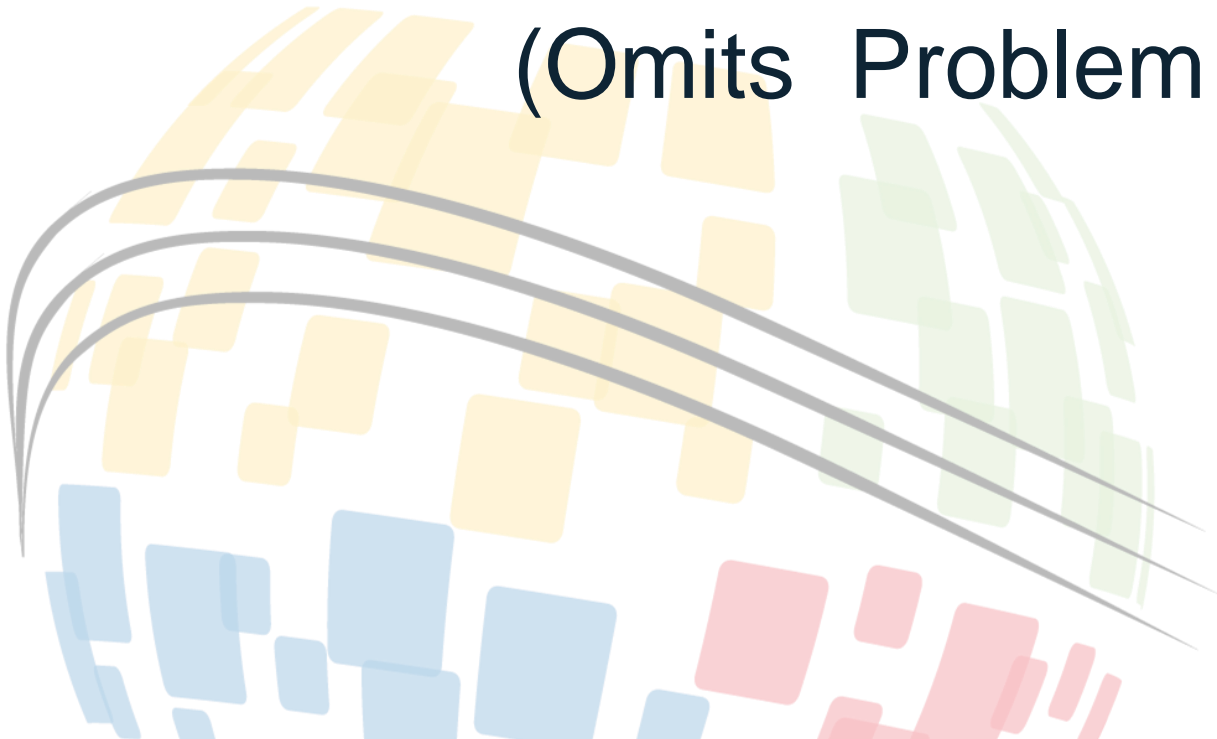
TRADITIONAL

LAWMAKING



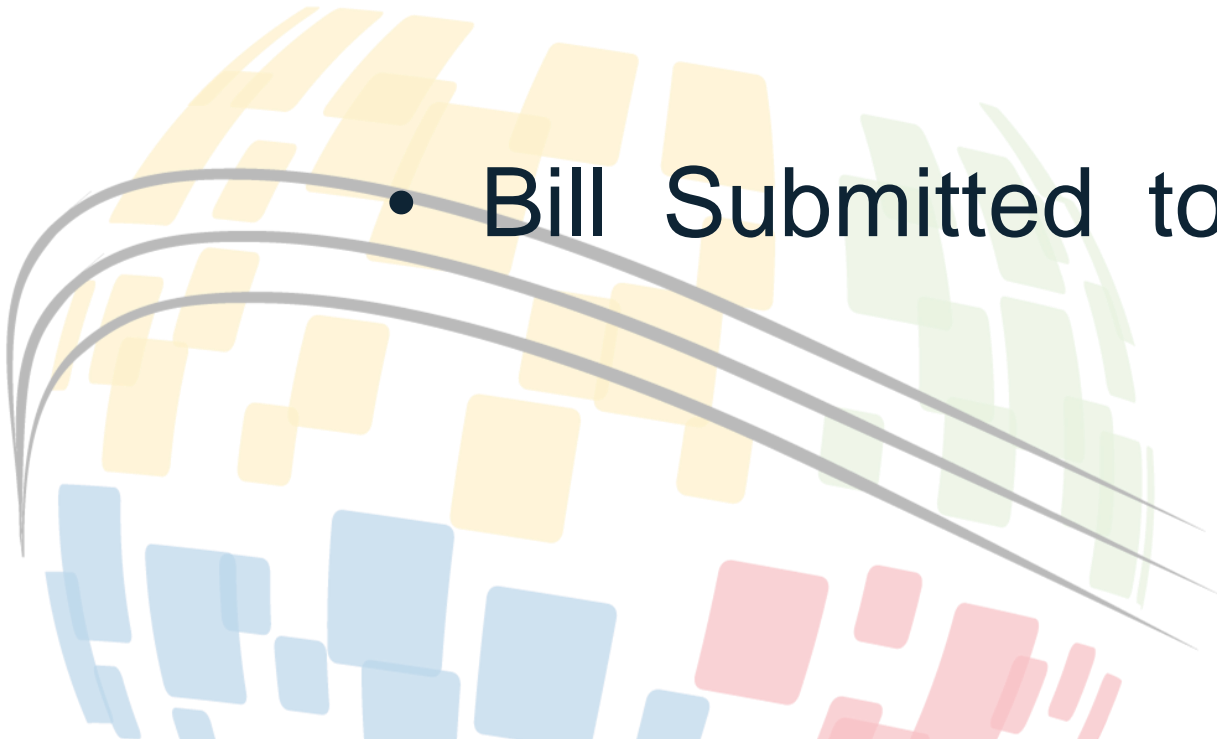
TRADITIONAL LAWMAKING

- Begins With An Idea For A Law
(Omits Problem Definition)



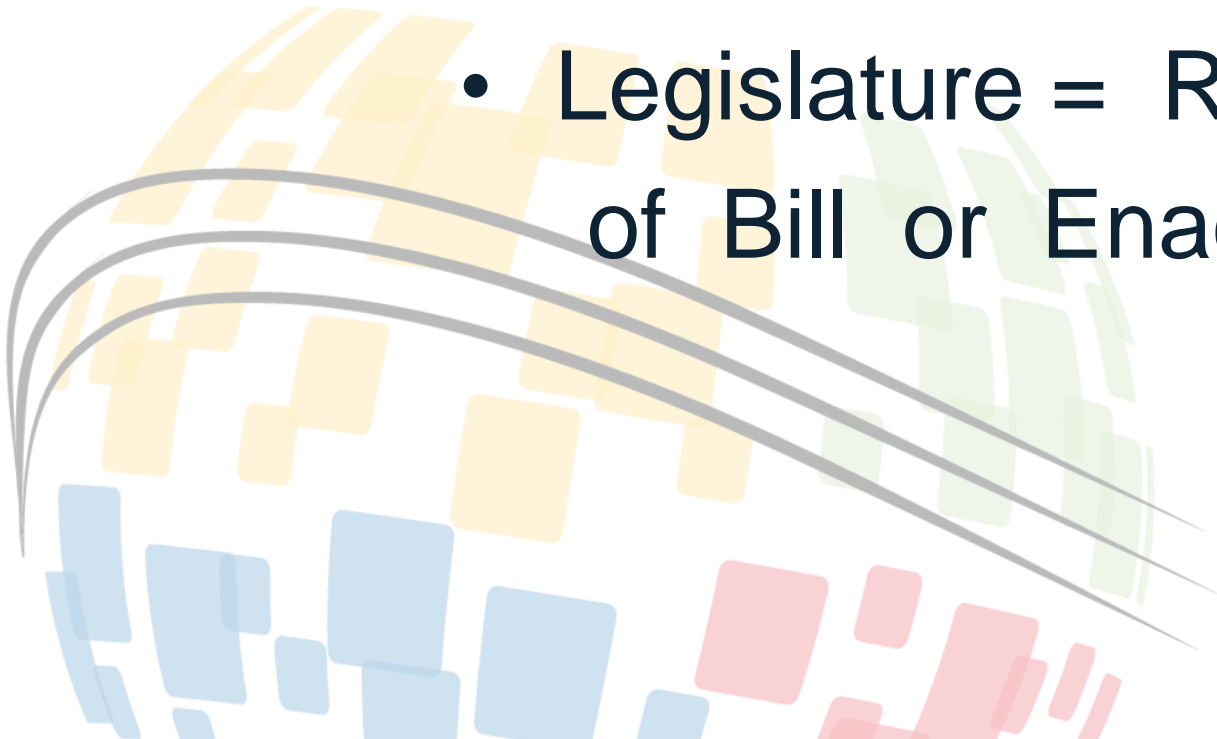
TRADITIONAL LAWMAKING

- Idea Transcribed into Written Petition (Bill)
- Bill Submitted to Legislature



TRADITIONAL LAWMAKING

- Legislature = Debate Bill, often Modifies with Amendments
- Legislature = Rejects Final Version of Bill or Enacts into Law



TRADITIONAL LAWMAKING

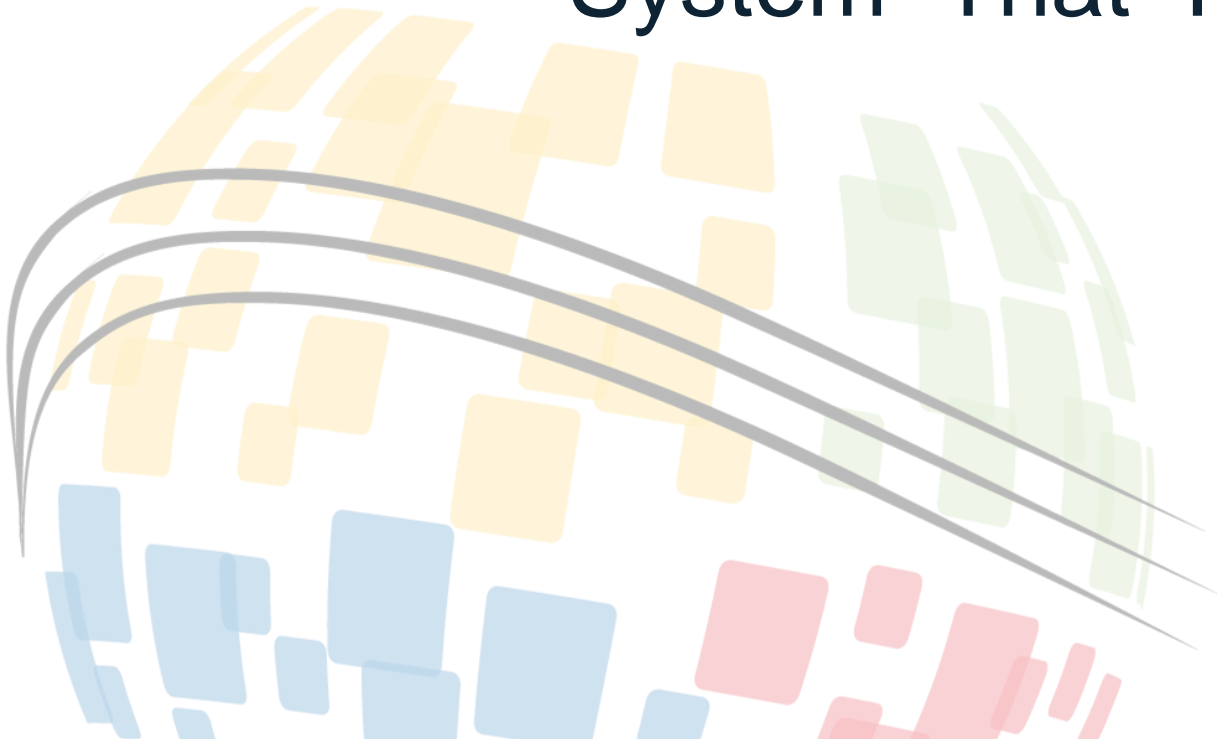
- Variation of Socratic Method
- Not a Knowledge-Based System
- Not a Problem-Solving Process

TRADITIONAL LAWMAKING

- Lacks Requirements
 - Problem Definition, Design Expertise
 - Statement of Purpose, Priority
 - Sanction Modeling, Selection Process
 - Cost / Risk / Analyses
 - Basis in Knowledge
 - Validation (Follow-up Evaluation)
 - Certification of Law-Creators

TRADITIONAL LAWMAKING

Merely A Feed Forward Control
System That Produces Laws



TRADITIONAL LAWMAKING



TRADITIONAL LAWMAKING

- MAKES LAWS

- SUCCESSFUL IN PRODUCTION

- 10,000's... OF LAWS STATE GOV'TS

TRADITIONAL LAWMAKING

NO FOLLOW-UP VALIDATION:

GOVERNMENTS ARE

“FLYING BLIND”



TRADITIONAL LAWMAKING

Davies, Legislative Law and Process:

“Once an act is passed, the legislature’s job is done.”



TRADITIONAL LAWMAKING

WITHOUT FOLLOW-UP

UNKNOWN PERCENTAGE OF LAWS:

- USELESS, REDUNDANT
- HARMFUL, CONFLICTING
- OUTMODED, WASTEFUL

RECORD OF FAILURE

- POVERTY, POLLUTION, CRIME
- ILLITERACY, DEBT, PRIVATION*
- WAR, HOMELESSNESS...



TRADITIONAL LAWMAKING

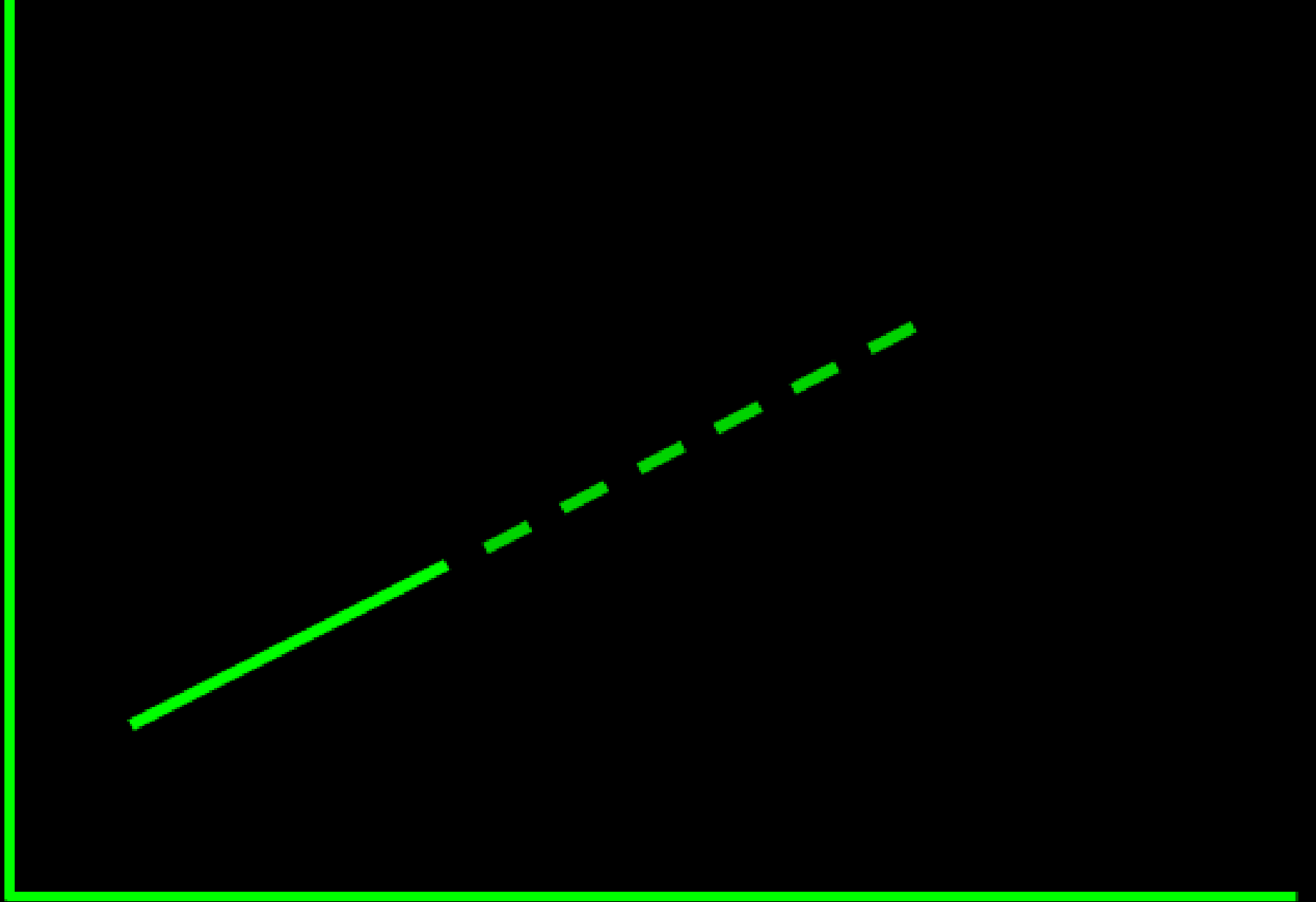
LEGISLATIVE RESPONSE TO
PERSISTENT PROBLEMS?

CREATE MORE LAWS





**Size of
Body of
Laws**



Time



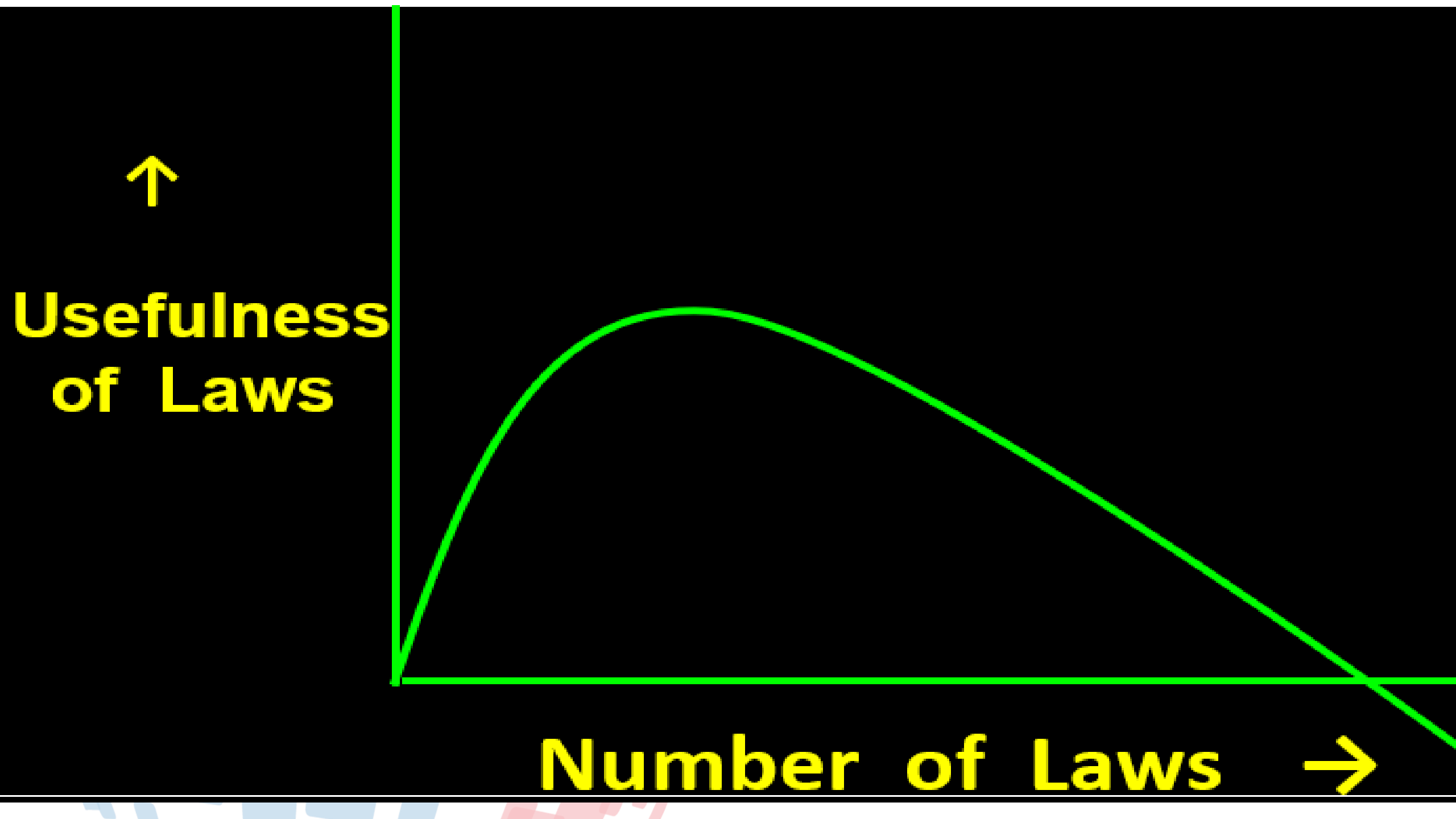
Over Production of Laws

- THREAT TO SOCIETAL WELLBEING
 - LAWS CONSUME INCREASING SHARE OF SOCIETAL RESOURCES
 - FEWER RESOURCES FOR PRODUCTIVE INDUSTRIES

Over Production of Laws

- THREAT TO RULE OF LAW
- SELECTIVE ENFORCEMENT OF LAWS, TRENDS TO AUTHORITARIAN FORM OF GOVERNMENT)





TRADITIONAL LAWMAKING

DEFECTS AND OMISSIONS:

Threat to Democracy

- Unprincipled
- Undisciplined
- Incompetent
- Irresponsible
- Misdirected

TRADITIONAL LAWMAKING

HOW TO CORRECT
DEFECTS
AND OMISSIONS?



LAWMAKING

Replace Tradition Method of Lawmaking
(to make laws)

-- With --

Problem Solving Method
(to solve problems*)

Transition of Lawmaking

Problem Solving Method

Traditional Method



PROBLEM SOLVING STANDARD

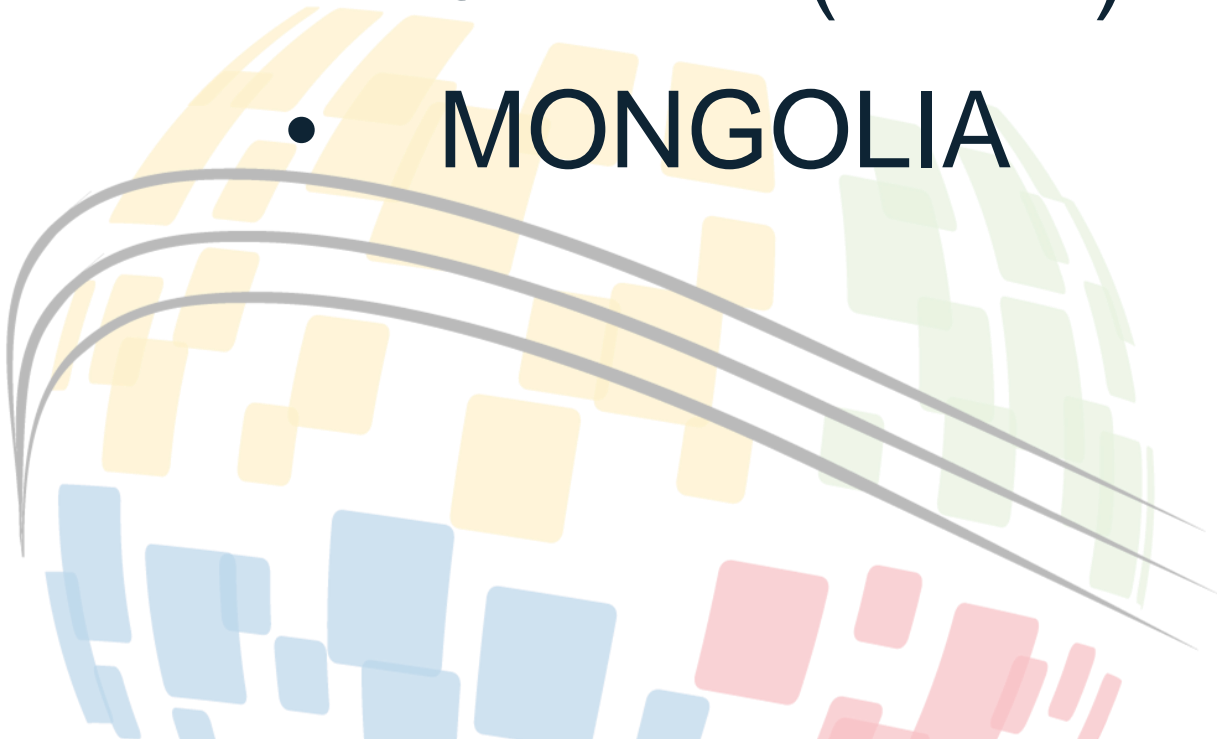
1. DEFINE PROBLEM, PRIORITIZE FOR SOLUTION
2. STATE OBJECTIVE (MEASURABLE)
3. MODELING / SIMULATION SOLUTIONS
4. COST / RISK ANALYSES / OPTIMIZATION
5. IMPLEMENTATION / VERIFICATION
6. VALIDATION, ..., RETIREMENT
7. DOCUMENTATION DATA / OUTCOMES

Rationale For Standards

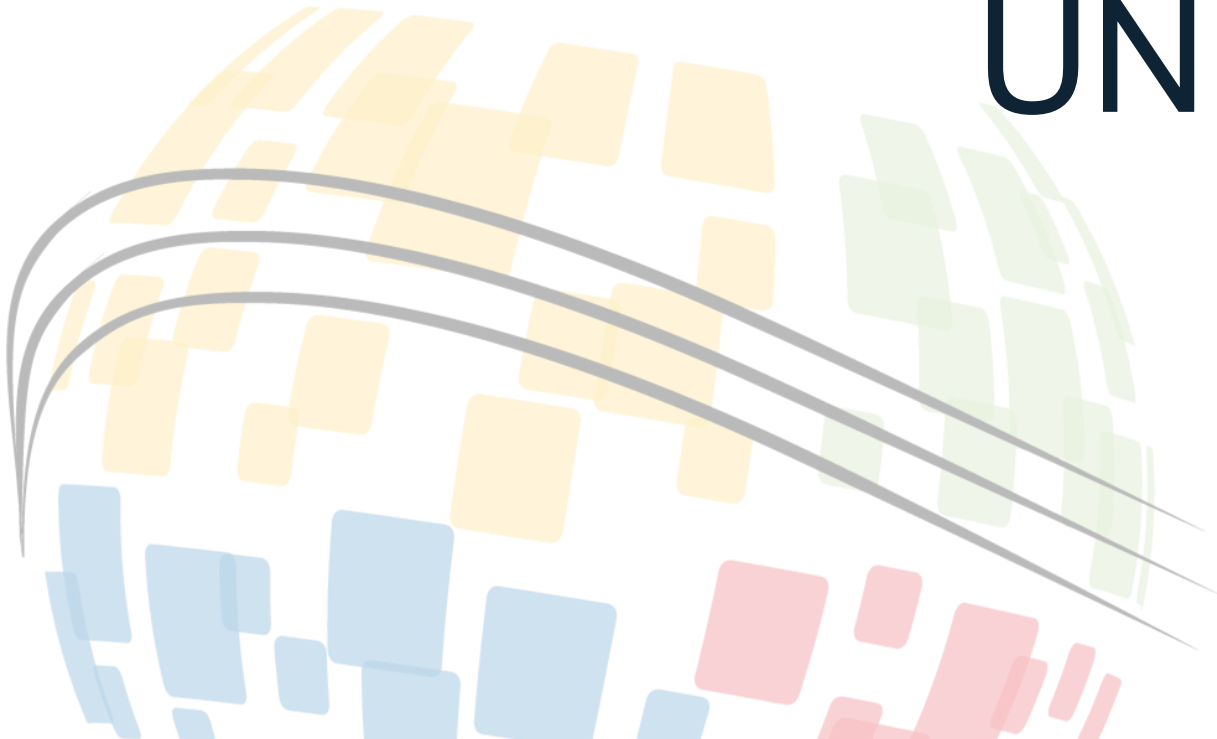
- Confirm Purpose of Lawmaking for Democratic Governments
 - Secure Rights and Liberty
 - Solve Societal Problems
 - Enable Pursuit of Happiness

Transition to Problem Solution

- European EU Commission
- JAPAN (METI)
- MONGOLIA



EUROPEAN UNION



Lawmaking Purpose

European EU Commission

The EU is committed to “human dignity, freedom, democracy, equality, the rule of law and respect for human rights.”

Lawmaking Standards



Initial Standards

European Commission, “Better Regulation Guidelines” SWD (2021), European Union (EU), Brussels, 2021, on Guidelines of Impact Assessment of Regulations, the following guidelines / standards constitute “...a tool to...conduct analyses to inform policy design,” pages 31-32:

- 1. *What is the (societal) problem and why is it a problem?***
- 2. *Why should the EU act?***
- 3. *What should be achieved?***
- 4. *What are the options for achieving the objectives?***
- 5. *What are their economic, social and environmental impacts and who will be affected?***
- 6. *How do the options compare (effectiveness, efficiency and coherence)?***
- 7. *How will monitoring and subsequent evaluation be organised?***

JAPAN



Lawmaking Standards Japan

Ministry of Economy, Trade, and Industry:

Governance Innovation

ver.2 (2021) “Agile Governance*”

*INCOSE Members contributing authors

Lawmaking Standards

GOVERNANCE INNOVATION

Ver.2

A Guide to Designing and Implementing Agile Governance



Lawmaking Standards

Japan “Agile Governance”

Page vii, on Liberty and the Pursuit of Happiness “...**liberty**” should continue to be positioned as an **“ultimate goal” of governance** ... to include “a state of being able to proactively choose, based on our individual values, the nature of technological influences under which we choose to **pursue our happiness**”

Lawmaking Standards

Japan “Agile Governance”

Page xii, on validation of laws and regulations, **“laws, regulations, standards, and guidelines should be continuously evaluated based on data, and improved from the standpoints of [1] whether they are able to achieve policy goals that were defined at the outset, and [2] whether policy goals need to be revised to address changes in social conditions.”**

MONGOLIA





Founding Principles

Mongolia Constitution (1992)

Chapter One, Article Three: State power is vested in the people of Mongolia. (**The definition of democracy**)

Chapter Two specifies the **civil, political and inalienable rights of the individual**: freedom of speech, of religion, of expression, of the press, the right to vote, equality before the law, the right to government-provided health care, education and intellectual property...

Mongolia Legislature

Legislation Enacted, 2016:

“APPROVAL OF METHODOLOGY,” Decision of the Government of Mongolia. Number 59, Ulaanbaatar City, January 25, 2016, “Based on Article 12.1 of the Law on Legislation the government of Mongolia passed legislation that **requires the legislature to observe quality standards for the creation, evaluation, improvement, and retirement of laws, and that the purpose of laws is to secure rights and liberty of the people.**”

Inauguration Lawmaking Standards

Transition from “Making Laws” to “Solving Problems”

European Commission – Japan – Mongolia

- Recognize Citizenry as Sovereign of Government
- Goal is to Solve Problems, Secure Rights, Liberty
- Define Problems, Set Goals, Basis in Knowledge
- Feedback Control of Lawmaking Process
- Accumulate Knowledge of Outcomes

Evolution of Lawmaking

Problem Solving Method

Traditional Method of Lawmaking



Challenge of Problem Solution*

– LAWMAKING TRANSITION –

Opinion / Belief / Ideology

to

Knowledge**



Law Creation and Validation Requirements

Efficacious Rule of Law

- Multi-Disciplinary Teams
- Satisfy Knowledge Requirements
 - **Establish Science of Laws and Lawmaking**

Evolution of Lawmaking

Science of Laws

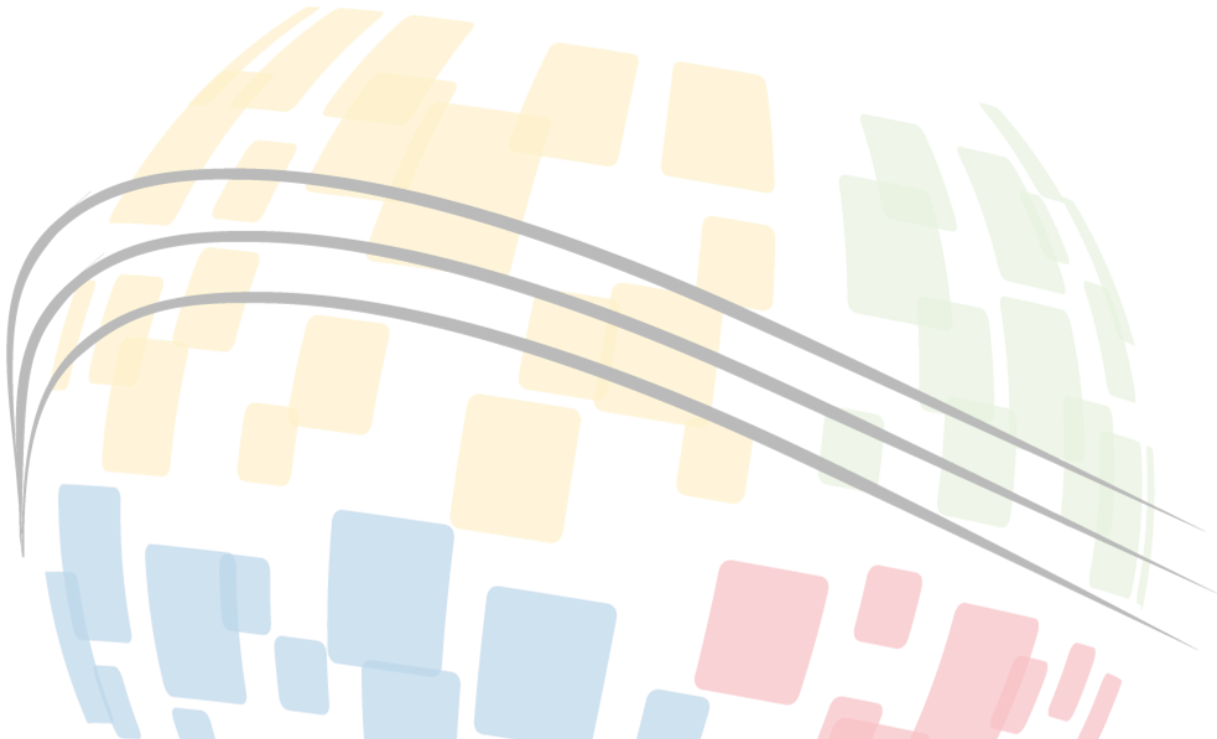


Problem Solving Standards



Traditional Method of Lawmaking

SCIENCE OF LAWS



ESTABLISH SCIENCE OF LAWS

DEVELOP ENTIRELY NEW
SCIENCE?

NO – NOT NECESSARY



ESTABLISH SCIENCE OF LAWS

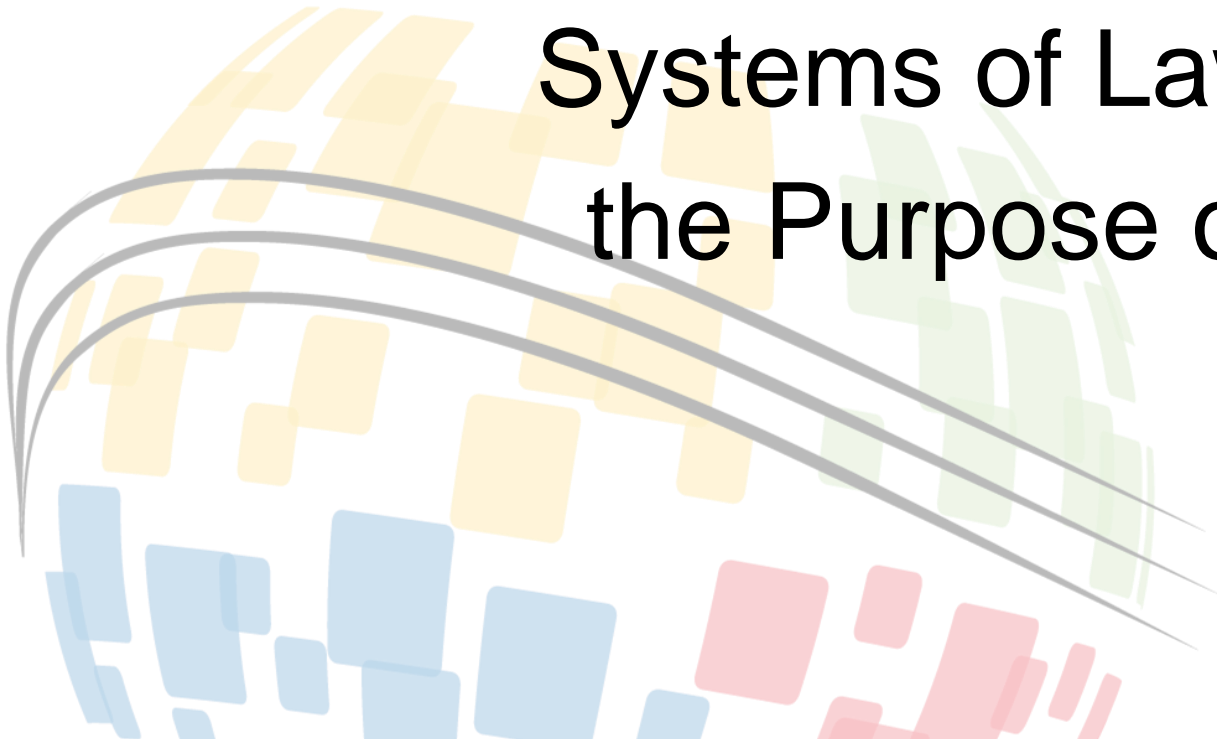
A FIELD OF SCIENCE
FOR LAWS AND LAWMAKING

ALREADY EXISTS:
SYSTEMS ENGINEERING



SYSTEMS ENGINEERING

Eminently Suited to the Creation
and Validation of Laws and
Systems of Laws that Satisfy
the Purpose of Democracy



SCIENCE / ENGINEERING

**NUCLEAR SCIENCE GENETICS
ROCKETS PHARMACOLOGY
AEROSPACE COMPUTERS
ELECTRONICS...**

**LAWS
LAWMAKING**



SELAW

SYSTEMS ENGINEERING AND LAWMAKING WORKING GROUP

ORGANIZED: May 2022

GOAL: Explore the utility of applying Systems

Engineering to Laws and Lawmaking, of Science-

Directed Lawmaking

SELAW

- Monthly meetings
- Research divided into eight subgroups
- Engage other WG's (Smart Cities, Social Studies
Risk Mitigation...)

SELAW Subgroups

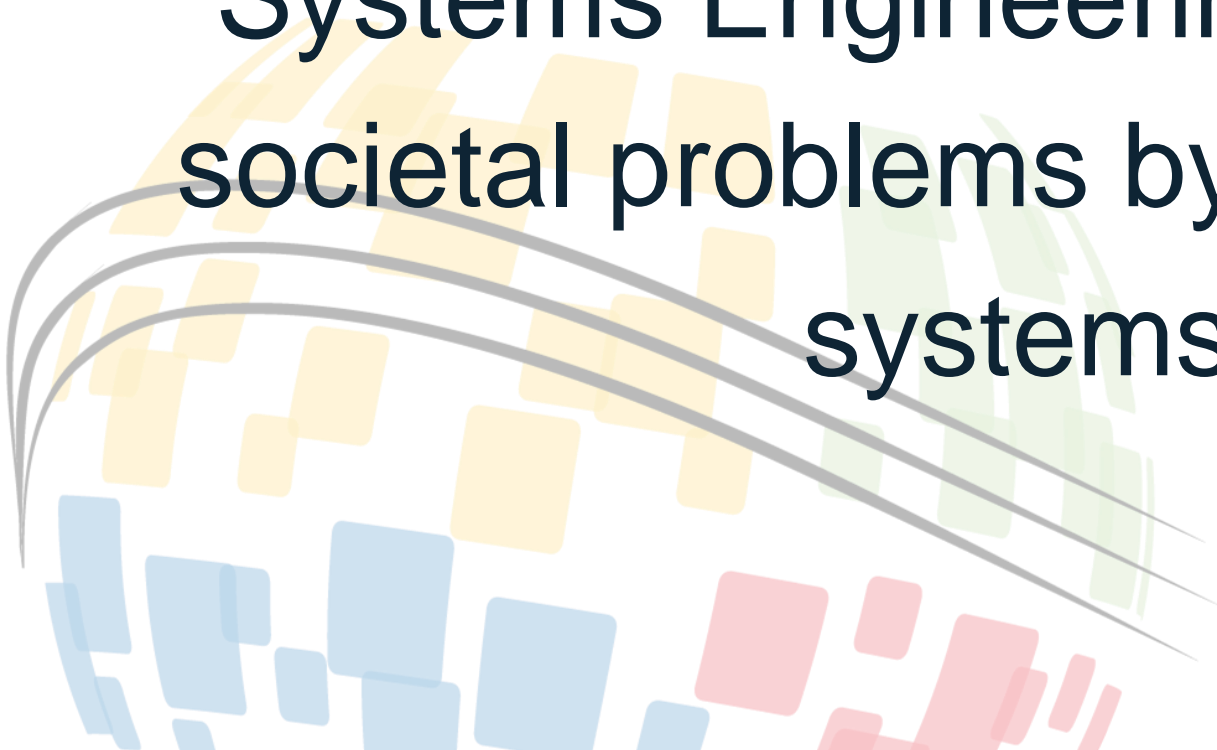
1. Document the **defects and omissions** in traditional lawmaking
2. Derive **law design standards** based on systems engineering principles (e.g., the IEEE-15288)
3. Create **models of sanctions** (fine, tax, tariff, subsidy...)
4. Create a **comprehensive cost model** for laws

SELAW Subgroups

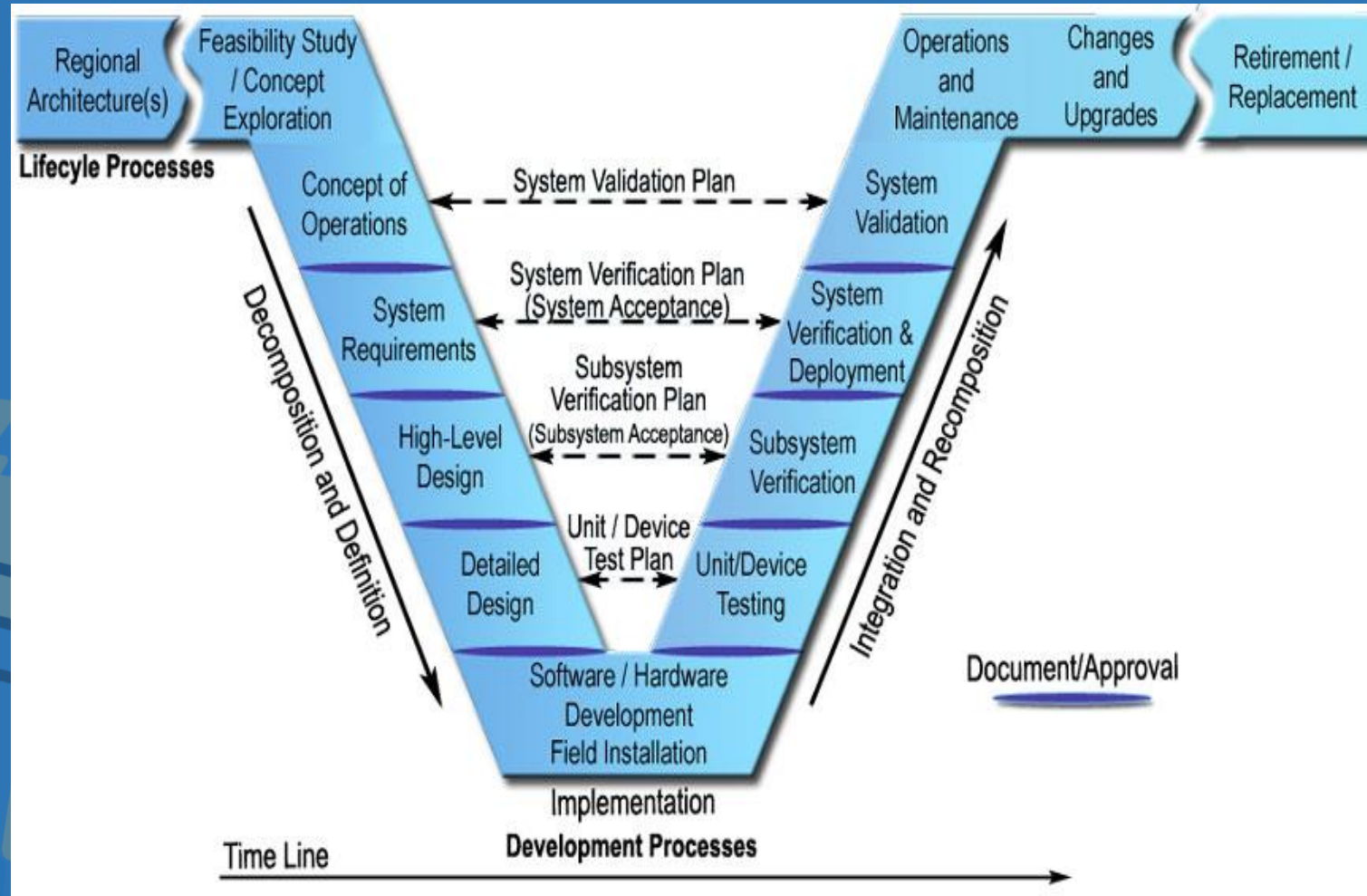
5. Creation of **risk-assessment models** for laws
6. Create **standards for the periodic follow-up** evaluation, validation, and documentation of outcomes of existing laws (**science of laws**)
7. Establish **credentials for designers** (drafters) of law-design
8. Create and **publish an SE Law-creation Manual**

SCIENCE DIRECTED LAWMAKING

Apply the full resources and expertise of
Systems Engineering to the solution of
societal problems by means of laws and
systems of laws

A decorative graphic in the bottom-left corner of the slide. It features a stylized globe with a grid of colored squares in yellow, green, blue, and red. Several grey curved lines sweep across the globe from the bottom-left towards the center.

FUTURE OF LAWMAKING



SCIENCE DIRECTED LAWMAKING

TRANSFORM LAWMAKING
INTO A PROBLEM – SOLVING
FEEDBACK CONTROL SYSTEM

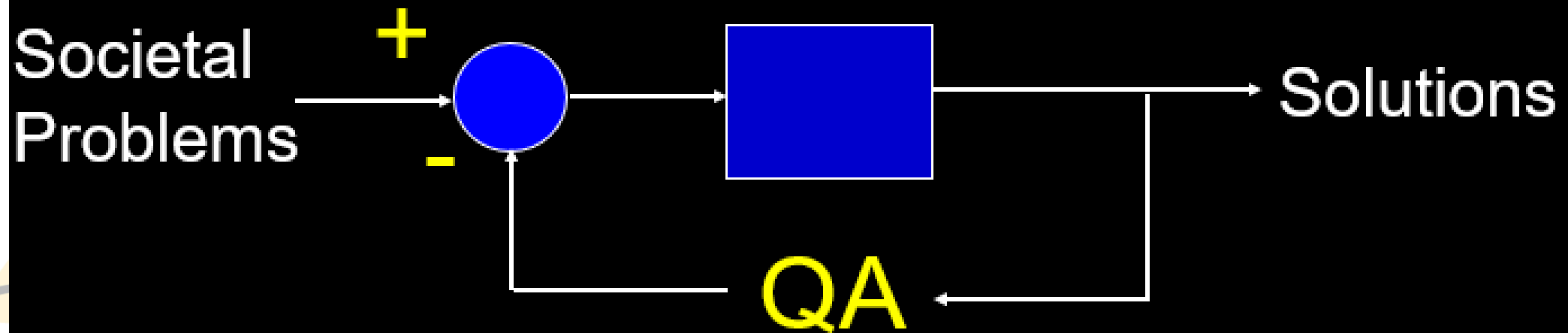


SCIENCE DIRECTED LAWMAKING

Conduct Periodic Verification and Validation (QA) of every law:

- Repeal of less-than-successful laws
- Ever-improving performance of the rule of law

SE - DIRECTED LAWMAKING



“Weed Out” Non - Productive Laws

QA: Repeal of Laws

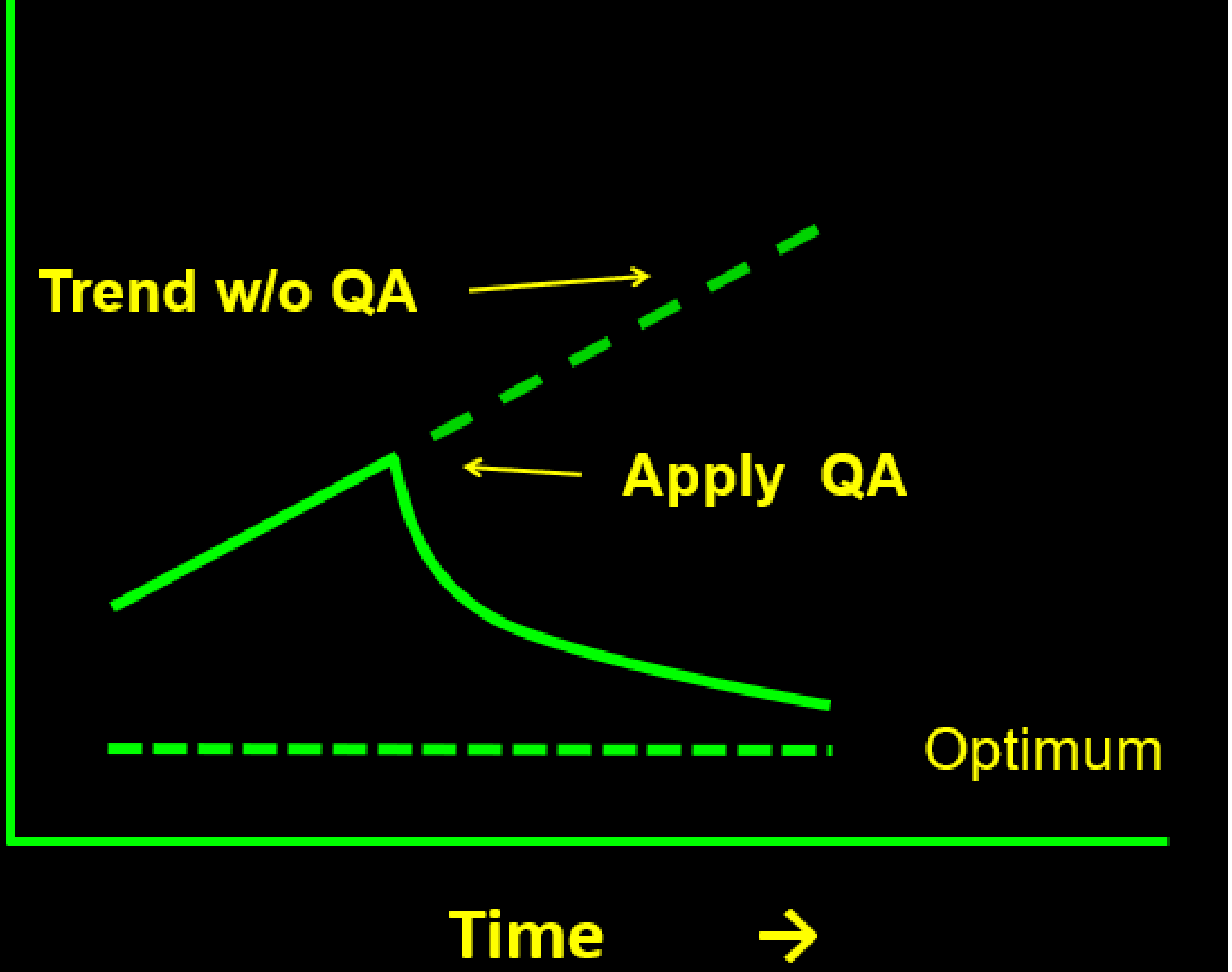
- address problems that have not been defined
- address problems that no longer exist
- address more than one problem (omnibus)
- lack a stated, measurable problem-solving goal
- are not enforced
- violate human rights
- are overly vague or complex
- fail to achieve their problem-solving purpose

QA: Repeal of Laws

- lack a citation of relevant references and data bases
- whose burdens are greater than their benefit
- whose problem-solving benefit and burdens are equal
- whose results cannot be accurately measured
- interfere with other laws
- duplicate other laws
- have not been signed by their designer(s)
- have not undergone QA analysis within a specified time frame, e.g., ten years



**Size of
Body of
Laws**



Trend w/o QA



Apply QA

Optimum

Time



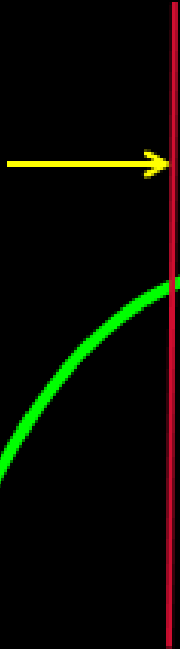
RESULTS -- FEEDBACK CONTROL

- Threat of Arbitrary Rule Reduced
- Rule of Law Maintained Optimum Level



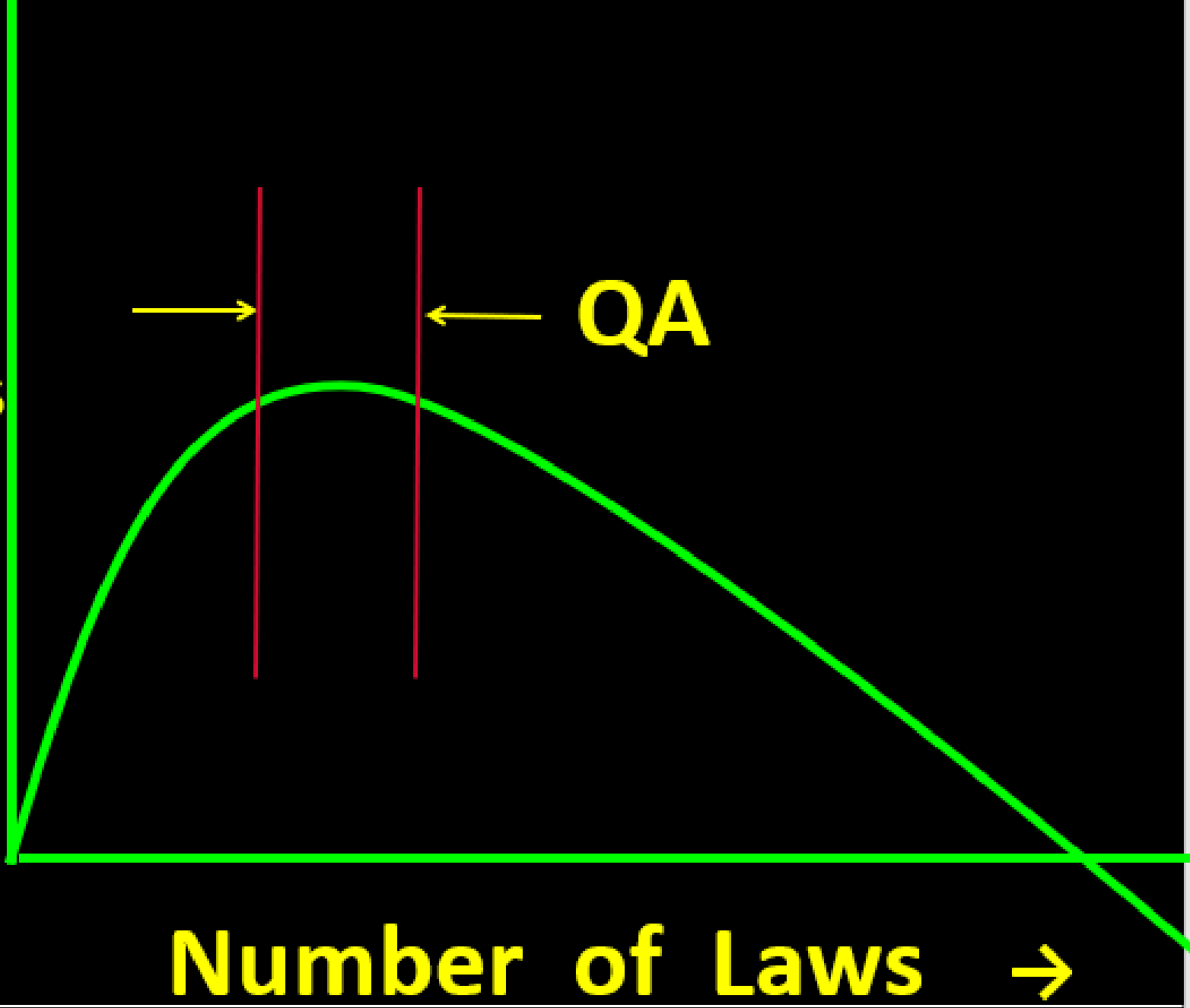


**Usefulness
of Laws**



QA

Number of Laws →



RESULTS -- FEEDBACK CONTROL

Each Cycle = Quality Improvement

Lawmaking Self-Correcting in the
Direction of Optimum Outcomes and
Performance of the Rule of Law

↑
**Efficacy
Of Useful
Products**

X

Cycles of QD / QA / QI →

SCIENCE DIRECTED LAWMAKING

Continual Growth of Scientific Knowledge

(Every field of science):

- The structure and mechanics of laws
- Engineering methodologies and best practices of law creation

-- CONCLUSION --

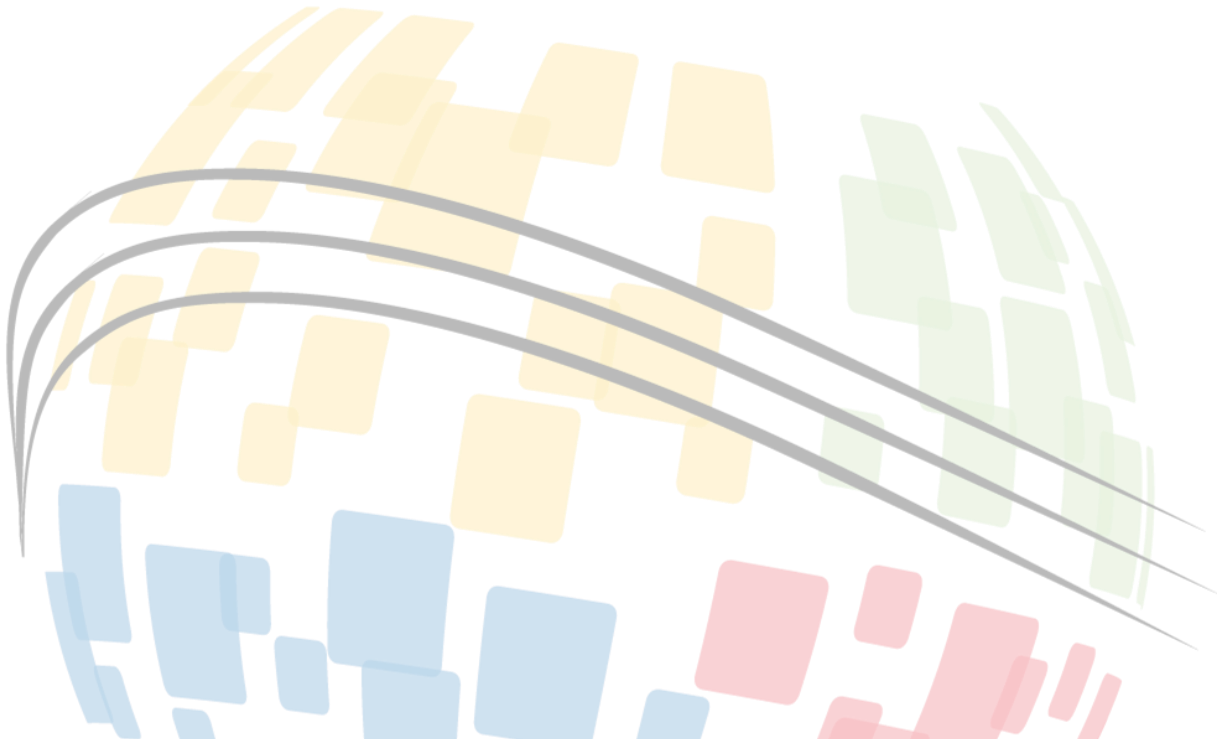
SCIENCE OF LAWS

SCIENCE-DIRECTED LAWMAKING

Evolving Tools of INCOSE

- Improvement in the Rule of Law
- Ascendancy of Democracy

THANK YOU



TRADITIONAL LAWMAKING

WSJ, Oct 2, 2024, p. A16:

“A state audit in April revealed that California **spent \$24 billion to combat homelessness** over five years, even as **the number** camping on streets **increased by tens of thousands**. Auditor Grant Parks identified at least 30 programs ‘dedicated to preventing and ending homelessness,’ **but agencies didn’t collect data on them or analyze if they worked.**”

